Dwight Look Engineering Building
College Station, TX, 77843

Robin L. Autenrieth, Ph.D., P.E.
Department Head and
A.P. & Florence Wiley Professor
PH: 979-862-1967
rautenrieth@civil.tamu.edu

Mark W. Burris
Associate Department Head for Graduate Studies
and Herbert D. Kelleher Professor
PH: 979-845-9875
mburris@tamu.edu
CVEN – Graduate Program Review
2012-2017

External Review Team Charge

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Texas A&M University
Academic Program Review (APR)

Charge to the Peer Review Team
Zachry Department of Civil Engineering

The Academic Program Review (APR) process at Texas A&M University provides the occasion for academic units to plan strategically, assess the quality and efficacy of their programs, and determine the best courses of action for ongoing improvement. APR is at the heart of our institutional commitment to excellence, and we sincerely thank you for assisting us. This letter provides you with the charge to the committee and a brief overview of the department.

Peer Review Team Charge

Please examine the department and its programs and make recommendations that will help in planning improvements. Your resources are a self-study report prepared by the department, copies of materials from the program’s last review, information you gain through personal interactions while visiting Texas A&M University, copies of strategic plans and goal-setting documents at the department, college, and/or university level, and any additional information requested by you or by the department. Within the broad charge of recommending ways the department can continue to improve are some specific questions that we would like you to address:

- Based on the data / information provided in the self-study report or gathered by the review team, what are the department’s overall strengths and weaknesses?
- How well do the department’s strategic goals align with those of its college and with those of Texas A&M University?
- How would you compare this department with its peers? Specifically, is the curriculum directly related and appropriate to the mission and goals of the institution?
- What improvements (including student learning and faculty development) has the department made since the previous program review?
- With only current resources or a modest infusion of new ones, what specific recommendations could improve the department’s performance, marginally or significantly?

We look forward to meeting with you during your time on campus. If you have any questions or require additional information prior to your visit, Ms. Bettyann Zito, APR Program Coordinator, at apr@tamu.edu.

Thank you.
Executive Summary

The Zachry Department of Civil Engineering’s graduate program has consistently been ranked in the top 10 Civil Engineering graduate programs among public institutions in the country for many years. We offer an outstanding undergraduate and graduate education, including high impact learning experiences for all students, while providing many opportunities for students to engage in state of the art research. Our departmental motto: We Build Our World, is reflective of our vision.

This report on our graduate program was developed to provide the external review committee the necessary background information to evaluate our graduate program. The mission of the Civil Engineering graduate program is to educate and prepare students who are well grounded in civil engineering fundamentals and equipped for lifelong learning so that they will succeed in a global, multi-disciplinary profession by building a better state, nation and world. Whichever degree a student wishes to pursue (Master of Engineering, Master of Science, or Doctor of Philosophy), the foundation gained in their education has been developed to serve them well throughout their careers whether in industry, government, research laboratories, academia, or other pursuits.

Our graduate program has over 400 students enrolled. Most students are full-time: approximately 33% Masters of Engineering (ME) (course based Masters degree), 25% Masters of Science (MS) (thesis along with course work), and 42% PhD students. In the last 5 years, graduate enrollment has grown from 343 students with most of this growth in the MS and PhD students. Along with this growth enrollment there has been an increase in the space available for graduate students and the lab facilities available for students to do research. During the timeframe of this report, the number of core faculty has been stable. Some faculty members have retired or left, however new faculty members have been hired. The student to core faculty ratio has increased, however APT faculty have offset teaching demands primarily at the undergraduate level.

The graduate student population is approximately 33% US citizens and 67% international students. This is common among graduate civil engineering programs in the US. The percentage of US citizens in the graduate program has been trending upwards in recent years. The department has substantial fellowship funding for US citizens and tries to use this resource to recruit these students. The department has far fewer fellowships available for attracting the best international students and increasing the fellowships is one area the department plans to use the new graduate program fee to attract students. A college of engineering graduate fee was first charged for students in Fall 2018 at the rate of $145 per credit hour. As planned by the college, the fee will be increased to $285 per credit hour starting in fall 2019. This fee will substantially increase the cost of obtaining a degree from our program and does pose concern for our ability to recruit students. However, the department will receive this fee money to enhance the graduate program and we have developed plans to make the graduate program even more attractive and beneficial for students and stronger than ever.

Robin L. Autenrieth, Ph.D., P.E.  
Department Head and A.P. & Florence Wiley Professor  
Mark W. Burris  
Associate Department Head for Graduate Studies and Herbert D. Kelleher Professor
1 Introduction to Program

1.1 Program History

Texas A&M began as a small military college in 1876 and has evolved into one of the top universities in the world. Civil Engineering courses were first introduced into the curriculum of Texas A&M College (TAMC) through the Department of Mathematics. The first Civil Engineering degree was awarded in 1880 and was conferred upon all who graduated from the Departments of pure Mathematics, Applied Mathematics and Mechanics, the English Language, one Modern Language, General Chemistry, and Geology. However, the word Civil Engineer did not appear in any catalogue until 1883 and it was not until 1887, eleven years after the opening of TAMC, that a separate Department of Civil Engineering was established. Interestingly, at this time the recommendation was made to establish a curriculum for postgraduate courses in Civil Engineering and in the year 1905 the first MS degree was awarded. By the year 1920, 501 young men, as well as two women, had completed the courses necessary to be awarded the C.E. degree. Both of the women were daughters of an acting history professor. In addition, 12 men had completed the graduate curriculum and were awarded the MS degree. Through its early beginnings, the Civil Engineering Department changed names, descriptions, and missions several times to reflect its continued growth and success, all while keeping in focus its ultimate goal of providing a solid educational experience that prepares its students to be leaders in the profession of Civil Engineering.

In 1920, the Civil Engineering Department was organized in four divisions: Structural Engineering, Highway Engineering (which was believed to have the best equipped laboratory in the United States at the time), Railway Engineering, and Hydraulics and Sanitary Engineering. In conjunction with the academic developments, two additional assets to the engineering programs were the organization of the Texas Engineering Experiment Station, in 1914, and later the development of the Texas Transportation Institute, in 1955.

By 1976, the Department had revised and restructured itself to encompass the following five divisions: Coastal, Hydraulic and Ocean Engineering, Environmental Engineering, Construction, Materials and Structural Engineering, Geoengineering and Civil Systems Engineering. By 1990, the nine divisions were reduced to four: Transportation & Materials; Environmental, Water Resources & Coastal; Construction, Geotechnical & Structural, and Ocean Engineering.

In 2005, the Department was named the Zachry Department of Civil Engineering in recognition of a $10 million gift from the Zachry Foundation. The Zachry family has been actively engaged with the Department since H. B. “Pat” Zachry graduated with a civil engineering degree from Texas A&M in 1922. He later founded the H.B. Zachry Company in Laredo, TX which has grown into a multi-faceted, multi-national corporation. This gift is an endowment that provides funds to assist the Department with a number of functions that are generally difficult to fund with state, tuition, and other available funds. It supports faculty chairs, professorships, graduate
fellowships, undergraduate scholarships, student activities, and special educational activities. The Department is fortunate to have strong support from many former students; this gift, along with many others, constitutes a large endowment that allows us to enhance our programs in many ways. Most importantly, we are able to award over $650,000 in scholarships and fellowships to our students each year.

In 2012, the college of engineering initiated a major strategic growth plan, styled “25 by 25”, and the Department developed a strategic growth plan to graduate approximately 75 percent of the projected market demand for new (mostly B.S.) civil engineers in Texas by 2025. The growth is planned to come from both undergraduate and graduate programs.

The Ocean Engineering degree program was established in 1972. Dr. John B. Herbich, who became the first head of the program, was the faculty leader who orchestrated its development. The Department awarded degrees in both Civil and Ocean Engineering at the BS, MS, MEng, and Ph.D levels. In 2015, the Ocean Engineering program became its own department in the College of Engineering.

Today, the Department occupies more than 102,075 square feet of space for teaching, laboratories for research and administration. We have more than 400 graduate students in three divisions: Coastal, Environmental and Water Resources Engineering; Construction, Geotechnical and Structural engineering; and Transportation and Materials Engineering. These divisions are divided into eight different areas, as reflected in the division names. The Department offers Civil Engineering graduate degrees in Master of Engineering (MEng), Master of Science (MS), Doctor of Philosophy (PhD). Over the years the civil engineering program has been consistently ranked as one of the top ten civil engineering programs amongst public institutions by the U.S. News & World Report.

1.2 MISSION, STRATEGIC PLAN, GOALS

Department Vision

We Build Our World: leading education, research, and service in civil and environmental engineering. The Zachry Department of Civil Engineering will offer an outstanding undergraduate and graduate education, including high impact learning experiences for all students, and will provide opportunities to engage students in state-of-the-art research programs. To achieve the greatest impact, we will cultivate the interdisciplinary connections necessary to advance all aspects of civil engineering research and education.

Graduate Program Mission

The mission of the graduate programs is to educate students who are well grounded in civil engineering fundamentals and equipped for life long learning so that they will succeed in a multi-disciplinary, global profession, and to conduct research that solves current and future problems facing society for the betterment of the state, nation, and world. By focusing on excellence, we achieve impact via the quality of our students, our research, and our service.
Graduate Program Goals

The graduate programs will enhance the education of our graduate students through rigorous courses grounded in theory and application, world-class research, multi-disciplinary course offerings, and a diverse range of career development opportunities. Specific goals include the following:

- Launch two new graduate degree programs (Architectural Engineering and Environmental Engineering)
- Evolve the Departmental curriculum to keep pace with innovation impacting the civil, architectural, and environmental engineering fields
- Hire faculty with expertise beyond traditional civil engineering fields to expand the multi-disciplinary talent within the Department
- Use some of the graduate enhancement funds to elevate the national and international recognition of our program (e.g., fund student travel to conferences, invite international leaders in civil engineering to our seminar series, etc.)
- Maintain and enhance our research portfolio to support the research activities of our graduate students.
- Create a focused writing program to support all thesis degree students, including mentoring and resources for authoring journal publications and technical reports
- Create a professional development track to mentor doctoral students whose goal is to pursue an academic profession.
- Create a professional development course to mentor those doctoral students who do not aspire to a career in academia.
- Ensure that all our doctoral students are funded to conduct their research.
- Develop curricula in multiple appropriate focus areas, dependent on workforce needs, for students to earn one-year masters degrees.
- Provide undergraduate students with more options to take graduate courses and save the hours for graduate degrees.
- Develop a portfolio of online courses that graduate students and practicing professionals can take to obtain certificates and masters degrees.

1.3 Administrative structure

The Department is organized with a Department Head as the overall leader of the faculty and manager of the Department. Figure 1.1 illustrates the current organizational structure of the Department.
Organizational structure for CVEN administration and staff updated as of November 2018.

Management of the Department is the overall responsibility of the Department Head. Due to the size of the Department it is difficult for the Department Head to manage all functions and the individual faculty directly. The administration of the Department faculty is managed through three Division Heads. The Division Heads work with the faculty to plan classes for each semester, manage the process of assigning faculty to teach courses each semester, and coordinate with other Division Heads in these activities. They also act as advisors to the Department Head on other matters such as planning, curriculum, faculty needs, faculty concerns, among other issues as they arise.

The Associate Department Head for Undergraduate Studies assists and advises the Department Head on undergraduate matters, supervises the Undergraduate Student Services Office, coordinates the undergraduate curriculum and continuous improvement efforts in support of undergraduate education, and manages the process of planning classes for each semester. The Associate Department Head for Graduate Studies assists and advises the
Department Head on graduate studies, supervises the Graduate Student Services Office, and coordinates the graduate curriculum. The Associate Department Head for Research assists and advises the Department Head on research activities and coordinates research within the Department and with other Departments and colleges and works to develop additional research opportunities for the faculty. The Department Administrator (effectively the Chief of Staff) manages the Department Head office, coordinates other administrative activities that include administrative support, coordination of alumni activities, coordination of Advisory Council activities, preparation of Department reports and newsletters, and several other activities. The Department Head Administrative Assistant manages the Department Head’s schedule, oversees student workers and coordinates meeting logistics and meetings with other departments. The property and safety officer manages the property book, conducts an annual inventory, acts as Department safety officer, building proctor, assists with space management, and supervises receiving and disposal of property.

Business, IT, Communications, and Events Planning have been centralized in the college. However, each department has dedicated personnel embedded in their staff who have a ‘dotted line’ of supervision to the Department Head. Departmental business services are managed by an assigned Academic Business Administrator who assists with budget and financial matters and manages the Department Business office. The Department IT office ensures that all of the appropriate software is available to the instructors in the classrooms as well as students using the computer lab, computer classroom, and design rooms. The software is generally also available to students both by wireless access and remote access. The Department has, or has access to, the full suite of Microsoft software, the AutoDesk software, MatLab, and many specialized software packages. The IT group manages upgrade and replacement of computers and helps faculty in making computer equipment purchases. Communications are managed locally for all media including webpages, magazines, promotional materials, and other productions that promote the faculty and department. The department does have an Events Planner who has been with the department many years and coordinates with the college, but does have a high degree of autonomy. The department has 1-2 Development Officers at any given time who are part of the college team, but are members of the TAMU Foundation. They are expected to identify prospective former students for potential participation and/or donations to the department and coordinate visits of the Department Head to individuals, companies and communities.

The Department is organized in three divisions which include: Environmental, Water Resources Engineering, and Coastal (EWRC); Construction, Geotechnical and Structural Engineering (CGS); and Transportation and Materials Engineering (TM). Each division is led by a Division Head whose responsibilities include providing a conduit for information to and from the Department Head and the faculty, managing the scheduling of courses, provide mentoring either directly or through other faculty of the assistant and associate professors, encouraging research collaborations, managing the culture and climate in the divisions. In the fall semester, each division receives $5,000 in discretionary funds to pay for seminar speakers, special events, and other operational expenses beyond the basic services. If these funds are exhausted, additional
funds are allocated depending on needs. Within each division, there are graduate advisors for each area who manage admissions reviews, scheduling and coordinating qualifying exams, and limited recruiting activities.

The Department Head, the Associate Heads, and the Division Heads meet regularly (bi-weekly) as the Department Head’s Council. Other members of the management team are brought into the Council meetings for specific issues and topics. The Department Head also meets with other managers on a regular basis, more often as needed. In particular, the Department Head meets with the Graduate Director, Assistant Director, and Senior Academic Advisor in the Graduate Advising Office to discuss plans, priorities, problems and issues related to graduate recruiting and advising.

1.4 Degree Program Supplements

1.4.1 Facilities (including space and equipment)

To ensure that the curriculum and facilities adapt to the changing research and education advances, adjustments are made to effectively and efficiently manage the increase in the number of students interested in the breadth of civil engineering specialties offered in the Department. The Department currently occupies a combined laboratory space for research and teaching of 102,075 SF between the following buildings: Haynes Engineering Building (HEB), Civil Engineering Laboratory Building (CVLB), and Wisenbaker Engineering Building (WEB). Additionally, the department utilizes 138,000 SF in the newly built Center for Infrastructure Renewal and a 3,000 SF Environmental Fluids Lab both on the RELLIS Campus. The Dwight Look Engineering Building (DLEB) houses all faculty, staff, and most graduate student offices.

TAMU Main Campus Facilities and Laboratories

Offices (Administrative, Faculty, Clerical, Graduate Students)

The Department administrative offices are located primarily on the 2nd floor of the Dwight Look Engineering Building (DLEB), formerly named the CE/TTI Building, and are adequate. The Department’s main office includes space for the Department Head, two associate Department Heads, and the administrative staff support in a suite of offices. The Business Offices are located in a suite adjacent to the main office. The Computer Support office is located on the 6th floor of the DLEB and also has adequate space. Department facilities, safety, and shipping/receiving are housed on the first floor of the Civil Engineering Laboratory Building (CVLB) which is adjacent to the DLEB Building. All Department faculty have offices in DLEB. In 2017, the Texas Transportation Institute vacated the DLEB and relocated to new facilities off campus. Prior to this transition, an effort was made by the Department to reassess space in the DLEB to more effectively maximize the building’s capacity. The result was a reconfiguration of space which allowed for, among other things, grouping division faculty within reasonable distance of one another. Currently, Construction, Geotechnical and Structural faculty are located on the 7th and 8th floors in the DLEB. The Materials faculty are mostly on the 5th floor of the DLEB.
Water Resources and Environmental faculty are located on the 4th floor. The Transportation and Coastal faculty are located on the 3rd floor. Faculty office space is adequate and some offices are fairly large. Each division also has adequate office space for administrative support, conference rooms, small kitchens, and visiting scholars/post-docs offices.

The Graduate Student Advising Office is located on the 1s floor of the DLEB and has adequate space. As of Fall 2018, it houses an Assistant Director, a Senior Academic Advisor, a Program Specialist, and two student workers all who provide advising and support services for graduate students. Additionally, the first floor houses the Undergraduate Program Office, a student study lounge, and two group study rooms. Figure 1.2 shows the location of these buildings on the main campus and the RELLIS campus and Figure 1.3 shows the spatial relationship of Civil Engineering’s various buildings on the main campus.

**Figure 1.2** Location of CVEN buildings on the main campus and the RELLIS location.
The departure of TTI from the DLEB also freed up space such that most graduate students have shared offices or cubicles located either in the DLEB or in the CVLB, however space is still limited. Increasing work space for our students was an important consideration when the Department reconfigured the floors for faculty and divisions. We were able to allocate space for teaching and research assistants which located them more closely to students and investigators. We were also able to increase general work space for doctoral and thesis-based masters students to do their research. The result of this effort allowed us to increase space for graduate students from 176 desks to 280 desks after the reconfiguration. However, with graduate student enrollment over 400, we still have to prioritize desk/office assignments. Ph.D. students with assistantships and Teaching Assistants have priority for offices, which are typically shared by two or three students (depending on square footage), then M.S. students who are funded (assistantship/fellowship). We have also converted some large rooms on the 2nd and 3rd floors of the CVLB building to cubicle spaces. Graduate students who are not funded may not get office space immediately, however this mostly affects unfunded masters students. Graduate students have access to two kitchens, one on the 2nd floor of CVLB and a new one created in 2017 on the 6th floor of DLEB. While students are dispersed in offices among floors 3 through 8, the 6th floor is mostly graduate student offices and the IT offices occupy a smaller portion of the floor. There are open areas on each floor that are amenable to open group study, team projects, other meetings and social gatherings.

Classrooms

The college recently opened the renovated main engineering building, now named the Zachry Engineering Education Complex (ZACH), which is approximately 525,000 SF dedicated to engineering education, primarily for undergraduate students. The civil engineering Department was allocated 2 large (98 seat) classrooms in ZACH. Once the undergraduate courses have been scheduled in ZACH, graduate courses can be scheduled. One graduate CVEN course was offered in ZACH in the Fall 2018 term, while another one is offered in the Spring of 2019. This additional space has relieved a space paucity across the college. However, most of our graduate classes are taught in the HEB, formerly the Civil Engineering Building. All of the classrooms for which the Department has priority of scheduling are equipped with computer projection and other modern instructional equipment. Larger classrooms are equipped with fixed chairs in conventional lecture room style. Other classrooms are equipped with tables as well as electronic instructional equipment to better support design type classes. Three classrooms are equipped with workstations at each table and electronic instructional equipment to facilitate team activities in design experiences. We have one classroom equipped with fifteen workstations at tables equipped for no more than two students per table to facilitate classes that require intensive computer use. Wireless microphones and sound systems are available for use in the larger classrooms and many of our medium sized rooms. The HEB is equipped with wireless access to the Department network so that students can access Department software from any location in the building. They can also access the software remotely off campus.
The Department has first priority when scheduling classes in the thirteen classrooms shown in bold in Table 1.1 which are located in three different buildings; the Haynes Engineering Building (HEB), the Zachry Engineering Education Complex (ZACH), and the Civil Engineering Laboratory Building (CVLB). Of those thirteen classrooms, the seven that are designated as “Teaching” under purpose will probably have classes from other programs scheduled by the University Registrar’s Office for the time periods in which civil engineering Department classes (undergraduate, graduate, and ocean engineering classes) are not assigned. The Department also schedules classes in the two listed as design and two of the three listed as computer, but the Registrar’s Office does not schedule classes in those rooms. The Department can also schedule small classes in the four preparation rooms in the laboratories in the CVLB if regular laboratories are not scheduled in them, and the Registrar’s Office does not schedule classes in those rooms. When additional classrooms are needed, they are requested through the College to the Registrar’s office; we have always been able to get classrooms of the required size and appropriately equipped. Study areas and areas for student organizations are also provided in the HEB or CVLB. The Undergraduate Student Services Office (USSO) staff coordinates use of the rooms in the HEB outside of regular classroom hours, and some rooms are regularly used by ASCE, Chi Epsilon, ITE, SEAoT, and other student organizations.

**Table 1.1: Classroom Inventory**

<table>
<thead>
<tr>
<th>Building</th>
<th>RM#</th>
<th>Purpose</th>
<th>Configuration</th>
<th>Area SF</th>
<th>Seats</th>
<th>Seating</th>
<th>Computers</th>
</tr>
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<tbody>
<tr>
<td>HEB</td>
<td>104</td>
<td>DESIGN</td>
<td>DESIGN LABORATORY</td>
<td>705</td>
<td>24</td>
<td>Tables and Chairs</td>
<td>1 per 4 persons</td>
</tr>
<tr>
<td></td>
<td>110</td>
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<td>AUDITORIUM</td>
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<tr>
<td></td>
<td>118</td>
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<td>CLASSROOM</td>
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<td>78</td>
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<td></td>
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<td>CLASSROOM</td>
<td>506</td>
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<td></td>
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<td>CLASSROOM</td>
<td>753</td>
<td>46</td>
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<td></td>
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<td>DESIGN LABORATORY</td>
<td>301</td>
<td>24</td>
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<td>215</td>
<td>COMPUTER</td>
<td>COMPUTER LABORATORY</td>
<td>1,720</td>
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<td>Tables and Chairs</td>
<td>1 per person</td>
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<td>814</td>
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<td>CVLB</td>
<td>421</td>
<td>TEACHING</td>
<td>CLASSROOM</td>
<td>1,338</td>
<td>50</td>
<td>Tables and Chairs</td>
<td>1 per 2 persons</td>
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<td></td>
<td>109B</td>
<td>TEACHING</td>
<td>WORKSPACE</td>
<td>1158</td>
<td>32</td>
<td>16 Tables and Chairs</td>
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<td></td>
<td>114</td>
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<td>1575</td>
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Data provide by CVEN Department sources.
Laboratories

The Civil Engineering Laboratory Building (CVLB) was built in 1988. This building provides approximately 30,000 square feet of laboratory and classroom space, including 15,000 square feet of laboratory space for civil engineering materials, geotechnical, environmental, fluid mechanics, and materials science laboratory classes (Table 1.2). At the time the building was constructed, a considerable amount of equipment was purchased. The Department has updated the equipment, especially in the area of computerized controls and data capture, since that time. Other specialized equipment has been added, including vent hoods, equipment for asphalt testing and advanced geotechnical testing equipment. As a result, available laboratory equipment and instrumentation are in good shape. A major renovation of the materials laboratory occurred during 2017 to adjust for the loss of the concrete mixing facility due to the college’s renovation of the engineering complex. The result is almost a doubling of the materials laboratory at the loss of a 120 foot flume used for fluid dynamics research. However, a new flume has been built on the RELLIS campus.

Table 1.2 – Civil Engineering Laboratory Facilities (CVLB and HEB)

<table>
<thead>
<tr>
<th>Physical Facility Building/Room Number</th>
<th>Purpose of Laboratory</th>
<th>Condition of Laboratory</th>
<th>Adequacy for Instruction</th>
<th>Number of Student Stations</th>
<th>Area (sq. ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVLB Room 109A</td>
<td>Fluid &amp; Wave Mechanics Lab</td>
<td>Excellent</td>
<td>Excellent</td>
<td>6</td>
<td>1084</td>
</tr>
<tr>
<td>CVLB Room 109</td>
<td>Concrete Lab</td>
<td>Excellent</td>
<td>Excellent</td>
<td>6</td>
<td>1904</td>
</tr>
<tr>
<td>CVLB Room 109B</td>
<td>Multi-Use/Workstations</td>
<td>Excellent</td>
<td>Excellent</td>
<td>16</td>
<td>1158</td>
</tr>
<tr>
<td>CVLB Room 114</td>
<td>Materials Lab</td>
<td>Excellent</td>
<td>Excellent</td>
<td>6</td>
<td>2214</td>
</tr>
<tr>
<td>CVLB Room 115</td>
<td>Materials Science Lab</td>
<td>Excellent</td>
<td>Excellent</td>
<td>4</td>
<td>2260</td>
</tr>
<tr>
<td>CVLB Room 116D</td>
<td>Geotechnical Lab</td>
<td>Excellent</td>
<td>Excellent</td>
<td>6</td>
<td>723</td>
</tr>
<tr>
<td>CVLB Room 116A</td>
<td>Workspace</td>
<td>Excellent</td>
<td>Excellent</td>
<td>8</td>
<td>195</td>
</tr>
<tr>
<td>CVLB Room 228</td>
<td>Biological/Biological Chemistry</td>
<td>Good</td>
<td>Good</td>
<td>6</td>
<td>1,000</td>
</tr>
<tr>
<td>CVLB Room 229</td>
<td>Wet Chemistry</td>
<td>Good</td>
<td>Good</td>
<td>6</td>
<td>1,000</td>
</tr>
<tr>
<td>CVLB Room 234</td>
<td>Geotechnical Lab</td>
<td>Excellent</td>
<td>Excellent</td>
<td>10</td>
<td>725</td>
</tr>
<tr>
<td>Haynes Engineering Building (HEB) 015</td>
<td>Geotechnical Testing Equipment</td>
<td>Good</td>
<td>Good</td>
<td>2</td>
<td>286</td>
</tr>
<tr>
<td>HEB 016</td>
<td>Stochastic Geo Lab</td>
<td>Good</td>
<td>Good</td>
<td>4</td>
<td>492</td>
</tr>
<tr>
<td>HEB 020</td>
<td>Geotechnical Testing Equipment</td>
<td>Good</td>
<td>Good</td>
<td>2</td>
<td>473</td>
</tr>
</tbody>
</table>

Table 1.2 summarizes the main campus laboratories utilized for graduate instruction in the civil engineering program, including a description of their adequacy for instruction, condition, number of student stations, and square feet of space.
**Construction Materials Lab (CVLB-Room 114)** - Room 114 was designed specifically for bituminous materials and portland cement concrete laboratory instruction. The lab contains six student workstations, an enclosed classroom equipped with computer projection equipment, a materials environmental chamber room, materials storage areas, and state-of-the-art testing equipment. This equipment includes equipment for testing aggregates, portland cement concrete, asphalt cement, asphalt concrete, and masonry. Fume hoods provide adequate ventilation for basic physical property tests on bituminous materials. Aggregate storage bins, a Bobcat loader, electric mixers, a sump system for cleaning concrete utensils, and various other equipment such as wheelbarrows, molds, etc. are also available in this lab. The lab is adequate in terms of space. The existing equipment is adequate for existing undergraduate laboratory instruction.

**Materials Science Lab (CVLB 114)** - Room 114 was designed as a general materials science instruction lab, now with a primary focus on bituminous materials. This lab contains 6 stainless steel fixed work stations with water, gas, air, power, and open storage. This area also includes a fenced equipment lock up, moisture room for curing specimens, several ovens of various capacity, a special ventilated oven for bituminous materials, acid and flammables cabinets, and 2 fume hoods for ventilation while testing materials and cleaning lab ware.

**Materials Science General Workspace (CVLB 109B)** - This lab is a combination workspace that can be used for testing wood, metal, asphalt, and concrete specimens, host smaller projects and activities, or be used as a classroom and lecture space. It also contains a centralized office for the laboratory coordinator and technician. With two overhead projectors, an audio/video podium, 32 drafting chairs and 16 workbenches, this room provides us the flexibility to suit a wide variety of needs.

**Materials Science Mixing Lab (CVLB 109)** - Room 109 serves as a mixing laboratory, with a focus on aggregates, Portland cement concrete, and masonry. With 6 student workstations, this lab is unique in that it is indoors, and features a robust climate control system. In addition, it has an overhead air extraction system with filter collector designed to remove airborne silica dust for student safety. It is a wet lab, featuring a trench drain running the entire length to remove excess water and aid in cleaning. This drain runs to a sump and filter system, which collect fine concrete waste for later disposal. The student workstations have overhead power provided from cord reels to reduce safety hazards and increase convenience. Due to easy cleaning and floor space, this room is also used for woodworking when water is not in use.

**Outdoor Storage** - Both CVLB 109 and 114 offer bay door access to a covered outdoor aggregate storage area located on the end of the laboratory building. Here, large stockpiles of aggregates and drums of other commonly used materials can be stored to free up room inside the building. This area features a wide enough alley for truck delivery of aggregates or heavy equipment. It is also home to a skid steer loader and forklift for ease of moving materials and equipment, both of which have easy access to the building’s interior.
**Geotechnical Labs (CVLB – Rooms 116C and 234)** – These rooms are designed for geotechnical laboratory instruction. The lab contains six student workstations, an enclosed classroom equipped with computer projection equipment, a lab technician’s office, a data acquisition room, an equipment storage room, and an environmental room for the storage of cores and materials. The lab is generally adequate in terms of space. The equipment is adequate for teaching geotechnical fundamentals and conventional laboratory testing for soils in civil engineering. The laboratory is equipped with tools for specimen preparation and storage. The existing equipment is adequate for current undergraduate laboratory instruction.

**Environmental Lab (CVLB – Room 228)** – It contains six student lab stations, a fume hood; and adjacent chemical storeroom, glassware cleaning room, and equipment storage room. When the department offered a mandatory environmental lab with the introductory environmental course, Room 228 was originally designed as a teaching lab along with another lab that has since been dedicated to research. With the anticipated start of the B.S. environmental engineering degree, this lab will be used for that degree program with the expectation that additional use will occur once the graduate degrees are started.

**Surveying Equipment Room (CVLB – Room 115B)** - The equipment for our surveying laboratories was stored in the HEB and has been moved to 115B CVLB for storage and distribution for student use during classes. Surveying is only taught at the undergraduate level. However, equipment is sometimes borrowed for graduate courses and research.

**RELLIS Campus Facilities: Center for Infrastructure Renewal and Environmental Fluids Lab**

The Center for Infrastructure Renewal (CIR) is a joint center between the Texas A&M Engineering Experiment Station (TEES) and the Texas A&M Transportation Institute (TTI). The CIR is located at the new RELLIS Campus, located in Bryan/College Station, Texas, bringing knowledge from multiple TEES and TTI divisions and centers into the infrastructure domain to greatly accelerate deployment of new technologies and concepts (Figure 1.3). The CIR serves as a hub for integrated and multi-disciplinary research, innovation, education outreach, and workforce development. The research conducted in the CIR is intended to make a positive impact on the nation’s infrastructure by researching issues related to improved safety, security, efficiency, performance, longevity, hazard resiliency, and sustainability. The facility houses collaborative, multi-use spaces and include shared facilities that support interdisciplinary engineering research teams. Research in the CIR is focused on developing advanced assessment techniques for aging infrastructure with a focus on structural systems, evaluation/improvement of current design standards to improve national specifications, addressing Texas infrastructure problems, to name a few of the activities.
The following laboratories replace the former high bay facility and the McNew laboratories that were adjacent to DLEB. The McNew Labs were removed to create the Engineering Quad (E-QUAD) adjacent to the DLEB, CVLB, WEB, and ZACH buildings.

**Structural and Materials Testing Lab**
The Structural and Materials Testing Lab is one of the largest, best-equipped facilities of its kind in the country. Both full-scale and component and material testing is easily accommodated. The CIR allows researchers to go one step further than computational simulation and conduct research on structural elements and systems similar to those put into service.

**Capabilities/Equipment**
- **High Bay and Mid-Bay Labs (Figure 1.4)**
  - 3-ft thick reinforced concrete strong floor provides a 70 ft x 120 ft area for testing, with a 300 kip tie-down capacity (tension/compression) on a 3 ft x 3 ft grid
  - 8,400 square foot strong floor provides a 45 ft clear height
  - Adjacent is a 60 ft long by 40 ft tall reinforced concrete reaction wall capable of resisting a 1,000 kip load at any elevation
  - Two tandem 35-ton overhead cranes with 5-ton auxiliary hoists
  - Adjoining mid-bay lab provides 40 ft x 60 ft floor space with a 20 ton, 28 ft clear height overhead crane
- Full-scale testing of bridge support components, such as bent caps and girders
- Railroad rail fatigue testing under combined axial tension and bending
Large-scale burst testing of service-damaged petroleum line pipe
- Scaffold and shoring proof-testing
- Seismically resilient bridge columns with sliding-rocking segmental joints
- Damage-resistant bridge columns using novel polymeric materials in damage-prone locations
- Seismic performance assessment of structures accounting for environmental conditions and aging effects

Asphalt Innovation Lab
Developing next-generation asphalt binders and mixtures that are environmentally friendly and provide cost effective solutions to the ever-expanding needed to build and maintain our roads and highways.

Soil/Unbound Materials Innovation Lab
Using existing or locally available soils, unbound or stabilized bases, and recycled materials in challenging operational environments to rapidly and structurally renewed pavements.

Concrete Innovation Lab
Developing next-generation alternative binders and supplementary cementitious materials (SCMs) and performance-based approaches for formulating durable and climate-adaptive concrete mixes.

Capabilities/Equipment for materials and pavements labs (the 3 above)
- Binder Testing
  - SARA fractional analysis of binder components
  - Superpave PG binder equipment: three Dynamic Shear Rheometers (DSR), two Bending Beam Rheometers (BBR), a Direct Tension Tester (DTT), two Pressure Aging Vessel (PAV), and a Rolling Thin Film Oven Test (RTFOT)
  - X-ray fluorescence (XRF) and Exudation Droplet and Fourier transform infrared analysis (FT-IR) for compatibility and aging analyses
- Mixture Testing
  - Multiple loading systems capable of conducting E* testing and other rutting and fatigue resistance tests, one of which is the Asphalt Mixture Performance Tester; pneumatic loading system for MR testing, the Hamburg Wheel-Tracking Test, the Texas Overlay Tester, a loading system for semi-circular bending (SCB) testing
  - Modified Pneumatic Adhesion Tensile Testing Instrument (PATTI) and Pull-Off tests used to characterize the adhesion between binders and aggregates, a flexural fatigue testing frame, the Asphalt Pavement Analyzer (APA), and the Model Mobile Load Simulator (MMLS3)
- Capable of conducting repeated loading and strength tests in flexure, indirect tension (IDT), or uniaxial modes or with scaled Accelerated Pavement Testing (APT) devices

- Equipment for mixture oven-aging, moisture conditioning, and specimen fabrication including:
  - the CoreLok device
  - three gyratory molding machines including two Superpave Gyratory Compactors (SGC),
  - European rolling wheel compactor
  - Wirtgen WLB 10 S laboratory-scale foamed bitumen plant for fabrication of WMA LMLC specimens

**Connected Infrastructure Lab**

Collaborative work space where different disciplines work together to develop, test and deploy next generation sensors and data applications for the connected and automated vehicle environment, allowing vehicles and infrastructure to “talk” to each other and communicate their real-time conditions.

**Advanced Characterization of Infrastructure Materials Lab**

Development of advanced materials characterization, nondestructive evaluation and computational modeling of infrastructure materials.

**Capabilities/Equipment**

- Standard tools and equipment required for specimen fabrication and mechanical testing of infrastructure materials such as:
  - Equipment for rheological characterization of materials
  - Geotechnical testing equipment
  - Ground penetrating radar
  - Gyratory compactors
  - Small scale load testers
  - Universal testing machines capable of conducting several AASHTO and ASTM tests

- Wilhelmy Plate Apparatus, the Universal Sorption Device (USD), and the Microcalorimeter used to characterize binders and aggregate in terms of surface energy

- X-ray Computed Tomography (CT) equipment for characterizing the internal microstructure of WMA/HMA specimens

- Dynamic Mechanical Analyzer to capture the fine aggregate phase resistance to fatigue cracking and moisture damage
Intelligent Infrastructure Assessment Lab

Development of smart structures, including structural health monitoring techniques and techniques for quantitative nondestructive testing.

Capabilities/Equipment

- Capable of applying commercially available instrumentation to infrastructure problems as well as to develop in-house sensors and instrumentation
- Numerous nondestructive tests such as:
  - Ultrasound
  - Infrared thermography
  - Magnetic flux leakage
  - Impact echo
  - Ultrasonic tomography
  - Ultrasonic phased array
  - Ultrasonic pulse velocity
  - Sounding
  - Ground penetrating radar
- Capable in measuring force, strain, deflection, acceleration, and modal parameters of infrastructure in the field

Advanced Infrastructure Materials and Manufacturing Lab

Bridge the recent advancements in additive manufacturing technologies with large-scale structures, including applications of robotics and 3-D printing in additive manufacturing technology

Capabilities/Equipment

- Multi-axis industrial robotic arm that:
  - Benefits our own software and materials development to 3D print large-scale structures for infrastructure applications
  - Can scan the surface and repair it without having computational data of the surface (applicable to robotic road repair that can save material costs and keep workers out of danger)

National Corrosion and Materials Reliability Lab

Provides solutions to the corrosion needs of industry and government to preserve and extend the integrity of the structures, such as buildings, bridges, pipelines, roads, ports and off-shore platforms.
Smart Grids Control Center

Innovative vision of a large-scale, seamlessly integrated Power System Control Center of the future, to ensure the reliability, sustainability, and security of the electric energy supply

Capabilities/Equipment

- Integrated training room and facilities that emulate end-to-end control systems
- Continuously monitors certain sites in various grids through virtual substation equipment
- Monitors numerous sensors located throughout the RELLIS Campus
- Capabilities/expertise in six key smart grid areas:
  - Electricity Transmission/Distribution and Production/Consumption
  - Clean Energy Enabling Technologies
  - Electrified Transportation System
  - The Built Environment
  - Computer Information Services
  - Energy-related Markets

Additional Laboratories and Facilities at Texas Transportation Institute (TTI)

Civil engineering faculty and graduate students also have access to research laboratories and other facilities at TTI. The following is a list of these laboratories/facilities in transportation and other civil engineering areas:

Connected Transportation

- Campus Transportation Technology Initiative
- Connected Vehicle Assessment Simulation Test Bed
- Connected Work Zone
- Proving Grounds Research Facility
- Texas AV Proving Ground Partnership
- Transit, Bicycle and Pedestrian Safety Test Bed

Infrastructure

- Asphalt Mixture Testing Laboratory
- Center for Infrastructure Renewal
- Instrumented Bridge
- Model and Machining Center
- National Geotechnical Experimentation Site
- Pavement Non-Destructive Testing Equipment
- Pavement Profiler Evaluation Facility
- Proving Grounds Research Facility
- Soils and Aggregates Laboratory
Safety
• Center for Transportation Computational Mechanics
• Connected Work Zone
• Driving Simulator
• Eye Tracking Systems
• Instrumented Vehicle
• Proving Grounds Research Facility
• Transit, Bicycle and Pedestrian Safety Test Bed

Environment
• Environmental & Emissions Research Facility
• Proving Grounds Research Facility
• Sediment and Erosion Control Laboratory (SEC Lab)

Traffic Operations
• Connected Vehicle Assessment Simulation Test Bed
• Connected Work Zone
• Mobile Retroreflectometer Certification Course
• National Geotechnical Experimentation Site
• Toll Equipment Proving Grounds
• Visibility Research Laboratory

Computer Labs
Graduate Civil engineering students have access to computer labs after class in HEB 217 and CVLB 421. In addition, graduate students also have access to the graduate computer lab in CVLB 237 with 20 computers, printers, and a plotter. Recently, the Department replaced 16 workstations in CVLB 222. These new computers all have 27” monitors, I7 8700 Processor, 16 Gigabytes of RAM, 512 Gigabytes SSDs, Nvidia Quadro P620 Graphics card, and with a 5-year warranty. However, several computers in the graduate computer lab need to be replaced. It is expected that the new Graduate Program fee money can help replace these computers within the next two years. A new computer room dedicated for Super Computer access using “dummy terminals” has been created in CVLB 321.

1.4.2 Finances
The annual budget for the Department has increased proportionate to the increase in the number of faculty and students. A formula based on weighted semester credit hours (WSCH) that faculty teach, regardless of the discipline of students taking the class, has contributed to this funding increase. As a result, there has been an increase in funding for supporting Teaching Assistants in the last five years from 26 to 34. Further support of faculty has been possible by employing graduate students as graders and peer mentors. Faculty members who take one year Faculty Development Leave (known as a sabbatical commonly) make it possible to reallocate salary funds to support TAs in some cases. The “Help Desk” is manned by TAs to help undergraduate students in the undergraduate Mechanics and Structures classes. When the first
floor of DLEB was renovated, the help desk was relocated from the basement of HEB to this spacious area with natural light and a free-flow from independent study to the help desk as students need help. Another study/tutoring area was created by enclosing a deck on the 2nd floor of CVLB; this is called the CE Solarium. The Help Desks have TAs scheduled all day during the week and more limited hours on the weekends. The TAs are expected to have regular interactions with the instructors to ensure the quality of advice students receive. Current TA and Grader numbers for Fall 2018 are listed below:

- Help Desk TAs – 4
- Graders - 18
- Other TAs - 30

A program piloted in the Department to prepare doctoral students who aspire toward careers in academia was originally funded by the Department’s Excellence Fund. However, in coordination with the Department of Aerospace Engineering, the college agreed to fund students for this program. The success of the students convinced the college to expand this program college-wide and is known as the Graduate Teaching Fellows program. Details of this program will be discussed in section 2.6, but the additional positions have added to the teaching depth in the Departments. The Department’s graduate student stipend had been one of the lowest in the college, but from 2015 the TA stipend was increased $100/month each fall semester and increased the rate to $1800/month in 2017. In fall 2017, the college mandated that all Departments would pay at least $2000/month for graduate students. Since then, the Department’s TA and Graduate Research Assistant stipend has been a minimum of $2000/month.

The college implemented Graduate Program Fee effective Fall 2018. Graduate students will pay $145 per credit hour in 2018-2019; the fee will increase to $285 per credit hour in Fall 2019. This new fee will make it more expensive to support TAs and RAs with Departmental resources. At the same time, all of the fee money generated by a Department is to be returned to the Department and will provide significant additional resources to be used for various graduate program operations. The Department has a proposed plan to allocate the new returned fee as follows: 40% fellowships, 30% climate, 25% new research initiatives & degree plans, and 5% evolving needs. The first of these fees is to be distributed in Fall 2018.

1.4.3 New degree plans

Three new degree programs have been initiated that have some impact in Civil Engineering, these are: Architectural Engineering (ARCHE), Environmental Engineering (ENVE), and Ocean Engineering (OCEN). The Architectural Engineering degree is cataloged as BS only, the Ocean Engineering degree is both undergraduate and graduate having originated out of the Civil Engineering Department as a separate degree. The Environmental Engineering degree is new in 2019 initially beginning as a BS with the expectation of adding a graduate ENVE degree.
Architectural Engineering

The College of Engineering created the Interdisciplinary Engineering degree program that was approved by the Texas Higher Education Commission Board. Within the Interdisciplinary Engineering degree program is a specialization in Architectural Engineering from which students can earn a B.S. degree. There is no graduate degree available in the architectural engineering program.

Ocean Engineering

The ocean engineering degree program existed within the department of civil engineering for many years. Two separate degree programs were administered within the one department. The department was organized in four divisions: Environmental & Water Resources, Transportation & Materials, Ocean & Coastal, and Construction, Geotechnical and Structural. The decision was made to create a new department of Ocean Engineering which was established in 2015. The new department combined two related programs at TAMU: Ocean Engineering in College Station and Offshore and Coastal Systems Engineering in Galveston. Faculty members who had been affiliated with the Ocean & Coastal division were offered the opportunity to join the new department fully (100%) or at 66.67% or 33.33% commitment. Those who joined at 100% were Drs. Randall and Falzarano who were joined recently by Dr. Kim (initially 66.67%). Those who joined 33.33% include Drs. Chang and Chen. Those who chose to remain 100% in Civil Engineering include Drs. Kaihatu, Mercier, and Socolofsky.

An additional change that resulted from the creation of the new department included the ‘Old Civil Engineering’ building being renamed the H.J. (Bill) and Rita Haynes Engineering Building (HEB) and designated to be the home of the Ocean Engineering faculty and staff. No civil engineering faculty had offices in this building, but the undergraduate and graduate advising offices did and those were moved into renovated space on the first floor of the Dwight Look Engineering Building (DLEB). Research laboratories primarily located in the basement of HEB are being relocated to the CVLB and the CIR. Due to the size of the undergraduate and graduate enrollment in civil engineering, CVEN maintains priority over classroom assignments in HEB except for one room, HEB 118, which has specialized distance education equipment to facilitate teaching courses on both campuses simultaneously.

Dr. Autenrieth has worked closely with Dr. Girimaji, the Department Head for Ocean Engineering, to minimize disruptions and facilitate the changes.

Environmental Engineering

In 2015 efforts were initiated to create a new B.S. degree program in environmental engineering (ENVE). Final review and decision by the Texas Higher Education Commission Board is scheduled for January 24, 2019. We are optimistic that the request for the new program will be approved. We have started efforts to follow up the B.S. degree with master’s and doctoral
degrees in environmental engineering. The degree program(s) will be housed and administered within civil engineering which means that there will be two degree programs as there was when ocean engineering was part of the department. Since there has been a specialty for environmental engineering in the civil engineering curriculum for about 40 years, the majority of courses are offered. However, two additional faculty will be hired to meet the anticipated teaching demand. If approved, the program will officially start in Fall 2019.

1.5 External program accreditations (if applicable)
   No external program accreditation for the civil engineering graduate program.

1.6 Date of last APR external review
   April 29 - May 2, 2012. A copy of the APR Team’s report and concluding observations from the 2012 assessment can be found in Appendix M.

1.7 Analysis: Include assessments of the strengths, weaknesses, opportunities, and threats.

1.7.1 Describe how the Program’s strategic plan creates a path forward for excellence.
   The strategic plan for the graduate program was developed out of the Department’s commitment to enhancing the quality of education and research, and producing graduates who are confidently prepared for the ever-changing needs of the civil engineering profession. This will be achieved through the goals outlined in the strategic plan, which are focused on increasing research opportunities and funding, evolving our graduate curriculum, and expanding multidisciplinary talent within the Department. Specifically, the following objectives have been identified:

   • Maintaining and enhancing our research portfolio to support the research activities of our Graduate students.
   • Ensuring that all of our doctoral students are funded to conduct their research.
   • Developing a focused writing program to support all thesis degree students, including mentoring and resources for authoring journal publications and technical reports.

Evolving Curriculum

• Launching two new graduate degree programs (Architectural Engineering and Environmental Engineering).
• Evolving the Departmental curriculum to keep pace with innovation impacting the civil, architectural, and environmental engineering fields.
• Developing curricula in multiple appropriate focus areas, dependent on workforce needs, for students to earn one-year masters degrees. Hiring faculty with expertise beyond traditional civil engineering fields to expand the multi-disciplinary talent within the Department.
• Developing a portfolio of online courses that graduate students and practicing professionals can take to obtain certificates and masters degrees.
1.7.2 Describe the alignment of the degree program’s strategic goals and priorities with college and institutional goals and priorities. Attach the degree program’s current strategic plan or, if unavailable, the strategic plan for the college.

The strategic goals of the program are closely aligned with both the university and the college’s commitment to providing high quality engineering education through impactful, quality programs and research, and preparing a diverse student population to be well equipped to serve the greater good in their academic and professional endeavors. Over the past six years, the Department has invested time and effort to continually explore ways to improve the graduate program. The result of this endeavor was the development of the initiatives defined by the strategic plan, through which the Department hopes to increase applications from a highly qualified diverse population of students, both domestic and international, enhance learning outcomes, raise the program’s standing, and make Texas A&M Civil Engineering the program of choice for the state of Texas. A copy of the University’s and Department’s strategic plan can be found in Appendix L.

1.7.3 Degree Appropriate Curriculum

Although all the degrees awarded by the Department are Civil Engineering degrees, there are eight distinct areas of specialization each with curricula. The curricula for the graduate program degrees are evaluated by the Department faculty. The Associate Department Head, Division Heads, and Area Graduate Advisors provide leadership in planning and reviewing the graduate curriculum to strengthen the collective focus of advancing national leadership in teaching innovation, research impact, and service to the civil engineering profession.

The department’s strategic plan (most of section 4) addresses the need to recruit, retain, graduate, and help place our graduate students. To meet the goals of the Department’s strategic plan, an Assistant Director for Graduate Programs was hired to develop recruiting plans and initiatives. Also, the communications office has been involved in developing recruiting materials and media. More active engagement of faculty in recruiting initiatives is part of the plan.

The degrees we offer, Ph.D., MS (thesis option) and MEng are appropriate for the needs of the students and the civil engineering profession. Our students are highly sought after and find opportunities in academia, national laboratories, government and public sector, and industry after graduation.

1.7.4 Improvements made since the previous APR.

The previous APR report cited 4 major areas of concern. These included: loss of key faculty and lack of replacement; excessive work load of the Department Head; uncertain future financial support; and, the department’s facilities. Each of these will be addressed in the following.

Prior to the 2012 review the then President Gates had launched an ambitious plan to increase the number of faculty and the college of engineering grew by a net 100 positions. The civil engineering department benefited from this growth program, but it was not sustainable due
to state legislative funding cuts. Consequently, across the campus when faculty departed due to retirements or seeking other opportunities their positions were not always replaced. Consequently, there had been a decrease in the number of faculty in the department. However, in 2012 Dean Banks was chosen to lead the college and under her leadership several changes began to occur.

Since the 2012 report there have been significant changes in the college of engineering, most notably a bold initiative to dramatically increase the size of engineering enrollment via the ‘25 by 25’ plan to achieve 25,000 students by the year 2025 through increasing enrollment, improving retention, and reducing time to graduation. The department developed a deliberate plan to increase enrollment of undergraduate and graduate students, improve retention and reduce the time to graduation. The growth plan considered the student to faculty ratios, class sizes, new faculty lines, and other needed resources. Since the 2012 review, a total of 13 tenured or tenure track faculty have been hired. During the same time, 9 faculty either retired or sought other employment opportunities. In 2015 the Department of Ocean Engineering was created from the degree program housed within Civil Engineering and that resulted in 3 faculty members joining OCEN 100%, 1 joined at 66.67%, and another 2 joined at 33.33%. Faculty continue to teach across the two departments as the new department begins to fill its faculty lines. The Civil Engineering core faculty numbers stabilized at 54-55. In addition, the number of Academic Professional Track (APT) faculty grew to 18 including Professors of Practice (4) and Instructional Professors (5), and an instructor (1). The newly hired faculty have expanded the research portfolio of the department and opened new areas of non-traditional research. Also, the APT faculty have brought strength in teaching professional courses such as capstone design, sophomore seminars, and professional development of graduate students. The Graduate Teaching Fellowships (GTF) program was expanded across the college, providing authentic teaching experience for graduate students under the mentoring guidance of faculty which further relieved the teaching loads. It has also been possible to encourage faculty to participate in Faculty Development Leave (e.g. sabbatical) through teaching adjustments.

The Department now has three Associate Department Heads (DH) one each for undergraduate programs, graduate programs, and research. The Associate DH for Undergraduate Programs (Professor Mary Beth Hueste) has a support staff consisting of a Director (Assoc. Prof. Luciana Barroso), Office Manager (Prof. of Practice Bob Appleton), 2 advisors, and a support staff. The Associate DH for Graduate Programs (Professor Mark Burris) has a newly hired Assistant Director (Juan Rodriguez), an Academic Advisor (Chris Grunkenmeyer), and a Program Specialist (Laura Byrd). Both offices also have student workers. The Associate DH for Research (Professor Jim Kaihatu) is tasked with creating opportunities for multi-inter-trans-disciplinary opportunities for the Civil Engineering faculty and fostering initiatives to ultimately seek large research grants. The main office is staffed with an Administrator, Administrative Coordinator, a Program Specialist, plus 3-4 student workers. There are also three division heads. The DH position is demanding, but a good support structure makes the position sustainable.
A combination of factors have made the financial support of the department quite stable. Although there has been a reduction in the IDC return funds, all departments were allocated ‘make whole’ funding from the college to equalize the impact of budget shifts. The differential tuition has been strategically used to purchase equipment for labs, replace computers, support the APT faculty, and employ student peer mentors to augment classroom support. The department has been able to increase the number of TAs from approximately 25 to at least 34 each semester, again due to additional funds from the college and redistribution of funds in the budget. The department has a significant endowment which makes it possible to fund a range of efforts such as launching new programs, providing awards for faculty and staff, offering social events, supporting some faculty travel, and each division receives $5,000 to use as discretionary funding. If a division exhausts the initial allocations, additional funds can be requested with justification. Maintaining a good climate in the department and the morale of the faculty are priorities for the department. Each August there is a faculty retreat during which various topics are discussed addressing research and teaching concerns, planning for the future, and seeking ways to make improvements.

The department has lost and gained facilities since the 2012 review. In addition to removal of the hydraulics laboratory, the Haynes Coastal Laboratory was re-appropriated to house a new ERC, the high bay lab and the CE/TTI materials labs were removed as was a flume. However, there have been significant additions to the department’s facilities including: the Center for Infrastructure Renewal (CIR) and new flume laboratory both located on the RELLIS campus; renovated advising offices for undergraduate and graduate programs; renovation and expansion of the materials laboratory; a kitchen for the graduate students; and, new labs in the Civil Engineering Laboratory Building (CVLB). The Dwight Look Engineering Building (DLEB), formerly the CE/TTI tower, is now fully occupied by civil engineering since TTI moved out in 2017. The Ocean Engineering faculty also moved out of this building freeing up more office space. As a result, all faculty and all advising services are now located in the same building. There are ample offices for graduate students and visiting scholars. The graduate students have access to two kitchens and there is lounge or study common space on floors 3-8 in DLEB. A computer lab in CVLB is dedicated to graduate students as are several group offices. The CIR is a unique facility opened in 2018 that houses in its 138,000 SF a high bay/mid bay lab that is about 3.5X the size of the former facility, plus expanded materials labs, and 2 stories of new labs for multi-disciplinary research. Although the CIR is located approximately 12 miles from main campus, there is regular shuttle service free to students and faculty and ample parking. With the changes in physical facilities have come many new opportunities that are benefiting both students and faculty.
2 Academic Programs and Curricula

2.1 Programs offered

The Civil Engineering Department offers the Master of Science, Master of Engineering, and Doctor of Philosophy degrees in civil engineering and ocean engineering. The College of Engineering offers the Doctor of Engineering degree, with emphasis in various areas of civil engineering. Below is a brief description of each degree within the Civil Engineering Department.

**Master of Science**

Currently, the MS degree requires 32 credit hours of course work beyond a Bachelor of Science degree. Additionally, the degree requires the student to submit a thesis to the University and defend it in an oral presentation. A college-wide 30-hour non-thesis option MS degree will become available in 2019. This new degree option is being implemented as a response to better assist international graduate students in their professional endeavors. Outside of the U.S., a Master of Science non-thesis degree is better recognized and more competitive than a Master of Engineering degree. Along with this new non-thesis MS degree, the minimum credit hours for the thesis option MS will also be reduced to 30.

**Master of Engineering**

This non-thesis degree requires 30 credit hours of course work beyond a Bachelor of Science degree. The work in the major field includes one or two written reports. These reports do not necessarily involve results of research conducted by the student. The degree does not require the submittal of a formal report to the University. The area advisors serve as the primary advisors for MEng students on their degree plans.

**Doctor of Philosophy**

The degree requires a minimum of 64 credit hours beyond the masters degree. Additionally, the degree requires the student to defend and submit a dissertation to the University. The University does not have formal course requirements for the degree, but the Department does require certain minimum number of credit hours from coursework. In recent years, we have admitted students with only a BS directly into the Ph.D. program (96-hour Ph.D.). Most of those direct-to-Ph.D. students are US students.

2.2 Program curricula (including duration and comparisons to peers)

**Master’s Degree Requirements**

**Master of Engineering (M.Eng.)**

The Master of Engineering degree requires a minimum of 30 semester credit hours of approved courses, with some restrictions on the use of transfer credit, special topics courses, etc.
Approximately one-third of the student's coursework is taken outside of her/his major field of study. The work in the major field must include a written report, but this need not reflect independent research. The student's program is under the direction of a chair from the Department of Civil Engineering and requires the approval of the Office of Graduate Studies. The student is required to pass a final examination administered by the chair. However, this final examination can be waived and often is for most students.

Master of Science – Thesis Option (M.S.)

The Master of Science degree (thesis option) requires a minimum of 30 semester credit hours of approved courses and research. University regulations allow up to 8 hours of the 32 to be CVEN 691, Research. The research must lead to a thesis that "reflect[s] a comprehensive understanding of the pertinent literature and express[es] in clear and legible English, the problem(s) for study, the method, significance and results of the student's original research." "The student must complete 9 resident credit hours during one regular semester or 6 credit hours in a 10-week summer session or 3 credit hours in the five week summer semester," in order to meet the residency requirement. There are also other restrictions on the use of transfer credit, special topics courses, for example. The student's program is under the direction of an advisory committee appointed by the Department, with the approval of the University Office of Graduate Studies. This committee, including at least two faculty members in the student's major area of study and at least one faculty member from outside the Department of Civil Engineering, reviews the student's degree program and thesis proposal, conducts a final oral thesis defense, and provides other direction as appropriate. The new 30-hour non-thesis MS degree will be course work only degree and does not require a thesis.

Doctoral Degree Requirements

Doctor of Philosophy (Ph.D.)

Work leading to the Ph.D. degree is designed to give the candidate a thorough and comprehensive knowledge of his or her professional field and training in methods of research. The final basis for granting the degree is the candidate's grasp of the subject matter of a broad field of study and a demonstrated ability to do independent research. In addition, the candidate must have acquired the ability to express thoughts clearly and forcefully both orally and in writing. The degree is not granted solely for the completion of course work, residence and technical requirements, although these requirements must be met.

The student's program is under the direction of an advisory committee appointed by the Department, with the approval of the Office of Graduate Studies. This committee consists of no fewer than four members of the graduate faculty representative of the student's several fields of study and research, where the chair must be from the student's Department. At least one of these four members must be outside the Department.
The student's advisory committee evaluates the student's previous education and degree objectives. The committee consults with the student in her/his development of a degree plan and an outline of a research problem for the dissertation. The degree plan must be filed with the Office of Graduate Studies no later than 90 working days prior to the preliminary examination. For a student who has completed a masters degree, a minimum of 64 hours is required on the Ph.D. degree plan. For a student who has completed a baccalaureate degree but not a masters degree, a minimum of 96 credit hours is required on the degree plan. The Department traditionally did not admit many 96-hour Direct-to-Ph.D. students and chose to admit these student who do not have a masters level degree into MS and give the students the opportunity to obtain an MS first before moving on to the Ph.D. study. Recently we have admitted more Direct-to-Ph.D. students in order to compete for top applicants, particularly domestic applicants.

Each student in the Ph.D. program needs to pass a Qualifying Exam (QE) early in his/her Ph.D. study, and pass a preliminary exam to become a Ph.D. candidate. The QE is to be completed by the end of the student’s first semester. The Preliminary Exam is given no earlier than a date at which the student is within approximately 6 credit hours of completion of the formal course work on the degree plan (excluding 681 and 691) and no later than two years after the initiation of the doctoral studies, by the end of their fifth semester. This deadline can be extended by one more semester if the student has more than 6 credit hours missing from his/her required courses, but should be no less than 6 months before the thesis defense. The details of these exams are provided below.

**Doctor of Engineering (D.Eng.)**

The most obvious ways in which the Doctor of Engineering program differs from the Ph.D. are that the research experience is replaced by an internship of at least one calendar year in industry, and the dissertation is replaced by a Record of Study, which usually consists of a report on the internship experiences.

The Doctor of Engineering degree is administered by the College of Engineering, rather than by the individual Departments in the College. The objective of the Doctor of Engineering program is the education of men and women to function at the highest levels of the engineering profession, with emphasis on solving problems that arise in the use of technology to benefit mankind. The Doctor of Engineering program seeks to couple understanding of the characteristics of social and business institutions with high competence in engineering problem solving.

The student's program is under the direction of an advisory committee appointed by the College, with the approval of the Office of Graduate Studies. This committee consists of no fewer than four members of the graduate faculty representative of the student's several fields of study. At least one of these members must be from a Department other than the student's administrative Department. The student's internship supervisor, a practicing engineer, also is a member of the advisory committee.
The student's advisory committee has the responsibility for guiding and directing the entire academic and internship programs of the student and for initiating all actions concerning the student. The committee responsibilities include the proposed degree program, the written and oral Doctor of Engineering qualifying examination, the technical adequacy of the internship program, the qualification of the student to embark on the internship, the internship report, and the final examination. The course portion of the student's Doctor of Engineering degree plan must include a minimum of 96 semester graduate credit hours, of which at least 80 credit hours are for course work. The Professional Internship earns 4 credit hours per semester or summer term.

The internship experience is intended to be at an organizational level such that the student is able to deal with broadly based problems affecting more than one facet of the organization, rather than a single narrow or specific technical problem.

**Doctoral Examinations**

Each student in the Ph.D. program in the Department of Civil Engineering is required to take a qualifying exam, within one year of entering the doctoral program. In this exam the student must demonstrate the educational background and the attributes that are appropriate for completion of the program. The Departmental Ph.D. qualifying exam has the dual purposes of: 1) identifying any admitted students who seem not to be qualified for Ph.D. studies in their selected areas of specialization, in terms of either technical competence or aptitude for research, and 2) identifying weaknesses in student preparation that should be remedied by taking appropriate course work.

Each student in both the Doctor of Engineering, and the Ph.D. program is required to pass a comprehensive written and oral exam called the Doctoral Engineering Qualifying Examination. This exam is administered when the student has accumulated approximately 30 semester credit hours of graduate courses or during the first semester after admission to the program if a masters degree has already been obtained. A student who fails the Qualifying Examination may retake the exam once. The second exam is given after a suitable period of preparation, normally the end of the next semester.

**Preliminary Exam and the Dissertation Proposal**

Each Ph.D. student is required to take a preliminary examination and to submit a dissertation proposal. This exam is given no earlier than a date at which the student is within approximately 6 credit hours of completion of the formal course work on the degree plan (excluding 681 and 691) and no later than two years after the initiation of the doctoral studies, and by the end of their fifth semester. This deadline can be extended by one more semester if the student still has more than 6 credit hours missing from his required courses, but should be no less than 6 months before the thesis defense.
The purpose of the preliminary examination is for the student’s advisory committee to satisfy itself that the student has demonstrated: a mastery of the subject matter of all fields in the program and an adequate knowledge of the literature in these fields and an ability to carry out bibliographical research. The examination is both oral and written. The written part of the examination covers the fields of study included in the student’s degree plan. Each member of the advisory committee is responsible for administering a written examination in his/her particular field, unless he/she chooses to waive participation. Each written examination must be completed and reported as satisfactory to the chair of the advisory committee before the oral portion of the examination may be held. The oral part will be closed. If it includes a presentation of the dissertation proposal, this part of the exam may be open to the public if the student and all the members of the committee request it in writing from the Department’s graduate office.

Upon approval of the student’s advisory committee with no more than one member dissenting and the approval of the office of Graduate Studies, a student who has failed the preliminary examination is given one re-examination, when adequate time has been given to permit the student to address the inadequacies emerging from the first examination (normally six months). The student and the advisory committee negotiate a mutually acceptable date for this purpose.

The student’s research proposal must be approved at a meeting of the student’s advisory committee that may coincide with the preliminary exam, at which time the feasibility of the proposed research and the adequacy of available facilities are reviewed. The proposal should make clear the topic to be addressed, its background, the motivation for the study, and the general approach to be followed. The approved proposal is submitted to the Office of Graduate Studies before the end of the second year after initiation of the doctoral studies and at least 6 months prior to the close of the semester or summer session in which the student expects to receive the degree or prior to scheduling of the final examination, whichever comes first, for final approval. The narrative portion of the proposal does not have to be more than 10 pages long, and the proposal also includes a list of the selected references. The Department has also developed guidance on the scheduling of this preliminary exam.

**Final Defense**

The candidate for the doctoral degree must pass a final examination by deadline dates announced in the "Office of Graduate Studies Calendar" each semester or summer session. Ideally the final defense should be scheduled within one year of passing the preliminary exam. No student is given a final examination unless her/his current official GPR is 3.0 or better and she/he has been admitted to candidacy. There must be no unsolved grades of D, F, or U for any course listed on the degree plan. To absolve a deficient grade, a student must have repeated the course and have achieved a grade of C or better. A student must have completed all course work on his or her degree plan with the exception of any remaining 691 (Research) for which he/she is registered.
The student's advisory committee, as finally constituted, conducts the final examination. The final examination for the Ph.D. student is not administered until such time that the dissertation is available in substantially final form to the student's advisory committee, and all concerned have had adequate time to review the document. Whereas the final examination may cover the broad field of the Ph.D. candidate's training, the major portion of the time is generally devoted to the dissertation and closely allied topics. Persons other than members of the graduate faculty may, with mutual consent of the candidate and the major professor, be invited to attend a final examination for an advanced degree. A positive vote by all members of the graduate committee with at most one dissension is required to pass a student on his or her exam. The final examination procedure for the Doctor of Engineering student is similar, but the emphasis is on the Record of Study, rather than a dissertation.

Graduate Course Offerings

The Civil Engineering Department typically offers about 30 graduate courses during both the fall and spring semesters and very few other than directed studies and research hours during the summer sessions. A one credit hour seminar course (CVEN 681) is offered in several areas. Appendix C provides a syllabus for each graduate course currently being offered by the Department. Appendix E shows when each graduate course was taught for the past five academic years.

2.3 Admissions criteria (doctoral students)

The Department considers all criteria included in each application package when making graduate admission decisions. A complete application package for both masters and doctoral programs requires transcripts from all previous institutions, all relevant test scores, three letters of recommendation, and a statement of purpose. Including additional information such as relevant work experience or research projects are also highly recommended so that the faculty can better assess the applicant.

For international graduate student applicants, the University requires those whose native language is not English to fulfill an English proficiency requirement. Verification of English proficiency can be achieved by a Test of English as a Foreign Language (TOEFL) score of at least 80, IELTS score of at least 6.0, or GRE Verbal score of 146). Those graduate applicants not so verified must take the English Language Proficiency Examination (ELPE) prior to registering for courses in their first semester. Those applicants with TOEFL scores below 80 and GRE verbal below 146 are required to take and pass the ELPE Oral exam as a condition of their acceptance into the graduate program.

Admissions decisions are made by a designated faculty coordinator within each of the eight areas of graduate study in the Department. Applications are reviewed by faculty in each area and then a final admissions decision is forwarded from each coordinator to the CVEN Director of Graduate Programs.
For PhD applicants, admission decisions are based on quality of institutions previously attended, content of past academic work, letters of recommendation, applicant's statement of purpose, GRE scores, GPA from the previous institution, relevant work experience, and occasionally, personal interviews. Additionally, the Department annually identifies prospective students from other universities who are considered competitive based on these factors, and extends invitations for a campus visitation event held in early Spring of each year. This allows the Department to showcase our programs and facilities, while also allowing faculty to meet with applicants one on one.

The CVEN Graduate Office is responsible for compiling and managing data for admissions processing. An important tool in this process is the CVEN Graduate Office database. This system contains information specific to CVEN graduate students and is housed within the Department. It is a critical resource for the Department as *ad hoc* and planned reports are frequently requested. This database also allows the Department to compare the graduate program data with that of the university to ensure accuracy. The Graduate Advising Office staff is responsible for maintaining and updating the database.

**GPA and GRE Scores**

GPA and GRE scores are important admissions criteria for our doctoral programs. Although CVEN programs do not require a minimum GRE score or GPA to apply, applicants are considered competitive if they have a GPA of at least 3.3 on a 4.0 scale and GRE scores of at least 146 for the verbal section, and 155 in the quantitative. This consideration is one way the Department manages the competitiveness of our programs.

Since 2012, the GPA average for incoming PhD students has remained relatively constant, averaging 3.7 (Figure 2.1). GRE Quantitative scores for admitted PhD students were relatively consistent each year, averaging 162 (Figure 2.2). We experienced a drop in Verbal scores beginning in 2014, however they have been increasing each year since. Although the verbal scores are important, they are not always indicative of the communication abilities of our students.
Figure 2.1: Avg. GPA – Incoming PhD’s

Data compiled from the CVEN Graduate Office database. GPA’s calculated from student transcripts, based on a 4.0 scale. Average GPA for incoming PhD students 3.7.

Figure 2.2: Avg. GRE Scores – Incoming PhD’s

Data was compiled from the CVEN Graduate Office database. GRE scores are based on the current scale of 130-170. GRE scores based on older scale were converted to new scale. Scores averages were Quantitative 162 and Verbal 150.

During the review period, incoming masters student GPAs remained relatively consistent, averaging 3.4 (Figure 2.3). GRE Verbal scores for these students showed a slight decline in 2014 and 2016, however there was a slight increase in Quantitative scores during this time (Figure 2.4).

Figure 2.3: Avg. GPA – Incoming Masters Students

Data was compiled from the CVEN Graduate Office database. GPA calculated from student transcripts, based on a 4.0 scale. Incoming masters student GPA’s averaged 3.4 during the review period. For school transcripts using a different grade scale, GPA is converted.

Figure 2.4: Avg. GRE - Incoming Masters Students

Data was compiled from the CVEN Graduate Office database. GRE scores are based on the current scale of 130-170. Applicants with older GRE scores graded on a higher scale were converted to the new one. Averages scores for this period were 161 – Quantitative and 152 – Verbal.

Admission Rate

The admission rate is defined as the ratio of admission offers to the total number of applications received for that period. The rate for CVEN graduate programs over the past 5 years has an average of 37% for PhD students (Figure 2.5) and 44% for masters students (Figure 2.6). In 2013 and 2014, the number of PhD applications dropped, as did the number of admission offers.
In 2015, although the Ocean Engineering Department separated from Civil Engineering, there was an appreciable increase in the number of PhD applications, comparable to those in 2012. Since 2015, the doctoral admission rate has increased. The Department is focused on keeping the number of competitive applications up to support enrollment goals. One initiative of the College of Engineering’s 25 by 25 strategic plan is to increase graduate enrollment by 6% annually.

**Figure 2.5: Admission Rate — PhD**

Data was provided by DARS and includes Ocean Engineering admissions data from 2012 until 2014. The average admission rate for PhD applicants during this period was 37%.

**Figure 2.6: Admission Rate - Masters**

The data was provided by DARS and includes Ocean Engineering admissions data from 2012 until 2014. The average admission rate for masters applicants during this period was 44%.

2.4 Number of degrees awarded per year (most recent 5 years)

The number of degrees awarded for the graduate program have fluctuated across the review timeframe (Figure 2.7). The number of PhD degrees awarded each year is dependent on
the number of admitted PhD’s in the years prior. In AY 2014-15, there were fewer PhD degrees awarded due to the large number of new enrolled PhDs in 2012. Most of these students completed their degrees in AY 2015-2016 which is indicated by the increase in PhD awards during that time. In AY 2014-2015 the program began to see an increase in the number of Masters degrees awarded. This was due to the increase in masters student admissions in 2013, particularly in the structural engineering area.

**Figure 2.7: Degrees Awarded by Year - All**

Data was compiled by the CVEN Graduate Office using information supplied by TAMU-DARS. Awarded degrees for Ocean Engineering are included from 2012 to 2014.

### 2.5 Average time to degree (most recent 5 years)

The average time to degree completion for both masters and PhD students was calculated using the difference between the semester a student started and the semester they graduated. The data provided by DARS was inaccurate and therefore information from the CVEN Graduate database was used for this section.

Our doctoral students have averaged time to degree of 4.5 years during the review period (Figure 2.8). There are a variety of factors which can impact a PhD student’s time to degree. A few students lost some time (a semester) due to the availability of testing equipment. A few others had changes to their committee chairs beyond their control which usually set them back a semester or even longer. To assist with some of these challenges, the Department has instituted required annual PhD reviews to provide students feedback regarding their progress. In addition to the usual interaction between students and their chairs, this resource also provides the Department a more accurate method of identifying any challenges students may be facing, and the opportunity to try and address them before they affect a student’s time to completion. The Department is also focusing on timely completion of qualifying and preliminary exams.
During the review period the average time for master degree non-thesis (MEng.) students is 1.5 years and 2.31 for masters students with thesis option (MS) (Figure 2.9). The MEng. degree is a 30 hour degree, thus students taking 9 credit hours in Fall and Spring semesters usually complete the program across 3 full semesters and a summer term. MS students are currently required to take an additional 2 hours for the degree, and then time for thesis preparation and defense. Though the majority of our masters students are full-time, most only register for more hours in either the Fall or Spring semester, or if they are able to find elective credit hours during the summer. Most CVEN graduate courses for non-thesis students are not typically offered in the summer, however some of the qualified electives outside the Department are available. The Department already has plans in place to offer additional courses in the summer, which we believe will help students expedite their time to degree completion. For our masters thesis students, the average over the past 5 years has been 2.31 years to complete their degree requirements. The additional time is attributed to research, development and preparation for their defense and thesis. Again, additional course offerings will provide these students an opportunity to complete coursework sooner and focus on research.
Data compiled from the CVEN Graduate Database and calculated using the difference between masters student start semester and the semester of completion. Ocean Engineering is included 2012-2014.

2.6 Academic enhancements / high-impact opportunities for students

We have a sound curriculum to give our students thorough training to prepare them for their future professional endeavors. In addition to the regular courses we offer, the Department has made a concerted effort, in addition to what the college and other Departments offer, to provide academic enhancements and professional development opportunities to our students. These efforts focus on the development of soft skills such as communication, teamwork, social awareness, and other essential job-related skills. These efforts include the Graduate Teaching Fellow (GTF) program to prepare our Ph.D. students for faculty positions, and other professional development opportunities for other students.

Graduate Teaching Fellow Program

In 2012, the Department piloted a program to prepare doctoral students who aspire toward careers in academia. The original program was initially funded by the Department’s Excellence Fund. However, in coordination with the Department of Aerospace Engineering, the college agreed to fund students for this program. The success of the students in the program convinced the college to expand it college-wide where it is now called the Graduate Teaching Fellows Program.

The purpose of the Graduate Teaching Fellowship program is to prepare and encourage our doctoral students to pursue academic careers. These fellowships are not to be used as conventional Teaching Assistant positions. This competitive program gives the selected students (teaching fellows) a supervised teaching experience that will help them compete for faculty positions at top tier universities. Engineering faculty positions at the rank of Assistant Professor require a new faculty member to find a balance between teaching excellence, establishment of independent research record, and service to the profession. Therefore Teaching Fellows are
expected to actively continue their doctoral research and professional activities during this appointment and learn about time management.

A faculty member can nominate only one student for the Teaching Fellowship to his/her Department head. An exception to this rule is the nomination of (no more than) two students for two different sections of the same course.

The appointment as a Teaching Fellow will typically be limited to two semesters. However, if a fellow has performed at an extraordinary level, if she/he gets a very strong recommendation from the Mentor, and has demonstrated a strong desire to join academia, she/he may be considered for a third term. A student cannot be a Fellow for four terms under any circumstance. The student will receive support for tuition, benefits and a fellowship stipend as appropriate. The Department may choose to pay the fees. Upon selection, the mentor will be expected to sign a mentoring agreement outlined as part of this document.

In order to be GTF eligible, the nominee must:
1. Have demonstrated a serious interest in and have the potential to pursue an academic career. The application form should be used for documentation purposes.
2. Be admitted to PhD candidacy.
3. Have completed, or concurrently complete the Academy for Future Faculty program (http://cte.tamu.edu/) offered by the Texas A&M University Center for Teaching Excellence.

Application Process
The mentor will prepare a nomination package containing the following documents and submit it to the Department Head.
1. Application Form to be filled by the nominee. (see Form below)
2. Statement of teaching and research philosophy from the nominee.
3. CV
4. A detailed recommendation letter by the Mentor which addresses the nominee’s qualifications for the Teaching Fellowship and lists the undergraduate course that the nominee will teach under the supervision of the Mentor. Once the Fellowship is granted, neither the Mentor nor the course can be changed without the consent of the Director.

Selection Process
1. A Departmental Selection Committee, appointed by the Department Head, will make a recommendation to the Department Head, who will then submit a prioritized list to the Search Committee.
2. The Search Committee and the Director will make the final decisions.
3. The selection will be done every semester.

The GTF program, currently a COE program, actually started in the CVEN Department. We had tremendous successes in placing those selected teaching fellows into academia when it was a Departmental program. Fellows successfully obtained faculty positions in universities such as: University of Illinois, University of Washington, Southern Methodist University, Kansas State University, and University of Arkansas.
Because of the success of this CVEN program, COE started a college-wide GTF program in fall of 2014. Our Department has continued to be an active participant of the COE’s GTF program (Table 2.1).

Table 2.1: Number of CVEN Graduate Teaching Fellows

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Number of CVEN Graduate Teaching Fellows by semester, 2013-2017. Data was compiled using student GTF information provided by the CVEN Department.

These teaching fellows, in general, put in great efforts in classroom teaching and received excellent student evaluations. They also found success in finding academic jobs. Across the College, the level of success did not compare well to the level when it was a CVEN program. The majority of GTFs in CVEN that received offers for academic positions were domestic students. The fellows of the COE’s GTF program were mostly international students and they were not as successful in competing for faculty positions.

Other Professional Development Opportunities

Our Ph.D. students are encouraged to participate in the Academy for Future Faculty program offered by the Texas A&M University Center for Teaching Excellence. They are also encouraged to attend the Future Faculty Seminar offered through COE: ENGR 681: Future Faculty Seminar. The topics of this seminar include:

- Succeeding in Faculty Positions
- Establishing Positive Professional Identity
- Preparing Job Search Materials
- Developing a Research, Teaching & Service Philosophies
- Interviewing and Negotiating the Job Packet
- Flourishing in the Job: Publishing, Grant Writing & Difficult Issues in the Workplace
- Versatile PhD: The Alternate Path

A seminar class offered by the Industrial and Systems Engineering: ISEN 681 Proposal Writing for Ph.D. Students, was also advertised and made available to our Ph.D. students.

Professional Development Seminar

The Department realizes the fact that most of our students do not find academic jobs but they equally need professional development opportunities to compete for industrial, public sector, or government jobs. A new seminar class, Professional Development for Civil Engineering Industry, is offered starting fall 2018. In this course, students learn the skills needed to identify and secure employment with their preferred employer of choice in the civil engineering industry. Students learn how to target and pursue opportunities using both direct communications as well as indirect, face-to-face and social networking techniques. Students learn how to differentiate themselves in the market-place and develop and tailor their resumes for each position they pursue. Students also practice their interview skills and compete for a job position in mock interview settings. Upon
completion of this course, students will enter the job hunt with confidence and the ability to secure their first post-graduate position.

This is a two hour seminar course that enables students to:

- Identify the employers hiring graduates in their area of expertise
- Target preferred employers and hiring managers
- Develop skills to network and nurture relationships in the Civil Engineering Professional Community
- Hone communication skills
- Meet Guest Speakers from the Civil Engineering Industry, including professionals in:
  - Consulting Design & Construction
  - Applied Researchers (Public and Private)
  - Federal, State & Municipal Agencies
  - Professional & Technical Trade Associations

2.7 Assessment of student learning outcomes (all degree levels)

Assessment of our graduate programs learning outcomes are based on students’ achievement of 3 primary goals which support the strategic mission and priorities of the Department, the college, and the university as well. These primary goals are:

- Focused Civil Engineering Knowledge - To graduate students with a mastery of knowledge and focused education which is responsive to an ever changing profession
- Well Rounded Education - To graduate students with effective skills in communication, critical thinking, research and investigation
- Lifelong Learning - Graduate students who are adept at assessing their learning needs, able to identify resources and development opportunities, and who are sufficiently motivated to do so

The Graduate Programs office collects data annually on student learning outcomes for all MEng, MS, and PhD students who are graduating. Between 2012 and 2014 of the review period, assessment outcomes were largely program based, in accordance with required assessment criteria for the university’s annual WEAVE reports. Outcomes were based mostly on GPA (for MEng & MS students) and GPA and research publications and presentations for PhD students. Beginning in 2015, annual assessment requirements were changed to be driven more to student learning outcomes. The Department implemented new methods and tools to improve the assessment of student outcomes. This data is now collected through a combination of qualitative and quantitative methods which include student-self assessment/surveys, faculty evaluations of students, thesis & defense evaluation, publications and presentations (both oral and written), and participation in professional activities. The data is then analyzed by the Graduate Programs office and used for program planning and various Departmental reports. As described below, program outcome targets were met between 2012 and 2016.
Beginning in spring 2018, the Department replaced the overall faculty evaluation for graduating students, with an annual review of all current PhD students which included a self-assessment and a review by each student’s advisor. The intent is for the Department to better assess the progress of PhD students, and also allows all PhD students to receive frequent, consistent feedback.

**Master of Engineering (MEng.)**

Since 2015, annual assessment of our student learning outcomes for graduating Master of Engineering (non-thesis) students have shown that targeted outcomes set by the Department have been consistently met. MEng students are assessed on their ability to understand, apply and interpret theories, concepts and principles of civil engineering associated with their discipline, by demonstrating mastery in coursework and degree milestones; their ability to demonstrate communication and critical thinking skills at a graduate level; and their preparation for life-long learning. These indirect methods supplement the direct measurements for outcomes embedded in each course design. Additionally, in 2016 we added a faculty evaluation of students to add another measurement and complement the self-assessment. The following outcomes represent average student self-assessment responses in those areas, as well as faculty evaluations from 2016.

- **Mastery of Knowledge in Discipline and other areas – Based on a scale of Poor to Excellent, 90% of students rated from Good to Excellent - Target: 85%**
- **Communication Ability – 100% of students completed a written paper and/or oral presentation to Department masters student standards - Target: 100%**
- **Lifetime Learning - 62% of students attended technical seminars, participated in internships or were members of professional societies (student chapters) – Target: 60%**

**Faculty MEng. Evaluations (2016):**

- **Mastery of Knowledge in Discipline and other areas – 86% of faculty rated Acceptable or Exemplary – Target: 80%**
- **Communication Ability – 69% of faculty rated Acceptable or Exemplary – Target: 75%**

**Master of Science (MS)**

Our Master of Science (thesis) students, are assessed based on their ability to understand, apply and interpret theories, concepts and principles of civil engineering associated with their discipline; successful development and completion of a graduate thesis; and their preparation for life-long learning. Additionally, in 2016 we added a faculty evaluation of students to add another measurement and complement the self-assessment. Since 2015, assessment of our MS student outcomes show the Department met set targets. Though the targets were met during the timeframe of this review, the Department would like to see an increase in the number of technical conferences attended to supplement their learning and experience. The following
outcomes represent average student self-assessment responses in those areas, as well as faculty evaluations from 2016.

- **Mastery of Knowledge in Discipline and other areas** – Average of 98% rated from Good to Excellent – Target 85%
- **Communication Ability** – Average of 0.7 papers per student were presented at technical conferences or submitted to peer-reviewed journals – Target: .4
- **Lifetime Learning** – 70% of students attended technical seminars and 50% were members of professional societies (student chapters) – Target 70% of students either attended technical conferences or were members of professional societies.

**Faculty MS Evaluations (2016):**

- **Mastery of Knowledge in Discipline and other areas** – 95% of faculty rated Acceptable or Exemplary – Target 85%
- **Communication Ability** – 83% of faculty rated Acceptable or Exemplary – Target 75%

**PhD**

CVEN PhD students are assessed based on their ability to understand, apply and interpret theories, concepts and principles of civil engineering associated with their discipline; successful development and defense of a dissertation; and their preparation for lifelong learning. Additionally, in 2016 we added a faculty evaluation of students to add another measurement and complement the self-assessment. Since 2016, assessment of our PhD student outcomes show the Department met set targets. The following outcomes represent average student self-assessment responses in those areas, as well as faculty evaluations from 2016.

- **Mastery of Knowledge in Discipline and other areas** – Average of 92% rated from Good to Excellent – Target: 85%
- **Communication Ability** – Students presented an average of 2.8 times at technical conferences – Target: Average of 2 presentations
- **Lifetime Learning** – 60% of students attended technical seminars, participated in internships or were members of professional societies (student chapters) – Target: 60%
- **Research Mastery** – Students held an average of 4.5 papers published in technical journals – Target: 2 published papers

**Faculty PhD Evaluations (2016):**

- **Mastery of Knowledge in Discipline and other areas** – 83% of faculty rated Acceptable or Exemplary – Target: 85%
- **Communication Ability** – 77% of faculty rated Acceptable or Exemplary – Target: 75%
- **Research Mastery** – 77% of faculty rated Acceptable or Exemplary – Target: 75%
2.8 Analysis

As previously mentioned, the Department reassessed some of the tools and measurements used to identify student outcomes in 2015, with the goal of having both qualitative and quantitative measurements. In addition to program targets, the Department developed and implemented other tools to articulate the knowledge and skills students have acquired during their program.

For all graduating students, we have moved from using GPA as a primary measure, to utilizing student self-assessment/exit surveys, faculty evaluations and performance demonstration through written and oral presentations. The result has allowed us to more effectively triangulate outcomes for targeted outcome goals, and help us identify areas of improvement. For example, in 2015, exit survey data identified an opportunity to improve advising for MEng students to help them more successfully navigate the program. From 2016 to present, the ratings by students for advising have consistently improved and are above our target goals.

Outcome targets for doctoral students are also based on publications, presentations and participation in conferences. Most recently, the Department instituted annual PhD reviews to be completed for all enrolled students. PhD students were already being assessed by their advisors, however the purpose of this additional review is to provide feedback, to encourage and motivate Ph.D. student research while also providing additional guidance. The impetus of this review was based on a 2017 College of Engineering initiative to provide a more consistent and frequent review of the progress of students. The first Ph.D. student annual review took place in May 2018.

Moving forward, the graduate program is working on efforts to help supplement student learning outcomes, as well as preparing for changes in curriculum delivery. Currently there are plans to develop a focused writing program to help students improve skills and to encourage authoring journal publications among PhD students. The program also developed and started offering a professional development special topics course in Fall 2018 to help students improve their skills in finding employment and successfully navigating the workplace as a professional.

Overall, our graduate curriculum suits the needs of our students and the civil engineering profession. However, there are a few areas that need improvements in order to adapt and anticipate the change of the landscape in research and the change of the direction of the civil engineering profession. At the undergraduate level, the Department has a standing curriculum committee and a Curriculum Assessment and Implementation Team (CAIT) that examine the curriculum to assess the course contents and the progression of student learning on objectives and outcome. Such committees currently do not exist for the graduate curricula. The course offerings are determined by each area and there is minimal level of coordination at the Departmental level, making it difficult to develop graduate courses that can meet the needs of all graduate students across the Department. The examples of these courses include programming (such as Python), advanced statistics, risk analysis, data analytics, and Artificial Intelligence (AI)
methods. While we have strong courses to address traditional civil engineering topics, our courses may not adapt quickly enough to meet the needs of the profession, particularly in the areas of new methods, new tools and software programs, and new technologies. Our courses are often clearly defined for a specific civil engineering area. Another issue is the limited offering of courses exclusively for Ph.D. students since most courses are currently equally applicable to MS and MEng students.

During this review period, our 32-hour MS degree requires a thesis and we did not have a non-thesis MS degree. Many of our peers often offer a non-thesis option MS. Though we have a 30-hour MEng, it is often perceived as a less competitive degree, particularly by international students. This degree option situation might have affected the attractiveness of our graduate program as a whole. The Texas Education Coordinating Board has recently approved a 30-hour MS for the entire college. In 2019, a 30 hour non-thesis option will be available, and at the same time, the minimum hours for thesis option MS degree will also be reduced to 30.

3 Faculty Profile

3.1 Core faculty (defined as full-time, tenured and tenure-track)

The department currently has 49 core faculty in the department which is defined as full-time, tenured, and tenure-track faculty. The Academic Professional Track (APT) Faculty are not considered core faculty, and there are currently, 18 of them. Some of the core faculty members who taught and worked with Ocean Engineering students before they became a separate department, have continued to teach the same courses. Several new faculty members were hired into Civil Engineering, thus, the total number of core faculty did not change after Ocean Engineering became their own department (Figure 3.1).

3.1.1 Number of core faculty

Figure 3.1: Number of Core Faculty

Data compiled from Departmental records. Core faculty are defined as full-time, tenured and tenure-track faculty members within the Department.
3.1.2 Student / Core Faculty Ratio

Although the total number of graduate students increased during the review period, the number of Ph.D. students did not. The average Ph.D. students to core faculty ratio varied from 2.5 to just over 3.5. Factors which affected this ratio include the increased costs of graduate student support and the overall challenging funding environment the faculty faced during this period.

Table 3.1: Total Core Faculty and Students by Year

<table>
<thead>
<tr>
<th></th>
<th>Fall 2013</th>
<th>Fall 2014</th>
<th>Fall 2015</th>
<th>Fall 2016</th>
<th>Fall 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masters</td>
<td>251</td>
<td>327</td>
<td>250</td>
<td>235</td>
<td>249</td>
</tr>
<tr>
<td>PhD</td>
<td>169</td>
<td>162</td>
<td>146</td>
<td>149</td>
<td>168</td>
</tr>
<tr>
<td>Faculty</td>
<td>54</td>
<td>51</td>
<td>57</td>
<td>51</td>
<td>47</td>
</tr>
<tr>
<td>PhD Students / Core Faculty Ratio</td>
<td>3.13</td>
<td>3.18</td>
<td>2.56</td>
<td>2.92</td>
<td>3.57</td>
</tr>
</tbody>
</table>

Number of total enrolled students and core faculty. Based on Fall semester data provided by CVEN Graduate Office and includes Ocean Engineering through 2015. Only Coastal faculty and students counted for subsequent years.

Table 3.2: Number of PhD Students Per Faculty - By Area

<table>
<thead>
<tr>
<th></th>
<th>WR</th>
<th>CST-OCN</th>
<th>ENV</th>
<th>TR</th>
<th>MAT</th>
<th>STR</th>
<th>GEO</th>
<th>CEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2015</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Fall 2016</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Fall 2017</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>8</td>
<td>4</td>
</tr>
</tbody>
</table>

Number of enrolled students PhD students per core faculty member. Data based on Fall semester data provided by CVEN Graduate Office and includes Ocean Engineering through 2015. Only Coastal faculty and students counted for subsequent years.

Table 3.3: Number of Masters Students Per Faculty - By Area

<table>
<thead>
<tr>
<th></th>
<th>WR</th>
<th>CST-OCN</th>
<th>ENV</th>
<th>TR</th>
<th>MAT</th>
<th>STR</th>
<th>GEO</th>
<th>CEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2015</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>4</td>
<td>1</td>
<td>6</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Fall 2016</td>
<td>5</td>
<td>0.5</td>
<td>7</td>
<td>4</td>
<td>2</td>
<td>6</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Fall 2017</td>
<td>6</td>
<td>0.2</td>
<td>7</td>
<td>5</td>
<td>2</td>
<td>6</td>
<td>6</td>
<td>14</td>
</tr>
</tbody>
</table>

Number of enrolled students MS students per core faculty member. Data based on Fall semester data provided by CVEN Graduate Office and includes Ocean Engineering through 2015. Only Coastal faculty and students counted for subsequent years.
### 3.1.3 Publications

**Table 3.4: Number of Core Faculty Publications by Title**

<table>
<thead>
<tr>
<th>Year</th>
<th>Full Professor</th>
<th>Associate Professor</th>
<th>Assistant Professor</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2013</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>51.8</td>
<td>58.3</td>
<td>13.8</td>
<td>123.9</td>
</tr>
<tr>
<td>Average</td>
<td>2.5</td>
<td>2.7</td>
<td>1.7</td>
<td>6.9</td>
</tr>
<tr>
<td></td>
<td>2014</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>67.3</td>
<td>79.7</td>
<td>8</td>
<td>155</td>
</tr>
<tr>
<td>Average</td>
<td>3.2</td>
<td>3.2</td>
<td>1.6</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>2015</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>78</td>
<td>56.5</td>
<td>5.5</td>
<td>140</td>
</tr>
<tr>
<td>Average</td>
<td>3.4</td>
<td>2.7</td>
<td>0.8</td>
<td>6.9</td>
</tr>
<tr>
<td></td>
<td>2016</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>77</td>
<td>49</td>
<td>21</td>
<td>147</td>
</tr>
<tr>
<td>Average</td>
<td>3.1</td>
<td>2.7</td>
<td>1.6</td>
<td>8.4</td>
</tr>
<tr>
<td></td>
<td>2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>103</td>
<td>48</td>
<td>33</td>
<td>184</td>
</tr>
<tr>
<td>Average</td>
<td>4</td>
<td>3.2</td>
<td>3.3</td>
<td>10.5</td>
</tr>
</tbody>
</table>

Table 3.4 shows the average journal publications per core faculty for the most recent 5 years. This number increased from just under 2.5 per year to just under 3.0 per year, reflecting improved research productivity of faculty as well as graduate students.

### 3.1.4 External Grants

**Table 3.5: Amount of External Grant Money of Core Faculty by Title**

<table>
<thead>
<tr>
<th>Year</th>
<th>Full Professor</th>
<th>Associate Professor</th>
<th>Assistant Professor</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2013</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$6,728,735.00</td>
<td>$11,396,877.00</td>
<td>$2,214,344.00</td>
<td>$20,339,956.00</td>
</tr>
<tr>
<td>Average</td>
<td>$611,703.18</td>
<td>$949,739.75</td>
<td>$316,334.86</td>
<td>$1,877,777.79</td>
</tr>
<tr>
<td></td>
<td>2014</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$6,089,514.00</td>
<td>$11,864,452.33</td>
<td>$989,430.20</td>
<td>$18,943,396.53</td>
</tr>
<tr>
<td>Average</td>
<td>$553,592.18</td>
<td>$741,528.27</td>
<td>$329,810.07</td>
<td>$1,624,930.52</td>
</tr>
<tr>
<td></td>
<td>2015</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$15,144,283.71</td>
<td>$4,796,090.50</td>
<td>$2,721,374.91</td>
<td>$22,661,749.12</td>
</tr>
<tr>
<td>Average</td>
<td>$658,447.12</td>
<td>$228,385.26</td>
<td>$388,767.84</td>
<td>$1,275,600.22</td>
</tr>
<tr>
<td></td>
<td>2016</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$14,944,309.00</td>
<td>$5,257,340.00</td>
<td>$3,471,372.78</td>
<td>$23,673,021.78</td>
</tr>
<tr>
<td>Average</td>
<td>$597,772.36</td>
<td>$292,074.44</td>
<td>$433,921.60</td>
<td>$1,323,768.40</td>
</tr>
<tr>
<td></td>
<td>2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$15,025,601.00</td>
<td>$3,470,319.00</td>
<td>$3,772,233.00</td>
<td>$22,268,153.00</td>
</tr>
<tr>
<td>Average</td>
<td>$601,024.00</td>
<td>$231,355.00</td>
<td>$377,223.00</td>
<td>$1,209,602.00</td>
</tr>
</tbody>
</table>

External grant data listed by core faculty title for both total and averages for each academic year 2013-2017. Data provided by CVEN Department Head’s office.
3.1.5 Teaching load
The typical tenure/tenure track faculty teaching load for research active faculty members is 3 courses per year, not including summer. Recently hired faculty are given a reduced teaching load of one course per semester for the first two years. The Texas workload prescribes three courses per semester which is satisfied through teaching, advising graduate students, and service. Faculty members that are not research active teach two to three courses per semester and have service activities. Academic Professional Track (APT) faculty (Instructors, Instructional Professors, Professors of Practice) are expected to teach three courses per semester or offset teaching with service or research activities.

3.2 Faculty Other than Core
The Department currently has 19 Academic Professional Track (APT) faculty members (Table 3.6). They teach undergraduate level classes and also provide services to the Department such as undergraduate student advising. One particular graduate level class that has just begun is a seminar class for professional development for civil engineering industry. This seminar class is currently taught by an (APT) faculty members. APT faculty members generally do not conduct sponsored research or advise graduate students at the Ph.D. level.

| Table 3.6: Academic Professional Track Faculty |
|---------------------------|---------|---------|---------|---------|
|                           | Fall 2015 | Fall 2016 | Fall 2017 | Fall 2018 |
| Professional Track        | 13       | 13       | 19       | 19       |
| Other Tenure Track        | 3        | 3        | 4        | 5        |
| Core Faculty              | 51       | 51       | 50       | 49       |
| Total                     | 67       | 67       | 73       | 73       |

Non-core faculty primarily focus on teaching undergraduate courses and minimal interaction with graduate students. With instruction being their primary role, publications and external grants for research are nominal among non-core faculty at this time.

3.3 Faculty diversity
The Department faculty highlights good diversity in gender and ethnicity. About 20% of the core faculty are women. Overall, in Fall 2017 the Department had 11 female faculty members, 5 Hispanic faculty, 35 white, and 8 other (Asian, international, etc.).
Data provided by DARS shows gender demographics for current CVEN faculty

Data provided by DARS shows ethnicity demographics for current CVEN faculty

3.4 Faculty qualifications (i.e., expected qualifications for faculty hired by the degree program)

The Department faculty is very qualified. Most of them are excellent teachers and active in research. Much of the research is applied in nature, particularly for TTI affiliated projects. Current and future faculty hires in the Department emphasize expertise beyond traditional civil engineering fields to expand the multi-disciplinary capability of the faculty to foster higher levels of multi-disciplinary collaboration across Departments, colleges, and with other institutions and encourage partnership with industry and with government laboratories. With the expanded
capabilities of multi-disciplinary research, it will make it possible to organize teams to compete for large center- or consortium-level research grants which are sorely lacking currently.

3.5 Analysis

The number of full-time faculty members is adequate to support the mission of the institution and to ensure the quality and integrity of its academic programs. The civil engineering faculty is very dedicated in teaching, research, and service. This Department has a group of excellent teachers in teaching both undergraduate and graduate classes. The faculty cares about and has a great relationship with our students. Many of our undergraduate students particularly in some areas (structures and others) choose to stay at Texas A&M for their graduate studies, and this reflects well the quality of teaching and advising our students receive from our faculty. The majority of the faculty are research productive, and have strong levels of research involvement. The faculty also has an excellent reputation in service to the profession, the university, and the Department. In particular, several of our faculty members are serving the college at various leadership positions and in their professional societies.

There are several areas of concern. The faculty research areas are dominated by traditional areas, which affect the overall competitiveness on interdisciplinary research initiatives and programs. Though as a Department the volume of the research and total dollar amount of research grants are very healthy, the average number of grants and the average research dollar amount per faculty are not high compared to our peers. Looking at the distribution of faculty by rank, it is top heavy lacking junior faculty in some areas. These situations are improved by recent hires of assistant professors, including three in academic year 2018. The new assistant professors are also more active in interdisciplinary research and better positioned to compete for new research grants.

4 Student Profile

4.1 Doctoral and Masters

4.1.1 Enrollment, including % of full-time students

Total graduate student enrollment in the Department has held steady at just around 400 for the past three years, which is an increase from 2012-2013. (Figure 4.1) Fall semester enrollment numbers are slightly higher than spring and summer semesters as the major influx of graduate students is in the fall while they graduate from the program throughout the year. For FY 18, 138 students are Master of Engineering level, 114 are Master of Science level, and 186 are considered doctoral students. International students comprise approximately 70% of the students, and 30% are domestic. Approximately 35% of domestic graduate students come from universities outside of Texas, with the majority coming from Texas schools, and predominately Texas A&M.
Figure 4.1: Graduate Student Enrollment

![Graph showing Total Enrollment 2012-2017]

Data was provided by TAMU-DARS and includes Ocean Engineering Program data from 2012-14.

Fulltime enrollment in our graduate programs over the past 5 years has averaged 87%. Fulltime status is defined as enrollment in at least 9 hours in the Fall and Spring semesters, and 6 hours in the Summer. A couple of factors driving this fulltime enrollment rate include the large percentage of international students in our graduate programs, and the fulltime eligibility requirements for funding. International students make up 70% of our graduate student population and student visa stipulations require them to be enrolled fulltime in Fall and Spring semesters. For students who have been awarded funding or assistantships, their eligibility also requires they be full-time during the semesters they receive funding. Additionally, most of our students are traditional and not working full-time jobs while attending school. For masters students, the impetus is to complete their programs in minimal time so they can move into their professions. We anticipate the number of part-time students may increase as we are able to offer an increased number of online courses and non-traditional programs which allow professionals to attend remotely.

Figure 4.2: Percentage of Graduate Students Enrolled Fulltime

![Graph showing Percentage of Graduate Students Enrolled Fulltime]

Data was provided by TAMU-DARS and includes Ocean Engineering Program data from 2012-14.
4.1.2 Student diversity / demographics

Though the Department has consistently maintained a large international student population, we continue to include diversity initiatives in our strategic plan. With the addition of a new graduate advisor who assists with recruiting initiatives, we hope to increase visibility of our program through proactive measures, both “high tech” and “high touch” in nature. Efforts to target students of diversity from previously under recruited undergraduate programs are underway and we are in the middle of revamping our website and program promotional materials. Recruiting efforts in Spring 2017 were successful in admitting two students who received Diversity Fellowship awards. Both had been recruited during our annual Spring Invitational event in 2017. We will continue our recruiting efforts to increase our enrollment of domestic minority and female students and expect to see progressive success as we move forward. To date, the one potential obstacle we foresee is the new Graduate Enhancement Fee implemented in Fall 2018. While the fee aims to provide resources for enhancement of the graduate program, it will increase the cost of the degree which could create an impediment to our recruiting efforts. We are in the process of developing strategies to use the fee to enhance graduate climate, and commit more resources to develop new strategies for recruiting and better financial support. Our goal is to use the fee in such a way that the enhancements to our program outweigh the increase in cost.

Gender

Currently, 27% of our enrolled graduate students are female (Figure 4.3). By degree, female students represent 28% of masters students and 26% of PhD students. In 2015, there was a reduction in the number of female masters students in the CVEN after Ocean Engineering had separated from the Department in 2015 (Figure 4.3).

Figure 4.3: Student Enrollment by Gender

Data for this chart was provided by TAMU DARS and includes both domestic and international students. Data from the Ocean Engineering Program is also included from 2012 to 2014.
Ethnicity

Ethnic diversity in the CVEN graduate program has fluctuated during the review period. In Fall 2017, 30% of doctoral students and 44% of masters students were considered to be of diverse origin. (Figure 4.4).

Figure 4.4: PhD Student Enrollment by Ethnicity

Data for this figure was provided by TAMU DARS and includes Ocean Engineering Program from 2012 to 2014. Data includes both domestic and international students.

Figure 4.5: Masters Student Enrollment by Ethnicity

Data provided by TAMU DARS and compiled by the CVEN Graduate Office. Data includes both domestic and international students.
International

The majority of the Department’s graduate student enrollment during the review period was comprised of International Students. During this time, the majority of these students were pursuing PhD degrees, however in 2014 we saw an increase in the ratio of international masters to PhD students. International Students are defined as “Individuals studying in the United States on a non-immigrant, temporary visa that allows for academic study at the post-secondary level”. Immigrants, permanent residents, citizens, resident aliens (“Green Card” holders), and refugees are excluded from this definition. As our strategic plan indicates we are working toward bringing more balance to the international/domestic student ratio.

Figure 4.6: International Student Enrollment

Data provided by TAMU and includes the Ocean Engineering Program from 2012 to 2014. Bars indicate total headcount.

4.1.3 Retention rates

Retention rates in the Department have remained high. We believe this is due to the comprehensive effort by the program to recruit quality students, support and develop them through their program, and encourage minimum time to completion. Regarding support of the students, we believe the efforts of the faculty and staff of the civil engineering Department have made a significant impact on our graduation and retention rates. This is indicated by the supporting data and exit survey responses receive from all graduating students. An example of the survey is listed in Appendix I, p. 308.
Doctoral Retention

For the purposes of this data, doctoral students were defined as students classified in G8 status. G8 classification represents those students who already have a masters degree, or who have completed at least 30 hours of eligible graduate coursework post the BS degree if pursuing a direct-to-Ph.D. degree.

Figure 4.7: Doctoral Student Retention Rates

Data provided by TAMU-DARS and compiled by the CVEN Graduate Office. Based on fall semester enrollment. Ocean Engineering doctoral students are included from 2012-2014.

4.1.4 Number of degrees per year

The number of degrees awarded for the graduate program have fluctuated across the review timeframe (Figure 4.8). The number of PhD degrees awarded each year is dependent on the number of admitted PhD’s in the years prior. In AY 2014-15, there were fewer PhD degrees awarded due to the large number of new enrolled PhD’s in 2012. Most of these students completed their degrees in AY 2015-2016 which is indicated by the increase in PhD awards during that time. An increase in the number of masters students degrees awarded. This was due to the increase in masters student admissions in 2013, which was being driven by the newly implemented 25 by 25 initiatives from the College of Engineering to increase graduate enrollment by 6%.
4.1.5 Figure 4.8: Number of Degrees Awarded by Year

Data was compiled by the CVEN Graduate Office using information supplied by TAMU-DARS. Awarded degrees for Ocean Engineering are included in the chart from 2012 to 2014.

4.1.6 Graduation rates

The chart below (Figure 4.9) details the graduation rate among doctoral students. However, since the data is based on when the student begins his/her studies, the results cannot be fully assessed at this time. Ideally, a MEng student will take one and a half to two years taking at least 9 sch per semester. A MS student will ideally take two years to complete the degree; whereas a typical PhD student will take four years to complete after the requirements for a MS degree have been met.

Figure 4.9: Graduation Rates – PhD

Data was compiled using the CVEN Graduate Office database and includes Ocean Engineering from 2012-2014.
4.1.7 Average time to degree (most recent 5 years)

Average time to degree completion for both masters and PhD students was calculated using the difference between the students start semester and the semester they graduated. The data provided by DARS was inaccurate and therefore information from the CVEN Graduate database was used for this section.

Our doctoral students have averaged time to degree of 4.5 years during the review period. There are a variety of factors which can impact a PhD students time to degree. A few students lost some time (a semester) due to availability of testing equipment. A few others had changes to their committee chairs beyond their control which usually set them back a semester. To assist with some of these challenges, the Department has instituted required annual PhD reviews to provide students feedback regarding their progress. In addition to the usual interaction between students and their chairs, this resource also provides the Department a more accurate method of identifying any challenges students may be facing, and the opportunity to try and address them before they affect a student’s time to completion. The Department is also focusing on timely completion of qualifying and preliminary exams.

**Figure 4.10: Average Time to Degree Completion- PhD**

Data for the chart was compiled from the CVEN Graduate Office database. Ocean Engineering was included from 2012-2014.

Over the past five years the average time to completion for master degree non-thesis students was 1.5 years. This is a 30 hour program, and therefore students taking 9 credit hours in Fall and Spring semesters usually complete the program across 3 long semesters and the summer. Those students who are fulltime usually register for more than 9 hours in one of those semesters, or they are able to find hours during the summer. CVEN graduate courses for non-thesis students are not typically offered in the summer, however some of the qualified electives outside the Department are available. The Department already has plans in place to offer additional courses in the summer, which we believe will help students expedite their time to degree. For our masters thesis students, the average over the past 5 years has been 2.31 years.
The additional time is attributed to research, development and preparation for their defense and thesis. Again, additional course offerings will provide these students an opportunity to complete coursework sooner and focus on research.

Figure 4.11: Average Time to Degree – Masters Students

Data was compiled from the CVEN graduate database. Ocean Engineering is included from 2012-2014.

4.1.8 Average institutional financial support provided

Financial support for students plays a critical part in the Department’s ability to recruit and retain quality students. It will continue to be an important factor as we have seen the total cost of attendance increase during the review period, and an even more dramatic increase began in Fall 2018. This was due to increases in tuition and fees. For resident students, tuition has increased from $220 per semester credit hour (sch) in 2012, to $257/sch in Fall 2016, and from $381/sch for non-resident students to $681/sch. With the addition of the new Graduate Program Fee, new CVEN graduate students will pay an additional $145/sch beginning Fall 2018, and then $285/sch for new students starting Fall 2019. A comparison of standard tuition costs for fulltime graduate students (at least 9 sch per term) starting Fall 2016, Fall 2018 and Fall 2019 is listed in Table 4.1.

Table 4.1 Cost of Attendance per Semester – Fulltime Graduate Students

<table>
<thead>
<tr>
<th></th>
<th>Resident</th>
<th>Non-Resident</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall 2016 Tuition</strong></td>
<td>$2,173</td>
<td>$5,986</td>
</tr>
<tr>
<td><strong>Fees</strong></td>
<td>$1,339</td>
<td>$1,339</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$3,512</td>
<td>$7,325</td>
</tr>
<tr>
<td><strong>Fall 2018 Tuition</strong></td>
<td>$2,457</td>
<td>$6,854</td>
</tr>
<tr>
<td><strong>Fees</strong></td>
<td>$2,486</td>
<td>$2,486</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$4,943</td>
<td>$9,340</td>
</tr>
<tr>
<td><strong>Fall 2019 Tuition</strong></td>
<td>$2,457</td>
<td>$6,854</td>
</tr>
<tr>
<td><strong>Fees</strong></td>
<td>$3,746</td>
<td>$3,746</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$6,203</td>
<td>$10,600</td>
</tr>
</tbody>
</table>

Data from TAMU Student Business Services. Tuition/Fee totals are based on enrollment of 9 credit hours per semester.
Financial support is available to civil engineering graduate students in various forms from several different sources within the University. Non-resident graduate students who are awarded funding are also eligible for out of state tuition waivers. Graduate students in the Civil Engineering Department receive funding through the following financial assistance opportunities:

• Graduate Assistantships – Teaching (GAT) & Research (GAR)
• Graduate Fellowships (Department, College and University)
• Graders, hourly part-time employees, student workers

The Graduate Teaching Assistants (GAT) assist faculty with course preparation, grading, helping students with homework questions, and some teach the laboratory sections of several undergraduate courses. The English language proficiency requirements are higher for GATs than graduate students in general, as required by the State of Texas. All GAT appointments are for half-time employment (20 hours per week).

The Graduate Research Assistants (GAR) assist faculty with research. Funding for these opportunities are based on availability from the principal investigators. Individual faculty members holding research contracts administer graduate research assistantships. Civil engineering graduate students held approximately 155 research assistantships during the fall of 2016. Other agencies and organizations, such as TEES and the Texas Transportation Institute (TTI) administer many of these opportunities.

In addition to Department supported assistantships, Civil Engineering continues to have a valuable relationship with TTI through the training of our graduate students, not only in the areas of Transportation and Materials (TM), but also in the Construction, Geotechnical and Structural (CGS) areas. Although TTI supports a significant portion of civil graduate students, we continue to work with them to bring up their stipend rates in line with the Department, as TTI did not increase their stipends across all projects at the same rate the college has.

Monthly stipends for graduate assistantships currently average $2000 per month at the masters and doctoral levels. This monthly rate has progressively risen since the last annual review when they averaged $1300 (Table 4.2). This increase began in 2016, when the COE Dean instructed all Departments to begin to raise their stipend rates to $2000/month. Some existing projects that did not have enough funds to pay students the required stipend, were allowed to offer lower rates. Standard tuition is also paid for students who hold assistantships, but not fees for GATs. For GARs it is up to the principal investigator (P.I.) whether they want to cover fees, and it is usually based on available funding for their research project.
Table 4.2: Average Funding Amounts

<table>
<thead>
<tr>
<th>Appointments &amp; Monthly Stipend</th>
<th>GAT</th>
<th>GAR</th>
<th>Student Worker</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>61</td>
<td>203</td>
<td>23</td>
</tr>
<tr>
<td>Avg Monthly Stipend</td>
<td>$1,250</td>
<td>$1,500</td>
<td>$867</td>
</tr>
<tr>
<td>2013</td>
<td>37</td>
<td>113</td>
<td>36</td>
</tr>
<tr>
<td>Avg Monthly Stipend</td>
<td>$1,250</td>
<td>$1,500</td>
<td>$867</td>
</tr>
<tr>
<td>2014</td>
<td>60</td>
<td>120</td>
<td>45</td>
</tr>
<tr>
<td>Avg Monthly Stipend</td>
<td>$1,300</td>
<td>$1,500</td>
<td>$867</td>
</tr>
<tr>
<td>2015</td>
<td>70</td>
<td>120</td>
<td>57</td>
</tr>
<tr>
<td>Avg Monthly Stipend</td>
<td>$1,350</td>
<td>$1,500</td>
<td>$880</td>
</tr>
<tr>
<td>2016</td>
<td>72</td>
<td>112</td>
<td>65</td>
</tr>
<tr>
<td>Avg Monthly Stipend</td>
<td>$1,500</td>
<td>$1,586</td>
<td>$1,026</td>
</tr>
<tr>
<td>2017</td>
<td>76</td>
<td>112</td>
<td>109</td>
</tr>
<tr>
<td>Avg Monthly Stipend</td>
<td>$2,000</td>
<td>$2,000</td>
<td>$1,026</td>
</tr>
</tbody>
</table>

Data was provided by the CVEN Graduate Office. Fellowship amounts listed for each year are averages of one-time funding awards. Assistantship data represents average monthly stipend payments.

Graduate student fellowships are awarded annually through available funds of approximately $300,000. This has supported their endowments and annual scholarships for the Department and its graduate students. The minimum fellowships award amount is $1,000, which is also the minimum funding requirement to provide non-resident graduate students with in-state tuition rates. Eligibility and stipulations for each Department fellowship is outlined in the donor agreements. Although we currently have some fellowships which can be awarded to international students, the majority specify U.S. residency as a requisite. The average annual fellowship award increased from $1200 in 2012 to $1700 in 2017.

Table 4.3: Average Annual Fellowship Awards

<table>
<thead>
<tr>
<th>Year</th>
<th>Fellowships</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>112</td>
</tr>
<tr>
<td>2013</td>
<td>71</td>
</tr>
<tr>
<td>Average Award</td>
<td>$1,200</td>
</tr>
<tr>
<td>2014</td>
<td>92</td>
</tr>
<tr>
<td>Average Award</td>
<td>$1,800</td>
</tr>
<tr>
<td>2015</td>
<td>75</td>
</tr>
<tr>
<td>Average Award</td>
<td>$1,500</td>
</tr>
<tr>
<td>2016</td>
<td>83</td>
</tr>
<tr>
<td>Average Award</td>
<td>$1,600</td>
</tr>
<tr>
<td>2017</td>
<td>80</td>
</tr>
<tr>
<td>Average Award</td>
<td>$1,700</td>
</tr>
</tbody>
</table>

Data was provided by the CVEN Graduate Office. Fellowship amounts listed for each year are averages of one-time funding awards. Assistantship data represents average monthly stipend payments.
The Department’s average financial support for PhD students was $14,208 during the review period (Figure 4.12). This average does not include payment of tuition, which is paid by the department for teaching and research assistantships.

**Figure 4.12: Average Institutional Financial Support - PhD**

[Bar chart showing average institutional financial support for PhD students from 2012-2013 to 2016-2017, with the highest support in 2016-2017 at $17,767 and the lowest in 2012-2013 at $12,585.]

Data was provided by the CVEN Department Head’s office.

**College and University Funding**

In addition to funding through the Department and TTI, the University and the College of Engineering also provide funding for graduate fellowships. The University's Merit Fellowship program of over $63,000 spread over 4 years (in addition to GAR or GAT funds) is used to attract some of the more outstanding applicants to the University's graduate program (The Merit Fellowship is now administrated by the college). A very similar program, called the Graduate Diversity Fellowship, is used to attract underrepresented groups to the graduate program, which has helped increase diversity. Each year the Department selects competitive students admitted for the upcoming year and presents recommendation profiles to the University and COE for consideration. For students awarded, these fellowships provide a competitive recruiting tool. The Department has consistently had 1-3 students receive the Merit and Diversity fellowships for the past Fall semesters, which speaks to the quality of our applicants.

**4.1.9 Percent of full-time students with institutional financial support**

Offering funding opportunities for our graduate students, particularly our doctoral students, is a critical aspect to enhance the Department’s recruiting efforts and remaining competitive among peer institutions. For fulltime doctoral students, the program has set a goal of ensuring our doctoral students have financial support. The majority of students are funded either through research grants (including TTI projects), Assistantships (Research and/or Teaching) or are government sponsored. In 2013 and 2014, the Department experienced a
reduction in the percent of fulltime students who were funded (Figure 4.13). In 2015, funding opportunities began to increase again and as of 2017, we are close to the level we experienced in 2012. The impetus now is for the program to move closer to being able to fund all admitted doctoral students. Identifying more research opportunities is one way we are addressing these goals. With the new Graduate Program Fee for the college going into effect Fall 2018, we have developed some guidelines for how best to utilize these funds to support our graduate students. If successful, these additional resources should also positively impact our recruiting efforts.

**Figure 4.13: Fulltime Students Receiving Institutional Funding**

![Graph showing percentage of fulltime students receiving institutional funding from 2012 to 2017.](image)

Data compiled from CVEN Graduate Office. Does not include fulltime students already supported by foreign governments.

### 4.1.10 Student publications / presentations (most recent 5 years)

During the review cycle timeframe, our doctoral students have averaged 2 publications per year, and attended at least 3 technical conferences, the average being 4. We continue to encourage students to publish and with the implementation of our strategic plan, and specifically assistance with writing development, we hope to increase the interest and confidence of students to publish. We are planning to utilize a portion of the funds from the new Graduate Enhancement Fee to help support travel to conferences.

### 4.1.11 Employment profile (in field within one year of graduation; most recent 5 years)

Employment data for students can be challenging to compile. Information gathered when students are in their final semester has proven to yield the most information. The Department requires all graduating students to complete a survey which includes post-graduation employment or continuing education plans (Figure 4.14). Because we survey students prior to the end of their graduating semester, the percentage represented by analyzing exit surveys of employment data is usually lower, as more acquire employment either closer to the end or just after their graduating semester. Domestic graduate employment or continuing education is usually close to 100%, while our International Students have a little more difficulty, though compared to other fields, they have been much more successful at acquiring employment at graduation. Once students graduate, it becomes much more difficult to track this data, particularly for those working outside of academia. For the purposes of tracking, we define
placement as either employment or acceptance into another graduate or post-doc program. The most likely challenge we face moving forward, is in regard to the group of students most likely to encounter challenges with post-graduation employment, our international students. Changes in government regulations regarding work visas may impact how many companies will continue to offer positions international students. Over the past 5 years, our international students have been predominately successful in their employment goals, but part of our strategic plan includes professional development for students to help enhance their employability, particularly with their communication and leadership skills.

**Figure 4.14: Graduating Students Employment & Continuing Education**

![Graph showing student responses by semester of graduation](image)

Data was compiled using information from exit surveys completed by graduating students in their last semester. Most surveys are returned mid-semester, thus these numbers most often increase toward the end and the last semester.

### 4.2 Analysis:

Over the past five years, the graduate program has seen some positive outcomes related to our efforts, including increased funding opportunities, and consistent ranking in U.S. News & World Report. However, the intent of the program’s strategic plan is to continually seek ways to enhance key areas including recruiting, student development and graduation outcomes. We are also focused on increasing the number of competitive applications, particularly from U.S. domestic and diversity students, to increase enrollment per the ‘25 by 25’ initiative. We are making progress in this area, but are also seeing some new challenges, such as increased cost of attendance. The strategic plan is also intended to supplement our enhanced recruiting efforts. In 2016, the Department hired a Senior Academic Advisor whose role, among others, includes developing proactive recruiting initiatives to increase domestic applicants. However, meeting the demands of 400 graduate students left little time to make substantial gains in developing recruiting materials. In 2018, we hired an Assistant Director of Graduate Programs to further enhance recruiting efforts. As with other graduate engineering programs, civil engineering graduate enrollment is usually made up of 70% international and 30% domestic students. We
would like to bring more balance to this ratio. Efforts are under way to proactively market our graduate programs and recruit students from more of our peer institutions. Currently, the majority of our domestic enrollment are TAMU undergraduates, however we would also like to further increase graduate school interest with that group. We continue to work closely with our undergraduate program to promote graduate school opportunities earlier in the program and encourage research interest. Since 2015, we have waived application fees and since Fall 2017, no longer require GRE scores for current TAMU undergraduates. We believe this effort has been fruitful, but promoting the program is an ongoing effort. In addition to targeting peer institutions, we are also looking at establishing relationships with various engineering and science undergraduate programs at schools which do not have graduate programs, and schools with higher diversity populations. The strategic plan also addresses the need for funding, as this is a major consideration for students considering graduate school.

While we have been fortunate to have funding opportunities for many of our students, we are currently unable to offer funding to all PhD students. Additionally, in 2018, the College of Engineering implemented a new Graduate Enhancement Fee for engineering students. This is a per credit hour fee which will start at $145 and increase to $285/semester credit hour by Fall 2019. This will impact recruiting by increasing total cost to students, but it will also impact funding for students. For a student taking 24 hours a year, this will increase fees to $6,840 per year. This will certainly affect our non-thesis master students, and our international students in particular. However, we are working on ways to utilize the funds the program will receive from these fees, which we believe, along with other initiatives, will still help us achieve our goals. Additionally, the Department has increased the number of faculty to provide more support for our students and to increase research opportunities for them.

There are other significant challenges in recruiting and supporting our graduate students. Our graduate student body is heavily international, particularly at the Ph.D. level. While we do receive quality applications, we have seen steady decline in the number of international applications in recent years possibly due to the changes in visa and immigration laws and procedures, along with the economic and other changes in the foreign countries where we receive most of our applications (i.e. China and Iran). While the college’s growth plan called for an increase in enrollment numbers, we need to develop strategies to increase the yield instead of lowering admission standards. The most effective ways to improve the yield is to make attractive financial support packages. In addition, we have increased our efforts to make early contact with admitted students, are involving faculty in the process, and are aiming to increase departmental participation in college wide recruiting events such as Spring Invitational or Fall Graduate Preview. We were not effective in providing attractive (multiple-year) packages to international students. The rising cost for graduate education will have a negative impact on the enrollment of our self-funded masters students. We are developing strategies to use the program fee returned to the Department to provide multiple-year offers to top applicants, and also provide more graduate fellowships to self-funded international masters students so they can qualify for in-state tuition to offset the rising cost of graduate education. Recently we also faced the issue of
changing the application system two times in two years, which could have had a negative impact on the number of applications received.

5 Concluding Observations

The following is an assessment of the strengths, weakness, opportunities, and threats related to our graduate programs. After the SWOT analyses, the goals of the graduate programs are presented.

Strengths

The Departmental strengths fall into the following major categories: reputation, faculty, education programs, research, size and other factors. The strengths are indicative of a faculty that takes pride in the quality of education that our students receive and the collegiality within the Department. Ranked in top 10, out of nearly 143, among public institutions, the civil engineering Department is highly regarded for both the undergraduate and graduate programs offered. Being one of the largest programs in the U.S. and graduating students that are highly sought in the workforce contribute to the perception of the Department as a major institution with brand name recognition. This reputation is furthered by the valued relationships with former students, their successes, and resources they provide to the Department demonstrated with donations, program support, and engagement. The Department faculty is large in number and diverse in the research conducted. The faculty take pride in the quality of their teaching and maintain high expectations reflected in annual and promotion reviews. There is a culture of respect and collegiality among the Department faculty.

The breadth of the faculty generates a wide range of research activities. Funding sources include state and federal agencies, institutes, industry and centers. Thanks to the Dean and Chancellor’s efforts and five years of planning by the Department faculty and TTI personnel, the Center for Infrastructure Renewal (CIR) is now complete, functional and will be a substantial boost to research potential. The Offshore Technology Research Center continues to generate corporate support providing opportunities for corporate supported research. TTI has been a significant source of research and funding for many faculty including transportation, materials, structures, construction, and geotechnical engineering. The new director of the Texas Water Research Institute holds tenure in the Department and is generating new research opportunities for the Department faculty. Multi-disciplinary collaborations with other colleges have been successful, for example the Texas Water Observatory which is being supported with RDF funds. Many faculty enjoy international collaborations that include China, Korea, Spain, Mexico, and others.
**Weaknesses**

Departmental weaknesses were identified in education, research, faculty and external factors. At the graduate level, there is a need to provide more targeted doctoral level courses in some areas within the Department. Recruiting is hampered by the lack of long-term support that can be committed to students through their degree, particularly for doctoral students.

Research activities are hampered by the lack of federal funding sources available, inability to attract domestic doctoral students, and the need for large-scale research initiatives. Most funding for civil engineering research comes from municipal and state sources, although some corporate sources exist. The federal funding is at a very low level. The Department has only one NAE member and not been able to hire any additional NAE members or Chancellor Research Initiative (CRI) prospects. Although some faculty have been participating in large-scale research initiatives, such as ERCs, with other institutions as the lead, not enough internal efforts have been championed. This may be linked to the lack of seed funding for new research initiatives.

All TxDOT funding must be routed through TTI. Further, access to a TTI controlled infrastructure makes it necessary to route many other DOT projects and NCHRP projects through TTI. The dependence on TTI funding is problematic for many faculty because there is very uneven engagement of areas and ranks. TTI has hired several individuals with expertise in transportation and materials which eliminates the need to engage Department faculty with expertise in those areas. It is not unusual for faculty members to be involved as lower level researchers rather than PI or coPI on projects so that TTI members can be supported.

While many faculty are highly research active, there are those who are marginally active or not active at all which is bringing down the Department’s performance as reported by Academic Analytics (AA). However, the AA reports only consider federal funding sources and civil engineering research is largely supported by non-federal sources.

**Opportunities**

Several opportunities are anticipated for the Department, especially in education, faculty, and research. New degrees in environmental engineering and architectural engineering are being planned, both of which should attract a more diverse pool of students. The workforce need for masters graduates, particularly in structural engineering and construction management, could be ripe to generate distance education courses. Transportation is another potential distance education growth area and collaborating with the outreach efforts embedded in the CIR would be a beneficial collaboration. The new Zachry Engineering Education Complex will be a show-piece that will promote all of engineering and excellence of educational opportunities. The Department can capitalize on this recognition.

With recent retirements and the voluntary separation program, several faculty positions will need to be filled. Current efforts to fill positions that are open rank and open discipline are considered creative ways to seek talent broadly. Also, the college’s willingness to reward ‘hires
of opportunity’ is seen as very beneficial and motivating to seek talent from a diverse pool of candidates. The CIR cluster hires could bring research active faculty in infrastructure areas. These programs provide a chance to make more strategic hires of new faculty. The addition of Academic Professional Track faculty is proving to be highly beneficial to the Department’s ability to meet teaching needs and engage individuals with expertise that the faculty lack. The Graduate Teaching Fellows (GTF) program is alleviating the teaching loads and making it possible to offer more courses at the graduate level by freeing up T/TT faculty from the undergraduate courses now being taught by the APT faculty members and GTFs. At the same time the GTF program provides the teaching experience and credential for our Ph.D. students to be competitive in getting faculty positions.

The civil engineering profession is driven to meet the needs of society and there are many challenges that require advances through research. The state of the country’s infrastructure, damage to the built environment due to extreme weather events (natural disasters), and threats to human and environmental health are some of the emerging research topics that should receive attention and have an infusion of research support. The faculty is cognizant of the need to be in a position to respond to the opportunities when they arise and are self-organizing in various centers or groups. The CIR, which is the first new building on the RELLIS campus, will be an important expansion that will also provide new multi-disciplinary collaborations in the shared research facilities. Development of the RELLIS campus will provide unique facilities for the faculty and the co-location of TTI and TEES headquarters will be very beneficial. Collaborations with material sciences and other Departments through shared research interests in autonomous vehicles, sensor technologies, new materials, to name a few advancing research arenas are exciting new extensions for the Department faculty.

Threats

At the Department’s current rank, it will be quite challenging to move up in the ranking and easier to move down. The perception of threats was considered by most faculty members to be external to the Department. However, the recent loss of several senior faculty members could create higher teaching loads unless we plan carefully. The decline in federal funding for civil engineering related research is of great concern. TTI management favors supporting their existing workforce with research funds which is reducing the need or desire to integrate faculty and students into their projects. The poor yield in recruiting high-quality graduate students, domestic or international, can seriously jeopardize the success of faculty members’ research advances if they cannot hire qualified students.

The college research priorities only marginally engage faculty expertise from the Department. Loss of the Haynes and the Hydrodynamics Laboratories has adversely impacted the ability to conduct fluids related research including projects in water resources and coastal engineering. The loss of these facilities has had a negative impact on the morale of those faculty members. Additional concerns emanating from the loss of overhead return and competition with centers, centralization of power, insufficient funds for start-up packages, and the rising overhead
rate. The increase in overhead when federal funding levels, notably NSF, is static further reduces the ability of faculty to be competitive. Keeping up with the rate of institutional change is very challenging.

The newly imposed Graduate Program Fee could be a threat to recruiting and supporting graduate students. With the increased cost of graduate education due to the GPF, the Department and the college as a whole may lose the advantage of being perceived as “best value” and see the number of applications drop. At the same time, it will be more expensive to support graduate students on research grants if these fees are to be covered on projects. The budgets of research programs remain the same or are diminishing, making it difficult to support as many students as the faculty used to do. TTI has traditionally supported a significant portion of our graduate students on research, but TTI PIs have voiced their strong concern on the rising costs of graduate students (higher tuition and new fees). Some PIs may opt to support fewer graduate students, or hire them as student workers instead of graduate research assistants.

6 Graduate Program Goals

Specific goals for enhancing the education of our graduate students include the following:

- Launch two new graduate ABET accredited programs (Architectural Engineering and Environmental Engineering)
- Keep pace with innovation impacting the civil, architectural, and environmental engineering fields and evolving the Departmental curriculum accordingly
- Expand the multi-disciplinary talent within the department. Hire faculty with expertise beyond traditional civil engineering fields
- Use some of the graduate enhancement funds to elevate the national and international recognition of our program (e.g., fund student travel to conferences, invite international leaders in civil engineering to our seminar series, etc.)
- Maintain and enhance our research portfolio to support the research activities of our graduate students.
- Create a focused writing program to support all thesis degree students, including mentoring and resources for authoring journal publications and technical reports
- Create a professional development track to mentor doctoral students whose goal is to pursue an academic profession.
- Create a professional development course to mentor those doctoral students who do not aspire to a career in academia.
- Ensure that all our doctoral students are funded to conduct their research.
- Develop curricula in multiple appropriate focus areas, dependent on workforce needs, for students to earn one-year masters degrees.
- Provide undergraduate students with more options to take graduate courses and save the hours for graduate degrees.
• Develop a portfolio of online courses that graduate students and practicing professionals can take to obtain certificates and masters degrees.

7 Appendices

A. Faculty CVs (abbreviated versions are acceptable)

B. Institutional Profile

C. Course syllabi

D. Degree Information

E. Graduate course offering

F. Graduate handbooks

G. Faculty workload

H. Faculty by Specialty Area & Research

I. Exit survey/Weave assessment/Ph.D. annual review

J. CE Advisory council bylaw and members

K. Departmental Committee members

L. Institutional and Departmental strategic plans

M. APR Report and Concluding Observations from 2012
7. Appendices

A. Faculty CVs (abbreviated versions are acceptable)

B. Institutional Profile

C. Course syllabi

D. Degree Information

E. Graduate Course Offering

F. Graduate Handbooks

G. Faculty Workload

H. Faculty by Specialty Area & Research

I. Exit Survey/Weave Assessment/Ph.D. Annual Review

J. CØAdvisory Council Bylaw & Members

K. Departmental Committee Members

L. Institutional & Departmental Strategic Plan

M. 2012 APR Report & Concluding Observations
APPENDIX A – Faculty Vitae
Name: Stuart D. Anderson

Education: BS, Building Construction, University of Washington, 1971
MS, Civil Engineering, University of Illinois, 1973
Ph. D., Civil Engineering, University of Texas at Austin, 1989

Academic Experience: Zachry Chair in Construction Integration, December 2014 to present
   A.P. and Florence Wiley Chair, December 2011 to November 2014
   Zachry Professor in Design and Construction Integration II, October 2006 to November 2011
   Professor, September 2004 to present
   Associate Professor, September 1996 to 2004
   Assistant Professor, September 1989 to August 1996
   Senior Lecturer, January 1989 to August 1989

Non-academic Experience: Manager, Construction Program, Texas Transportation Institute, 1998 to present
Research Engineer, Texas Transportation Institute, 2004 to present
Associate Research Engineer, Texas Transportation Institute, 1990 to 2004
Washington State Department of Transportation, Risk Engineer, September 2005 through July 2006,
Texas A&M University Faculty Development Leave Program
Fluor, Inc. Irvine, Project Controls Manager/Engineer, California August 1975- May 1986
Stone and Webster Engineering Corp., Cost Engineer August 1973-July 1975

Prof. Registration: Professional Engineer, Texas, 89556

Prof. Organizations: National Academy of Construction, Member
   Pan American Academy of Engineering, Member
   American Society of Civil Engineers, Member
   Transportation Research Board
   Project Management Institute, Member

   National Academy of Construction, Elected and Inducted, Member, 2010 for “Outstanding contribution to construction research and practice in heavy and industrial sectors.”

Construction Industry Institute Outstanding Researcher, Construction Industry Institute, Austin, Texas, 1997


Zachry Teaching Excellence Award, May, 1993, Texas A&M University, Department of Civil Engineering, $6,000 award

**Institution Service:** Courses Taught:

CVEN 473  Engineering Project Estimating and Planning (2-3), 1 section, day, undergraduate, Fall 2010, Fall 2011, Fall 2012, Fall 2008, Fall 2013, Fall 2014, Fall 2015

CVEN 641  Construction Engineering Systems, (3-2), 1 section, day, graduate, Spring 2011, Spring 2012, Spring 2013, Spring 2014, Spring 2015

CVEN 668  Advanced EPC Project Development, (3-0), 1 section, day, graduate, Fall 2010, Fall 2011, Fall 2012, Fall 2013, Fall 2014, Fall 2015

Other Duties:

Member, Promotion and Tenure Committee

Member, Construction Search Committee

Peer Review of Teaching for Faculty

Graduate Advisor, Construction Engineering and Management

Undergraduate Advisor, Construction Engineering and Management

Member, Scholarship Committee

**External Service:** Head, TRB Construction Section

Chair, TRB Committee on Construction Management

Member, TRB Committee on Project Delivery Methods

Chair, Construction Industry Institute, Academic Standing Committee

Member, Construction Management Expert Technical Group

Member Project Committee, NCHRP SP20-5, Synthesis of Information Related to Highway Problems

Reviewer for the Journal of Construction Engineering and Management

Specialty Editor for the Transportation Research Record, Journal of the Transportation Research Board, Construction


Prof. Development: Basic Mediation Training, December 15, 2015 (40 hour course), The Center for Change and Conflict Resolution
Name: Luciana R. Barroso

Education:
Bachelor of Science, Civil Engineering, Rice University, 1993
Bachelor of Arts, Architectural Studies, Rice University, 1993
Master of Science, Civil Engineering, Stanford University, 1994
Doctor of Philosophy Civil Engineering, Stanford University, 1999

Academic Experience:
Associate Professor, 2005 to present
Assistant Professor, 1999 to 2005

Non-academic Experience: None

Certification or Professional Registration: None

Current Professional Organization Membership: American Society of Engineering Education (ASEE); American Society of Civil Engineers (ASCE); American Concrete Institute (ACI); American Institute of Steel Construction (AISC); Women in Engineering ProActive Network (WEPAN)

Honors and Awards:

Stanford Distinguished Alumni Scholar, Stanford University, November 2013.

Teaching for Tomorrow: Spotlight on Teaching Video, College of Engineering Representative – Center of Teaching Excellence, Fall 2011.


2008 Association of Former Students (AFS) University Level Distinguished Teaching Award

2003 ExCEEd New Faculty Excellence in Teaching Award for Zone III from the American Society of Civil Engineers (ASCE)

2002-2003 Zachry Award for Excellence in Teaching – Department of Civil Engineering at Texas A&M University

Service Activities:

University Service:
Member Steering Committee, Women’s Faculty Network, 2014 – present.

Member, SAC Leadership Team, 2011 – 2014

Co-Chair, Quality Enhancement Program Committee, January 2011 – August 2013.

College Service:
Member, Committee on Architectural Engineering, January 2014 – present

Member, College Honors and Awards Committee, Fall 2013 – Fall 2015.

Departmental Service:
Undergraduate Entry-To-A-Major (ETAM) admissions review committee.

Study Abroad Programs: 2006, 2008-2015

Current course coordinator: CVEN 345, CVEN 657, CVEN 669, CVEN 751, CVEN 754

Courses taught:

**Undergraduate**

1. UPAS 181 – First Year Seminar
2. ENGR 111 – Foundations of Engineering
3. CVEN 207 – Introduction to Civil Eng.
4. CVEN 302 – Computer Applications in Engineering and Construction
5. CVEN 363 – Engineering Mechanics: Dynamics (n)
6. MEEN 363 – Dynamics and Vibrations
7. CVEN 345 – Theory of Structures
8. CVEN 444 – Structural Concrete Design
9. CVEN 445 – Matrix Analysis of Structures
10. CVEN 483 – Analysis and Design of Structures

**Graduate**

1. CVEN 657 – Dynamic Loads and Structural Behavior
2. CVEN 669 – Hazardous Environmental Loads
3. CVEN 681 – Constructed facilities seminar
4. CVEN 751 – Advanced Dynamics and Introduction to Control of Civil Structures
5. CVEN 750 – Finite Element Applications in Structural Engineering
6. CVEN 754 – Advanced Structural Design Studio

Selected Publications:


Professional Development: ATC Webinar Recent Advances in Ground Motion Selection and Scaling (2014); ASCE Webinar ASCE 7-10 Wind Load Provisions (2012)
1. Name Minsu Cha, Ph.D., Assistant Professor, Zachry Department of Civil Engineering

   Texas A&M University, College Station, Texas 77843

2. Education

   - Ph.D., Civil & Environmental Engineering, Georgia Institute of Technology (12/2012)
   - M.Sc., Civil & Environmental Engineering, Georgia Institute of Technology (8/2010)
   - M.Sc., Civil & Environmental Engineering, KAIST, Daejeon, Republic of Korea (02/2006)
   - B.Sc., Civil Engineering, Pusan National University, Pusan, Republic of Korea (02/2004)

3. Academic experience

   Assistant Professor, Zachry Department of Civil Engineering, Texas A&M University (08/2015-Present), full time
   Research Assistant Professor, Department of Civil and Environmental Engineering, Colorado School of Mines (01/2014-07/2015), full time
   Post-Doctoral Associate, Department of Petroleum Engineering, Colorado School of Mines, Golden, Colorado (11/2012-12/2013), full time
   Graduate Research Assistant & Postdoctoral Associate, Georgia Tech (2008-2012), full time
   Graduate Research Assistant, UC, Berkeley, California (08/2007-07/2008), full time
   Researcher, KAIST Institute of Urban Space and Systems, Korea (2006-2007), full time
   Graduate Research Assistant, KAIST, Daejeon, Republic of Korea (2004-2006), full time

4. Non-academic experience

   Technical and Language Interpreter, Daewoo Engineering and Construction Co., Ltd., Seoul, Korea (2004), full time
   Consulting projects: NDE techniques to detect voids in fresh concrete & fly ash behavior, EPRI (06/2011 - 11/2012) at Georgia Tech, part time

5. Certifications or professional registrations

   Engineer-In-Training (EIT), California, 151535
   Certified as a first-level civil engineer, Republic of Korea, 2003

6. Current membership in professional organizations

   Member, American Society of Civil Engineers (ASCE)
   Member, International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE)
   Member, American Geophysical Union
   Member, Society of Petroleum Engineers
   Member, Sigma Xi: The Scientific Research Society
   Member, Korean Society of Civil Engineers (KSCE)

7. Honors and awards

   Graduate Research Assistantship, Georgia Institute of Technology (08/2008-08/2012)
   Jane Lewis Fellowship, UC Berkeley (08/2007-05/2008)
   Graduate Research Assistantship, KAIST, Republic of Korea (03/2004-02/2006)
   Alumni & University Scholarship, Pusan National University, Republic of Korea (1997-2004)

8. Service activities

   Reviewer of Journal Articles
   - ASCE Journal of Geotechnical and Geoenvironmental Engineering
   - Géotechnique, Institution of Civil Engineers, UK
   - Computers and Geotechnics
   - Geotechnical Testing Journal
   Technical Support/Collaboration

   Seismic interferometry and electrokinetic conversion (Andre Revil, Geophysics, CSM 2013)
   Jet grouting performance evaluation and monitoring (Mike Mooney, CSM 2013)
   Characterization of internal erosion with geophysical monitoring (Mike Mooney, Colorado School of Mines 2012-2013)
   Electrical needle probe, UNAM - Mexico (Feb. 2012)
   Bender elements manufacturing and cell instrumentation for shear-wave velocity measurement (Mendoza National Technological University, Argentina, 2010; University of Mississippi, 2011)
Campus Service
Thesis committee: Bowen Yao (Petroleum Engineering, M.S. 2015, Advisor Dr. Yu-Shu Wu)
Equipment management in Particulate Media Research Laboratory at Georgia Tech (2011–2012)
Webmaster services: Geosystems Engineering website at Georgia Tech (02/2010 – 08/2011) & Particulate Media Research Laboratory website at Georgia Tech (08/2010 – 02/2011)

9. Important publications/presentations (5-year)

Journal articles

Conferences

10. The most recent professional development activities
Judging at Conferences on Earth and Energy Research (02/2013 & 02/2014 at CSM)
Graduate student mentoring (2012-2015 at Colorado School of Mines)
Shankar Chellam

Education
Ph.D. Environmental Engineering, Rice University, Houston, TX 1996
M.S. Environmental Engineering, Rice University, Houston, TX 1991
M.S. (Honors) Chemistry, Birla Institute of Technology & Science, India, 1986
B.E. (Honors) Mechanical Engineering, Birla Institute of Technology & Science, India, 1986

Academic experience

J. Walter “Deak” Porter ‘22 & James W. “Bud” Porter ’51 Professor, Texas A&M University, College Station, TX (2015–present; full-time)
Professor, Departments of Civil and Environmental Engineering and Chemical and Biomolecular Engineering, University of Houston, Houston, TX, (2008–2015; full-time)
Overseas Professor, Department of Chemical Engineering, Anna University, Chennai, India (July 2012–present)
Visiting Professor, Department of Environmental Engineering, Istanbul Technical University, June–August 2011
Associate Professor, Departments of Civil and Environmental Engineering and Chemical and Biomolecular Engineering, University of Houston, Houston, TX, 2004–2008 (full-time)
Assistant Professor, Department of Civil and Environmental Engineering, University of Houston, Houston, TX, 1999–2004 (full-time)
Adjunct Assistant Professor, Department of Civil and Environmental Engineering, Howard University, Washington DC, 1998–1999 (part-time)
Lecturer, Department of Geography and Environmental Engineering, The Johns Hopkins University, Baltimore, MD, 1998–1999 (part-time)

Non-academic experience

Senior Engineer, Montgomery Watson Americas Inc., Herndon, VA, 1995–1999 (full-time)

Certifications or professional registrations: None

Current membership in professional organizations
Association of Environmental Engineering and Science Professors
North American Membrane Society
American Chemical Society

Honors and awards
Elected to Board of Directors, North American Membrane Society (NAMS), 2015–2018
Most downloaded paper between 1/2014 – 6/2014 and 3rd most downloaded paper in all of 2014 (Bozlaker et al. Environmental Science and Technology, 48 54-62)
Elected to Board of Directors, Association of Environmental Engineering and Science Professors, 2013–2016
Excellence in Review Award, Environmental Science and Technology, 2008
W.T. Kittinger Outstanding Teacher Award, Cullen College of Engineering (College’s highest teaching award), 2008
Outstanding Teacher Award, Cullen College of Engineering, University of Houston, 2006-2007
Distinguished Service Award for Outstanding Service as Chair of the Masters’ Thesis Award Subcommittee, Association of Environmental Engineering and Science Professors, 2005
Outstanding Teacher Award, Cullen College of Engineering, University of Houston, 2003-2004
Certificate of Merit for the Oral Presentation, Division of Environmental Chemistry, American Chemical Society, 2004
Junior Faculty Research Award, Cullen College of Engineering, University of Houston, 2003
National Science Foundation CAREER award, 2002
Larson Aquatic Research Scholarship, American Water Works Association, 1992-1993
Eleanor and Mills Bennett Fellowship, Rice University, 1992-1994

Selected service activities

Co-Chair, Membranes for Water Treatment and Desalination session in The North American Membrane Society Annual Meeting NAMS 2015, Boston, MA

Co-Chair, North American Membrane Society Annual Conference, Houston, TX, 2014

Member, Regional Air Quality Planning Committee Houston-Galveston Area Council 2012-2016

Member, Project Advisory Committee for “Equivalency of Advanced Treatment Trains for Potable Reuse,” WateReuse Foundation 2012 – 2015

Five important recent publications


Name: Amy Epps Martin

Education:
- Bachelor of Science, Civil Engineering, University of California at Berkeley, 1992
- Master of Science, Civil Engineering, University of California at Berkeley, 1993
- Doctor of Philosophy, Civil Engineering, University of California at Berkeley, 1997

Academic Experience: Texas A&M University, Professor, 2011-Present
- Zachry Department of Civil Engineering, Transportation and Materials Division, Division Head, 2011-2014
- CE/TTI Collaboration Team, Member, 2013-Present
- Center for Infrastructure Renewal (CIR) Committee, Member, 2012-Present

Texas A&M University, Associate Professor, 2003-2011
- Materials Group, Co-Area Advisor, 2004-2011

Texas A&M University, Assistant Professor, 1997-2003

Non-Academic Experience: Research Engineer, Texas A&M Transportation Institute, 2011-Present
- Associate Research Engineer, Texas Transportation Institute, 2003-2011
- Assistant Research Scientist, Texas Transportation Institute, 1997-2003

Certifications or Professional Registration:
- Professional Engineer, Texas, No. 91053

Professional Organizations:
- American Society of Civil Engineers (ASCE), Journal of Transportation Engineering, Associate Editor, 2008-2011
- Association of Asphalt Paving Technologists (AAPT), Board of Directors Member-at-Large, 2012, Newer Member Committee, Co-Chair, 2009-2012
- International Society for Asphalt Pavements (ISAP), 14th Conference on Asphalt Pavements, Scientific Committee, Co-Chair
- Transportation Research Board (TRB), Committee on Full-Scale and Accelerated Pavement Testing (AFD40), 2001-2010, Committee on Characteristics of Bituminous-Aggregate Combinations to Meet Surface Requirements (AFK40), 2011-Present, Committee on Characteristics of Bituminous Paving Mixtures to Meet Structural Requirements (AFK50), 2012-Present
- Federal Highway Administration, Pavement Preservation Expert Task Group, Emulsion Task Force, 2008-Present
- National Center for Asphalt Paving Technology, Application Steering Committee, 2009-2011
Honors & Awards: A.P. & Florence Wiley Faculty Fellow, 2014-Present
Association of Asphalt Paving Technologists (AAPT) Award of Recognition, 2012
Texas A&M University Fish Camp Namesake, 2008
E. B. Snead II Developmental Professorship, 2004-2007
Zachry Award for Excellence in Teaching, 2001-2002
TTI/Trinity New Researcher Award, 2001
Texas A&M University Montague-Center for Teaching Excellence Scholar, 2000-2001


**Professional Development:**


TRB Annual Meeting 1993-Present

Name: Nasir G. Gharaibeh

Education: Doctor of Philosophy, Civil Engineering, University of Illinois at Urbana-Champaign, 1997
Master of Science, Civil Engineering, Jordan University of Science and Technology, 1991
Bachelor of Science, Civil Engineering, Jordan University of Science and Technology, 1990

Academic Experience: Texas A&M University, Associate Professor, 9/2014 – Present, full time
Texas A&M University, Assistant Professor, 8/2008 – 8/2014, full time
University of Texas at El Paso, Assistant Professor, 1/2004 – 8/2008, full time

Nishikawa Gumi Corporation, Japan, Construction Project Engineer, 1992-1993, full time

Prof. Licenses: Professional Engineer, Ohio, No. 68391

Prof. Societies: Transportation Research Board (TRB), member

Honors and Awards: Birdwell Excellence in Teaching Award (2014)
TTI Research Diversity Bonus Award (2011)

Service Activities: Member of the Editorial Board of the ASCE Journal of Infrastructure Systems (2009-Present).
Member of Scientific Committee for ASCE 1st Transportation and Development Institute (T&DI) Congress: Advanced Technologies in Transportation Systems, Chicago, IL, March 2011.
Member of Scientific Committee for ASCE 2013 Green Streets, Highways and Development Conference, Austin, TX, November 2013.
Reviewer for ASCE Journal of Infrastructure Systems; ASCE Journal of Transportation Engineering; ASCE Journal of Construction Engineering and Management; Transportation Research Record; International Journal of Pavement Engineering; Computer-Aided Civil and Infrastructure Engineering, Structure and Infrastructure Engineering.
Proposal Reviewer for the National Science Foundation (NSF) and Qatar National Research Fund (QNRF)
Services to TAMU: Graduate Area Advisor for the Materials area (2012-present); Member of the Curriculum Committee (2015-present); Member of Curriculum Transformation Team (2013-2015); Coordinator for Surveying Program (2008-present); Member of the Sensors Committee (2011); Member of the Dwight Look College of Engineering Doctor of Engineering Admissions Committee (2011-present).
Recent Publications:  *indicates student under the advisement of Dr. Gharaibeh.

Professional Development: Patriciate in 1-2 professional development workshops per year at TAMU’s Center for Teaching Excellence (CTE).
1. Name: James M. Kaihatu

2. Education:
   a. Bachelor of Science, Civil Engineering, California State Polytechnic University, 1986.
   b. Master of Science, Civil Engineering, University of California, 1987

3. Academic experience:
   a. Texas A&M University, Associate Professor, 2012-present, full time.
   b. Texas A&M University, Assistant Professor, 2006-2012, full time.
   c. University of Southern Mississippi, Adjunct Professor, 1998-2006, part time.

4. Non-academic experience:
   c. US Army Engineer Waterways Experiment Station, Coastal Engineering Research Center, Hydraulic Engineer, 1987-1989.

5. Certifications or professional registrations: None.

6. Current membership in professional organizations:
   a. Marine Technology Society
   b. American Geophysical Union

7. Honors and Awards:
   b. Truman R. Jones Award for Excellence in Graduate Teaching, Zachry Department of Civil Engineering, Texas, 2013.
   d. Member, Chi Epsilon (Civil Engineering Honor Society), since 1986.
   e. Member, Tau Beta Pi (Engineering Honor Society), since 1985.

8. Service activities:
   a. Chair, Curriculum Assessment and Implementation Committee, Zachry Department of Civil Engineering, Texas A&M University.
   b. Chair, Curriculum Committee, Zachry Department of Civil Engineering, Texas A&M University.
   c. College Representative, University Grievance Committee
   d. Associate Editor, Journal of Waterway, Port, Coastal and Ocean Engineering, ASCE.
   e. Associate Editor, Journal of Ocean Engineering and Marine Energy.

g. Member, Hurricane Ike Coastal Impact Assessment Team, ASCE, 2008.

9. **Selected publications over the last five years:**


Name: Dominique Lord

Education: Bachelor of Engineering, Civil Engineering, McGill University, 1992
Master of Science, Civil Engineering, University of Toronto, 1994
Doctor of Philosophy, civil Engineering, University of Toronto, 2000

Academic Experience: 12 years of service
Professor, 2015-Present
Associate Professor, 2010-2015
Assistant Professor, 2004-2010
Visiting Assistant Professor, 2003-2004
Visiting Assistant Professor, Department of Nuclear Engineering, Texas A&M University, 2002

Non-Academic Experience:
Associate Research Scientist, Crash Analysis and Modeling Group, Texas Transportation Institute, 2001 - 2004.
Lecturer, Ryerson University, 2001.
Teaching Assistant, University of Toronto, 1995 - 1999.
Teaching Assistant, University of Toronto, 1992 - 1994.
Traffic Engineer, CIty of Côte St. Luc, 1992.

Professional Registration:
Professional Engineer, Quebec, CANADA, No. 109575
Professional Engineer, Ontario, CANADA, No. 100052049

Memberships: Professional Engineers of Ontario
Ordre des ingénieurs du Québec
Association québécoise du transport et des routes
Transportation Research Board (TRB)
The Canadian Association of Road Safety Professionals
Institute of Transportation Engineers
American Statistical Association

Honors and Awards:
Best Paper: 2015 Young Researcher Award (TRB Committee ANB20) 2016
Williams Brothers Construction Company Fellow 2015
(Dwight Look College of Engineering, TAMU)
“Circle of Ambassador” for Professional Accomplishments (College Charles Lemoyne High School) 2015
Service Impact Award (Zachry Department of Civil Engineering) 2014
Best Paper Nominee (two papers) (TRB Committee ANB20) 2011
Best Paper: 2010 Young Researcher Award (TRB Committee ABJ80) 2011
Lambertois Award – Professional Life 2010 (Award given by the City of St. Lambert, Qc)
CUTC-ARTBA New Faculty Award 2009
Truman R. Jones Excellence in Graduate Teaching (Zachry Dept. of C.E.) 2009
Best Paper: 2009 Young Researcher Award (TRB Committee ANB20) 2009
Best Paper Award for Young Researchers (TRB Committee ABJ80) 2007
ITE Transportation Achievement Award given to TCRP/NCHRP, 2006
D. Grant Mickle Award, Transportation Research Board (TEB), 2004
Committee ANB20 Best Paper Award (TRB), 2004
New Investigator Award for Non-intentional Injuries, (CDC), 2003
Young Researcher Award (TRB Committee A3B05), 2003
D. Grant Mickle Award, Transportation Research Board (TRB), 2002
Committee A3A08 Best Paper Award, Transportation Research Board (TRB), 2002
2000 Best Student Paper Competition, CTRF, 2000
Research Assistantship, University of Toronto/Ryerson University, 2000
Open Fellowship, University of Toronto, 1999
2nd Prize Best Student Presentation, CITE, 1996
Scholarship for Graduate Studies in Transportation, CTRF, 1994
2nd Prize Student Research Paper Competition, CTRF, 1992
Allen Cook Prize in Transportation, McGill University, 1992
David Adrian Selby Award, CSCE, 1992.

**Service Activities:**

Division Head, Transportation & Materials 2014-Present
College of Engineering Representative – Member
- Transportation working group for the Texas Office for Homeland Security 2014-Present
Member - CE Endowed Position Committee - Zach Dept. of Civil Eng. 2013-Present
Chair - Awards Committee - Zach Dept. of Civil Eng. 2013-Present
TAMU-ITE Student Chapter Faculty Representative 2010-2014
College of Engineering Representative – Faculty Advisory Board:
Disability Services 2009-Present
Member of the Tenure and Promotion Committee, 2010-Present
Faculty member responsible for the System Engineering Safety Certificate 2007-Present
Graduate Task Force, Member, Appointed 2005-2006

TRB Special Task Force for the Highway Safety Manual (Scientific Review Committee)
Member of TRB Committee ABJ80 (Statistical Methods) (2004-2014)
Member of TRB Committee ANB20 (Safety Data, Analysis and Evaluation) (2010-2017)
Member of TRB Committee ANB25 (Highway Safety Performance) (2012-2017)
Friend of TRB Committees of ANF10 (Pedestrians)

**Recent Publications:**


1. Robert L. Lytton

2. Bachelor of Science, Civil Engineering, University of Texas, 1960
   Master of Science, Civil Engineering, University of Texas, 1961
   Doctor of Philosophy, Civil Engineering, University of Texas, 1967

3. University of Texas at Austin, Assistant Professor, 1967-1968, Full Time
   Texas A&M University, Associate Professor, 1971-1976, Full Time
   Texas A&M University, Professor, 1976- Present, Full Time
   F. J. Benson Endowed Chair, 1995 – present.

4. Research Engineer, Texas A&M Transportation Institute (TTI), 1976-present
   Associate Research Engineer, TTI, 1971-1976
   Post-Doctoral Fellow, U.S. National Science Foundation, Australian Commonwealth Scientific and
   Industrial Research Organization, February 1969-December 1970
   Teaching Assistant, University of Texas, Austin, September 1965 - May 1967
   Associate, J.B. Dannenbaum, Consulting Engineer, October 1963-September 1965
   U.S. Army Officer, Corps of Engineers, 35th Engineer Group (Construction) Fort Hood, Texas and Fort
   Polk, Louisiana, 1961-1963
   Civil Engineer, U.S. Naval Civil Engineering Laboratory, Port Hueneme, California, June-August 1960

5. Professional Engineer, Texas No. 27657
   Professional Engineer, Louisiana No. 9620

6. Transportation Research Board
   International Society of Asphalt Pavements
   Association of Asphalt Paving Technologists
   International Society of Soil Mechanics and Geotechnical Engineering
   American Society of Civil Engineers
   Texas and National Society of Professional Engineers
   Tau Beta Pi Engineering Honor Society
   Chi Epsilon Civil Engineering Honor Society
   Sigma Xi Scientific Research Society
   Phi Kappa Phi National Honor Society
   Pi Kappa Delta (National Speech Honorary)
   Friar Society (University of Texas Honorary)
   American Concrete Institute
   Post-Tensioning Institute

7. Carl L. Monismith Lecture and Award, June, 2013, ASCE
   Association of Former Students, Distinguished Achievement in Teaching Award, College Level, 2013
   National Academy of Geo-Professionals, Diplomate Geotechnical Engineering, 2009
   Honor Professor, Chongqing Jiiaotong University, Chongqing, China, 2008
   Dick and Joyce Birdwell Teaching Award, Zachry Civil Engineering Department, 2007
   NOVA Award, Construction Innovation Forum, Construction User’s Roundtable, 2006
   Honorary Life Member, Houston Foundation Performance Association, 2006
   “Legend of Post-Tensioning”, Post-Tensioning Institute, 2005
   2005 Trendsetter, Public Works Magazine, November, 2005
   Ohanian Lecture, University of Florida, November, 2004
   Fellow of the Post-Tensioning Institute, Post-Tensioning Institute, 2004
Association of Former Students, Distinguished Achievement in Research Award, 1996
Hamilton Watch Award, University of Texas, College of Engineering, 1960
Honorary Fellow, University of Texas, 1960-61
Graduate Fellow, National Science Foundation, 1960-61, 1965-67
John B. Hawley Award, Texas Section ASCE, 1966
Post-doctoral Fellow, National Science Foundation, 1969-1970
Everite Bursary Award, Council for Scientific and Industrial Research, Pretoria, South Africa, 1984
American Men and Women in Science, 1989 and afterward
Fellow, American Society of Civil Engineers, 1992

8. Doctoral and Master’s candidate supervising; Research
   Executive Committee, Faculty of Material Science and Engineering (Elected)
   Search Committee, Snead Chair, Gregory Chair, Wiley Chair, Wyatt Chair, Director, Texas A&M
   Transportation Institute; numerous faculty candidates
   Civil Engineering Department Promotion and Tenure Committee (Chair, Two Terms)
   Faculty Senate Committee on Emeritus Status
   Director, Center for Infrastructure Engineering, Texas Engineering Experiment Station
   Two Term Chairman, TRB Committee A2L06, Engineering Behavior of Unsaturated Soils
   Control Group Member, ASCE Standards Committee on Residential Foundations on Expansive Clays, from inception in 1985 until the present
   Post-Tensioning Institute Slab-On-Ground Committee, 1978-present.


10. December Lecture Series with the Houston Foundation Performance Association, 2006-2015
Name: John B Mander

Education:
Bachelor of Engineering, First Class: BE(Hons), Univ. of Canterbury, NZ, 1979
Doctor of Philosophy, Civil Engineering, University of Canterbury, NZ, 1984

Academic Experience:
28 years experience (all full time)
Professor, Texas A&M University, 2007 - present
Appointed Inaugural Zachry Professor in Design and Construction Integration 1, 2007
Division Head, Construction, Geotechnical and Structural Engineering, 2009
Chaired Professor of Structural Engineering, Department of Civil Engineering, University of Canterbury, NZ, 2000-2006
Assistant-Associate Professor, Department of Civil of Structural and Environmental Engineering, State University of New York at Buffalo, 1988-2000

Non-Academ. Experience:
Senior Civil Engineer, New Zealand Railways Corporation, 1983-1987

Certifications:
-

Memberships:
ASCE (Associate Editor JSE), IPENZ (Fellow), NZ Society for Earthquake Eng.
ACI, EERI.

Honors and Awards:
Fellow of Institution of Professional Engineers New Zealand [IPENZ]
2007 Otto Glogau Award, NZ Society for Earthquake Engineering

Institutional Service:
Courses taught in last 5 years: CVEN 444 Structural Concrete Design (3 0); CVEN 621 Advanced Reinforced Concrete Design (3-0); CVEN 671 Behavior and Design of Prestressed Concrete Structures (3-0); CVEN754 Adv. Structural Design Studio (1-6)
Chair, Civil Department Promotion and Tenure Committee, 2008-2014
Member College of Engineering Promotion and Tenure Committee, 2013-2016
Editorial Board: Earthquake Engineering and Structural Dynamics, Wiley 2003-
Associate Editor: Advances in Civil Engineering, Hindawi Publishing, 2008-
Associate Editor: ASCE Journal of Structural Engineering,

Publications:
Totals (since 2010): Journal 118(36), Conference 151(20), Reports 50(12), Patents 6(3)


Name: Zenon Medina-Cetina

Education

- PhD, Civil Engineering, The Johns Hopkins University JHU, 2006
- MSc, Civil Engineering, The Johns Hopkins University JHU, 2005
- ME, Soil Mechanics, Universidad Nacional Autonoma de Mexico UNAM, 1996
- BSc, Civil Engineering, Universidad Autonoma de Yucatan UADY, 1994

Academic experience

Texas A&M University, Associate Professor, Graduate Coordinator (Geotechnical Program), 2014 – Present, full time
Texas A&M University, Assistant Professor, 2008 – 2014, full time
Academic Coordinator (Engineering), Westhill University, 1999 – 2001, part-time
Adjunct Professor, Universidad Nacional Autonoma de Mexico, 1996 – 2001, part-time
High School Adjunct Teacher, Centro Universitario Montejo, AP Calculus and AP Physics, 1990-1994, part-time

Non-academic experience

Researcher, International Centre for Geohazards & Norwegian Geotechnical Institute, 2006 – 2008, full-time
Researcher, Norwegian Geotechnical Institute / International Centre for Geohazards, 2006 – 2008, full-time
Research Assistant, The Johns Hopkins University, 2001 – 2006, full-time
Research Assistant, Universidad Nacional Autonoma de Mexico, 1994 – 1996, full-time
Field Engineer, Ingeniería y Planeación del Sureste, 1990-1994, full-time

Certifications or professional registrations

Ingeniero Civil y Maestro en Ingeniería, México

Current membership in professional organizations

Society for Underwater Technology SUT,
  Chair (Elected), Offshore Site Investigation and Geotechnics OSIG Committee (USA Chapter), 2012 - 2014
  Chair (Elected), Offshore Site Investigation and Geotechnics OSIG Committee (USA Chapter), 2014 - 2016
  Chair (Elected), Society for Underwater Technology (SUT-USA), 2016 – Present

Honors and Awards

Winner Offshore Technology Conference OTC’s University Research and Development Showcase.
Fellow (Elected), Society for Underwater Technology SUT, 2014

Service activities

Society for Underwater Technology SUT,
  Chair (Elected), Offshore Site Investigation and Geotechnics OSIG Committee (USA Chapter), 2012
- 2014
Chair (Elected), Offshore Site Investigation and Geotechnics OSIG Committee (USA Chapter), 2014 – 2016
  - Chair (Elected), Society for Underwater Technology (SUT-USA), 2016 – Present
- Graduate Committees (38): Department Biomedical Engineering, Department of Computer Science 
  and Engineering, Zachry Department of Civil Engineering, Harold Vance Department of Petroleum 
  Engineering, Department of Aerospace Engineering, Department of Electrical and Computer 
  Engineering, Department of Geology and Geophysics. University of Oslo (Applied Mathematics), 
  University of Bologna (Civil Engineering)
- Departmental Service: Graduate Student Advisor (Geotechnical), Course Coordinator, Geotech 
  Faculty Search Committee, Geotech Faculty Representative for the Civil Engineering Graduate 
  Invitational, Volunteer for the “Geotech Lecture to Civil Engineering Freshmen 
- Chair, Seminar Series of the Stochastic Geomechanics Laboratory SGL 
- Students’ Service, Society for Underwater Technology SUT –TAMU, Faculty 
- Advisor, Student Chapter at Texas A&M University, 2013 – Present.

Briefly list the most important publications and presentations from the past five years
“Varying Dimensional Bayesian Acoustic Waveform Inversion for 1D semi-infinite heterogeneous 
Mechanics*, 2015
“Evaluation of Unknown Foundation for Bridges Subjected to Scour”, Yousefpour N, Medina-Cetina 
Z. and Briaud J.L, *Transportation Research Record: Journal of the Transportation Research Board. 
Geology and Properties of Earth Materials*, 2014
“Joint States of Information from Different Probabilistic Geo-Profile Reconstruction Methods”, 
Medina-Cetina Z. and Esmailzadeh S., *Georisk: Assessment and Management of Risk for Engineered 
“Probabilistic Calibration of a Damage Mechanics Model”, Medina-Cetina and Arson C., 
*Geotechnique Letters*, 2014

Briefly list the most recent professional development activities
Live Webinar, American Society of Civil Engineers ASCE, Continuum Education, “To Bayes or Not 
to Bayes? A Scenario-Based Approach for Using (or Not) Bayesian Methods,” September 26, 2013, 
first time taught.
International Workshop, Universidad Nacional Autonoma de Mexico (UNAM) – Texas A&M 
University (TAMU) on “GIS + Big Data + Probabilistic Decision-Making in Geo-Engineering”. 
Mexico City, May 21, 2015.
Texas A&M University System (TAMUS) Office of Mexico and Latin American Relations (MLAR). 
2015
Name: John M. Niedzwiecki

Education:
Bachelor of Science, Boston University, May 1970
Master of Science, Boston University, May 1973
Doctor of Philosophy, Catholic University of America, May 1977

Academic Experience: Texas A&M University, Professor of Civil Engineering, 1991- present, full time
Texas A&M University, Professor of Ocean Engineering, 2016- courtesy appointment
Woods Hole Oceanographic Institute (WHOI), Guest Investigator, 2009 – present, part time
Shanghai Jiao Tong University, Guest Prof., Shanghai, China, 2007 – present, part time
Texas A&M University, W. Cain Senior Chair in Offshore Technology, 2011 - present
Texas A&M University, Regents Professor, Board of Regents Appointment, 11/06-present

Texas A&M University, Professor of Civil and Ocean Engineering, 1991-2015
Texas A&M University, Associate Professor of Civil & Ocean Engineering, 1983-1991
Harbin Engineering University, Guest Professor, Harbin, China, 2006 – 2009.
Texas A&M University, Development Leave, WHOI/TAMU, 4/13-9/14
Texas A&M University, Department Head, Civil Engineering 6/10-4/13
Texas A&M University, Interim Department Head Civil Engineering, 6/09-6/10
Texas A&M University, Executive Associate Dean & Assoc. TEES Director, 10/02-6/10
Texas A&M University, Associate Vice Chancellor for Engineering, 10/02-6/07
Texas A&M University, Acting Vice-Chancellor, Interim Dean & TEES Director, 9/02-10/02
Texas A&M University, R.P. Gregory’32 Chair in Civil Engineering, 7/02-6/11
Texas A&M University, Interim Director Offshore Technology Research Center, 2/00-8/01 Texas A&M University, Department Head, Civil Engineering, 6/98-10/02
Texas A&M University, Interim Department Head of Civil Engineering, 8/97-6/98
Texas A&M University, Associate Department Head of Civil Engineering, 9/95-8/97
Texas A&M University, Departmental Graduate Advisor for Civil Engineering, 9/95-9/96
Texas A&M University, Division Head, Constructed Facilities Division, 9/93-8/97
Texas A&M University, W. Cain ’13 Professorship in Offshore Technology, 4/93-7/02
Texas A&M University, Leader Structural Engineering & Engr. Mechanics Group, 7/92-9/93
Massachusetts Institute of Technology, Visiting Assoc. Professor, Civil Engr., 1986-1987
Texas A&M University, Associate Professor Civil and Ocean Engineering, 1983-1991
Texas A&M University, Graduate Advisor Ocean Engineering Program, 9/87-11/89
Texas A&M University, Associate Head & Graduate Advisor Ocean Engineering, 9/87-9/88
University of Rhode Island, Associate Professor of Ocean Engineering, 1982-1983
University of Rhode Island, Graduate Faculty Member, Engr. Faculty Senator, 8/82-8/83
Texas A&M University, Assistant Professor of Civil and Ocean Engineering, 1978-1982
Catholic University of America, Assistant Professor, 1977-1978

Non-Academic
Virginia Offshore Wind Consortia, David Taylor Naval Ship Research and Development Center, IKOR Corporation, Research Engineer, HELIO Corporation, Research Engineer, Mexican Petroleum Institute

Prof. Registration: Professional Engineer, Texas, No. 48561

Professional Societies: American Society of Civil Engineers (ASCE), Fellow; American Society of Mechanical Engineers (ASME), member; International Society of Offshore and Polar Engineering (ISOPE), member; Marine Technology Society (MTS), member; Consortium of Universities for Research in Earthquake Engineering (CUREE), member


Recent Publications:

* Graduate Student or Former Graduate Student


Jeffrey M. Otey

Ph.D., Design, Manufacturing, and Industrial Project Management, Polytechnic University of Valencia
M.Eng., Agricultural Engineering, Texas A&M University at College Station, 1994
B.S., Agricultural Engineering, Texas Tech University, 1991

Texas A&M University (Zachry Department of Civil Engineering), Instructional Assistant Professor (May 2014-Present), full time
  Texas A&M University (Engineering Academic and Student Affairs), Lecturer (September 2013-May 2014), full time
  Texas A&M University (Engineering Design Graphics), Program Director (June 2008-August 2013), full time
  Texas A&M University (Engineering Design Graphics), Lecturer (January 2001-May 2008), full time
  Texas A&M University (Department of Agricultural Engineering), Assistant Lecturer (August 1997-May 1998), full time

Popcorn Palace Foods, Foreman, manufacture of popcorn products, (June 1986-May 1988), part time/full time
  United States Army, Military Policeman/Armorer, law enforcement and maintenance of small arms, (June 1983-April 1986), full time

None

None

Zachry Award for Teaching Excellence, 2015
  College of Engineering Instructional Faculty Teaching Award, 2014-2015
  Texas A&M University Engineering Design Graphics Leadership Award, 2006
  Alpha Epsilon, the National Honor Society of Agricultural Engineering
  Chi Epsilon, the National Honor Society of Civil Engineering
  Gamma Sigma Delta, the National Agriculture Honor Society
  Veterans mentor
  Graduation Marshal


Journal Articles:


Conference Papers:


Textbook:


Computer Tools for Document Composition Research and High Quality Presentations-Semester course at Polytechnic University of Valencia, Spring 2015

Scientific Communication: High Standards for Scientific Production and Communication-Semester course at Polytechnic University of Valencia, Spring 2014
Name: Luca, Quadrifoglio

Education: Laurea, Chemical Engineering, Politecnico of Milan, 1996
Master of Science, Engineering Management, University of Southern California, 2002
Ph.D., Industrial and Systems Engineering, University of Southern California, 2005

Academic Experience:
Texas A&M University, Associate Professor, 2012 – present, full time
Texas A&M University, Assistant Professor, 2006 – 2012, full time

Non-academic Experience:
Postdoctoral Research Associate, University of Southern California, 2005-2006, full time
Project Economist, Snamprogetti, 1996-2001, full time

Certifications or professional registrations: None

Current membership in professional organizations:
Transportation Research Board
Institute for Operations Research and the Management Sciences
Institute of Transportation Engineers
Institute of Industrial Engineers
American Society of Civil Engineers

Honors and Awards:
2015 Fulbright-Fondazione CON IL SUD for Teaching&Research
2014 E.B. Snead ’25 Career Development Professorship I
2014 Transportation Research Board of the National Academy’s Certificate of Appreciation
2006 Pritsker Doctoral Dissertation Award, 3rd Place
2004 CUTC (Council of University Transportation Centers) National Student Award for best non thesis publication in Science and Technology

Service activities: Courses taught in last 5 years
CVEN 322  Civil Engineering Systems, (3-0), 1 section, day, undergraduate, Spring, 2011; 1 section, day, undergraduate, Fall, 2011; 1 section, day, undergraduate, Spring, 2012; 1 section, day, undergraduate, Fall, 2012; 1 section, day, undergraduate, Spring, 2013; 1 section, day, undergraduate, Fall, 2013; 1 section, day, undergraduate, Spring, 2014; 1 section, day, undergraduate, Summer, 2015; 1 section, day, undergraduate, Fall, 2015

CVEN 307  Introduction to Transportation Engineering, (3-0), 1 section, day, undergraduate, Spring, 2011; 1 section, day, undergraduate, Spring, 2013

CVEN 765  Advanced Civil Engineering Systems, (3-0), 1 section, day, graduate, Spring, 2012; 1 section, day, graduate, Fall, 2013

Transportation Graduate Advisor
Undergrad Advisor
Transportation Division PhD Qualifying Exam Coordinator
Secretary of TRB’s Paratransit Committee AP060
Study Abroad – Leader of Italy Civil Engineering Programs

Recent Publications:


Shen C.* and Quadrifoglio L. (2012), “Evaluating the Zoning Design with Transfers for Paratransit Services,” Transportation Research Record, 2277, 82-89


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**Professional Development:**

Faculty Developmental Leave, 2014-15

Class Development: SYEN642 – Systems Performance Modeling
Name: Alireza Talebpour

Education—degree, discipline, institution, year

- PhD, Civil Engineering, Northwestern University, 2015
- MSc, Civil Engineering, Sharif University of Technology, 2009
- BSc, Civil Engineering, Sharif University of Technology, 2007

Academic experience—institution, rank, title (chair, coordinator, etc. if appropriate), when (ex. 1990-1995), full time or part time

- Texas A&M University, Assistant Professor, 2015-present, full time
- Northwestern University, Research Assistant, 2009-2015, part time

Non-academic experience—company or entity, title, brief description of position, when (ex. 1993-1999), full time or part time

- N/A

Certifications or professional registrations

- N/A

Current membership in professional organizations

- Transportation Research Board (TRB)

Honors and Awards

- Northwestern University Transportation Center Dissertation Year Fellowship

Service activities (within and outside of the institution)

- TRB Committee: Traffic Flow Theory and Characteristics (member) 2016-present
- TRB Subcommittee: Connected and Automated Vehicles (member) 2014-present
- TRB Committee on Traffic Flow Theory and Characteristics (Reviewer) 2010-present
- TRB Committee on Transportation Safety Management (Reviewer) 2012-present
- TRB Committee on Vehicle-Highway Automation (Reviewer) 2015-present
- IEEE Intelligent Transportation Systems (Reviewer) 2014-present

Briefly list the most important publications and presentations from the past five years—title, co-authors if any, where published and/or presented, date of publication or presentation


Briefly list the most recent professional development activities

Name: John A. Walewski

Degrees: 
Doctor of Philosophy, Civil Engineering, University of Texas, Austin, 2005
Master of Urban Planning, University of Michigan, 1993
Bachelor of Landscape Architecture, Michigan State University (MSU), 1988
Bachelor of Science, Building Construction Management, MSU, 1988

Academic: 
Associate Professor of Practice, Texas A&M University, 2013 to present

Experience: 
Assistant Professor, Texas A&M University, 2008 to 2013

Related: 
Research Associate, Center for Transportation Research, University of Texas, Austin, 2005 to 2007
Program Officer, National Research Council, National Academies of Science, 1996 to 2000
Research Associate, Colorado State University, College of Natural Resources, 1993 to 1996
Assistant City Planner, City of Ann Arbor Michigan, 1992 to 1993
Construction Manager, Detroit Medical Center, 1991
Project Manager, ACE Companies, 1988 to 1990
Construction Superintendent, General Motors Corporation, 1986 to 1987

Consulting: 
Winstead, PC, expert witness project management practices and training
Bullivant | Houser | Bailey, PC, expert witness construction project practices
Hyundai Engineering and Construction, risk management consultant
U.S. State Department Embassy Construction, risk management consultant
FMI Corporation, Research design and development consultant
National Research Council, research design and writing

Societies: 
American Society of Civil Engineers
American Society of Military Engineers
Design Build Institute of America
Project Management Institute
Transportation Research Board

Service Activities: 
Undergraduate Coordinator, Construction Engineering and Management
Faculty Mentor, TAMU Chapter, American Society of Military Engineers
Commissioner, City of Austin Airport Advisory Commission
Panel Member, Multiple ACRP projects, Transportation Research Board

Recent Publications:


Honors and Awards: Alfred P. Sloan Foundation Industry Studies Dissertation Award Finalist

Fulbright Fellowship, U.S. State Department and the Norwegian Fulbright Foundation

Houston Marine Insurance Seminars Risk Management Scholarship

ChevronTexaco Project Management Scholarship

State Bar of Texas, Construction Law Section, ADR Fellowship
Name: Bruce Wang

Education
- Bachelor of Engineering, Mechanical Engineering, Northern Jiaotong University, 1989
- Master of Science, Transportation Engineering, Northern Jiaotong University, 1991
- Doctor of Philosophy, Civil Engineering, University of California - Irvine, 2001

Academic Experience
- Researcher, University of Wisconsin – Madison, 1/07-08/08
- Assistant Professor, University of Wisconsin – Superior, 8/02-1/07
- Postdoctoral Researcher, Texas Southern University, 10/01-8/02

Non-academic Experience
- Consultant, American Airlines, 1/01-9/01

Certifications or professional registrations
- N/A

Current membership in professional organizations
- Transportation Research Board; Institute of Transportation Engineer.

Honors and Awards
- Certificate of Appreciation for serving as Co-Chair of Freight Planning and Logistics Committee. 2016. Transportation Research Board.
- New Faculty Award, 2011, Council of University Transportation Centers (CUTC) and American Road and Transportation Builders Association (ARTBA)
- Excellence in Scholarship Award, 2007, University of Wisconsin – Superior
- Wisconsin Teaching Fellow, 2007, University of Wisconsin System
- Higher Education Award, 2006, Wisconsin Space Grant Consortium

Service Activities
- Editorial Board of: (1) Transportation Research Part E: Logistics Review; (2) International Journal of Revenue Management.
- Co-Chair and paper review coordinator of Freight Planning and Logistics Committee of TRB.
- Freight Group Executive Committee Member of TRB (for 11 committees in freight area of TRB)
- International Technical Committee Member of East Asia Society for Transportation Studies.
- Texas A&M University Student Chapter Institute for Traffic Engineers faculty advisor (TAMUite).
- Zachry Department of Civil Engineering. Tenure and Promotion Committee.
- Zachry Department of Civil Engineering. Transportation Program Ph.D. Qualifying Exam Committee Chair.

Recent Publications:
Research Part B: Methodological. 80 303-321.


**Professional Development:** N/A

**Name** Ralph Wurbs

**Education**

Bachelor of Science, Civil Engineering, Texas A&M University, 1971
Master of Science, Civil Engineering, University of Texas at Arlington, 1974
Doctor of Philosophy, Civil Engineering, Colorado State University, 1978

**Academic experience**

Texas A&M University, Assistant Professor, 1980-1987, full-time
Texas A&M University, Associate Professor, 1987-1999, full-time
Texas A&M University, Professor, 1999-present, full-time

**Non-academic experience**

Engineering Technician, Texas Highway Department, 1969-1970, TAMU Cooperative Work-Study Program

Certifications or professional registrations

Registered Professional Engineer in Texas since 1975
Founding Diplomate, American Academy of Water Resources Engineers, ASCE, 2005

Current membership in professional organizations

Fellow and Life Member, American Society of Civil Engineers
Member, International Water Resources Association

Honors and Awards

Honorary Diplomate, American Academy of Water Resources Engineers, ASCE, 2014
Arthur McFarland Endowed Professorship, 2012-present
Freese and Nichols Faculty Fellow, 2009-2012
Truman R. Jones Excellence in Graduate Teaching Award, 2008 and 2014
National J. M. Robbins Teaching Excellence Award from Chi Epsilon Honor Society, 2000
Southwest Region Teaching Excellence Award from Chi Epsilon Honor Society, 1999
Association of Former Students Distinguished Teaching Award, 1993
Zachry Award for Excellence in Teaching, 1991/1992
Texas Section ASCE John B. Hawley Award for Best Paper, 1996 and 2005
Chi Epsilon National Civil Engineering Honor Society
Tau Beta Pi Engineering Honor Society
Phi Kappa Phi Honor Society

Service activities (within and outside of the institution)

TAMU Delegate, Universities Council on Water Resources, 1988-present
Interdepartmental Graduate Program in Water Management and Hydrologic Science,
Executive and Admissions Committee Member from creation of program in 2005 to present

Associate Director for Engineering, Texas Water Resources Institute, 2007-2012

Most important publications from the past five years


**Briefly list the most recent professional development activities**


Name: Yunlong Zhang

Education:
Bachelor of Science, Civil Engineering, Southeast University of China, 1984
Master of Science, Transportation Engineering, Southeast University of China, 1987
Doctor of Philosophy, Transportation Engineering, Virginia Polytechnic Institute and State University, 1996

Academic Experience:  
Texas A&M University, Associate Professor, 2010 - present, full time

Non-Academic Experience:
Assistant/Associate Research Scientist, Texas Transportation Institute, 2004-present
Senior Transportation Engineer, ITT Industries, 1996-2000
Research Associate, Virginia Polytechnic Institute and State University, 1996
Research Assistant, Virginia Polytechnic Institute and State University, 1992-1995
Lecturer, Southeast University, 1987-1992

Prof. Licenses:
Professional Engineer, Colorado, 34231

Membership:
American Society of Engineering Education (ASEE)
Institute of Transportation Engineers (ITE)

Honor & Awards:
Lockheed Award for Teaching Excellence, 2011
Outstanding Faculty SLATE (Student-Led Award for Teaching Excellence) Award by Texas A&M University Systems, 2010.

Service Activities:
Director of Graduate office, and Assistant Department Head for Civil Engineering
Member of Graduate Instructional Committee (GIC), College of Engineering

Publications:

Zeng X.*, Sun X., Zhang Y., and Quadrifoglio L, 2015, “Person-based
Adaptive Priority Signal Control with Connected-vehicle Information,” Transportation Research Record, No. 2384, pp. 74-84.


Professional Development: Annual Transportation Research Board (TRB) meetings

TRB workshops

International conferences on transportation research
Name: Kuang-An Chang

Education:
B.S., Agricultural Engineering, National Taiwan University, 1991
M.S., Civil & Environmental Engineering, Cornell University, 1994
Ph.D., Civil & Environmental Engineering, Cornell University, 1999

Academic experience:
Professor of Ocean Engineering, 09/2015 – present
Professor of Civil Engineering, 09/2011 – present
Associate Professor of Civil Engineering, 09/2005 – 08/2011
Assistant Professor of Civil Engineering, 01/2000 – 08/2005
Postdoctoral Associate, Cornell University, 08/1998-12/1999

Non-academic experience:
None

Certifications or professional registration:
Professional Engineer, Texas, No. 98741, 02/2007 – present

Current membership in professional organizations:
American Society of Civil Engineers, 1998 – present

Honors and awards:
Dick and Joyce Birdwell Award for Teaching Excellence, Texas A&M University, 2016
Lockheed Martin Excellence in Teaching Award, Texas A&M University, 2012
Zachry Award for Excellence in Teaching, Texas A&M University, 2009
Invitation Fellowship (Long-Term) Award, Japan Society for the Promotion of Science, 2009
VSJ SGI Award for Excellent Visualized Image, Visualization Society of Japan, 2001

Service activities:
Director, Haynes Coastal Engineering Laboratory, 2016 – 2017
Interim Head, Ocean Engineering Program, 2014 – 2015
Undergraduate Advisor, Ocean Engineering Program, 2011 – 2015
Graduate Advisor, Ocean Engineering Program, 2004 – 2009
Coordinator, Ocean Engineering Laboratory, 2003 – present
Associate Editor, ASCE Journal of Engineering Mechanics, 2006 – present
Associate Editor, Coastal Engineering Journal, 2013 – present
Member of Editorial Board, International Journal of Ocean and Coastal Engineering, 2017 – present
Member of Editorial Board, *Applied Ocean Research*, 2018 – present

**Recent Publications:**


Recent professional development activities:

- Visiting Professor, Kyoto University, Japan, 10/2009 – 8/2010
- Visiting Associate Professor, Cornell University, 6/2009 – 10/2009
Name: Hamn-Ching Chen

Academic Rank: Professor, full time

Degrees:
- B.S., Power Mechanical Engineering, National Tsing-Hua University, Taiwan, 1976
- M.S., Power Mechanical Engineering, National Tsing-Hua University, Taiwan, 1978
- Ph.D., Mechanical Engineering, The University of Iowa, Iowa City, Iowa, 1982

TAMU CE Faculty:
- 27 years service
- A.P. & Florence Wiley Professor I, 2014-present
- Professor, 2001 - present
- Associate Professor, 1991 - 2001

Related Experience:
- Chair Professor, Marine Environment and Ocean Engineering, National Sun Yat-Sen University, Taiwan, ROC, February-July 2018
- Visiting Researcher, Maritime Research Institute Netherlands (MARIN), Wageningen, Netherlands, September 2017-January 2018
- Adjunct Associate Professor, Mechanical Engineering, University of Iowa, 1987-1988
- Assistant Research Scientist, Iowa Institute of Hydraulic Research, 1982-1987
- Adjunct Assistant Professor, Mechanical Engineering, University of Iowa, 1984-1987
- Visiting Assistant Professor, Mechanical Engineering, University of Iowa, 1982-1984
- Instructor, Power Mechanical Engineering, National Tsing-Hua University, Taiwan, ROC, 1978-1979

Prof. Licenses:
- Professional Engineer, Texas, No. 74412

Recent Publications:

Prof. Societies:  
American Society of Civil Engineers
American Society for Mechanical Engineers, Fellow
American Institute of Aeronautics and Astronautics, Associate Fellow
International Society of Offshore and Polar Engineers

Honors and Awards:  
Elected Fellow in ASME, 2005
Elected Associate Fellow in AIAA, 2006
Civil Engineering Excellence in Research Award, Zachry Department of Civil Engineering, Texas A&M University, 2007
Truman R. Jones Excellence in Graduate Teaching Award, Zachry Department of Civil Engineering, Texas A&M University, 2017

Institutional Service: Courses Taught

CVEN 302  Computer Applications in Engineering and Construction (3-0), 1 section, day, undergraduate, spring 2013
CVEN 680  Advanced Computation Methods for Fluid Flow (3-0), 1 section, day, graduate, spring 2013, 1 section, day, graduate, spring 2015, & 1 section, day, graduate, spring 2017
CVEN 688  Computational Fluid Dynamics (3-0), 1 section, day, graduate, fall 2013, 1 section, day, graduate, fall 2014, 1 section, day, graduate, fall 2015, 1 section, day, graduate, fall 2016
OCEN 678  Fluid Dynamics for Ocean and Environmental Engineering (3-0), 1 section, day, graduate, fall 2014, & 1 section, day, graduate, fall 2015 & 1 section, day, graduate, fall 2016
OCEN 685  Directed Studies, 1 section, day, graduate, fall 2014 & 1 section, day, graduate, fall 2015 & 1 section, day, graduate, fall 2016 & 1 section, day, graduate, spring 2017 & 1 section, day, graduate, fall 2017 & 1 section, day, graduate, spring 2018
Other Duties
ABET Coordinator, Ocean Engineering Program, 2006-2016
**Professional Service:**  
Member, Editorial Board, Journal of Hydrodynamics, 2004-present  
Vice Chair, ISOPE International Hydrodynamics Committee, 2010-2014  
Associate Editor, International Journal of Offshore and Polar Engineering, 2011-present  
Editorial Board Member, International Journal of Ocean System Engineering, 2010-present

**Professional Development Activities:**

Chair Professor, National Sun Yat-Sen University, Kaohsiung, Taiwan, ROC, February 19 – July 31, 2018.


Attended 26th International Conference on Offshore and Polar Engineering in Rhodes, Greece, June 26-July 1, 2016.

Attended Texas A&M Turbulence Symposium 2015: Recent Advances in Turbulence and Mixing Research, College Station, Texas, April 1-3, 2015
CURRICULUM VITAE
XINGMAO (SAMUEL) MA, PH.D., P.E.
ZACHRY DEPARTMENT OF CIVIL ENGINEERING, TEXAS A & M UNIVERSITY, 3136 TAMU, COLLEGE STATION, TX, 77843, USA.
PH : (979)-862-1772 ;                FAX : (979)-862-1452 ;                    EMAIL : XMA@CIVIL.TAMU.EDU

EDUCATION
P.E.          Civil Engineering,                    2006              Ohio Board of Professional Engineers
Ph.D.        Civil Engineering,                    2004               Missouri Univ. of Sci. & Technol.
M.S.          Environmental Engineering,     2000              Tongji University, China
B.S.          Environmental Engineering,     1997              Taiyuan University of Technology, China

PROFESSIONAL EXPERIENCES:
• 2018-present, faculty member of Center for Infrastructure Renewal, Texas A&M University
• 2015- present, Associate professor, Zachry Department of Civil Engineering, Texas A & M University, College Station, TX.
• 2012-2014, Associate Professor, Southern Illinois University Carbondale, IL.
• 2010, Guest Scientist. Helmholtz Center for Environmental Research (UFZ), Leipzig, Germany.
• 2007- 2012, Assistant Professor, Southern Illinois University Carbondale, IL.
• 2006-2007, Postdoc Fellow, University of Texas Austin
• 2004-2006, Postdoc Fellow, Louisiana State University

HONORS AND AWARDS
• 2018 Who’s Who in America
• 2018 Southeastern Conference (SEC) Faculty Travel Grant, ($1,700)
• 2017 Invited Speaker, ASA-CSSA-SSSA International Annual Meeting, Tampa, FL
• 2017 CAPEES Distinguished Service Award
• 2013 Invited Speaker, Missouri University of Science & Technology
• 2012 Invited Speaker, Bielefeld University, Germany.
• 2011 Invited Speaker, Montclair State University Sustainability Seminar Series
• 2009 Green Talents Award from German Federal Ministry of Education and Research
• 2008 Invited Speaker, Missouri University of Science & Technology
• 2006 Invited Speaker, AEHS West Coast Conference in CA.

RESEARCH AND SCHOLARSHIP
Research Interests
- Environmental biogeochemistry of conventional and emerging contaminants
- Environmental remediation and ecosystem restoration
Recent Journal Publications


HUILIN GAO

Assistant Professor
Zachry Dept. of Civil Engineering
Texas A&M University, College Station, TX 77843-3136
Email: hgao@civil.tamu.edu; Phone: (979) 845-2875
Website: http://ceprofs.civil.tamu.edu/hgao

EDUCATION

Ph.D. Civil and Environmental Engineering, Princeton University, 2005
M.A. Civil and Environmental Engineering, Princeton University, 2002
M.S. Atmospheric Sciences, Peking University, 2000
B.S. Atmospheric Sciences, Peking University, 1997

ACADEMIC EXPERIENCE

Texas A&M University: Assistant Professor, 2012–present, full time
University of Washington: Research Associate, 2008–2012, full time
Georgia Institute of Technology: Research Faculty, 2005–2007, full time

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

- Member of American Geophysical Union (AGU)
- Member of the Institute of Electrical and Electronics Engineers (IEEE)
- Member of American Meteorology Society (AMS)
- Member of Sigma Xi Scientific Research Society
- Member of American Society of Civil Engineers (ASCE)

HONORS AND AWARDS

2015: NSF CAREER Award
2015: Research Excellence Award, Civil Engineering Department, Texas A&M University

SERVICE ACTIVITIES

- Lead Guest editor for the special issue on “Water-Energy-Food Nexus under Changing Environments: Perspectives Using Interdisciplinary Approaches” (Advances in Meteorology, 2016)
- Co-convener of AGU 2014 fall meeting, session GC11G: From Glacierized Watersheds to Global River Basins: Advances in water resources management modeling and monitoring
- Chair convener of AGU 2013 fall meeting, session GC012: Advances in Reservoir Modeling and Monitoring from Regional to Global Scales
- Associate Editor of Journal of Plant Ecology (UK) (2010-2012)
- Invited Editor for the special issue on “Plant and Water” (Journal of Plant Ecology, 2011)
- Co-convener of AGU 2010 fall meeting, session H52A: Detecting and Predicting Change in Coupled Human-Water Systems
- American Geophysical Union Remote Sensing technical committee member, 2015-present
- Department representative of Center for Autonomous Vehicles and Sensor Systems (CANVASS)
- Judge for the Summer Undergraduate Research Symposium at Texas A&M University, 2014
- Committee member of ‘Water initiative committee working group 3 (integrated water funding)’ at Texas A&M University
Reviewer for funding agencies: National Aeronautics and Space Administration (NASA), National Science Foundation (NSF), Netherlands Organization for Scientific Research (NOSR), Deutsche Forschungsgemeinschaft (DFG) Program.

INVITED TALKS (selected)
3. School of Atmospheric Sciences, Nanjing University, Nanjing, China, Jul., 2015.
4. Jackson School of Geosciences, University of Texas, Austin, Nov., 2014.
5. Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, Aug. 2014.
6. Dept. of Atmospheric and Oceanic Sciences, Peking University, China, Aug. 2014.
8. Dept. of Civil and Environmental Engineering, University of Houston, Apr. 2014.

PEER REVIEWED JOURNAL PAPERS (selected* represent student; # represent corresponding author)
8. Leng, G., M. Huang, Q. Tang, H. Gao, L. Leung, Impacts of irrigated agriculture on surface and groundwater resources simulated by the Community Land Model, J. Hydrometeorology, 15, 957-972, 2014.

CONFERENCE PRESENTATIONS/PUBLICATIONS (selected)
2. Zhao, G*, H. Gao, B. Naz, S. Kao, and N. Voisin, Sensitivity of reservoir storage and outflow to climate change in a water-limited river basin, EOS Trans. AGU Suppl. 95(57), 2015.
4. Lee, K*, H. Gao, M. Huang, and J. Sheffield, Hydrological extremes and their agricultural impacts under a changing
climate in Texas, EOS Trans. AGU Suppl. 95(57), 2015.


PROFESSIONAL DEVELOPMENT

- Junior Faculty Research Collaboration Conference by the TAMUS Engineering Network, 2013
Name: Stefan Hurlebaus

**Education:**
- Vordiplom (B.S. equiv.), Mechanical Eng., *University of Stuttgart*, 1993
- Master of Science, Mechanical Engineering, *University of Stuttgart*, 1996
- Doktor-Ingenieur, Mechanical Engineering, *University of Stuttgart*, 2002

**Academic Experience:**
- 9/2015–present: Professor, Zachry Dept. of Civil Eng., TAMU

**Experience:**
- 9/2011–8/2015: Associate Professor, Zachry Dept. of Civil Eng., TAMU
- 8/2005–8/2011: Assistant Professor, Zachry Dept. of Civil Eng., TAMU

**Prof. Licenses:**
- N/A

**Prof. Societies:**
- American Society of Civil Engineers (ASCE)
- American Society of Nondestructive Testing (ASNT)
- Acoustical Society of America (ASA)
- Society of Experimental Mechanics (SEM)
- Structural Engineering Association of Texas (SEAoT)
- Int. Society for Structural Health Monitoring and Intelligent Infrastructure
- National Precast Concrete Association
- Chi Epsilon

**Honors and Awards:**
- ASCE ExCEEd Faculty Award for Excellence in Teaching, 2007
- Birdwell Endowed Teaching Award in Civil Engineering, 2006 – 2007
- Caterpillar Teaching Excellence Award, 2012 – 2013
- William Brothers Construction Company Fellow, 2013
- ASNT Fellowship Award, 2013
- Peter C. Forster Career Development Professor, 2014 – 2015
- Truman R. Jones Excellence in Graduate Teaching Award 2015
William Brothers Construction Eng. Award for Contributions, 2016
Research Impact Award, Zachry Department of Civil Engineering, 2016
TEES Faculty Fellow Award, 2017
William Brothers Construction Eng. Award for Contributions, 2018

Service Activities:

Courses Taught
CVEN 207 Introduction to the Civil Engineering Profession (1-0)
CVEN 315 Sensor Technology for the Built Environment (2,3)
CVEN 345 Theory of Structures (3-0)
CVEN 363 Engineering Mechanics II: Dynamics and Vibrations
CVEN 662 Experimental Methods in Civil Engineering (2-3)
CVEN 752 Smart Structures (3-0)

Other Duties
SEAOt, Faculty Advisor, 2008 - present
Member of the Transportation Research Board AFF 40 committee
Member Editorial Board: Structural Monitoring and Maintenance

Recent Publications:


Gretchen R. Miller, Ph.D., P.E.

Education:
Bachelor of Science, Geological Engineering, *University of Missouri at Rolla*, 2002
Master of Science, Geological Engineering, *University of Missouri at Rolla*, 2003
Doctor of Philosophy, Civil and Environmental Eng., *Univ. of California at Berkeley*, 2009

Academic Experience:
Texas A&M University (TAMU), Associate Professor, 2016 to present, full time
Texas A&M University (TAMU), Assistant Professor, 2009 to 2016, full time
University of California at Berkeley, Graduate Student Instructor, 2008, part time
University of Missouri at Rolla, Graduate Research Assistant, 2003, part time

Related Experience:
Hydrogeophysics Inc., Research Engineer, 2006-2007, part time
Shaw Environmental, Project Engineer, Summer 2003, January - August 2004, full time
SAIC, Environmental Field Scientist, Summer 2002, full time

Certifications and Professional Registration:
Professional Engineer, Texas, No. 113115
ENV SP, Sustainability Professional, Institute for Sustainable Infrastructure

Professional Organizations:
American Society of Civil Engineers (ASCE)
American Geophysical Union (AGU)
National Ground Water Association (NGWA)
Tau Beta Pi

Honors and Awards:
Dean of Engineering Excellence Award, TAMU, 2016
Editors’ Citation for Excellence in Refereeing, *Water Resources Research*, 2015
Montague Scholar, Center for Teaching Excellence, TAMU, 2015
National Science Foundation CAREER Award, 2014-2019
Dick and Joyce Birdwell Award for Teaching Excellence, TAMU, 2013
Truman R. Jones Excellence in Graduate Teaching Award, TAMU, 2011
National Science Foundation Graduate Research Fellowship, 2005-2008
AGU Outstanding Student Paper Award, Fall Meeting, 2007

Service Activities:
Associate Editor, Hydrological Processes, 2016-present
Vice President, Interdisciplinary Council, ASCE Environmental and Water Resources Institute (EWRI), 2017-present
Secretary, Interdisciplinary Council, ASCE Environmental and Water Resources Institute (EWRI), 2015-2017
Leadership, Sustainability Committee, ASCE-EWRI, Chair 2013-2014, Vice-Chair 2012-2013, Secretary 2011-2012
Advisory Committee, Texas Center for Climate Studies, TAMU, July 2013 – present
Civil Engineering Curriculum Committee, TAMU, 2011 –2013
Advising, American Water Resources Association Student Chapter, TAMU, Advisor 2015-present, Co-advisor 2011-2015

Recent Publications:


Recent Invited Presentations:


Prof. Development:
- Annual conference attendance and presentations at ASCE-EWRI, AGU
- Civil Engineering/CTE workshop on “Active Learning”
- InTeGrate Webinar on “Critical Zone Science: A transdisciplinary approach to environmental science”
Name: Scott A. Socolofsky

Education: Bachelor of Science, Civil & Environmental Engineering, University of Colorado, Boulder, 1994
Master of Science, Civil & Environmental Engineering, Massachusetts Institute of Technology, 1997
Doctor of Philosophy, Civil & Environmental Engineering, Massachusetts Institute of Technology, 2001

Academic Experience: Zachry Department of Civil Engineering, Texas A&M University,
Professor, full time, 2015-present
Zachry Department of Civil Engineering, Texas A&M University, Associate Professor, full time, 2009-2015
Zachry Department of Civil Engineering, Texas A&M University, Assistant Professor, full time, 2003-2009
Institute for Hydromechanics, University of Karlsruhe, Germany, Director, Environmental Fluid Mechanics Division, full time, 2002
Institute for Hydromechanics, University of Karlsruhe, Germany, Research Associate, full time, 2001-2002

Civil Engineer, Wright Water Engineers, Inc., 1994

Certifications or Professional Registrations: None

Current Membership in Professional Organizations: American Geophysical Union (AGU)
American Physical Society (APS)
American Society of Civil Engineers (ASCE)
International Association of Hydraulic Engineering and Research (IAHR)

Honors and Awards: Texas A&M Engineering, Williams Brothers Construction Engineering Fellow Award for Contributions, 2017
IgNobel Award in Chemistry, Improbable Research, 2010
Karl Emil Hilgard Hydraulic Prize, ASCE, 2009
Montague Center for Teaching Excellence Scholar, Texas A&M University, 2008
Zachry Award for Excellence in Teaching, Texas A&M University, 2007
Texas Engineering Experiment Station Select Young Faculty Award, Texas A&M University, 2005

Service Activities:
- Division Head, Environmental, Water Resources, and Coastal Engineering, Zachry Department of Civil Engineering, Texas A&M University, 2016-present
- Division Head, Coastal and Ocean Engineering, Zachry Department of Civil Engineering, Texas A&M University, 2011-2014
- Editorial Board Member, Environmental Fluid Mechanics, Appointed, International Level, January, 2015-present.
- Technical Advisory Committee Member, American Petroleum Institute, Joint Industry Task Force for Oil Spill Planning and Response, Subcommittee D3 Dispersant Effectiveness, Project Subsea Effectiveness, Appointed, International Level, 2012-present.
- Journal of Hydraulic Engineering, American Society of Civil Engineers (ASCE), Associate Editor, Appointed, International Level, 2010-present.

Recent Publications:


**Professional Development:** Faculty development leave conducted at the University of Texas, Austin, spring 2014 to fall 2015.
Anna Birely  
Assistant Professor  
Zachry Department of Civil Engineering  
Texas A&M University  
DLEB 710-F  
3136 TAMU  
College Station, TX 77843-3136  
abirely@civil.tamu.edu

EDUCATION

- **Ph.D.**, Civil and Environmental Engineering, University of Washington – Seattle, December 2012  
  Dissertation: Seismic Performance of Slender Reinforced Concrete Structural Walls  
  Advisors: Laura N. Lowes, Dawn E. Lehman

- **M.S.C.E.**, Civil and Environmental Engineering, University of Washington – Seattle, June 2008  
  Non-thesis option, Topic: Modeling RC Beam-Column Joints for Earthquake Demands  
  Advisors: Laura N. Lowes, Dawn E. Lehman

- **B.S.C.E.** (Cum Laude), Civil, Architectural, and Environmental Engineering, University of Colorado – Boulder, May 2006

EMPLOYMENT

- **Assistant Professor**, Zachry Department of Civil Engineering, Texas A&M University, January 2013 – present
- **Visiting Assistant Professor**, Zachry Department of Civil Engineering, Texas A&M University, December 2012
- **Consultant**, Applied Technology Council, September 2012 – March 2013
- **Research Assistant**, Department of Civil and Environmental Engineering, University of Washington, September 2006 – August 2012
- **Teaching Assistant**, Department of Civil and Environmental Engineering, University of Washington, September – December 2008, January – June 2010
- **Engineering Intern**, BNSF Railway, Albuquerque, New Mexico, May – August 2005
- **Civil Design Intern**, J.R. Engineering, Greenwood Village, Colorado, May – August 2003

PROFESSIONAL REGISTRATION

Colorado Engineer-Intern, 2006

RESEARCH INTERESTS

Design and performance of concrete structures under ordinary and hazardous loads; reinforced concrete; prestressed concrete; strengthening (retrofit/rehabilitation/repair) of existing structures; earthquake engineering; performance-based design; fire resistance of structures; fiber reinforced concrete; 3D printing for civil infrastructure

PROFESSIONAL MEMBERSHIPS

- American Concrete Institute  
  - Subcommittee SA03 – Chester Paul Siess Award for Excellence in Structural Research (2017 – present; Chair 2018)
  - Committee on Awards (CAP) for Papers (2018)
  - Committee 133 – Disaster Reconnaissance (Voting Member: 2013 – present)
  - Committee 369 – Seismic Repair and Rehabilitation (Voting Member: 2013 – present)
  - Subcommittee 369-D – Walls (Voting Member: 2017 – present)
  - Committee 374 – Performance Based Seismic Design of Concrete Buildings (Associate Member: 2013 – present)
  - Committee 544 – Fiber Reinforced Concrete (Associate Member: 2017 – present)
JOURNAL PUBLICATIONS

* Indicates student


SUBMITTED JOURNAL MANUSCRIPTS

* Indicates student


**PUBLISHED DATA ARTICLES**

* Indicates student; Data Articles are peer-reviewed


**PUBLISHED DATASETS**

* Indicates student; Data Sets are not peer-reviewed


SUBMITTED DATA PAPERS & DRAFT DATASETS

DA Indicates data article; DS indicates dataset; * Indicates student

1DS. *McKee, C.D., *Lee, J.D., Birely, A.C., and Mander, J.B. "TxDOT 0-6863: Pretensioned Concrete Bent Caps Phase 2 Experimental Data." doi:10.18738/T8/CPNVA5, Texas Data Repository Dataverse, DRAFT VERSION. Note: Publication will be requested following acceptance of submitted journal manuscripts. For P&T review, dataset may be viewed via private URL: https://dataverse.tdl.org/privateurl.xhtml?token=1de00945-91c6-46b1-81d4-7e3cfe8aeb89

CONFERENCE PUBLICATIONS

* Indicates student


INVITED PRESENTATIONS


CONFERENCE PRESENTATIONS


STUDENTS SUPERVISED

PhD, Chair or Co-Chair
- Ni, Shuna (2013 to 2018) – PhD August 2018, “Post-Earthquake Fire in Reinforced Concrete Structural Walls”
- Chang, Wen-Nan (2013 to present) – PhD Anticipated 2018, “Performance Based Design Tools for Reinforced Concrete Coupled Walls”
  - Student is currently instructor at Chung Cheng Institute of Technology, Taiwan.
- Cui, Jilong (2015 to present) – PhD Anticipated 2019, Co-chaired w/ Stefan Hurlebaus, “Retrofit of In-Serviced Inverted-T Bent Caps”
- Pearson, Andrew (2017 to present), PhD Anticipated 2020, “Novel Retrofit Solutions for Reinforced Concrete Structures”

MS/ME, Chair or Co-Chair
- Kruzick, Daniel (Spring 2015) – ME December 2015, Co-chaired w/ John Mander, No Thesis

**Undergraduate Research**

• Gills, Cassidy (6/2015-8/2015) – Sponsored by TAMU Undergraduate Summer Research Grant, “Residual Displacements in Reinforced Concrete Walls”; current graduate student at University of Washington
• Martin, J. Bryce (6/2016-8/2016) – Sponsored by TAMU Undergraduate Summer Research Grants, “Advancing the Understanding of Reinforced Concrete Bent Cap Behavior through Experimental Testing”; current graduate student at Stanford University

**Other**

• PhD Committee Membership: Natasha Boger, Yan Zhou, Hungjoo Kwon, Sun Hee Park
• MS/ME Committee Membership: Justin Buskmiller, Santiago Serrano Aponte
• Hourly Research Assistants: Connor Brady, Nick Danney, Josh Ortiz, Brandon Oxley, Alexis Velaquez, Vanessa Hernandez, Ricardo Espinoza, John Teets, Benito Soto, Walker Needles, Jacob Page

**FUNDED RESEARCH PROJECTS**

“In-Situ Deficiency Detection and Characterization for Automated Structural Repair,” Texas A&M University T3 grant. **$35k**. PI: Stephanie Paal (34%), Co-PIs: Anna Birely (33%), Amir Behzadan (33%). April 2018 to April 2020.

“Strengthening of Existing Inverted-Tee Bent Cap Ledges,” Sponsored by Texas Department of Transportation. **$567k**. PI: Stefan Hurlebaus (34%), Co-PIs: Anna Birely (33%), John Mander (33%). September 2015 to August 2018.

• Role: co-PI; led documentation of in-service structures, including outcome of field visits; primary faculty for supervising preparation and testing of first laboratory specimen; co-led supervision of strength evaluation or in-service bent caps and design of strengthening solutions; currently leading preparation of final report
• Students Supervised/Advised
  • PhD: Jilong Cui (co-Chair); Sun Hee Park (committee member)
• Publications: anticipate 1 report and 3+ journal manuscripts following project completion in August 2018


• Role: Project management and primary advisor/supervisor for all Master/PhD students and hourly workers; Primary faculty for supervising literature review, case studies, design of experimental test program (including test setup, test matrix, instrumentation, loading plans), experimental testing (including data documentation and post-processing); co-led supervision of design procedures/recommendations, experimental test setup details, and design examples
• Students Supervised/Advised
  • PhD: Ju Dong Lee
  • MS: Daniel Kruzick (ME), Usha Barooah, Kevin Yole, Codi McKee
  • Summer Undergraduate Research Assistant: J. Bryce Martin
  • Hourly research assistants: 2 graduate & 8 undergraduate (includes 4 students from underrepresented groups)
• Publications:
  • 2 reports to sponsor (accepted February 2018, published April 2018), co-authored by 3 MS students and 1 PhD student
  • 4 manuscripts in review, co-authored by 3 MS students and 1 PhD student
2 manuscripts in preparation, co-authored by 2 MS students and 1 PhD student
2 datasets to be published following manuscript acceptance
• Workshop at June 2018 International Bridge Conference in Baltimore, MD

• Role: Project management; Supervised all aspects of structural engineering portion of project, including literature review, case students, experimental test programs (slab strips and full-scale deck test), analysis, design recommendations; developed design recommendations and design examples
• Students Supervised/Advised
  o MS: Joshua McMahon
  o Hourly research assistants: 1 undergraduate
• Publications:
  o 1 report to sponsor, co-authored by 1 MS student
  o 2 journal papers, co-authored by 1 MS student

TEACHING EXPERIENCE
Instructor, Zachry Department of Civil Engineering, Texas A&M University
CVEN 345 – Theory of Structures (2014c, 2015a, 2016a, 2017a, 2018a)
CVEN 444 – Reinforced Concrete Design (2013a, 2013c, 2016c, 2018a\textsuperscript{h})
CVEN 445 – Matrix Structural Analysis (2015c, 2017c)
CVEN 621 – Advanced Reinforced Concrete Design (2014a, 2015a, 2016a, 2017a)
a = spring; b = summer; c = fall; \textsuperscript{h} = includes honors section

Teaching Assistant, Department of Civil and Environmental Engineering, University of Washington
Advanced Structures I (Fall 2008)

HONORS AND AWARDS
• NSF Fellow for ENHANCE, 2013 - 2016
• Engineering Structures Outstanding Reviewer Status, 2015, 2017
• William N. Allison Endowed Fund Fellowship, University of Washington, Fall 2009
• Charles McMahon Civil Engineering Scholarship, University of Colorado, 2005-2006
• Westfall Scholarship, University of Colorado, 2003-2004, 2004-2005
• Isbill Associates Scholarship, University of Colorado, 2003-2004
• Freshman Merit Scholarship, Women in Engineering Program, University of Colorado, 2002-2003
• American Council of Engineering Companies Colorado Chapter Malcolm & Charles Meurer Memorial Scholarship, 2005-2006
• Society of Women Engineers, Elizabeth McLean Memorial Scholarship, 2005-2006
• National Associate of Women in Construction, Vona J. Wagner Memorial Scholarship, 2002-2003
• Target All-Around Scholarship, 2002-2003

INVITED WORKSHOP PARTICIPATION
• Advances and Opportunities in Real-Time Hybrid Substructuring, Storrs, CT, June 2, 2018
• TAMU Center for Infrastructure Renewal (CIR) Additive construction & Manufacturing Idea Lab, September 29-30 2017
• NHERI Cyberinfrastructure User Needs Workshop, January 2016
• 10\textsuperscript{th} NEES/E-Defense Planning Meeting, Kyoto, Japan, December 2013
CAREER DEVELOPMENT ACTIVITIES ATTENDED

- TAMU CVEN Active Learning Workshop, February 28, 2018, 0.5 days
- TAMU NSF CAREER Workshop, February 2016 (2 hrs.)
- NSF CAREER Proposal Workshop, April 27-28, 2015
- TAMU ADVANCE Roadmap Workshop, March 30-31, 2015
- ENHANCE (Women in Earthquake Engineering mentoring group) Meetings – April 24-27, 2014; September 24-27, 2015, and 5 1 hour WebEx meetings throughout 2015
- TAMU Center for Teaching Excellence (CTE): Five workshops (approx. 2 hrs. each), 2013 – 2015
- TAMU Center for Teaching Excellence (CTE): New Faculty Workshop Series, 21 hours over 8 meetings, 2013
- Portland Cement Association (PCA) Professor’s Workshop, July 15-18, 2013

PROFESSIONAL SERVICE

- Member of George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES) Requirements Analysis and Assessment Subcommittee (RAAS) – June 2013 to July 2014
- Member of International Wall Institute – 2014 to 2015
- EERI Student design competition judge – 2014
- Journal Reviews for:
  - ACI Structural Journal (11/12 to 6/16)
  - ACI Special Publications (10/13)
  - Advances in Civil Engineering (4/2018)
  - Advances in Concrete Construction (12/14)
  - ASCE Journal of Structural Engineering (5/12 to 5/18)
  - ASCE Natural Hazards Review (5/18)
  - Canadian Journal of Civil Engineering (4/17)
  - Earthquake Spectra (4/17)
  - Earthquake Engineering & Vibrations (12/13)
  - Engineering Structures (10/12 to 5/18)
    - Outstanding Reviewer: 2015, 2017
  - Int’l Journal of Concrete Structures (4/2014)
  - Marine Structures (2017)
  - NSZEE (4/2017)
  - Thin-Walled Structures (5/2018)
  - Structures (5/2018)

COLLEGE AND UNIVERSITY SERVICE

- Civil Engineering Representative for COE Junior Faculty Advisory Council (2017-present)
- Mentor for TAMU Graduate Teach Academy (2014)
- TAMU-CAPES Seed Grant Proposal Review (2014)
- Aggieland Saturday (2013, 2018)
Name: Joseph M. Bracci

Education:
Bachelor of Science, Civil Engineering, State University of New York at Buffalo, 1987
Master of Science, Civil Engineering, State University of New York at Buffalo, 1989
Doctor of Philosophy, Civil Engineering, State University of New York at Buffalo, 1992

Academic Experience:
25 years service
Professor, 2005-present
Associate Professor, 1999-2005
Assistant Professor, 1993-1999

Non-academic Experience:
Research Engineer, Texas Transportation Institute, 1993-present
Structural Engineer, EQE Engineering Consultants, San Francisco, CA, 1993
Lecturer, State University of New York at Buffalo, 1989-1992
Structural Engineer, Cannon Design Inc., Buffalo, New York, 1989

Prof. Licenses:
Professional Engineer, Texas No. 79855

Membership in Prof. Societies:
American Concrete Institute, member

Honors and Awards:
Williams Brother Construction Company Faculty Fellow Award, 2009-10
Fellow of the American Concrete Institute, awarded 11/05
Zachry Award for Excellence in Teaching, 2002
ASCE Faculty Advisor Award, 2001 and 2002

Institutional Service:
Courses taught in last 5 years:
CVEN 483 Analysis and Design of Structures, (2-3), day, undergraduate
CVEN 444 Structural Concrete Design, (3-0), day, undergraduate
CVEN 315 Sensor Technology (2-3), day, undergraduate
CVEN 221 Engineering Mechanics-Statics, (2-2), day, undergraduate
Other duties:
Graduate Advisor, Structural Engineering, 2014 – present.
Faculty Search Committee Chair, 2015-16.
Faculty representative for TAMU with the American Concrete Institute, 1998-present
Undergraduate and Graduate Advising

**Professional Service:** American Concrete Institute (ACI)

Concrete Research Council, Chair (2014-present)
ACI Foundation, Trustee (2014-present)
Committee 335 - Composite and Hybrid Structures, Member
Committee 374 - Performance-Based Seismic Design, Member
Committee 375 - Performance-Based Wind Design, former Chairman and Member

**Professional Development:**

n/a
Name: Mark W. Burris

Education: Bachelor of Engineering, Civil Engineering, Technical University of Nova Scotia, 1993
Master of Science in Engineering, Civil Engineering, University of New Brunswick, 1995
Doctor of Philosophy, Civil Engineering, University of South Florida, 2001

Academic Experience: Texas A&M, Professor (since 2012) and Associate Department Head for Graduate Studies, 2018, full time
Texas A&M, Associate Professor and Assistant Department Head, 2007 – 2012, full time
Texas A&M, Assistant Professor, 2001 – 2007, full time

Non-Academic Experience: Research Engineer, Texas Transportation Institute, 2012 to present
Associate Research Engineer, Texas Transportation Institute, 2007 to 2012
Assistant Research Scientist, Texas Transportation Institute, 2001 to 2007
Senior Research Associate, Center for Urban Transportation Research, University of South Florida, 2001
Research Associate, Center for Urban Transportation Research, University of South Florida, 1995 to 2001

Prof. Licenses: Professional Engineer, Texas, No. 93123

Memberships: Institute of Transportation Engineers, Transportation Research Board, Chi Epsilon, Tau Beta Pi

Honors and Awards: Herbert D. Kelleher Professorship, 2014
Council of University Transportation Centers (CUTC) New Faculty Member Award, 2007.
Zachry Teaching Award, 2007.

Institutional Service: Director of the Graduate Office, 2009 – 2013
Associate Department Head for Research and Operations, 2013 - 2017
Search committee chair for an Assistant Professor in the Transportation and Materials Division, 2015.
Member of search committee to hire Automated/Connected Vehicle Faculty, 2015 - present.
Member of the strategic visioning committee for Automated/Connected Vehicles in the College, 2015 – present
College of Engineering Graduate Experience Subcommittee, 2012
College of Engineering Research Council Committee, member, 2013 – present.
Civil Engineering 25x25 Committee, member, 2012 - 2014
Civil Engineering Distance Learning Committee Chair, 2013 – 2014
Civil Engineering Department Head Search Committee, 2013

**Professional Service:** Transportation Research Board Committee on Transportation Economics Member, 2001 – 2010, Committee Chair 2010 to 2016.


Peer Review Panelist for Oregon DOT’s least cost planning tool, Mosaic.


**Professional Development:** Southern Plains Transportation Center (SPTC) workshop and symposium on Teaching at Louisiana Tech, July 2016
Name: Ivan Damnjanovic

Education:

*Diploma in Engineering, Civil Engineering, University of Nis, Serbia, 2000*

*Doctor of Philosophy, Civil Engineering, University of Texas at Austin, 2006*

Academic experience

*Texas A&M University, Assistant Professor, (2006-2012), full time*

*Texas A&M University, Associate Professor, (2012-Present), full time*

Non-academic experience

*Associate Research Engineer, Texas Transportation Institute, 2006-present*


Certifications or professional registrations

*N/A*

Current membership in professional organizations

*ASCE, TRB, SPE, SRA, INFORMS*

Honors and Awards

*Birdwell Excellence in Teaching Award (2010)*

Service activities

*Chair of Engineering Faculty Advisory Council (EFAC)*

*Differential Tuition Oversight Advisory Committee*

*Director of Engineering Project Management Education*

Briefly list the most important publications and presentations from the past five years- title, co-authors if any, where published and/or presented, date of publication or presentation


Briefly list the most recent professional development activities

*Faculty Development Leave in Norway at the University of Stavanger, Norway*
Name: David N. Ford

Degrees: Bachelor of Science, Civil Engineering, Tulane University, 1976
Master of Engineering, Civil Engineering, Tulane University, 1979
Doctor of Philosophy, Civil Engineering, Massachusetts Institute of Technology, 1995

A&M Faculty: 18 years service
Professor, 2016 – present
Associate Professor, 2006 - 2016
Assistant Professor, 2000 - 2006.

Naval Postgraduate School Graduate School of Business, Research Associate, 2006 - present
Professor of Acquisition, Univ. de Castilla La Mancha, Spain, Civil and Construction Instructor, 2006 - 2007
University of Bergen, Norway, Information Science Associate Professor, 1995 - 1999
Chalmers University of Technology, Göteborg, Sweden, School of Technology, Adjunct Professor, 1996 - 1998
Mikkeli Polytechnic Institute of Technology, Mikkeli, Finland, Management and Economics Instructor, 1996 - 1998
Delgado College, New Orleans, LA, Engineering Technology Instructor, 1985 - 1986

Non-academic Experience:
Assistant Project Manager and Tenant Coordinator Harvard Real Estate (Harvard University), Cambridge, Massachusetts 1993
Project Manager, Design Communications Limited, Boston, Massachusetts, 1992
Universal Access, Adaptive Environments Consultants, Boston, Ma., 1991

Prof. Licenses: Professional Engineer, Louisiana, No. E-18893 (civil)

Societies: American Society of Civil Engineers, member since 1975
National Society of Professional Engineers, member since 1981
International System Dynamics Society, member since 1993

Honors and Awards:


Recipient, Faculty Impact Award. Zachry Department of Civil Engineering. Texas A&M University. 2012.


Williams Brothers Construction Company Faculty Fellow. Texas A&M University. 2008 2009.


Chi Epsilon, National Civil Engineering Honor Society. member since 2007.


**Service Activities:**

System Dynamics Society: President, 2012

Dwight Look College of Engineering Honors Program. Texas A&M. Zachry Department of Civil Engineering Coordinator. 2015 – present.


**Recent Publications:**


**Professional development activities**

Chancellor’s Summit on Academic Technology. Texas A&M University. June, 2015
Name - Zachary Grasley
Education -
  Bachelor of Science, Civil Engineering, Michigan Technological Univ., 2001
  Master of Science, Civil Engineering, University of Illinois (U-C), 2003
  Doctor of Philosophy, Civil Engineering, University of Illinois (U-C), 2006
Academic experience-
  Texas A&M University, Professor & Director of Center for Infrastructure Renewal, Presidential Impact Fellow, 2017-current, full time
  Texas A&M University, Associate Professor, Peter C Forster Faculty Fellow I, 2014-2017, full time
  Virginia Tech, Associate Professor, 2012-2014, full time
  Texas A&M University, Assistant Professor, 2006-2012, full time
Non-academic experience-
  G&W Residential Builders, Inc., Qualifying Officer, 1997-current, part time
  OSL Concrete, Inc., Board of Advisors, 2016-current, part time
Certifications or professional registrations
  Engineer in Training, MI, 2001
  Licensed Residential Builder, Michigan, No. 2102141214
Current membership in professional organizations
  American Society of Civil Engineers, American Concrete Institute, American Ceramic Society
Honors and Awards
  Elected Fellow of the American Ceramic Society, 2018
  Truman R. Jones Excellence in Graduate Teaching Award, Zachry Department of Civil Engineering, 2017
  Research Impact Award, Zachry Department of Civil Engineering, 2015
  ACI Young Member Award for Professional Achievement, 2015
  Outstanding Paper Award for the year 2015 from Materials & Structures journal
  Elected Fellow of the American Concrete Institute (ACI) International, 2015
  ACI Walter P. Moore, Jr., Faculty Achievement Award, 2013
  TEES Select Young Faculty Award, 2011
  Zachry Award for Teaching Excellence, 2010
  NSF CAREER Award, 2009
Service activities (within and outside of the institution)
  Faculty search committee member, 2015-2016
  Advisor for TAMU ACI Student Chapter, 2010-2012, 2014-present.
  Member of Curriculum Transformation Team, 10/2014-present.
Peer teaching reviewer, 2015.
Host for Future Faculty Development Program at Virginia Tech, January 2014.
Member of Qualifying Examination Committee, SEM group (VT), 12/2012-8/2014.
MS admissions officer, SEM group (VT), 9/2013-8/2014.
Faculty advisor for Concrete Canoe (VT), 8/2012-8/2014.
Green Engineering Department Representative (VT), 1/2013-8/2014.
Search committee member, 2011-2012
ACBM-ACerS Annual meeting, Program Chair, Austin TX, 6/2012.
Texas A&M University, Session Co-Chair for “Perambulation of Continuum Mechanics,” College Station, TX 11/2010.
American Concrete Institute, Secretary for Committee 236, 2012-present
American Ceramic Society, Chair for the Cements Division, 2010-2011
American Ceramic Society, Chair-Elect for the Cements Division, 2009-2010
American Ceramic Society, Secretary of Cements Division, 2008-2009

Briefly list the most important publications and presentations from the past five years- title, co-authors if any, where published and/or presented, date of publication or presentation


Briefly list the most recent professional development activities
Name: H. Gene Hawkins, Jr.

Education—degree, discipline, institution, year

Bachelor of Science, Civil Engineering, Texas A&M University, 1981
Master of Engineering, Civil Engineering, Texas A&M University, 1983
Doctor of Philosophy, Civil Engineering, Texas A&M University, 1993

Academic experience— institution, rank, title (chair, coordinator, etc. if appropriate), when (ex. 1990-1995), full time or part time

Appointed Associate Professor without tenure, 2004
Associate Professor with tenure, 2007
Professor, 2016

Non-academic experience— company or entity, title, brief description of position, when (ex. 1993-1999), full time or part time

Head, Operations and Design Division, Texas Transportation Institute, 1999-2004.
Associate Research Engineer, Texas Transportation Institute, 1993-2001.
Manager, System Implementation Program, Texas Transportation Institute, 1987-1993.
Assistant Research Engineer Texas Transportation Institute, 1987-1993.

Certifications or professional registrations

Professional Engineer, Texas, No. 61509

Current membership in professional organizations

National Committee on Uniform Traffic Control Devices (NCUTCD): Member, 2002-Present; Associate Member, 1995-2002; Technical Committee Member, 1992-Present.

Chair (elected), 2018-present.
Vice-Chair for Programs (elected), 2012-2018.
Executive Committee: Member, 2008-Present.
Edit Committee: Chair 2012-2018 (appointed); Secretary, 1994-1998.
ITE Delegation: Chair 2008-2012.
Markings Technical Committee: Chair, 2003-2012 (appointed).
MUTCD Strategic Planning Task Force: Chair, 2008-Present (appointed).

Transportation Research Board (TRB): 1989-Present.
TRB Operations and Preservation Group, Committee Member, 2015-Present.
TRB Traffic Control Devices Committee; Committee Member, 1994-2017.
Committee Chair, 2001-2007 (appointed).
TRB Tort Liability and Risk Management Committee; Committee Member, 2002-2017.
TRB Transportation Education and Training Committee, Subcommittee on Undergraduate and Graduate Education, member, 2015-present.
TRB Roundabout Committee; Committee Member, 2012-2015.

TRB Signing and Marking Materials Committee; Committee Member, 1994-2010.

Institute of Transportation Engineers (ITE): Fellow 2006-Present, Member, 1993-2006; Associate Member, 1987-1993.

ITE Delegation to National Committee on Uniform Traffic Control Devices: Chair 2008-Present; Member, 2002-Present; Associate Member, 1995-2002.


Faculty Advisor, Texas A&M University Student Chapter, 2007-2010.

Texas Section, Member; 1987-Present.

Local Arrangement Committee member, event co-chair, March 2015.


Vice-Chair of Executive Committee 2014-2018 (elected).

Honors and Awards

- 2018 Public Sector recipient of the American Road & Transportation Builders Association John “Jake” Landen Memorial Safety Award, awarded June 2018.
- 2015 Association of Former Students College Level Teaching Award, Texas A&M University Dwight Look College of Engineering, July 2015.
- 2013 Zachry Award for Teaching Excellence, Texas A&M University Zachry Department of Civil Engineering, December 2013.
- 2013 Aggie Salute to Academics Award, Texas A&M University Department of Athletics, September 2013.
- 2012 Wilbur S. Smith Distinguished Transportation Educator Award, Institute of Transportation Engineers, August 2012.
- Williams Brothers Construction Company Development Professor I, September 2011.
- 2010 Transportation Engineer of the Year, Texas District of the Institute of Transportation Engineers, June 2010.
- 2009 Technical Paper Award from the Texas District of the Institute of Transportation Engineers for the paper entitled Revised Process for Work Zone Decision-Making Based on Quantitative Performance Measures, T.W. Hartmann* and H.G Hawkins, August 2009.
FHWA Outstanding Service Award from Office of Safety in recognition of research and technical support for developing and implementing MUTCD minimum retroreflectivity standards, November 2008.

Fellow of the Institute of Transportation Engineers, September 2006.

Selected as Fish Camp namesake for Fish Camp 2005 at Texas A&M University.

Selected as participant and report facilitator on an FHWA technology scanning trip of European practices regarding incident response practices, April 2005.

Texas Department of Transportation Top Research Innovation Award for the document *Sign Crew Field Book*, 2001.

Texas Department of Transportation Top Research Innovation Award for the document *Guidelines for Performing Traffic Signal Warrant Analysis*, 1999.

Texas Transportation Institute/Trinity Researcher Award, December 1998.

Selected as participant and report facilitator on an FHWA technology scanning trip of European practices regarding innovative traffic control, May 1998.

One of 100 younger engineers invited to attend the National Academy of Engineering’s Second and Third Symposiums on Frontiers of Engineering held in Irvine, California, September 1996 and 1997.


Service activities (within and outside of the institution)

See current membership information (#6). University service below.

Department Peer-Review Committee, co-chair, 2017-Present.
Department Tenure and Promotion Committee, member, Fall 2007 – Present.
Departmental Representative to the University Strategic Planning Forums, Spring 2015.
Professor of Practice Committee, Zachry Department of Civil Engineering: Chair, 2014.
Graduate Coordinator – Transportation Program, Zachry Department of Civil Engineering, 2014 – Present.
Department of Civil Engineering Distance Education Committee, 2013-present.
Transportation course coordinator, Transportation and Materials Division, Department of Civil Engineering, 2011-present.
Division Head, Transportation and Materials Division, Department of Civil Engineering, 2004-2011.
Texas A&M University Civil Engineering Department Head Search Committee, Member, 2009-2010.
Chair, SWUTC Student Conference Planning Committee, appointed August 2009, conference held February 2010.
Curriculum Committee, Zachry Department of Civil Engineering: Member, 2008-2010.
Institute of Transportation Engineers, Texas A&M University Student Chapter, Faculty Advisor, 2007-2010.
Engineering and Public Policy Task Committee, Zachry Department of Civil Engineering: Member, 2009.
Southwest Region University Transportation Center, Associate Director - Education, September 2006 - Present
Transportation Scholars Program, Director, 2006 – Present
Executive Committee, Member, December 2004 – Present.
Transportation Scholars Summer Undergraduate Research Experience, Director, 2006 – Present.
Civil Engineering Transportation Faculty Search Committee, 2005-2006.
Civil Engineering Task Force on the Undergraduate Experience, 2005-2006.
Graduate Curriculum Committee, Department of Civil Engineering, 2005.
Transportation Engineering undergraduate coordinator, Department of Civil Engineering, 2004-Present.
Advisor to civil engineering undergraduate students, 2004 – Present.
Strategic Planning Committee for Surface Transportation Education Program, Department of Civil Engineering, Member, 2003-2004.


Presentations:

98. “Long-Range Vision and Strategic Plan for the MUTCD.” Presented to the Brazos Valley Section of the Institute of Transportation Engineers, College Station, Texas, March 2013.
92. “Preliminary Thoughts on a Long-Range Vision for the MUTCD.” Presented at Institute of Transportation Engineers Annual Meeting, Atlanta, Georgia, August 2012.
89. “Preliminary Thoughts on a Long-Range Vision for the MUTCD.” Presented at National Association of County Engineers Annual Meeting and Technical Conference, Lexington, Kentucky, April 2012.

Briefly list the most recent professional development activities

None provided
Mary Beth Deisz Hueste, Ph.D., P.E., F. ACI

Education
Ph.D. Civil Engineering, University of Michigan, 1997
M.S. Civil Engineering, University of Kansas, 1993
B.S. Civil Engineering, North Dakota State University, 1988, With Honor

Academic Experience
Professor, Zachry Dept. of Civil Engin., TAMU, 2012-present, full time
Interim Division Head; Construction, Geotechnical, and Structures (CGS) Division; Texas A&M Transportation Institute (TTI), TAMU, 2010-present, part time
Division Head; CGS Division; Zachry Dept. of Civil Engin., TAMU, 2010-2013, part time
Program Manager, Major Highway Structures, TTI, TAMU, 2005-present, part time
Associate Professor, Department of Civil Engineering, TAMU, 2005-2012, full time
Assistant Division Head; CGS Division; Dept. of Civil Engin., TAMU, 2005-2009, part time
Assistant Professor, Dept. of Civil Engin., TAMU, 1998-2005, full time
Research Assistant, CEE Department, University of Michigan, 1994-1997, part time
Teaching Assistant, CEE Department, University of Michigan, 1997, part time
Teaching Assistant, CEE Department, University of Kansas, 1993, part time

Non-academic Experience
Structural Engineer, Black & Veatch, Overland Park, Kansas, 1988-1993, full time
Civil Engineering Technician, North Dakota Soil Conservation Service, 1987, full time

Professional Registration
Professional Engineer, Kansas, No. 12774
Professional Engineer, Texas, No. 89660

Current Membership in Professional Organizations
American Concrete Institute, American Society of Civil Engineers, American Society of Engineering Education, Earthquake Engineering Research Institute, Structural Engineers Association of Texas

Select Honors and Awards
- 2016 ACI Delmar L. Bloem Distinguished Service Award, American Concrete Institute
- 2014 Preservation Achievement Award, Board of Historic Fort Worth
- 2014 TTI/Trinity Senior Researcher Award, Texas A&M Transportation Institute
- 2013 Leadership Impact Award, Zachry Department of Civil Engineering, TAMU
- 2011 Williams Brothers Construction Company Fellow, TAMU Engineering
- 2010-present, Fellow of the Institute, American Concrete Institute

Select Service Activities

Professional
- ACI Education Activities Committee (appointed), Voting Member, 2012-2015.
Institutional

- College of Engineering Tenure and Promotion Committee, Member, 2017-2018.
- Faculty Search Committee, Structural Engineering, Member, 2015-2016, 2016-2017.
- College of Engineering Honors and Awards Committee, Member, 2015-2016.
- Center for Infrastructure Renewal Planning Committee, Member, 2012-2016.
- CVEN Women Student Mentoring Group, Faculty Steering Committee, 2004-present.

Significant Publications (past five years)


Significant Presentations (past five years)


Recent Professional Development Activities

Name: Arash Noshadravan

Education—degree, discipline, institution, year

- Ph.D, Civil Engineering, University of Southern California, 2011.

Academic experience— institution, rank, title (chair, coordinator, etc. if appropriate), when (ex. 1990-1995), full time or part time

- Texas A&M University, Research Assistant Professor, Zachry Department of Civil Engineering, January 2015-Present, full time.
- Massachusetts Institute of Technology, Engineering Systems Division, Postdoctoral Associate, January 2012-December 2014, full time.
- University of Southern California, Department of Civil Engineering, Research Assistant, January 2006-November 2011, part time.
- University of Southern California, Department of Civil Engineering, Teaching Assistant, January 2006-December 2010, part time.

Non-academic experience— company or entity, title, brief description of position, when (ex. 1993-1999), full time or part time


Certifications or professional registrations

- Engineering-In-Training (EIT), California, January 2009, Certificate No EIT 135843.

Current membership in professional organizations

- American Society of Civil Engineering (ASCE).
- Society for Industrial and Applied Mathematics (SIAM).
- Earthquake Engineering Research Institute (EERI).

Honors and Awards

- Award of Excellence in Engineering Education, Association of Professors and Scholars of Iranian Heritage (APSIH), May 2010.
- NSF fellowship for attending summer institute on nano-mechanics and materials, Northwestern University, July 2007.

Service activities (within and outside of the institution)
11. Briefly list the most important publications and presentations from the past five years- title, co-authors if any, where published and/or presented, date of publication or presentation

March 15, 2018

TO: External Program Reviewers and Program Accreditors

FROM: Michael T. Stephenson
Vice Provost for Academic Affairs and Strategic Initiatives

RE: Information required for USDOE Accrediting Bodies

Texas A&M University is accredited by the Southern Association of Colleges and Schools Commission on Colleges to award baccalaureate, master's, and doctoral degrees. Consistent with comprehensive standard 3.13.1, the following provides the institution’s official position on its purpose, governance, programs, degrees, diplomas, certificates, personnel, finances, and constituencies and is published in official university documents as noted.

Purpose

Classified by the Carnegie Foundation as a Research Doctoral University (Highest Research Activity), Texas A&M embraces its mission of the advancement of knowledge and human achievement in all its dimensions. The research mission is a key to advancing economic development in both public and private sectors. Integration of research with teaching prepares students to compete in a knowledge-based society and to continue developing their own creativity, learning, and skills beyond graduation.

The institution’s official mission statement, published both on the institution’s web page as well as in its annual university catalog, is:

Texas A&M University (Texas A&M) is dedicated to the discovery, development, communication and application of knowledge in a wide range of academic and professional fields. Its mission of providing the highest quality undergraduate and graduate programs is inseparable from its mission of developing new understandings through research and creativity. It prepares students to assume roles in leadership, responsibility and service to society. Texas A&M assumes as its historic trust the maintenance of freedom of inquiry and an intellectual environment nurturing the human mind and spirit. It welcomes and seeks to serve persons of all racial, ethnic and geographic groups, women and men alike, as it addresses the needs of an increasingly diverse population and a global economy. In the twenty-first century, Texas A&M University seeks to assume a place of preeminence among public universities while respecting its history and traditions.

Governance

The governance of the institution was described in the 2012 certification of compliance submitted to SACSCOC.
Texas A&M University at College Station, the flagship institution of the Texas A&M University System, has branch campuses located in Galveston, Texas and Doha, Qatar. A ten-member Board of Regents, appointed by the Governor, directs the Texas A&M System. The appointment of each Regent follows Texas Education Code (TEC, Chapter 85, Section 21).

TEC outlines the duties and responsibilities of the Board of Regents. These responsibilities are also defined in System Policy 02.01 Board of Regents and TEC 51.352. The Board elects two officers: Chair and Vice Chair. There are four standing committees: Audit, Academic & Student Affairs, Finance, and Buildings & Physical Plant. Special committees may be appointed by the Chair with Board approval.

At Texas A&M University the President is the chief executive officer; the President is not the presiding officer of the Board of Regents. The President reports to the state-appointed Board of Regents through the Chancellor of the Texas A&M University System. System Policy 2.05 Presidents of System Member Universities defines the duties of the President. The appointment of the President follows conditions set forth in System Policy 01.03 Appointing Power and Terms and Conditions of Employment, section 2.2.

**Personnel**

The institution is led by the President and members of his cabinet:

- Michael K. Young, President
- Carol A. Fierke, Provost and Executive Vice President, Chief Academic Officer
- Jerry R. Strawser, Executive Vice President for Finance and Operations and Chief Financial Officer
- Michael Benedik, Vice Provost and Chief International Officer
- M. Dee Childs, Vice President for Information Technology and CIO
- Michael G. O’Quinn, Vice President for Government Relations
- Col Michael E. Fossum, Vice President and COO, TAMU-Galveston
- Barbara A. Abercrombie, Vice President for HR & Organizational Effectiveness
- Robin Means Coleman, Vice President and Associate Provost for Diversity
- Mark Barteau, Vice President for Research
- Carrie L. Byington, Senior Vice President TAMU Health Science Center, Dean of the College of Medicine, and Vice Chancellor for Health Services
- Daniel J. Pugh, Sr., Vice President for Student Affairs
- Joseph P. Pettibon, II, Vice President of Enrollment and Academic Services
- Gen Joe E. Ramirez, Jr. Commandant, Corps of Cadets
- Amy B. Smith, Senior Vice President and Chief Marketing and Communications Officer
- Scott Woodward, Director of Athletics
- R. C. Slocum, Special Advisor to the President
- David Batson, Sr. Associate Athletic Director, Athletic Compliance
- Shane Hinkley, Vice President of Brand Development
- Andrew P. Morris, VP of Entrepreneurship & Economic Development, Dean of the I-School

**Programs, Degrees, Diplomas, and Certificates**

See the Institutional Summary submitted to SACSCOC

**Finances**

See the Financial Profile 2017 submitted to SACSCOC
GENERAL INFORMATION

Name of Institution  Texas A&M University

Name, Title, Phone number, and email address of Accreditation Liaison
Michael T. Stephenson
Vice Provost for Academic Affairs and Strategic Initiatives
979.845.4016
mstephenson@tamu.edu

Name, Title, Phone number, and email address of Technical Support person for the Compliance Certification
Alicia M. Dorsey
Assistant Provost for Institutional Effectiveness
979.862.2918
amdorsey@tamu.edu

IMPORTANT:

Accreditation Activity (check one):

☑ Submitted at the time of Reaffirmation Orientation
☐ Submitted with Compliance Certification for Reaffirmation
☐ Submitted with Materials for an On-Site Reaffirmation Review
☐ Submitted with Compliance Certification for Fifth-Year Interim Report
☐ Submitted with Compliance Certification for Initial Candidacy/Accreditation Review
☐ Submitted with Merger/Consolidations/Acquisitions
☐ Submitted with Application for Level Change

Submission date of this completed document:  September 29, 2015
EDUCATIONAL PROGRAMS

1. Level of offerings (Check all that apply)
   - Diploma or certificate program(s) requiring less than one year beyond Grade 12
   - Diploma or certificate program(s) of at least two but fewer than four years of work beyond Grade 12
   - Associate degree program(s) requiring a minimum of 60 semester hours or the equivalent designed for transfer to a baccalaureate institution
   - Associate degree program(s) requiring a minimum of 60 semester hours or the equivalent not designed for transfer
   - Four or five-year baccalaureate degree program(s) requiring a minimum of 120 semester hours or the equivalent
   - Professional degree program(s)
   - Master's degree program(s)
   - Work beyond the master's level but not at the doctoral level (such as Specialist in Education)
   - Doctoral degree program(s)
   - Other (Specify) _____

2. Types of Undergraduate Programs (Check all that apply)
   - Occupational certificate or diploma program(s)
   - Occupational degree program(s)
   - Two-year programs designed for transfer to a baccalaureate institution
   - Liberal Arts and General
   - Teacher Preparatory
   - Professional
   - Other (Specify) _____

GOVERNANCE CONTROL

Check the appropriate governance control for the institution:

- Private (check one)
  - Independent, not-for-profit
    - Name of corporation OR
    - Name of religious affiliation and control: _____
  - Independent, for-profit *
    - If publicly traded, name of parent company: _____


Public state * (check one)

☐ Not part of a state system, institution has own independent board
☒ Part of a state system, system board serves as governing board
☐ Part of a state system, system board is super governing board, local governing board has delegated authority
☐ Part of a state system, institution has own independent board

* If an institution is part of a state system or a corporate structure, a description of the system operation must be submitted as part of the Compliance Certification for the decennial review. See Commission policy “Reaffirmation of Accreditation and Subsequent Reports” for additional direction.

INSTITUTIONAL INFORMATION FOR REVIEWERS

Directions:

Please address the following and attach the information to this form.

1. History and Characteristics
   Provide a brief history of the institution, a description of its current mission, an indication of its geographic service area, and a description of the composition of the student population. Include a description of any unusual or distinctive features of the institution and a description of the admissions policies (open, selective, etc.). If appropriate, indicate those institutions that are considered peers. Please limit this section to one-half page.

2. List of Degrees
   List all degrees currently offered (A. S., B.A., B.S., M.A., Ph.D., for examples) and the majors or concentrations within those degrees, as well as all certificates and diplomas. For each credential offered, indicate the number of graduates in the academic year previous to submitting this report. Indicate term dates.

3. Off-Campus Instructional Locations and Branch Campuses
   List all locations where 50% or more credit hours toward a degree, diploma, or certificate can be obtained primarily through traditional classroom instruction. Report those locations in accord with the Commission’s definitions and the directions as specified below.

   Off-campus instructional sites—a site located geographically apart from the main campus at which the institution offers 50% or more of its credit hours for a diploma, certificate, or degree. This includes high schools where courses are offered as part of dual enrollment. For each site, provide the information below. The list should include only those sites reported and approved by SACSCOC. Listing unapproved sites below does not constitute reporting them to SACSCOC. In such cases when an institution has initiated an off-campus instructional site as described above without prior approval by SACSCOC, a prospectus for approval should be submitted immediately to SACSCOC.
<table>
<thead>
<tr>
<th>Name of Site</th>
<th>Physical Address (street, city, state, country) Do not include PO Boxes.</th>
<th>Date Approved by SACSCOC</th>
<th>Date Implemented by the institution</th>
<th>Educational programs offered (specific degrees, certificates, diplomas) with 50% or more credits hours offered at each site</th>
<th>Is the site currently active? (At any time during the past 5 years, have students been enrolled and courses offered? If not, indicate the date of most recent activity.)</th>
</tr>
</thead>
</table>

Institutions with off-campus instructional sites at which the institution offers **25-49%** credit hours for a diploma, certificate, or degree—including high schools where courses are offered as dual enrollment—are required to notify SACSCOC in advance of initiating the site. For each site, provide the information below.

<table>
<thead>
<tr>
<th>Name of Site (Indicate if site is currently active or inactive. If inactive, date of last course offerings and date of projected reopening)</th>
<th>Physical Address (street, city, state, country) Do not include PO Boxes.</th>
<th>Date Notified SACSCOC by SACSCOC</th>
<th>Date Implemented by the institution</th>
<th>Educational programs offered (specific degrees, certificates, diplomas) with 25-49% credit hours offered at each site</th>
<th>Is the site currently active? (At any time during the past 5 years, have students been enrolled and courses offered? If not, indicate the date of most recent activity.)</th>
</tr>
</thead>
</table>

**Branch campus**—an instructional site located geographically apart and independent of the main campus of the institution. A location is independent of the main campus if the location is (1) permanent in nature, (2) offers courses in educational programs leading to a degree, certificate, or other recognized educational credential, (3) has its own faculty and administrative or supervisory organization, and (4) has its own budgetary and hiring authority. **The list should include only those branch campuses reported and approved by SACSCOC.** Listing unapproved branch campuses below does not constitute reporting them to SACSCOC. A prospectus for an unapproved branch campuses should be submitted immediately to SACSCOC.

<table>
<thead>
<tr>
<th>Name of Branch Campus</th>
<th>Physical Address (street, city, state, country) Do not include PO Boxes.</th>
<th>Date Approved by SACSCOC</th>
<th>Date Implemented by the institution</th>
<th>Educational programs (specific degrees, certificates, diplomas) with 50% or more credits hours offered at the branch campus</th>
<th>Is the campus currently active? (At any time during the past 5 years, have students been enrolled and courses offered? If not, indicate the date of most recent activity.)</th>
</tr>
</thead>
</table>

4. **Distance and Correspondence Education**
Provide an initial date of approval for your institution to offer distance education. Provide a list of credit-bearing educational programs (degrees, certificates, and diplomas) where 50% or more of the credit hours are delivered through distance education modes. For each educational program, indicate whether the program is delivered using synchronous or asynchronous technology, or both. For each educational program that uses distance education technology to deliver the program at a specific site (e.g., a synchronous program using interactive videoconferencing), indicate the program offered at each location where students receive the transmitted program. Please limit this description to one page, if possible.

5. Accreditation

(1) List all agencies that currently accredit the institution and any of its programs and indicate the date of the last review by each.

(2) If SACS Commission on Colleges is not your primary accreditor for access to USDOE Title IV funding, identify which accrediting agency serves that purpose.

(3) List any USDOE recognized agency (national and programmatic) that has terminated the institution’s accreditation (include the date, reason, and copy of the letter of termination) or list any agency from which the institution has voluntarily withdrawn (include copy of letter to agency from institution).

(4) Describe any sanctions applied or negative actions taken by any USDOE-recognized accrediting agency (national, programmatic, SACSCOC) during the two years previous to the submission of this report. Include a copy of the letter from the USDOE to the institution.

6. Relationship to the U.S. Department of Education

Indicate any limitations, suspensions, or termination by the U.S. Department of Education in regard to student financial aid or other financial aid programs during the previous three years. Report if on reimbursement or any other exceptional status in regard to federal or state financial aid.

Document History
Adopted: September 2004
Revised: March 2011
Revised: January 2014
1. History and Characteristics

Provide a brief history of the institution, a description of its current mission, an indication of its geographic service area, and a description of the composition of the student population. Include a description of any unusual or distinctive features of the institution and a description of the admissions policies (open, selective, etc.). If appropriate, indicate those institutions that are considered peers. Please limit this section to one-half page.

History. Texas A&M University was established in 1871 as the state’s first public institution of higher education and opened for classes in 1876. We are now one of a select few institutions in the nation to hold land grant, sea grant (1971) and space grant (1989) designations. We are also one of few universities to host a presidential library; the George Bush Presidential Library and Museum opened in 1997. A mandatory military component was a part of the land grant designation until 1965 and today we are one of only three institutions with a full-time corps of cadets, leading to commissions in all branches of service. We have two branch campuses, one in Galveston, Texas, (established in 1962, officially merged with Texas A&M in 1991) and one in Doha, Qatar (established in 2003). In 2001 we were admitted to the Association of American Universities (AAU) and in 2004 to Phi Beta Kappa. We are classified by the Carnegie Foundation as a Research University (very high research activity).

Mission. Texas A&M University is dedicated to the discovery, development, communication, and application of knowledge in a wide range of academic and professional fields. Its mission of providing the highest quality undergraduate and graduate programs is inseparable from its mission of developing new understandings through research and creativity. It prepares students to assume roles in leadership, responsibility and service to society. Texas A&M assumes as its historic trust the maintenance of freedom of inquiry and an intellectual environment nurturing the human mind and spirit. It welcomes and seeks to serve persons of all racial, ethnic and geographic groups as it addresses the needs of an increasingly diverse population and a global economy. In the 21st century, Texas A&M University seeks to assume a place of preeminence among public universities while respecting its history and traditions.

Enrollment Profile.
77.42% Undergraduate, 18.41% Graduate, 4.02% Professional, and 0.14% Post-Doc Certificate

Undergraduate Students:
93.58% Texas Residents, 3.96% non-Texas Residents, 2.46% non-Texas, non-US Residents;
62.41% White, 3.11% Black, 22.33% Hispanic, 6.21% Asian

Graduate Students:
45.09% Texas Residents, 16.57% non-Texas Residents, 38.34% non-Texas, non-US Residents
Admissions Process. Selective. Automatic admission for Texas resident applicants in the top 10% of their high school graduating class; automatic admission for applicants who rank in the top 25% of their high school graduating class and achieve a combined (old) SAT math and SAT critical reading score of at least 1300 with a test score of at least 600 in each component, or combined (newly redesigned) SAT math and SAT evidence based reading and writing (EBRW) score of at least 1360 with a test score of at least 620 in Math and 660 in EBRW, or 30 composite on the ACT with a 27 in the math and English components; review of all other applicants based on academic potential, distinguishing characteristics, exceptional circumstances and personal achievements.

Peer Institutions. Georgia Institution of Technology, Ohio State University, Pennsylvania State University, Purdue University, University of California- Berkeley, Davis, Los Angeles, San Diego, University of Florida, University of Illinois – Champaign/Urbana, University of Michigan, University of Minnesota, University of North Carolina – Chapel Hill, University of Texas – Austin, and University of Wisconsin – Madison.
2. List of Degrees
List all degrees currently offered (A. S., B.A., B.S., M.A., Ph.D., for examples) and the majors or concentrations within those degrees, as well as all certificates and diplomas. For each credential offered, indicate the number of graduates in the academic year previous to submitting this report. Indicate term dates.

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<th>College</th>
<th>Degree Program</th>
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<th>Summer 2016</th>
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<td>AGRICULTURE AND LIFE SCIENCES</td>
<td>AGRICULTURAL COMMUNICATION &amp; JOURNALISM</td>
<td>BS</td>
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3. **Off-Campus Instructional Locations and Branch Campuses**

List *all locations* where 50% or more credit hours toward a degree, diploma, or certificate can be obtained primarily through traditional classroom instruction. Report those locations in accord with the Commission’s definitions and the directions as specified below.

**Off-campus instructional sites**—a site located geographically apart from the main campus at which the institution offers **50% or more** of its credit hours for a diploma, certificate, or degree. This includes high schools where courses are offered as part of dual enrollment. For each site, provide the information below. The list should include only those sites reported and approved by SACSCOC. Listing unapproved sites below does not constitute reporting them to SACSCOC. In such cases when an institution has initiated an off-campus instructional site as described above without prior approval by SACSCOC, a prospectus for approval should be submitted immediately to SACSCOC.

**Off-Campus Instructional Locations – 50% or more.**

<table>
<thead>
<tr>
<th>Name of Site</th>
<th>Physical Address (street, city, state, country) Do not include PO Boxes.</th>
<th>Date Approved by SACSCOC</th>
<th>Date Implemented by the institution</th>
<th>Educational programs offered (specific degrees, certificates, diplomas) with 50% or more credits hours offered at each site</th>
<th>Is the site currently active? (At any time during the past 5 years, have students been enrolled and courses offered? If not, indicate the date of most recent activity.)</th>
</tr>
</thead>
</table>
| Texas A&M Health Science Center | 8441 State Highway 47 Clinical Building 1, Suite 3100 Bryan, TX 77807 | 2000 | 2000 | EDUCATION FOR HEALTHCARE PROFESSIONALS  
MEDICAL SCIENCES  
MEDICAL SCIENCES  
MEDICAL SCIENCES  
MEDICINE  
NURSING  
NURSING EDUCATION  
PHARMACY  
FAMILY NURSE PRACTITIONER | Yes |
| City Centre | 842 West Sam Houston Parkway North, Suite 200 Houston, Texas 77024-3920 | 2012 | 2012 | ANALYTICS  
BUSINESS ADMINISTRATION | MBA |
| College of Dentistry | 3302 Gaston Ave. Dallas, TX 75246 | 2001 | 2000 | ADVANCED EDUCATION IN GENERAL DENTISTRY  
DENTAL HYGIENE  
DENTAL PUBLIC HEALTH  
DENTISTRY  
ENDODONTICS  
MAXILLOFACIAL SURGERY  
ORAL AND MAXILLOFACIAL PATHOLOGY  
ORAL AND MAXILLOFACIAL | CTGFA Yes |
<table>
<thead>
<tr>
<th>Name of Site</th>
<th>Physical Address (street, city, state, country) Do not include PO Boxes.</th>
<th>Date Approved by SACSCOC</th>
<th>Date Implemented by the institution</th>
<th>Educational programs offered (specific degrees, certificates, diplomas) with 50% or more credits hours offered at each site</th>
<th>Is the site currently active? (At any time during the past 5 years, have students been enrolled and courses offered? If not, indicate the date of most recent activity.)</th>
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<tbody>
<tr>
<td>Institute of Biosciences and Technology</td>
<td>2121 W. Holcombe Blvd., Houston, TX 77030</td>
<td>2000</td>
<td>2000</td>
<td>HEALTH ADMINISTRATION, MEDICINE</td>
<td>Yes</td>
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<tr>
<td>Rangel College of Pharmacy</td>
<td>1010 W. Avenue B. Kingsville, TX 78363</td>
<td>2011</td>
<td>2006</td>
<td>PHARMACY, PHMD</td>
<td>Yes</td>
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<tr>
<td>College of Medicine - Temple</td>
<td>2401 S. 31st Street Temple, TX 76508</td>
<td>2000</td>
<td>2000</td>
<td>MEDICINE, MEDICAL SCIENCES</td>
<td>Yes</td>
</tr>
<tr>
<td>Clinical Learning Resource Center</td>
<td>Health Professions Building 3950 North A. W. Grimes Blvd. Round Rock, TX 78665</td>
<td>2011</td>
<td>2010</td>
<td>MEDICINE, NURSING, MEDICAL SCIENCES</td>
<td>Yes</td>
</tr>
<tr>
<td>Rural Public Health - McAllen Teaching Site</td>
<td>2101 South McColl Road McAllen, TX 78503</td>
<td>2011</td>
<td>2010</td>
<td>HEALTH POLICY AND MANAGEMENT, HEALTH PROMOTION AND COMMUNITY HEALTH SCIENCES, NURSING, MEDICAL SCIENCES</td>
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<tr>
<td>Texas A&amp;M University School of Law</td>
<td>1515 Commerce St Fort Worth, TX 76102</td>
<td>2013</td>
<td>2013</td>
<td>HEALTH CARE LAW, INTELLECTUAL PROPERTY, LAW, NURSING</td>
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<tr>
<td>Houston Methodist Hospital</td>
<td>6670 Bertner Avenue, R2-216 Houston, TX 77030</td>
<td>2015</td>
<td>2015</td>
<td>MEDICINE</td>
<td>Yes</td>
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<tr>
<td>Baylor University Medical Center</td>
<td>3500 Gaston Avenue Dallas, TX 75246</td>
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<td>Yes</td>
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### Off-Campus Instructional Locations – 25%-49%.

<table>
<thead>
<tr>
<th>Name of Site</th>
<th>Physical Address (street, city, state, country)</th>
<th>Date Notified SACSCOC</th>
<th>Date Implemented by the institution</th>
<th>Educational programs offered (specific degrees, certificates, diplomas) with 25-49% credit hours offered at each site</th>
<th>Is the site currently active? (At any time during the past 5 years, have students been enrolled and courses offered? If not, indicate the date of most recent activity.)</th>
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<td>Name of Site</td>
<td>Physical Address (street, city, state, country)</td>
<td>Date Notified SACSCOC</td>
<td>Date Implemented by the institution</td>
<td>Educational programs offered (specific degrees, certificates, diplomas) with 25-49% credit hours offered at each site</td>
<td>Is the site currently active? (At any time during the past 5 years, have students been enrolled and courses offered? If not, indicate the date of most recent activity.)</td>
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<tr>
<td>Department of State Health Services</td>
<td>1100 West 49th Austin, TX. 78756</td>
<td>2011</td>
<td>2004</td>
<td>HEALTH POLICY &amp; MANAGEMENT - MPH</td>
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### Branch Campuses

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<th>Name of Branch Campus</th>
<th>Physical Address (street, city, state, country)</th>
<th>Date Approved by SACSCOC</th>
<th>Date Implemented by the institution</th>
<th>Educational programs (specific degrees, certificates, diplomas) with 50% or more credit hours offered at the branch campus</th>
<th>Is the campus currently active? (At any time during the past 5 years, have students been enrolled and courses offered? If not, indicate the date of most recent activity.)</th>
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<tr>
<td>Texas A&amp;M University at Galveston</td>
<td>200 Seawolf Pkwy, Galveston, TX 77553</td>
<td>1992</td>
<td>1991</td>
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<td>OFFSHORE &amp; COASTAL SYSTEMS ENGINEER BS</td>
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<td>MARINE BIOLOGY MS</td>
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<td>MARINE BIOLOGY PHD</td>
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<td>MARINE FISHERIES BS</td>
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<td>MARINE RESOURCES MANAGEMENT MMR</td>
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4. Distance and Correspondence Education

Provide an initial date of approval for your institution to offer distance education. Provide a list of credit-bearing educational programs (degrees, certificates, and diplomas) where 50% or more of the credit hours are delivered through distance education modes. For each educational program, indicate whether the program is delivered using synchronous or asynchronous technology, or both. For each educational program that uses distance education technology to deliver the program at a specific site (e.g., a synchronous program using interactive videoconferencing), indicate the program offered at each location where students receive the transmitted program. Please limit this description to one page, if possible.

**Initial Approval in February 2000**

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<td>PETROLEUM ENGINEERING</td>
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<td>PLANT BREEDING</td>
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<td>PUBLIC SERVICE AND ADMINISTRATION</td>
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<th>RECREATION &amp; RESOURCES DEVELOPMENT</th>
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<td>CERT</td>
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<tr>
<td>APPLIED BEHAVIOR ANALYSIS</td>
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<td>EDUCATION FOR HEALTHCARE PROFESSIONALS</td>
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<td>ENERGY</td>
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<tr>
<td>ENERGY SUSTAINABILITY ENGINEERING</td>
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<tr>
<td>FORENSIC HEALTH CARE</td>
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<td>HOMELAND SECURITY</td>
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<td>INDUSTRIAL DATA ANALYTICS</td>
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<tr>
<td>NATIONAL SECURITY AFFAIRS</td>
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<td>College Station, TX; Livermore, CA; Sandia, NM</td>
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<tr>
<td>NONPROFIT MANAGEMENT</td>
<td>CERT</td>
<td>College Station, TX; Houston, TX</td>
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<td>PUBLIC HEALTH</td>
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<td>McAllen, TX</td>
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<tr>
<td>REGULATORY SCIENCE IN FOOD SYSTEMS</td>
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5. Accreditation

<table>
<thead>
<tr>
<th>Accreditation Council for</th>
<th>The pharmacy professional degree program</th>
<th>Last Review: April 2014</th>
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30
<table>
<thead>
<tr>
<th>Organization</th>
<th>Description</th>
<th>Last Review</th>
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<tbody>
<tr>
<td>Pharmacy Education</td>
<td>The B.S. and M.S. curriculum in construction science</td>
<td>2011 (B.S.) and 2012 (M.S.)</td>
</tr>
<tr>
<td>American Psychological Association</td>
<td>The clinical psychology program in the Department of Psychology and the counseling psychology and school psychology program in the Department of Educational Psychology</td>
<td>April/May 2015</td>
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<tr>
<td>American Veterinary Medical Association Council on Education</td>
<td>The veterinary medicine degree program</td>
<td>2013</td>
</tr>
<tr>
<td>Association to Advance Collegiate Schools of Business (AACSB)</td>
<td>The business baccalaureate, master’s, and doctoral programs in Mays Business School</td>
<td>Fall 2012</td>
</tr>
<tr>
<td>Commission on Accreditation for Dietetics Education</td>
<td>The dietetic track in the nutritional sciences curriculum and the dietetic internship program</td>
<td>January 2015</td>
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<tr>
<td>Commission on Accreditation of Athletic Training Education (caATe)</td>
<td>Athletic Training (College of Education)</td>
<td>2013</td>
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<tr>
<td>Commission on Accreditation of Healthcare Management Education</td>
<td>The Master of Health Administration</td>
<td>Fall 2010</td>
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<tr>
<td>Commission on Collegiate Nursing Education and the Texas Board of Nursing</td>
<td>The nursing degree programs</td>
<td>July 2013</td>
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<tr>
<td>Commission on Dental Accreditation (CODA)</td>
<td>The degree programs in dentistry and dental hygiene and the certificate programs in the ten advanced dental graduate education programs</td>
<td>August 2013</td>
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<tr>
<td>Commission on English Language Program Accreditation (CEA)</td>
<td>The English Language Institute</td>
<td>2013</td>
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<tr>
<td>Computing Accreditation Commission of ABET</td>
<td>The computer science program</td>
<td>2010</td>
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<tr>
<td>Council of the Section of Legal Education and Admissions to the Bar of the American Bar Association</td>
<td>Texas A&amp;M University School of Law</td>
<td>2010</td>
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<tr>
<td>Council on Education for Public Health</td>
<td>The School of Public Health degree programs</td>
<td>April 2011</td>
</tr>
<tr>
<td>Engineering Accreditation Commission of ABET</td>
<td>Undergraduate programs in aerospace, biological and agricultural, biomedical, chemical, civil, computer, electrical, industrial, mechanical, nuclear,</td>
<td>2010-2011 (College Station) and 2015 (Qatar)</td>
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<td>Organization</td>
<td>Program Description</td>
<td>Last Review/Date</td>
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<tr>
<td>Engineering Accreditation Commission of ABET</td>
<td>Maritime systems engineering (Offshore and Coastal Systems Engineering) – TAMU Galveston</td>
<td>2010-11</td>
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<td>Engineering Technology Accreditation Commission of ABET</td>
<td>The electronic systems engineering technology program, the manufacturing and mechanical engineering technology program,</td>
<td>2013-2014 (College Station) and 2015 (Qatar)</td>
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<tr>
<td>Engineering Technology Accreditation Commission of ABET</td>
<td>marine engineering technology – TAMU Galveston</td>
<td>2013-14</td>
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<td>Forensic Science Education Programs Accreditation Commission (FEPAC)</td>
<td>The forensics and investigative sciences program</td>
<td>Last Site Visit: October 2011 Accreditation dates: 1/2012-1/2017</td>
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<td>Institute of Food Technologists</td>
<td>The food science and technology curriculum</td>
<td>December 2011</td>
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<td>Landscape Architectural Accreditation Board</td>
<td>The curriculum in landscape architecture</td>
<td>July 2015</td>
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<tr>
<td>Liaison Committee on Medical Education</td>
<td>The medical education degree program</td>
<td>August 2012</td>
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<tr>
<td>National Architectural Accrediting Board</td>
<td>The curriculum in architecture</td>
<td>March 2013</td>
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<tr>
<td>Network of Schools of Public Policy, Affairs, and Administration</td>
<td>The Master of Public Service and Administration degree in the Bush School of Government and Public Service</td>
<td>April 2014</td>
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<tr>
<td>National Recreation and Park Association</td>
<td>The curriculum in recreation, park and tourism sciences</td>
<td>June 2010</td>
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<tr>
<td>Planning Accreditation Board</td>
<td>The Master of Urban Planning curriculum</td>
<td>July 2013</td>
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<td>Society for Range Management</td>
<td>The curriculum in rangeland ecology and management</td>
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<td>Society of American Foresters</td>
<td>The curriculum in forestry</td>
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<tr>
<td>State Board of Educator Certification Texas Education Agency</td>
<td>Programs in professional education and degrees conferred by Texas A&amp;M University</td>
<td>Last review 2011</td>
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</tbody>
</table>

(2) If SACS Commission on Colleges is not your primary accredditor for access to USDOE Title IV funding, identify which accrediting agency serves that purpose.

Not applicable.

(3) List any USDOE recognized agency (national and programmatic) that has terminated the institution's accreditation (include the date, reason, and copy of the letter of termination) or list any agency from which the institution has voluntarily withdrawn (include copy of letter to agency from institution).
(4) Describe any sanctions applied or negative actions taken by any USDOE-recognized accrediting agency (national, programmatic, SACSCOC) during the two years previous to the submission of this report. Include a copy of the letter from the USDOE to the institution.

None.

6. Relationship to the U.S. Department of Education.

Texas A&M University does not have any limitations or suspensions, nor have we been terminated by the U.S. Department of Education in regard to student financial aid or other financial aid programs during the previous three years. We are not on reimbursement nor do we have any other exceptional status in regard to federal or state financial aid.
# Financial Profile 2017

Texas A&M University, College Station, TX

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount</th>
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<tr>
<td>Total All Revenues &amp; Other Additions (IPEDS Part B, line 25)</td>
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<td>Instruction (IPEDS Part C line 01, Column 1)</td>
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<td>Academic Support (IPEDS Part C line 05, Column 1)</td>
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<td>Student Services (IPEDS Part C line 06, Column 1)</td>
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<td>Institutional Support (IPEDS Part C line 07, Column 1)</td>
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<td>Hospital Services (IPEDS Part C line 11, Column 1)</td>
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<td>Independent Operations (IPEDS Part C line 12, Column 1)</td>
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<td>Other Expenses &amp; Deductions (IPEDS Part C line 14, Column 1)</td>
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## Financial Indicators (From Audited FY 2016 Financial Statements)

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<tr>
<th>Category</th>
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<td>Total Assets</td>
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<td>Total Liabilities</td>
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<td>Total Unrestricted Net Assets</td>
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<td>Nonexpendable/Permanently Restricted Net Assets</td>
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<td>Total Revenue</td>
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<td>Tuition and Fees, Net</td>
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<td>Current Debt</td>
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<td>Long-term Debt</td>
<td>$1,355,011,877</td>
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## Signatures of Verification

We certify that the information provided in the Financial Profile and Indicators is correct.

[Signatures]

Chief Executive Officer  
Chief Financial Officer  
Respondent (if other than CEO or CFO)

Please Mail Signed Profile Form To:
SACSCOC  
Attn: Profiles  
1886 Southern Lane  
Decatur, GA 30033

Texas A&M University, College Station, TX  
72801
MEMORANDUM

TO: Vice Presidents
    Directors Reporting to the President

SUBJECT: Delegation of Authority

July 25, 2018

To ensure that operations are unaffected when I am out of the office for extended periods of time, I hereby issue delegation of authority to the following individuals in the order they are listed. They are authorized to act on matters regarding Texas A&M University, Texas A&M University at Galveston, Texas A&M University at Qatar, Texas A&M University Health Science Center and Texas A&M University School of Law. This delegation shall be effective as of the date of execution and shall remain in effect until revoked.

1. Carol A. Fierke, Provost and Executive Vice President
2. Jerry R. Strawser, Executive Vice President and Chief Financial Officer
3. Michael G. O’Quinn, Vice President for Government Relations and Strategic Initiatives
4. Amy B. Smith, Senior Vice President, Chief Marketing and Communications Officer
5. Daniel J. Pugh, Sr., Vice President for Student Affairs
6. Barbara Abercrombie, Vice President for Human Resources and Organizational Effectiveness
7. M. Dee Childs, Vice President for Information Technology and Chief Information Officer

Tracy Cullen will know how to contact me if necessary.

Michael K. Young

cc: Mr. John Sharp
APPENDIX C — Course Syllabi
CVEN 601
Title – Environmental Engineering Processes III

Description: Biological processes that describe behavior of materials in natural and engineered environmental systems, including fundamental theory of kinetics, bioenergetics, genetics, and cellular functions.

Prerequisites: CHEM 222; CVEN 301


Reference textbooks

Course Learning Outcomes:
- Describe the fundamental principles of environmental biotechnology
- Describe the field of biological wastewater treatment processes in a plain language that a person with technical background in any engineering fields (other than environmental engineering) can understand.
- Recognize the design principle, objective, advantage/disadvantage, and limitation of each of biological treatment processes discussed in this course.
- Apply mass balance, kinetics, and learned fundamental principles of biotechnology to common environmental problems in natural and engineered systems.

Topics Covered:
- Fundamental of Microbiology (including microbial cell biology, redox, respiration/fermentation)
- Enzyme and Growth Kinetics
- Bioreactors
- Activated Sludge Process
- Attached Growth Systems
- Nitrogen Control (Nitrogen Cycle, Nitrification, Denitrification)
- Anaerobic Wastewater Processes
- Bioremediation

Meeting Time: Three lecture sessions each week, 50 minutes each

Professional Contribution: Mathematics and basic sciences
Engineering science
Engineering design

Graduate Level: Masters & PhD

Schedule: One semester per calendar year
CVEN 603 Environmental Engineering Management

Description: Federal and state regulatory framework for environmental engineering; techniques for environmental control; risk assessment; evaluation of critical environmental problems with multimedia aspects.

Prerequisites: CVEN 301 or approval of instructor

Textbook: Environmental Law Handbook

Course Learning Outcomes:
1) Familiarize students with the main laws that govern environmental management in the United States;
2) introduce students to the risk assessment paradigm used to support environmental decision making in the US;
3) enable students to apply gained knowledge to address an environmental management problem of importance to the State of Texas, and
4) develop a student’s technical leadership, writing, and presentation skills.

Topics Covered:
- US Environmental Laws (Framework & History)
- US Environmental Laws (Environmental Movement & NEPA)
- US Environmental Laws (Waste & Residuals Acts)
- International Environmental Laws
- Environmental Risk Assessment
- Environmental Risk Management
- Environmental Risk
- Hazardous Waste Flows Project
- Project Specific Topics (examples include overviews of regulatory statutes and challenges for the nuclear power industry, healthcare, wind energy, forestry, manufacturing, and agriculture)
- Environmental Management in the 21st Century

Meeting Time: Two lecture sessions each week, 75 minutes each

Professional Contribution:
- Engineering science
- General education
- Legal review

Graduate Level: Masters & PhD

Schedule: Spring semesters
CVEN 604
Title – Engineering Analysis of Treatment Systems

Description: Theory of processes used to treat water, wastewater and hazardous wastes; applications of theory to design and operation of treatment systems, including biological treatment, adsorption, coagulation, filtration and precipitation.

Prerequisites: CVEN 601, 619, 620


Course Learning Outcomes: 1) Develop the ability to describe fundamental behavior of treatment processes for water, wastewater, and hazardous wastes and apply this knowledge to design and operation of such systems. 2) Develop the ability to use material balance techniques to describe engineered environmental systems. 3) Improve communication and computer skills.

Topics Covered:
I. Introduction (1 hour)
II. MATLAB Fundamentals (3 hour)
III. Fundamentals of Treatment Process Analysis
   A. Review (2 hour)
   B. Example: Equalization (2 hour)
   C. Non-Ideal Reactors (2 hour)
IV. Biological Treatment
   A. Review (1 hour)
   B. Activated Sludge (12 hour)
   C. Methanogenic Processes (1 hour)
V. Chemical Treatment
   A. Review (1 hour)
   B. Neutralization (2 hours)
   C. Precipitation (1 hours)
   D. Redox/Disinfection (1 hour)
VI. Physical Treatment Processes
   A. Review (1 hour)
   B. Adsorption (3 hour)
   C. Ion Exchange (1 hour)
   D. Gas Transfer (1 hour)
   E. Particle Treatment Processes (2 hour)
   F. Desalination (1 hour)
VII. Review (1 hour)

Meeting Time: Three lecture sessions each week, 50 minutes each

Professional Contribution: Engineering science

Graduate Level: Masters & PhD

Schedule: One semester per calendar year
CVEN 605
Title – Environmental Measurement

Description: Theory and practice of analytical methods used in the environmental engineering field; instrumental and wet chemical techniques used in measurement of environmental quality parameters and pollutants.

Prerequisites: CVEN 620 or approval of instructor

Textbook: No Textbook is required.

References:


Course Learning Outcomes:
By the end of the course, students should be able to

- Describe the fundamental principles of analytic methods used in the environmental engineering field, including IC, AA, GC, and/or HPLC.
- Perform basic analysis to determine pH, suspended solids, nutrients (nitrogen and phosphorus), and pathogens in water and wastewater samples.
- Understand common experimental designs/approaches to determine mass balance, reactor analysis, and kinetics - fundamentals to understand environmental problems in natural and engineered systems.

Topics Covered:
- Laboratory safety
- Statistical analyses
- Basic physical/chemical water quality parameters: pH, total solids, total suspended solids, and volatile suspended solids
- Ammonia, nitrate, nitrite, and total nitrogen
- Orthophosphate and total phosphorous
- Metal analysis
- E coli. numeration
- Advanced chemical oxidation: Organic degradation

Meeting Time: One lecture session each week, 50 minutes, and two laboratory sessions each week, 170 minutes

Professional Contribution:
- Engineering science
- Engineering design

Graduate Level:
- Masters

Schedule:
- Less often than every two calendar years
**CVEN 606**  
**Title – Environmental Engineering Design I**

**Description:** Design of engineered environmental systems for water or wastewater treatment in domestic or industrial applications.

**Prerequisites:** CVEN 604 or approval of instructor


**Course Learning Outcomes:**
1) Develop your ability to apply knowledge of fundamental treatment processes to the design of water and wastewater treatment systems.
2) Develop your ability to work in teams to achieve professional goals.
3) Develop your ability to effectively communicate technical information.

**Topics Covered:**

I. Introduction  
II. Design Project  
III. Overview of Treatment Plant Design  
   A. Design Process  
   B. Laws and Regulations  
   C. Cost Estimation  
   D. Hydraulic Design  
IV. Wastewater Treatment Plant Design  
   A. Lift Station  
   B. Preliminary Treatment  
   C. Primary Treatment  
   D. Secondary Treatment  
   E. Disinfection  
   F. Residual Management  
   G. Design Tools (Biowin)  
V. Water Treatment Plant Design  
   A. Preliminary Treatment  
   B. Rapid Mix  
   C. Flocculation  
   D. Sedimentation  
   E. Filtration  
   F. Disinfection  
   G. Residual Management  

**Meeting Time:** For 3-0 classes, use: Three lecture sessions each week, 50 minutes each

**Professional Contribution:** Engineering design  
General education (written and oral communication) Major Design Experience

**Graduate Level:** Masters & PhD

**Schedule:** Once every two calendar years
CVEN 607

Title – Engineering Aspects of Air Quality

Description: Characterization of air contaminants; health effects and legal aspects; dispersion of pollutants in the atmosphere; technology for the control of gaseous and particulate emissions.

Prerequisites: CVEN 311

Textbook: Main text book:
Seinfeld and Pandis, Atmospheric Chemistry and Physics from Air Pollution to Climate Control, 2nd edition, 2006

References:
Copper and Alley, Air Pollution Control – A Design Approach, 3rd edition, 2002
Heinsohn and Jabel, Sources and Control of Air Pollution, 1st edition, 1999
Finlayson-Pitts and Pitts, Chemistry of the Upper and Lower Atmosphere, 1999

Course Learning Outcomes: At the end of the course, the students should
1) understand the chemical and physical processes that related with air pollution at various scales;
2) understand the theories of commonly used air pollution monitoring and control devices;
3) understand the science and mathematics used in air quality models

Topics Covered: Part I: Gas phase Atmospheric Chemistry
   Chemical kinetics
   Chemistry in the remote troposphere
   Chemistry in areas with significant anthropogenic influences
Part II: Airborne Particulate Matter
   Dynamics of single particles and particle population
   Chemical composition of airborne particulate matter
   Formation of secondary particulate matter
Part III: Emission, Transport and Removal of Air Pollutants
   Major emission sources of air pollutants
   Modeling transport of pollutants in the atmosphere
   Dry and wet deposition
PART IV: Air Pollution Monitoring and Control
   Quantification of gas phase pollutants
   Quantification of PM pollutants
   Emission control devices

Meeting Time: Three lecture sessions each week, 50 minutes each

Professional Contribution: Mathematics and basic sciences
Engineering science
Engineering design

Graduate Level: Masters & PhD

Schedule: One semester per calendar year
**CVEN 610**

**Title – Environmental Risk Assessment**

**Description:** Risk assessment of the environment and human exposure in a statistically-based approach to determine allowable levels of exposure without significant deleterious effects; the basic approach of hazard identification; data collection and analysis; toxicity assessment; risk characterization; applications in ecological and human risk assessment; risk analysis performed.

**Prerequisites:** CHEM 222 or equivalent.

**Textbook:**


Other articles and book chapters will be made available via the website.

**Course Learning Outcomes:** Students will learn the fundamental concepts of Risk Assessment with a focus on human health risk assessment and minor coverage of environmental risk assessment. Students will be able to relate these principles to environmental and health situations. Students will expand applications of contaminant transport principles and exposure pathways for risk assessment and the use of probability skills to estimate adverse health consequences. Through a major project, students will master the basic steps in performing a risk assessment including statistical characterization of observed data.

**Topics Covered:**

- Human exposure
- Principles and concepts in risk assessment
- Health risk assessment
- Toxicological basis for risk assessment
- Chemical hazard determination
- Fundamental aspects of environmental modeling
- Release assessment
- Environmental transport theory
- Exposure assessment
- Chemical toxicity
- Chemical risk characterization and uncertainty analysis
- Risk policy and communication

**Meeting Time:** Two lecture sessions each week, 75 minutes each

**Professional Contribution:** Mathematics and basic sciences

**Graduate Level:** Masters & PhD

**Schedule:** Once every two calendar years
Description: Discrete-particle and continuum micromechanics energy principles; finite-element and discrete-element formulations for constitutive modeling of asphalt, concrete, and coarse and fine-grained soils; adhesive and cohesive fracture and healing; stress-dependent plasticity; principles and measurement of surface energy and pseudo-strain.

Prerequisites: CVEN 615, 616 or approval of instructor


References: Elements of Materials Science and Engineering (6th Edition), L. H. Van Vlack, Addison-Wesley
Fundamentals of Interfacial Engineering, R. J. Stokes and P. Fennell Evans, Wiley- VCH

Course Learning Outcomes:
1. The principles of particulate and continuum micro-mechanics, which form the basis for constitutive modeling of asphalt, concrete, granular, and fine grained materials
2. Materials testing to determine their response to stress, strain, and strain notes including their fracture, healing, and plastic deformation.

Students will become familiar with surface energies (both wetting and de-wetting) and their polar and non-polar components. Laboratory demonstrations will be made of the measurement of the surface energy components for both asphalt and aggregate and of micro fracture arid healing of asphalt concrete mixtures with and without micro crack arresting modifiers. Demonstrations will be made of the testing and analysis of unbound granular materials to determine their stress dependent cross-anisotropic and plastic properties and how these properties are associated with the gradation of the material. Particles may be bound together with fluids such as water or asphalts or with cements such as Portland cement mortar. The stress-strain curves of these composite materials depend upon the surface energy, thickness, tensile strength and fracture properties of these glues. Adhesive and cohesive fracture rules will be developed and implemented in the computational laboratory. Example problems in asphalt and concrete pavements, foundations, and earth structures will also be used as student exercises to demonstrate the use of correct fracture and plastic formulations.

Topics Covered:
- Continuum Micro mechanics Models
- Particulate Micro mechanics Models
- Constitutive Models of Civil Materials
- Fracture and Micro fracture Principles
- Plasticity Principles
- Viscoelasticity
- The Pseudo-Strain Idea
- Finite Element Implementation Discrete
- Element Implementation
- Surface Energies and Measurement
- Micro fracture and Measurement
- Healing and Measurement
- Stress-Dependent Cross-Anisotropy
- Measurement of Cross-Anisotropy
- Dependence of Cross-Anisotropy on Gradation
- Asphalt Composition and Measurement
- Aggregate Composition and Measurement
- Failure of Civil Materials Exercise

Meeting Time:
Two lecture sessions each week, 50 minutes each, and one laboratory session each week, 110 minutes

Professional Contribution:
Mathematics and basic sciences
Engineering science
Engineering design

Grad Level:
Masters & PhD

Schedule:
Once every three regular semester
CVEN 614
Title – Stabilization of Soil-Aggregate Systems

Description: Theory of mechanical and chemical stabilization of soils and soil-aggregate systems.

Prerequisites:


Course Learning Outcomes:
1. Understand the fundamental mineralogical and chemical properties of soils that impact stabilization.
2. Understand the physico-chemical mechanisms that cause volume instability and strength instability as the moisture state fluctuates in soils.
3. Be able to describe the physico-chemical mechanisms of reactions between each chemical additive and soils that result in modification of stabilization of the soil or aggregate.
4. Be able to describe how engineering properties of the chemically treated soil or aggregate change upon stabilization and how these properties are used in structural design applications.
5. Understand and be able to set up a testing program to investigate the efficacy of a non-traditional stabilizer candidate.
6. Be able to prepare a construction specification for the traditional stabilizers.
7. Understand how pozzolanic reactions between soils and traditional stabilizers such as Portland cement, lime and fly ash can be interrupted by organic and sulfate salts in the soil and be able to articulate steps to be taken in order to prevent or reduce the risk of harmful reactions if these compounds exist.
8. Understand how a chemically treated soil or aggregate can impact pavement structural design and impact life cycle cost of the pavement.

Topics Covered:
1. Soil mineralogy, soil pedology, soil water systems
2. Stabilization with calcium oxide
3. Stabilization with Portland cement
4. Stabilization with lime and cement by-products
5. Stabilization with coal combustion by-products
6. Basic reaction between soils and traditional stabilizers, delirious soil-chemical stabilizer reactions
7. Engineering properties chemically stabilized materials
8. Stabilization using non-standard chemicals: mechanisms, reactions, engineering property changes
9. Construction methods to achieve stabilization, quality control and quality assurance

Meeting Time: Three lecture sessions each week, 50 minutes each

Professional Contribution: Engineering design

Graduate Level: Masters & PhD

Schedule: Once every two calendar years
CVEN 615
Title – Structural Design of Pavements

Description: Characteristics of pavement loads, stress analysis in pavements, design practices, construction, rehabilitation and maintenance.

Prerequisites: CVEN 418

Textbook: Pavement Design and Analysis, Second Edition

Course Learning Outcomes:
1. Be able to characterize soils and unbound aggregate materials in the pavement structure to account for their moisture-sensitive, stress-sensitive, and anisotropic behavior under traffic and environmentally induced loads.
2. Understand fundamentals of the distribution of stresses in the pavement system and how the stress distribution is affected by the interactions of the pavement structure.
3. Be able to use layered elastic and finite element models of the pavement structure to determine pavement responses under load and to understand the limitations of these systems and to adjust for such limitations.
4. Understand how empirical functions are used to relate pavement responses to damage and distress in MEPD methods. Understand the limitations of such empirical “transfer functions” and how to adjust for such limitations.
5. Be familiar with how to properly consider the following modes of distress in mechanistic analysis: fatigue cracking, rutting and plastic deformation, impact of moisture diffusion and moisture damage, impact of aging on damage, thermal cracking, and healing.
6. Be able to use the new AASHTO Mechanistic-Empirical Pavement Design Guide (MEPDG) and understand its limitations. Be able to fully characterize granular, asphalt, and chemically stabilized systems in the MEPDG and understand the damage models and transfer functions associated with such systems.
7. Be familiar with other classical and traditional methods of design that are widely used including: AASHTO 1998, Texas Method, Asphalt Institute method.
8. Understand how to evaluate the in situ structure of a pavement and how to design appropriate rehabilitation using the AASHTO 1998 and the mechanistic approach.
9. Understand how to use the Texas Method and the USACOE CBR approach for the design of low volume and unpaved roads.

Topics Covered:
1. Stresses in flexible pavements
2. Overview of elastic layered theory
3. Overview of linear visco-elastic theory
4. Multi-layered elastic modeling, linear viscoelastic modeling
5. Characterization of asphalt bound layers: master dynamic modulus relationships, time-temperature superposition
6. Characterization of unbound, granular layers considering stress and moisture sensitivity
7. Pavement performance
8. Calibrated, mechanistic-empirical design
9. Texas method of pavement design
10. Pavement rehabilitation using mechanistic-empirical approach
11. Advanced design: FEM and continuum damage

Meeting Time: Three lecture sessions each week, 50 minutes each

Professional Contribution: Engineering design

Graduate Level: Masters & PhD

Schedule: One semester per calendar year
CVEN 616 - TITLE – SYSTEMS DESIGN OF PAVEMENTS

Description: Optimization of the design of rigid and flexible pavement systems; empirical and mechanistic stochastic structural subsystems; utility theory, serviceability concept, cost studies, traffic delay, environmental deterioration, rehabilitation and maintenance optimization systems.

Preqs: CVEN 418


References:
The Fast Fourier Transform, E. Oran Brigham
Principles of Soil Mechanics, Ronald F. Scott
Vibration Theory and Applications, William T. Thompson
Reliability-Based Design in Civil Engineering, Milton E. Harr
A Pavement Moisture-Accelerated Distress (MAD) Identification System, Samuel H. Carpenter, Michael I. Darter, and Barry J. Dempsey

Course Learning Outcomes:
Upon completion of this course, the student will understand and be able to apply the objectives of pavement design as a multi-objective optimization process simultaneously considering riding quality, safety, durability against a variety of types of distress, structural capacity, reliability and life cycle costs.

Students will complete exercises to identify the causes and correction methods for each type of distress in both asphalt and concrete pavements, how to measure and model them using modern mechanics approaches and the formulation and application of reliability in design. The course concludes with lectures, exercises and student presentations of sensitivity analyses of the major variables in the life cycle costing of pavement projects, Markov Transition Matrices in estimating future pavement conditions and decision making using multi-attribute utility theory.

Topics Covered:
1. Systems concepts of pavement design
2. Riding Quality: equipment, measurement and analysis; vehicle dynamics, International Roughness Index
3. Safety: equipment, measurement, and analysis: wet weather safety index, surface friction, measurement of surface texture with laser probe and Fourier Analysis
4. Durability of pavement materials: asphalt concrete distress: their causes and mechanistic models of each distress, the relevant material properties and the relation of each to design; concrete pavement distress: their causes and mechanistic models of each distress, the relevant material properties and the relation of each to design
5. Structural capacity of pavements and a survey of methods of determining the properties of pavement layers nondestructively including ground penetrating radar, impulse and seismic methods
6. Calculus of the Expected Value; a mini-course in estimating means and variances of functions and applications to the reliability of pavements
7. Determination of design reliability with empirical and mechanistic models
8. Project level design optimization using a systems design program; laboratory exercises in sensitivity analysis of the variables, including interest and inflation rates, user and agency life cycle costs, time delay costs and traffic handling through pavement repair work zones, traffic, climatic and subgrade variations, and reliability levels.
9. Introduction to stochastic utility theory and its applications to pavements
10. Lectures on the use of utility theory in the optimal selection of pavement alternatives. Exercise in the use of utility theory in determining optimal life cycle strategies considering the relative value of costs, timing factors, performance, corridor impact (including accident rates, noise, and pollution), constructability, maintainability, reliability, material availability, quality control/assurance.

Meeting Time:
Number of sessions each week and duration of each session. This is a 2-2 class. Two lecture sessions each week, 50 minutes each, and one laboratory session each week, 110 minutes

Professional Contribution:
Mathematics and basic sciences; Engineering science; Engineering design

Grad. Level:
Masters & PhD

Schedule:
Once every three regular semester

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CVEN 617

Title – Traffic Engineering: Characteristics

Description: Human, vehicular and traffic characteristics as they relate to driver-vehicle-roadway operational systems; traffic studies and methods of analysis and evaluation.

Prerequisites: CVEN 457 or equivalent


Course Learning Outcomes: This class presents the fundamental knowledge and theories of uninterruptible traffic flow. Main course topics include: human factors characteristics, traffic flow fundamentals (characteristics and analysis techniques), uninterrupted traffic flow studies, and freeway operations. The course provides students with hands-on experience in various traffic studies and traffic data analysis.

Topics Covered: Traffic Studies; Statistical methods for traffic data analysis; microscopic flow characteristics; Macroscopic Flow Characteristics; Microscopic Speed Characteristics; Macroscopic Speed Characteristics; Microscopic Density Characteristics; Macroscopic Density Characteristics; Demand/Supply Analysis; Capacity Analysis; Traffic Stream Models; Human Factors; Shock Wave Analysis; Queuing Analysis; Computer Simulation Models

Meeting Time: Two lecture sessions each week, 50 minutes each, and one laboratory session each week, 170 minutes

Professional Contribution: Mathematics and basic sciences

Engineering science

Engineering design

General education (such as Matlab instruction)

Graduate Level: Masters & PhD

Schedule: Fall Semesters

One semester per calendar year
CVEN 618
Title – Traffic Engineering: Operations

Description: Advanced theory and application of traffic control; signalization and freeway operations

Prerequisites: CVEN 457 or equivalent

Highway Capacity Manual (2000) and updates

Course Learning Outcomes: This class presents the theories and analysis procedures of traffic signal systems. The course provides students with hands-on experience in designing and evaluating signal timing plans using existing computer packages. By the end of the course, students are expected to understand the theories of signal timing logic and use proper tools to develop signal timing plans for various scenarios.

Topics Covered: Principles of Intersection Signalization; Signal Timing Methods; Queueing at Signalized Intersection; Intersection Delay Models; Left Turn Operations/Permitted Left-Turn; Special Intersection Timing methods; Diamond Interchange Operations; Diamond interchange Signal Timing; Two-Level Diamond Interchange Operation; Oversaturated Link Parameters and Operations; Intersections and Interchanges; Fundamentals of two-way arterial Signal Progression; Signal Progression Optimization Methods; Signal Network Timing Optimization; TRNSYT-7F Arterial and Network Signal Model; Theory of Traffic Actuated Control; Real-Time Signal Control Systems; Signal System Hardware; Recent Research Developments

Meeting Time: Two lecture sessions each week, 50 minutes each, and one laboratory session each week, 170 minutes

Professional Contribution: Mathematics and basic sciences
Engineering science
Engineering design

Graduate Level: Masters & PhD

Schedule: Spring Semesters
One semester per calendar year
CVEN 619
Title – Environmental Engineering Processes I

Description: Physical processes that describe behavior of materials in natural and engineered environmental systems including transport phenomenon, sorption, desorption, flocculation and sedimentation.

Prerequisites: CVEN 301


References:

Course Learning Outcomes: At the end of the course the students should be able to:
1) understand and quantitatively describe the important physical processes that determine the fate of materials in natural and engineered environments;
2) apply their understanding of these physical processes to solve actual environmental problems.

Topics Covered:
1. Introduction
2. Math Review
3. Mass conservation
4. Diffusion
5. Advection-diffusion equation
6. Turbulent diffusion
7. Numerical solution of advection-diffusion equation
8. Adsorption
9. Equilibrium partitioning
10. Inter-phase mass transfer
11. Motion of single particles
12. Sedimentation
13. Dry deposition
14. Coagulation
15. Numerical method for coagulation
16. Filtration
17. Mass transfer in porous media
18. Reactor modeling

Meeting Time: Three lecture sessions each week, 50 minutes each

Professional Contribution: Mathematics and basic sciences
Engineering science
Engineering design

Graduate Level: Masters & PhD

Schedule: One semester per calendar year
CVEN 620
Environmental Engineering Processes II

**Description:** Chemical processes that describe behavior of materials in natural and engineered environmental systems including neutralization, precipitation, complex formation, adsorption, oxidation-reduction, coagulation, volatilization and absorption

**Prerequisites:** CVEN 301; course in organic chemistry

**Textbook:** Water Chemistry

**Course Learning Outcomes:**
1) Understand the underlying chemical processes taking place in environmental systems;
2) apply derived knowledge and concepts to solve problems of importance in environmental systems;
3) analyze and interpret relevant literature based upon derived knowledge;
4) synthesize gained knowledge to work on environmental engineering projects

**Topics Covered:**
- Equilibrium & Kinetics
- Acid Base Chemistry
- Buffer Systems
- Gas-Liquid Partitioning
- Adsorption
- Basics of Organic Chemistry
- Complexation
- Redox Chemistry
- Env. Analytical Chemistry
- Partition Coefficients
- Advanced Oxidation Systems to treat CECs
- Water Reuse

**Meeting Time:** Two lecture sessions each week, 75 minutes each

**Professional Contribution:**
- Mathematics and basic sciences
- Engineering science
- Engineering design

**Graduate Level:** Masters & PhD

**Schedule:** Fall Semesters
CVEN 621
Title – Advanced Reinforced Concrete Design

Description: Reinforced concrete principles; analysis of rigid building frames, design of building frames, slabs, biaxially loaded columns, rectangular and circular tanks, and deep beams

Prerequisites: CVEN 444 or equivalent


ACI Committee 318 (2011), Building Code Requirements for Structural Concrete (ACI 318-11) and Commentary (ACI 318R-11), American Concrete Institute, Farmington Hills, Michigan.

Course Learning Outcomes: Students should be able to:
- Explain and apply advanced concepts of reinforced concrete design
- Analyze and design structural concrete members for complex loading conditions including biaxial bending, torsion and large load reversals
- Characterize the moment-curvature behavior of RC beams into the nonlinear range of behavior
- Develop appropriate structural and load models for analysis of RC frames under lateral loading
- Analyze and design various reinforced concrete structural elements including structural walls, two-floor slab systems, deep beams and slender columns
- Demonstrate an ability to apply principles covered in the course to the design of a concrete structural system

Topics Covered:
1. Design of two-way floor slab systems
2. Design for torsion
3. Design of slender columns
4. Design of columns for biaxial bending
5. Analysis of RC frames under lateral loading
6. Modeling and design of reinforced concrete members subjected to large load reversals
7. Structural walls
8. Deep beams
9. Moment-curvature relationship for beams

Meeting Time: Three lecture sessions each week, 50 minutes each

Professional Contribution: Engineering design

Graduate Level: Masters & PhD

Schedule: One semester per calendar year
CVEN 622
Title - Properties of Concrete

Description: Materials, properties and behavior of concrete; cement, cement types, aggregate characteristics; properties of fresh concrete; structure of portland cement paste; mechanical properties of hardened concrete; durability and repair of concrete structures.

Prerequisites: CVEN 342

Textbook: Concrete, Second Edition; Mindess, Young, and Darwin; 2003

Course Learning Outcomes:
- Ability to elaborate the tests and properties of the constituents of portland cement concrete and the principles of concrete mixture proportioning
- Ability to elaborate the tests and properties of fresh and hardened portland cement concrete
- Ability to understand of the early-age, mechanical property development and the durability characteristics of portland cement-based systems
- Ability to use sound civil engineering in practice to the design and use of portland cement material systems

Topics Covered:
- Course Introduction; History of Concrete and Usage
- Manufacture of Cement
- Aggregate Composition and Grading
- Aggregate Moisture and Physical Characteristics
- PC Concrete Hydration and Rheology
- PC Concrete Mechanical Properties
- PC Concrete Creep and Shrinkage
- PC Concrete Sustainability
- PC Concrete: Chemical Admixtures
- PC Concrete Composite Behavior
- PC Concrete Fracture
- PC Concrete Maturity
- PC Concrete Thermal Properties
- PC Concrete Mixture Design
- PC Concrete Durability
- PC Concrete: Lightweight
- PC Concrete Response to Stress
- PC Concrete: Use of Fibers

Meeting Time: For 2-3 classes, use: Two lecture sessions each week, 50 minutes each, and one laboratory session each week, 170 minutes

Professional Contribution: Engineering science; Engineering design

Graduate Level: Masters & PhD

Schedule: One semester per calendar year
CVEN 625
Title – Traffic Engineering: Design

Description: Design of traffic control device installations with special emphasis on traffic signal design and installation, including the design features of detector placement and operation; national and state design standards and guidelines for traffic control device installation.

Prerequisites: CVEN 457

Textbook: No textbook. Reading materials are posted on the course website and include portions of FHWA and TTI reports.

Course Learning Outcomes: This course is focused on traffic design, which is defined as that part of traffic control that is described in a set of plans. The course emphasizes traffic control device design, with a focus on traffic signal design. A significant portion of the class exposes the student to the full spectrum of designing a traffic signal. A complete set of contract documents are developed including bid documents, contract plans, specifications, and cost estimates. A plan set is finally prepared, together with a design report describing the engineering analysis and guidelines applied. Other aspects of traffic control device design are also addressed, including sign and marking retroreflectivity.

Topics Covered: Outline of course by listing of topics covered

   Classroom: Traffic control devices standards (MUTCD); human factors; traffic signal design; signal design plan sets, references, and detail sheets; accessibility issues at signalized intersections; detector design; detector systems – loops; detector systems – video; detector installation; signal controller components; signal controller components and elements; accessibility issues at signalized intersections; signal displays and design configuration requirements; electrical design; signal mounting details; signal poles and foundations; controller cabinets; contract documents.

   Lab: Walking tour of nearby traffic control device installations; sign and marking retroreflectivity, retroreflective materials; scientific analysis of retroreflectivity; MUTCD traffic signal design principles and standards; signal warrant analysis; student presentations on local signalized intersections; TTI Visibility Lab visit; site visit to local intersection; signal plans and design documents; Consultant that prepares signal plans; Visit City of College Station Signal Facility, and student presentations of traffic signal design plans.

Meeting Time: Two lecture sessions each week, 50 minutes each, and one laboratory session each week, 170 minutes

Professional Contribution: Engineering science

   Engineering design

   Major Design experience

Graduate Level: Masters & PhD

Schedule: Less often than every two calendar years in the past, intent is to over every other year in the future
CVEN 626
Title – Roadside Safety Design

Description: Fundamental concepts of designing safety into roadways; safety improvement programs, accident data analysis, safety methodology, safety in cross section design and the design of safety devices; safety improvement programs, sideslopes and ditches, breakaway devices, crash cushions and roadside barriers.

Prerequisites: STAT 601 (or permission from instructor)


Course Learning Outcomes: Understand the basic concepts of highway safety and the crash process. Conduct safety-related studies: safety performance functions, before-after studies and identification of hazardous sites. Conduct a critical review the literature.

Topics Covered:
1. Introduction: what is traffic safety (1 week)
2. Human factors in highway safety (1 week)
3. Economic costs of crashes and value of life (1 week)
4. Crash data collection and database management (1 week)
5. Crash count distribution (1 week)
6. Exploratory analysis of crash data (1 week)
7. Regression analysis of crash data (2 weeks)
8. Before-after studies (2 weeks)
9. Network screening and diagnosis (1 week)
10. Study Design (1 week)
11. Roadside Design (1 week)
12. Crash modification factor development (1 week)
13. Seminar by graduate students (1 week)

Meeting Time: Three lecture sessions each week, 50 minutes each

Professional Contribution: Mathematics and basic sciences

Graduate Level: Masters & PhD

Schedule: Once every two calendar years

*A form has been sent to change the Title and Description:

New Title: Highway Safety

New Description: Fundamental concepts for performing traffic safety analyses; crash data collection and database management; safety improvement programs; accident data analysis; development of statistical models; before-after studies; economic analyses; accident risk.
**CVEN 627**

**Title – Engineering Surface Water Hydrology**

**Description:** Precipitation-runoff processes; watershed and streamflow modeling; frequency analysis; erosion and sedimentation engineering; hydrologic design of hydraulic structures and nonstructural stormwater management strategies

**Prerequisites:** Graduate classification in engineering or approval of instructor


**Course Learning Outcomes:** After completing this course, the student should be able to

1. Understand the physical transport processes which occur in the hydrologic cycle, their relative importance and time scale
2. Determine the accuracy of different modeling approaches for these hydrologic transport processes
3. Use different computer models which are commonly used in engineering practice and research to simulate and analyze hydrologic processes
4. Understand the limitations of current hydrologic models

**Topics Covered:** Precipitation, evaporation, unsaturated soil moisture dynamics, runoff generation, hydrologic modeling

**Meeting Time:** Three lecture sessions each week, 50 minutes each

**Professional Contribution:** Mathematics and basic sciences; General education

**Graduate Level:** Masters & PhD

**Schedule:** One semester per calendar year
APPENDIX D – Degree Information
Civil Engineering Graduate Degree Information

A variety of courses are offered in civil engineering to permit a student to study one of nine specialty areas. The department is especially well equipped to offer research and courses in coastal engineering; construction engineering management; environmental engineering; infrastructure management systems; geotechnical engineering; materials engineering; structural engineering; transportation engineering and water resources engineering.

Modern facilities and current equipment are available to enhance study and instruction in civil engineering. These facilities include the following laboratories: fluid and wave mechanics, construction materials, materials science, sensors, soil mechanics, biological, high bay, Center for Infrastructure Renewal; Offshore Technology Research Center and several facilities shared with the Texas A&M Transportation Institute.

No foreign language is required for the PhD in civil engineering. Students pursuing a PhD or DEng are required to pass the Civil Engineering qualifying exam.

A student holding a Bachelor of Science degree in engineering or a qualified senior during the last semester may apply for admission to graduate studies to work toward the non-thesis degree of Master of Engineering (MENG), majoring in his or her particular field of engineering.

The work in the major field will include one or two written reports (not necessarily involving results of research conducted by the candidate).

MASTER OF ENGINEERING IN CIVIL ENGINEERING

- Program Requirements
- Student's Advisory Committee
- Degree Plan
- Credit Requirement
- Transfer of Credit
- Limitations on the Use of Transfer, Extension and Certain Other Courses
- Final Examination

Student’s Advisory Committee

After receiving admission to graduate studies and enrolling for coursework, the student will consult with the head of the department or the department head’s designee (e.g., departmental graduate advisor) concerning appointment of the chair of his or her advisory committee. The student’s advisory committee for the Master of Engineering will consist of at least one member of the graduate faculty. Typically this member may be the departmental graduate advisor and will serve as the student’s committee chair or, the departmental graduate advisor may appoint/approve another departmental faculty member to serve as the appropriate chair of the student’s advisory committee. Depending on the departmental policy, additional committee members may be required. If additional committee members are deemed necessary by the department, the chair, in consultation with the student, will
select the remainder of the advisory committee. The student will interview each prospective committee member to determine whether he or she is willing to serve. Only graduate faculty members located on Texas A&M University campuses may serve as chair of a student’s advisory committee. Other graduate faculty members located off-campus may serve as a member or co-chair (but not chair), with a member as the chair. The chair of the committee, who usually has immediate supervision of the student’s degree program, has the responsibility for calling meetings at any other time considered desirable.

If the chair of a student’s advisory committee voluntarily leaves the University and the student is near completion of the degree and wants the chair to continue to serve in this role, the student is responsible for securing a current member of the University Graduate Faculty, from the student’s academic program and located near the Texas A&M University campus site, to serve as the co-chair of the committee. The Department Head or Chair of Intercollegiate faculty may request in writing to the Associate Provost for Graduate and Professional Studies that a faculty member who is on an approved leave of absence or has voluntarily separated from the university, be allowed to continue to serve in the role of chair of a student’s advisory committee without a co-chair for us to one year. The students should be near completion of the degree. Extensions beyond the one year period can be granted with additional approval of the Dean.

If the chair of the student’s advisory committee is unavailable for an extended time in any academic period during which the student is involved in activities relating to an internship or professional paper and is registered for courses such as 684, 692 or 693, the student may request, in writing, that the department head appoint an alternate advisory committee chair during the interim period.

The duties of the committee include responsibility for the proposed degree plan, any professional study or project, and the final examination. In addition, the committee, as a group and as individual members, is responsible for counseling the student on academic matters, and, in the case of academic deficiency, initiating recommendations to the Office of Graduate and Professional Studies.

The committee members’ approval on the degree plan indicate their willingness to accept the responsibility for guiding and directing the entire academic program of the student and for initiating all academic actions concerning the student. Although individual committee members may be replaced by petition for valid reasons, a committee cannot resign en masse.

Degree Plan

The student’s advisory committee, in consultation with the student, will develop the proposed degree plan. The degree plan must be completed and filed with the Office of Graduate and Professional Studies prior to the deadline imposed by the student’s college, and no later than 90 days prior to the date of the final oral examination. No exceptions are allowed.

This proposed degree plan should be submitted through the online Document Processing Submission System located on the website https://ogsdpss.tamu.edu.

Additional coursework may be added to the approved degree plan by petition if it is deemed necessary by the advisory committee to correct deficiencies in the student’s academic preparation. No changes can be made to the degree plan once the student’s Request for Final Examination or Request for Exemption from Final Examination is approved by the Office of Graduate and Professional Studies.
Credit Requirement

A minimum of 30 semester credit hours of approved courses is required for the Master of Engineering degree.

Transfer of Credit

A student who has earned 12 hours of graduate credit in residence at Texas A&M University may be authorized to transfer courses in excess of the limits prescribed above upon the advice of the advisory committee and with the approval of the Office of Graduate and Professional Studies. Courses taken in residence at an accredited U.S. institution or approved international institution with a final grade of B or greater might be considered for transfer credit if, at the time the courses were completed, the courses would be accepted for credit toward a similar degree for a student in degree-seeking status at the host institution. Otherwise, the limitations stated in the preceding section apply. Coursework in which no formal grades are given or in which grades other than letter grades (A or B) are earned (for example, CR, P, S, U, H, etc.) is not accepted for transfer credit. Courses appearing on the degree plan with grades of D, F or U may not be absolved by transfer work. Credit for thesis research or the equivalent is not transferable. Credit for coursework submitted for transfer from any college or university must be shown in semester credit hours or equated to semester credit hours. An official transcript from the university at which the transfer coursework was taken must be sent directly to the Office of Admissions.

Courses used toward a degree at another institution may not be applied for graduate credit. If the course to be transferred was taken prior to the conferral of a degree at the transfer institution, a letter from the registrar at that institution stating that the course was not applied for credit toward the degree must be submitted to the Office of Graduate and Professional Studies.

Grades for courses completed at other institutions are not included in computing the GPR.

Limitations on the Use of Transfer, Extension and Certain Other Courses

Some departments may have more restrictive requirements for transfer work. If otherwise acceptable, certain courses may be used toward meeting credit-hour requirements for the master’s degree under the following limitations.

1. The maximum number of credit hours which may be considered for transfer credit is the greater of 12 hours or one-third (1/3) of the total hours of a degree plan. The following restrictions apply:

   a. Graduate or upper-level undergraduate courses taken in residence at an accredited U.S. institution, or approved international institution with a final grade of B or greater will be considered for transfer credit if, at the time the courses were completed, the student was in degree-seeking status at Texas A&M University, or the student was in degree-seeking status at the institution at which the courses were taken; and if the courses would be accepted for credit toward a similar degree for a student in degree-seeking status at the host institution.

   b. Courses previously used for another degree are not acceptable for degree plan credit.

2. The maximum number of credit hours taken in post-baccalaureate non-degree (G6) classification at Texas A&M University which may be considered for application to the degree plan is 12.
3. A zero credit 684 and 685 course is only allowed for non-thesis master's students. Other courses, including 691 research hours, are not eligible for zero credit.

4. Any combination of 684, 685, 690 and 695 may not exceed 25 percent of the total credit hour requirement shown on the individual degree plan:
   a. A maximum of 6 hours of 684 (Professional Internship) and/or
   b. A maximum of 6 hours of 685 (Directed Studies), and
   c. Up to 3 hours of 690 (Theory of Research), and
   d. Up to 3 hours of 695 (Frontiers in Research).

5. A maximum of 2 hours of Seminar (681).

6. A maximum of 9 hours of advanced undergraduate courses (300- or 400-level).

7. For graduate courses of three weeks' duration or less, taken at other institutions, up to 1 hour of credit may be obtained for each five-day week of coursework. Each week of coursework must include at least 15 contact hours.

8. No credit hours of 691 (Research) may be used.

9. Continuing education courses may not be used for graduate credit.

10. Extension courses are not acceptable for credit.

Exceptions will be permitted only in unusual cases and when petitioned by the student’s advisory committee and approved by the Office of Graduate and Professional Studies.

Final Examination

A final comprehensive examination is not required for the MEng Civil Engineering non-thesis option.

Additional Requirements

- Residence
- Time Limit
- Foreign Languages
- Internship or Practicum
- Application for Degree

Residence

No residence requirement exists; however, attention is directed to the rules regarding Limitations on the Use of Transfer, Extension and Certain Other Courses.

Time Limit
All degree requirements must be completed within a period of seven consecutive years for the degree to be granted. A course will be considered valid until seven years after the end of the semester in which it is taken. Graduate credit for coursework which is more than seven calendar years old at the time of the final examination (oral or written) may not be used to satisfy degree requirements.

Foreign Languages

No specific language requirement exists for the Master of Engineering degree.

Internship or Practicum

The final examination is not to be administered until all other requirements for the degree, including any internship, have been substantially completed.

Application for Degree

For information on applying for your degree, please visit the Graduation section.

MASTER OF SCIENCE IN CIVIL ENGINEERING

The Master of Science (MS) curriculum is designed to develop new understanding through research and creativity. Students have the option to pursue a thesis or non-thesis Master of Science degree.

Steps to Fulfill Master's Degree Requirements

1. Meet with departmental graduate advisor to plan course of study for first semester.

   When: Before first semester registration.

   Approved by: Graduate advisor or chair of the intercollegiate faculty.

2. Establish advisory committee; Submit a degree plan.

   When: Prior to the deadline imposed by the student's college and no later than 90 days prior to final oral or thesis defense.

   Approved by: Advisory committee, department head or chair of the intercollegiate faculty, and Office of Graduate and Professional Studies (OGAPS).

3. If thesis is required, submit thesis research proposal and research proposal approval form to the Office of Graduate and Professional Studies.

   When: At least 20 working days prior to the submission of the Request for the Final Examination.

   Approved by: Advisory committee, department head or chair of the intercollegiate faculty, Research Compliance and Biosafety, and OGAPS.

4. Apply for degree; pay graduation fee.

   When: During the first week of the final semester, see OGAPS calendar.

5. Check to be sure degree program and advisory committee are up-to-date, and coursework is complete.
When: Well before submitting request to schedule final examination.

6 Complete residence requirement.

When: If applicable, before or during final semester.

Approved by: OGAPS.

7 Submit request to schedule final examination.

When: Must be received by OGAPS at least 10 working days before exam date. See OGAPS calendar for deadlines.

Approved by: Advisory committee, department head or chair of the intercollegiate faculty, and OGAPS.

8 Successfully complete final examination.

9 When: The Report of the Final Examination Form should be submitted to OGAPS within 10 days following the exam.

Approved by: Advisory committee and OGAPS.

10 If required, upload one approved final copy of thesis as a single PDF file to etd.tamu.edu and submit the fully signed thesis approval form to the Office of Graduate and Professional Studies.

When: See OGAPS calendar for deadlines.

Approved by: Advisory committee, department head or chair of the intercollegiate faculty and OGAPS.

11 Graduation; arrange for cap and gown.

For more information, visit http://graduation.tamu.edu.

1The online Document Processing Submission System is located on the website https://ogsdpss.tamu.edu.

2Complete the application for degree form via the student's Howdy portal.

Program Requirements

• Student's Advisory Committee
• Degree Plan
• Credit Requirements
• Transfer of Credit
• Limitations on the Use of Transfer, Extension and Certain Other Courses
• Thesis Option
• Thesis Proposal
Final Examination/Thesis Defense

Non-Thesis Option

Student’s Advisory Committee

After receiving admission to graduate studies and enrolling for coursework, the student will consult with the head of his or her major or administrative department (or intercollegiate faculty, if applicable) concerning appointment of the chair of his or her advisory committee. The student’s advisory committee for the MS degree will consist of no fewer than three members of the graduate faculty, representative of the student’s fields of study and research. The chair or the co-chair of the advisory committee must be from the student’s major department (or intercollegiate faculty, if applicable), and at least one or more of the members must have an appointment to a department other than the student’s major department. The outside member for students in an interdisciplinary program must have an appointment to a department different from the chair of the student’s committee.

The chair, in consultation with the student, will select the remainder of the advisory committee. The student will interview each prospective committee member to determine whether he or she is willing to serve. Only graduate faculty members located on Texas A&M University campuses may serve as chair of a student’s advisory committee. Other graduate faculty members located off campus may serve as a member or co-chair (but not chair) with a member as the chair. The chair of the committee, who usually has immediate supervision of the student’s research and thesis, has the responsibility for calling required meetings of the committee and for calling meetings at any other time considered desirable.

If the chair of a student’s advisory committee voluntarily leaves the University and the student is near completion of the degree and wants the chair to continue to serve in this role, the student is responsible for securing a current member of the University Graduate Faculty, from the student’s academic program and located near the Texas A&M University campus site, to serve as the co-chair of the committee. The Department Head or Chair of Intercollegiate faculty may request in writing to the Associate Provost for Graduate and Professional Studies that a faculty member who is on an approved leave of absence or has voluntarily separated from the university, be allowed to continue to serve in the role of chair of a student’s advisory committee without a co-chair for us to one year. The students should be near completion of the degree. Extensions beyond the one year period can be granted with additional approval of the Dean.

If the chair of the student’s advisory committee is unavailable for an extended time in any academic period during which the student is involved in activities relating to an internship, thesis or professional paper, and is registered for courses such as 684, 691, 692 or 693, the student may request, in writing, that the department head appoint an alternate advisory committee chair during the interim period.

The duties of the committee include responsibility for the proposed degree plan, the research proposal, the thesis and the final examination. In addition, the committee as a group and as individual members are responsible for advising the student on academic matters, and, in the case of academic deficiency, initiating recommendations to the Office of Graduate and Professional Studies.
The committee members’ approval on the degree plan indicate their willingness to accept the responsibility for guiding and directing the entire academic program of the student and for initiating all academic actions concerning the student. Although individual committee members may be replaced by petition for valid reasons, a committee cannot resign en masse.

Degree Plan

The student’s advisory committee, in consultation with the student, will develop the proposed degree plan. The degree plan must be completed and filed with the Office of Graduate and Professional Studies prior to the deadline imposed by the student’s college or interdisciplinary degree program, if applicable, and no later than 90 days prior to the date of the final oral examination or thesis defense.

A student should submit the degree plan using the online Document Processing Submission System located on the website https://ogsdpss.tamu.edu.

A student submitting a proposed degree plan for a Master of Science degree should designate on the official degree plan the appropriate program option.

Additional coursework may be added to the approved degree plan by petition if it is deemed necessary by the advisory committee to correct deficiencies in the student’s academic preparation. No changes can be made to the degree plan once the student’s Request for Final Examination or Request for Final Examination Exemption is approved by the Office of Graduate and Professional Studies.

Credit Requirement

A minimum of 32 semester credit hours of approved courses and research is required for the thesis option Master of Science degree. A minimum of 36 semester credit hours of approved coursework is required for the Non-Thesis Option.

Ordinarily the student will devote the major portion of his or her time to work in one or two closely related fields. Other work will be in supporting fields of interest.

Transfer of Credit

A student who has earned 12 hours of graduate credit in residence at Texas A&M University may be authorized to transfer courses in excess of the limits prescribed below upon the advice of the advisory committee and with the approval of the Office of Graduate and Professional Studies. Courses taken in residence at an accredited U.S. institution or approved international institution with a final grade of B or greater may be considered for transfer credit if, at the time the courses were completed, the courses would be accepted for credit toward a similar degree for a student in degree-seeking status at the host institution. Otherwise, the limitations stated in the following section apply. Coursework in which no formal grades are given or in which grades other than letter grades (A or B) are earned (for example, CR, P, S, U, H, etc.) is not accepted for transfer credit. Courses appearing on the degree plan with grades of D, F or U may not be absolved by transfer work. Credit for thesis research or the equivalent is not transferable. Credit for coursework submitted for transfer from any college or university must be shown in semester credit hours or equated to semester credit hours. An official transcript from the university at which the transfer coursework was taken must be sent directly to the Office of Admissions.
Courses used toward a degree at another institution may not be applied for graduate credit. If the course to be transferred was taken prior to the conferral of a degree at the transfer institution, a letter from the registrar at that institution stating that the course was not applied for credit toward the degree must be submitted to the Office of Graduate and Professional Studies.

Grades for courses completed at other institutions are not included in computing the GPR.

Limitations on the Use of Transfer, Extension and Certain Other Courses

Some departments may have more restrictive requirements for transfer work. If otherwise acceptable, certain courses may be used toward meeting credit-hour requirements for the master’s degree under the following limitations.

1. The maximum number of credit hours which may be considered for transfer credit is the greater of 12 hours or one-third (1/3) of the total hours of a degree plan. The following restrictions apply:
   
a. Graduate and/or upper-level undergraduate courses taken in residence at an accredited U.S. institution, or approved international institution with a final grade of B or greater will be considered for transfer credit if, at the time the courses were completed, the student was in degree-seeking status at Texas A&M University, or the student was in degree-seeking status at the institution at which the courses were taken; and if the courses would be accepted for credit toward a similar degree for a student in degree-seeking status at the host institution.

b. Courses previously used for another degree are not acceptable for degree plan credit.

2. The maximum number of credit hours taken in post-baccalaureate non-degree (G6) classification at Texas A&M University which may be considered for application to the degree plan is 12.

3. Not more than 12 hours may be used in any combination of the following categories:
   
a. Not more than 8 hours in the combination of 691 (research), 684 (Professional Internship) or may be used.

b. Not more than 8 hours of 685 (Directed Studies) may be used.

c. Not more than 3 hours of 690 (Theory of Research) may be used.

d. Not more than 3 hours of 695 (Frontiers in Research) may be used.

4. A maximum of 2 hours of Seminar (681).

5. A maximum of 9 hours of advanced undergraduate courses (300- or 400-level).

6. For graduate courses of three weeks’ duration or less, taken at other institutions, up to 1 hour of credit may be obtained for each five-day week of coursework. Each week of coursework must include at least 15 contact hours.

7. Continuing education courses may not be used for graduate credit.

8. Extension courses are not acceptable for credit.
Exceptions will be permitted only in unusual cases and when petitioned by the student’s advisory committee and approved by the Office of Graduate and Professional Studies.

Thesis Option

An acceptable thesis is required for the Master of Science degree for a student who selects the thesis option program. The finished work must reflect a comprehensive understanding of the pertinent literature and express in clear English, the problem(s) for study, the method, significance and results of the student’s original research. Guidelines for the preparation of the thesis are available in the Thesis Manual, which is available online at the Office of Graduate and Professional Studies website.

After successful defense (or exemption) and approval by the student’s advisory committee and the head of the student’s major department (or chair of the intercollegiate faculty, if appropriate), the student must submit his/her thesis in electronic format as a single PDF file. The PDF file must be uploaded to the Office of Graduate and Professional Studies website. Additionally, a signed approval form must be brought or mailed to the Office of Graduate and Professional Studies. The PDF file and the signed approval form are required by the deadline.

Deadline dates for submitting the thesis are announced each semester or summer term in the “Office of Graduate and Professional Studies Calendar” (see Time Limit statement). These dates also can be accessed via the Office of Graduate and Professional Studies website.

Each student who submits a document for review is assessed a one-time thesis/dissertation processing fee through Student Business Services. This processing fee is for the thesis/dissertation services provided. After commencement, theses and dissertations are digitally stored and made available through the Texas A&M Libraries.

A thesis that is deemed unacceptable by the Office of Graduate and Professional Studies because of excessive corrections will be returned to the student’s department head (or chair of the intercollegiate faculty, if applicable). The manuscript must be resubmitted as a new document, and the entire review process must begin again. All original submittal deadlines must be met during the resubmittal process to graduate that semester.

Thesis Proposal

For the thesis option Master of Science degree, the student must prepare a thesis proposal for approval by the advisory committee and the head of the major department or chair of the interdisciplinary faculty, if applicable. This proposal must be submitted to the Office of Graduate and Professional Studies at least 20 working days prior to the submission of the request for the final examination.

Compliance issues must be addressed if a graduate student is performing research involving human subjects, animals, infectious biohazards and recombinant DNA. A student involved in these types of research should check with the Office of Research Compliance and Biosafety at (979) 458-1467 to address questions about all research compliance responsibilities. Additional information can also be obtained on the Office of Research Compliance and Biosafety website.

Final Examination/Thesis Defense
A student must pass a final examination by dates announced each semester or summer term in the Office of Graduate and Professional Studies Calendar. To be eligible to take the final examination, a student’s GPR must be at least 3.000 for courses on the degree plan and for all courses completed at Texas A&M which are eligible to be applied to a graduate degree, and there must be no unabsolved grades of D, F or U for any course listed on the degree plan. To absolve a deficient grade, the student must repeat the course at Texas A&M University and achieve a grade of C or better. All coursework on the degree plan must have been completed with the exception of those hours for which the student is registered. For thesis-option students, an approved thesis proposal must be on file in the Office of Graduate and Professional Studies according to published deadlines prior to the final examination or submission of the request for exemption from the final examination.

A request to hold and announce the final examination must be submitted to the Office of Graduate and Professional Studies a minimum of 10 working days in advance of the scheduled date for the examination. The Office of Graduate and Professional Studies must be notified in writing of any cancellations. A student may be given only one opportunity to repeat the final examination for the master’s degree and that must be within a time period that does not extend beyond the end of the next regular semester (summer terms are excluded).

For thesis option students, the final examination covers the thesis and all work taken on the degree plan and at the option of the committee may be written or oral or both. The final examination may not be administered before the thesis is available to all members of the student’s advisory committee in substantially final form, and all members have had adequate time to review the document. The examination is conducted by the student’s advisory committee as finally constituted. A thesis option student must be registered in the University in the semester or summer term in which the final examination is taken. Persons other than members of the graduate faculty may, with mutual consent of the candidate and the major professor, attend final examinations for advanced degrees. Upon completion of the questioning of the candidate, all visitors must excuse themselves from the proceedings. A positive vote by all members of the graduate committee with at most one dissension is required to pass a student on his or her exam. A department, or interdisciplinary degree program, may have a stricter requirement provided there is consistency within all degree programs within a department or interdisciplinary degree program.

The Report of the Final Examination Form must be submitted with original signatures of only the committee members approved by the Office of Graduate and Professional Studies. If an approved committee member substitution (1 only) has been made, his/her signature must also be submitted to the Office of Graduate and Professional Studies. If necessary, multiple copies of the form may be submitted with different committee member original signatures. If an approved committee member substitution (1 only) has been made, his/her signature must be included on the form submitted to the Office of Graduate and Professional Studies.

A thesis option candidate may petition to be exempt from his/her final examination provided his/her degree plan GPR is 3.500 or greater and he/she has the approval of the advisory committee, the head of the student’s major department, or intercollegiate chair, if appropriate, and the Office of Graduate and Professional Studies. It is required that the petition for exemption be submitted the same semester the student intends to submit the thesis.

Non-Thesis Option
For non-thesis option students, a final comprehensive examination may be required.

The final exam cannot be held prior to the mid point of the semester if questions on the exam are based on courses in which the student is currently enrolled. If a student has completed all required degree plan coursework, the student is not required to be registered for classes in the semester the final examination is administered (unless he/she holds an assistantship). For specific final examination requirements, a student should check the program requirements for the degree which he/she is pursuing.

Exam results must be submitted with original signatures of only the committee members approved by the Office of Graduate and Professional Studies. If an approved committee member substitution (1 only) has been made, his/her signature must also be submitted to the Office of Graduate and Professional Studies.

A student pursuing the non-thesis option is not allowed to enroll in 691 (research) for any reason and 691 may not be used for credit toward a non-thesis option Master of Science degree. A maximum of 4 credit hours of 684 (Professional Internship), 8 credit hours of 685 (Directed Studies), and up to 3 credit hours of 690 (Theory of Research) or 695 (Frontiers in Research) may be used toward the non-thesis option Master of Science degree. In addition, any combination of 684, 685, 690 and 695 may not exceed 25 percent of the total credit hour requirement shown on the individual degree plan. All requirements for the non-thesis option Master of Science degree other than those specified above are the same as for the thesis option degree.

Additional Requirements

- Residence
- Continuous Registration
- Time Limit
- Foreign Languages
- Application for Degree

Residence

In partial fulfillment of the residence requirement for the degree of Master of Science, the student must complete 9 resident credit hours during one regular semester or one 10-week summer semester in resident study at Texas A&M University. Upon recommendation of the student’s advisory committee, department head or Chair of the Interdisciplinary Program, if appropriate, and with approval of the Office of Graduate and Professional Studies, a student may be granted exemption from this requirement. Such a petition, however, must be approved prior to the student’s registration for the final 9 credit hours of required coursework.

Students who are employed full-time while completing their degree may fulfill total residence requirements by completion of less-than-full time course loads each semester. In order to be considered for this, the student is required to submit a Petition for Waivers and Exceptions along with verification of his/her employment to the Office of Graduate and Professional Studies.
Continuous Registration

A student in the thesis option of the Master of Science program who has completed all coursework on his/her degree plan other than 5V98, 5V99, and 691 (research) is required to be in continuous registration until all requirements for the degree have been completed. See Continuous Registration Requirements.

Time Limit

All degree requirements must be completed within a period of seven consecutive years for the degree to be granted. A course will be considered valid until seven years after the end of the semester in which it is taken. Graduate credit for coursework which is more than seven calendar years old at the time of the final examination (oral or written) may not be used to satisfy degree requirements.

A student who has chosen the thesis option must have the final corrected version of the thesis cleared by the Office of Graduate and Professional Studies no later than one year after the final examination, or approval of a petition for exemption from the final exam, or within the seven-year time limit, whichever occurs first. Failure to do so will result in the degree not being awarded.

Foreign Languages

No specific language requirement exists for the Master of Science degree.

Application for Degree

For information on applying for your degree, please visit the Graduation section.

DOCTOR OF PHILOSOPHY IN CIVIL ENGINEERING

Work leading to the degree of Doctor of Philosophy (PhD) is designed to give the candidate a thorough and comprehensive knowledge of his or her professional field and training in methods of research. The final basis for granting the degree shall be the candidate’s grasp of the subject matter of a broad field of study and a demonstrated ability to do independent research. In addition, the candidate must have acquired the ability to express thoughts clearly and forcefully in both oral and written languages. The degree is not granted solely for the completion of coursework, residence and technical requirements, although these must be met.

For a student who has completed a master’s degree, a DDS/DMD, DVM or MD at a U.S. institution, a minimum of 64 hours is required on the degree plan for the degree of Doctor of Philosophy. For a student who has completed a baccalaureate degree but not a master’s degree or a U.S. DDS/DMD, DVM or MD, a minimum of 96 hours is required on the degree plan for the degree of Doctor of Philosophy.

Steps to Fulfill Doctoral Degree Requirements

<table>
<thead>
<tr>
<th>Doctoral Degree Requirements</th>
<th>Step</th>
<th>Instruction</th>
<th>Details</th>
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<tbody>
<tr>
<td></td>
<td>1</td>
<td>Meet with departmental/intercollegiate graduate advisor to plan course of study for first semester.</td>
<td></td>
</tr>
</tbody>
</table>
a. When: Before first semester registration.

b. Approved by: Graduate advisor.

2 Complete qualifying exam by the end of student’s first semester

3 Establish advisory committee; Submit a degree plan.

a. When: Prior to the deadline imposed by the student's college or intercollegiate programs, and no later than 90 days prior to preliminary examination.

b. Approved by: Advisory committee, department head or intercollegiate faculty chair, and Office of Graduate and Professional Studies (OGAPS).

4 Complete course work detailed on the approved degree plan.

a. When: Before preliminary exam.

5 Complete the preliminary examination.

a. When: See steps for completing the preliminary examination. The student should complete the Preliminary Examination no later than the end of the semester following the completion of the formal coursework on the degree plan.

b. Approved by: Advisory committee, department head or chair of the intercollegiate faculty, and OGAPS.

6 Submit research proposal for dissertation or record of study and the research proposal approval form to the Office of Graduate and Professional Studies.

a. When: At least 20 working days prior to the submission of the Request for the Final Examination.

b. Approved by: Advisory committee, department head or intercollegiate faculty chair, Research Compliance and Biosafety, and OGAPS.

7 Complete residence requirement.

a. When: Before submitting request to schedule final examination.

b. Approved by: OGAPS

8 Apply for degree; pay graduation fee.

a. When: During the first week of the final semester; see OGAPS calendar for deadlines.

9 Submit request for permission to hold and announce final examination.

a. When: Must be received by OGAPS at least 10 working days before requested exam date. See OGAPS calendar for deadlines.

b. Approved by: Advisory committee, department head or intercollegiate faculty chair, and OGAPS.

10 Successfully complete final examination.
a. When: The Report of the Final Examination Form should be submitted to OGAPS within 10 days following the exam.

b. Approved by: Advisory committee and OGAPS

11 Upload one approved final copy of the dissertation or record of study as a single pdf file to etd.tamu.edu and submit the fully signed dissertation/record of study approval form to the Office of Graduate and Professional Studies.

a. When: See OGAPS calendar for deadlines.

b. Approved by: Advisory committee, department head or intercollegiate faculty chair, and Office of Graduate and Professional Studies.

12 Graduate; arrange for cap and gown.

For more information, visit http://graduation.tamu.edu.

Note: Once formal coursework is complete, you must be continuously registered until all degree requirements have been met. This includes submission and clearance of the dissertation or record of study. See Continuous Registration Requirements.

Program Requirements

- Student's Advisory Committee
- Degree Plan
- Transfer of Credit
- Research Proposal
- Examinations
- Qualifying Examination
- Preliminary Examination
- Preliminary Examination Format
- Preliminary Examination Scheduling
- Report of Preliminary Examination
- Retake of Failed Preliminary Examination
- Final Examination
- Report of Final Examination
- Dissertation

Student’s Advisory Committee

After receiving admission to graduate studies and enrolling, the student will consult with the head of his or her major or administrative department (or chair of the intercollegiate faculty) concerning appointment of the chair of the advisory committee. The student’s advisory committee will consist of no fewer than four members of the graduate faculty representative of the student’s several fields of study and research, where the chair or co-chair must be from the student’s department (or intercollegiate faculty, if applicable), and at least one or more of the members must have an appointment to a department other than the student’s major department. The outside member for a student in an
interdisciplinary degree program must be from a department different from the chair of the student’s committee.

The chair, in consultation with the student, will select the remainder of the advisory committee. Only graduate faculty members located on Texas A&M University campuses may serve as chair of a student’s advisory committee. Other Texas A&M University graduate faculty members located off-campus may serve as a member or co-chair (but not chair), with a member as the chair.

If the chair of a student’s advisory committee voluntarily leaves the University and the student is near completion of the degree and wants the chair to continue to serve in this role, the student is responsible for securing a current member of the University Graduate Faculty, from the student’s academic program and located near the Texas A&M University campus site, to serve as the co-chair of the committee. The Department Head or Chair of Intercollegiate faculty may request in writing to the Associate Provost for Graduate and Professional Studies that a faculty member who is on an approved leave of absence or has voluntarily separated from the university, be allowed to continue to serve in the role of chair of a student’s advisory committee without a co-chair for up to one year. The students should be near completion of the degree. Extensions beyond the one year period can be granted with additional approval of the Dean.

The committee members’ signatures on the degree plan indicate their willingness to accept the responsibility for guiding and directing the entire academic program of the student and for initiating all academic actions concerning the student. Although individual committee members may be replaced by petition for valid reasons, a committee cannot resign en masse. The chair of the committee, who usually has immediate supervision of the student’s research and dissertation or record of study, has the responsibility for calling all meetings of the committee. The duties of the committee include responsibility for the proposed degree plan, the research proposal, the preliminary examination, the dissertation or record of study and the final examination. In addition, the committee, as a group and as individual members, is responsible for counseling the student on academic matters, and, in the case of academic deficiency, initiating recommendations to the Office of Graduate and Professional Studies.

Degree Plan

The student’s advisory committee will evaluate the student’s previous education and degree objectives. The committee, in consultation with the student, will develop a proposed degree plan and outline a research problem which, when completed, as indicated by the dissertation (or its equivalent for the degree of Doctor of Education or the degree of Doctor of Engineering), will constitute the basic requirements for the degree. The degree plan must be filed with the Office of Graduate and Professional Studies prior to the deadline imposed by the student’s college and no later than 90 days prior to the preliminary examination.

This proposed degree plan should be submitted through the online Document Processing Submission System located on the website http://ogsdpss.tamu.edu. A minimum of 64 hours is required on the degree plan for the Doctor of Philosophy for a student who has completed a master’s degree. A student who has completed a DDS/DMD, DVM or a MD at a U.S. institution is also required to complete a minimum of 64 hours. A student who has completed a baccalaureate degree but not a master’s degree will be required to complete a 96-hour degree plan. Completion of a DDS/DMD, DVM or MD degree at a foreign institution requires completion of a minimum of 96 hours for the Doctor of Philosophy. A field of
study may be primarily in one department or in a combination of departments. A degree plan must carry a reasonable amount of 691 (research).

Additional coursework may be added by petition to the approved degree plan by the student’s advisory committee if it is deemed necessary to correct deficiencies in the student’s academic preparation. No changes can be made to the degree plan once the student’s Request for Final Examination is approved by the Office of Graduate and Professional Studies.

Approval to enroll in any professional course (900-level) should be obtained from the head of the department (or Chair of the intercollegiate faculty, if applicable) in which the course will be offered before including such a course on a degree plan.

No credit may be obtained by correspondence study, by extension or for any course of fewer than three weeks duration.

Transfer of Credit

Courses for which transfer credits are sought must have been completed with a grade of B or greater and must be approved by the student’s advisory committee and the Office of Graduate and Professional Studies. These courses must not have been used previously for another degree. Except for officially approved cooperative doctoral programs, credit for thesis or dissertation research or the equivalent is not transferable. Credit for “internship” coursework in any form is not transferable. Courses taken in residence at an accredited U.S. institution or approved international institution with a final grade of B or greater will be considered for transfer credit if, at the time the courses were completed, the courses would be accepted for credit toward a similar degree for a student in degree-seeking status at the host institution. Credit for coursework taken by extension is not transferable. Coursework in which no formal grades are given or in which grades other than letter grades (A or B) are earned (for example, CR, P, S, U, H, etc.) is not accepted for transfer credit. Credit for coursework submitted for transfer from any college or university must be shown in semester credit hours, or equated to semester credit hours.

Courses used toward a degree at another institution may not be applied for graduate credit. If the course to be transferred was taken prior to the conferral of a degree at the transfer institution, a letter from the registrar at that institution stating that the course was not applied for credit toward the degree must be submitted to the Office of Graduate and Professional Studies.

Grades for courses completed at other institutions are not included in computing the GPR. An official transcript from the university at which transfer courses are taken must be sent directly to the Office of Admissions.

Research Proposal

The general field of research to be used for the dissertation should be agreed on by the student and the advisory committee at their first meeting, as a basis for selecting the proper courses to support the proposed research.

As soon thereafter as the research project can be outlined in reasonable detail, the dissertation research proposal should be completed. The research proposal should be approved at a meeting of the student’s advisory committee, at which time the feasibility of the proposed research and the adequacy of available facilities should be reviewed. The approved proposal, signed by all members of the student’s
advisory committee, the head of the student’s major department (or chair of the intercollegiate faculty, if applicable), must be submitted to the Office of Graduate and Professional Studies at least 20 working days prior to the submission of the Request for the Final Examination.

Compliance issues must be addressed if a graduate student is performing research involving human subjects, animals, infectious biohazards and recombinant DNA. A student involved in these types of research should check with the Office of Research Compliance and Biosafety at (979) 458-1467 to address questions about all research compliance responsibilities. Additional information can also be obtained on the website http://rcb.tamu.edu.

Examinations

Qualifying Examination for Doctoral Students

A Qualifying Examination will be scheduled with members of the faculty in the student’s area of specialization. The exam will include both written and oral components. The exam is to be taken after the first semester (Fall or Spring) of study. For direct to PhD students, the exam should be taken prior to the student’s fourth semester of study. The oral exam is generally scheduled within two weeks of the written exam. The students need to pass both the oral and written parts. If a student fails the qualifying exam, he or she are allowed to take it again the following semester. If the student fails again, he or she will have to leave the program.

The written component is intended to judge the ability to communicate in writing as well as to judge the student’s understanding of basic material, graduate or undergraduate, at the graduate level.

The oral component is intended to probe further into some of the questions in the written part, to explore breadth or depth of knowledge, explore any fundamental deficiencies identified from the written exam, and to assess oral communication skills.

Preliminary Examination for Doctoral Students

The student’s major department (or chair of the interdisciplinary degree program faculty, if applicable) and his or her advisory committee may require qualifying, cumulative or other types of examinations at any time deemed desirable. These examinations are entirely at the discretion of the department and the student’s advisory committee.

The preliminary examination is required. The preliminary examination for a doctoral student shall be given no earlier than a date at which the student is within 6 credit hours of completion of the formal course work on the degree plan (i.e., all coursework on the degree plan except 681, 684, 690, 691, 692, 693, 695, 697, 791, or other graduate courses specifically designated as S/U in the course catalog). The student should complete the Preliminary Examination no later than the end of the semester following the completion of the formal coursework on the degree plan.

Preliminary Examination Format

The objective of preliminary examination is to evaluate whether the student has demonstrated the following qualifications:

- a mastery of the subject matter of all fields in the program;
b. an adequate knowledge of the literature in these fields and an ability to carry out bibliographical research;

c. an understanding of the research problem and the appropriate methodological approaches.

The format of the preliminary examination shall be determined by the student’s department (or interdisciplinary degree program, if applicable) and advisory committee, and communicated to the student in advance of the examination. The exam may consist of a written component, oral component, or combination of written and oral components.

The preliminary exam may be administered by the advisory committee or a departmental committee; herein referred to as the examination committee.

Regardless of exam format, a student will receive an overall preliminary exam result of pass or fail. The department (or interdisciplinary degree program, if applicable) will determine how the overall pass or fail result is determined based on the exam structure and internal department procedures. If the exam is administered by the advisory committee, each advisory committee member will provide a pass or fail evaluation decision.

Only one advisory committee substitution is allowed to provide an evaluation decision for a student’s preliminary exam, and it cannot be the committee chair.

If a student is required to take, as a part of the preliminary examination, a written component administered by a department or interdisciplinary degree program, the department or interdisciplinary degree program faculty must:

a. offer the examination at least once every six months. The departmental or interdisciplinary degree program examination should be announced at least 30 days prior to the scheduled examination date.

b. assume the responsibility for marking the examination satisfactory or unsatisfactory, or otherwise graded, and in the case of unsatisfactory, stating specifically the reasons for such a mark.

c. forward the marked examination to the chair of the student’s advisory committee within one week after the examination.

Preliminary Examination Scheduling

Prior to commencing any component of the preliminary examination, a departmental representative or the advisory committee chair will review the eligibility criteria with the student, using the Preliminary Examination Checklist to ensure the student is eligible for the preliminary examination. The following list of eligibility requirements applies.

- Student is registered at Texas A&M University for a minimum of one semester credit hour in the long semester or summer term during which any component of the preliminary examination is held. If the entire examination is held between semesters, then the student must be registered for the term immediately preceding the examination.

- An approved degree plan is on file with the Office of Graduate and Professional Studies prior to commencing the first component of the examination.

- Student’s cumulative GPR is at least 3.000.
• Student’s degree plan GPR is at least 3.000.
• All English language proficiency requirements are satisfied.

At the end of the semester in which at least the first component of the exam is given, there are no more than 6 hours of coursework remaining on the degree plan (except 681, 684, 690, 691, 692, 693, 695, 697, 791, or other graduate courses specifically designated as S/U in the course catalog). The head of the student’s department (or Chair of the Interdisciplinary Degree Program, if applicable) has the authority to approve a waiver of this criterion.

Report of Preliminary Examination

Credit for the preliminary examination is not transferable in cases where a student changes degree programs after passing a preliminary exam.

If a written component precedes an oral component of the preliminary exam, the chair of the student’s examination committee is responsible for making all written examinations available to all members of the committee. A positive evaluation of the preliminary exam by all members of a student’s examination committee with at most one dissension is required to pass a student on his or her preliminary exam.

The student’s department will promptly report the results of the Preliminary Examination to the Office of Graduate and Professional Studies via the Report of Doctoral Preliminary Examination form. The Preliminary Examination checklist form must also be submitted. These forms should be submitted to the Office of Graduate and Professional Studies within 10 working days of completion of the preliminary examination.

The Report of the Preliminary Examination form must be submitted with original signatures of the approved examination committee members. If an approved examination committee member substitution (one only) has been made, that signature must also be included, in place of the committee member, on the form submitted to the Office of Graduate and Professional Studies. The original signature of the department head is also required on the form.

After passing the required preliminary examination for the doctoral degree, the student must complete the final examination for the degree within four calendar years. Otherwise, the student will be required to repeat the preliminary examination.

Retake of Failed Preliminary Examination

Upon approval of the student’s examination committee, with no more than one member dissenting, and approval of the Office of Graduate and Professional Studies, a student who has failed the preliminary examination may be given one re-examination. Adequate time must be given to permit the student to address the inadequacies emerging from the first preliminary examination. The examination committee must agree upon and communicate in writing to the student, an adequate time-frame from the first examination (normally six months) to retest, as well as a detailed explanation of the inadequacies emerging from the examination. The student and the committee should jointly negotiate a mutually acceptable date for this retest. When providing feedback on inadequacies, the committee should clearly
document expected improvements that the student must be able to exhibit in order to retake the exam. The examination committee will document and communicate the time-frame and feedback within 10 working days of the exam that was not passed.

Final Examination for Doctoral Students

The candidate for the doctoral degree must pass a final examination by deadline dates announced in the “Office of Graduate and Professional Studies Calendar” each semester. The doctoral student is allowed only one opportunity to take the final examination.

No unabsolved grades of D, F, or U for any course can be listed on the degree plan. The student must be registered for any remaining hours of 681, 684, 690, 691, 692, 791 or other graduate courses specifically designated as S/U in the course catalog during the semester of the final exam. No student may be given a final examination until they have been admitted to candidacy and their current official cumulative and degree plan GPAs are 3.00 or better.

To be admitted to candidacy for a doctoral degree, a student must have:

1. completed all formal coursework on the degree plan with the exception of any remaining 681, 684, 690 and 691, 692, 791 hours,
2. a 3.0 Graduate GPA and a Degree Plan GPA of at least 3.0 with no grade lower than C in any course on the degree plan,
3. passed the preliminary examination,
4. submitted an approved dissertation proposal,
5. met the residence requirements.

The request to hold and announce the final examination must be submitted to the Office of Graduate and Professional Studies a minimum of 10 working days in advance of the scheduled date. Any changes to the degree plan must be approved by the Office of Graduate and Professional Studies prior to the submission of the request for final examination.

The student’s advisory committee will conduct this examination. The final examination is not to be administered until the dissertation or record of study is available in substantially final form to the student’s advisory committee, and all concerned have had adequate time to review the document. Whereas the final examination may cover the broad field of the candidate’s training, it is presumed that the major portion of the time will be devoted to the dissertation and closely allied topics. Persons other than members of the graduate faculty may, with mutual consent of the candidate and the chair of the advisory committee, be invited to attend a final examination for an advanced degree. A positive vote by all members of the graduate committee with at most one dissension is required to pass a student on his or her exam. A department can have a stricter requirement provided there is consistency within all degree programs within a department. Upon completion of the questioning of the candidate, all visitors must excuse themselves from the proceedings.

Report of Final Examination
The student’s department will promptly report the results of the Final Examination to the Office of Graduate and Professional Studies via the Report of Doctoral Final Examination form. These forms should be submitted to the Office of Graduate and Professional Studies within 10 working days of completion of the final examination. The Office of Graduate and Professional Studies must be notified in writing of any cancellations.

A positive evaluation of the final exam by all members of a student’s advisory committee with at most one dissension is required to pass a student on his or her final exam. The Report of the Final Examination Form must be submitted with original signatures of only the committee members approved by the Office of Graduate and Professional Studies. If necessary, multiple copies of the form may be submitted with different committee member original signatures. If an approved committee member substitution (1 only) has been made, his/her signature must be included on the form submitted to the Office of Graduate and Professional Studies.

Dissertation

The ability to perform independent research must be demonstrated by the dissertation, which must be the original work of the candidate. Whereas acceptance of the dissertation is based primarily on its scholarly merit, it must also exhibit creditable literary workmanship. The format of the dissertation must be acceptable to the Office of Graduate and Professional Studies. Guidelines for the preparation of the dissertation are available in the Thesis Manual, which is available online at http://ogaps.tamu.edu.

After successful defense and approval by the student’s advisory committee and the head of the student’s major department (or chair of the intercollegiate faculty, if applicable), a student must submit his/her dissertation in electronic format as a single PDF file. The PDF file must be uploaded to the website, http://ogaps.tamu.edu. Additionally, a signed paper approval form with original signatures must be received by the Office of Graduate and Professional Studies. Both the PDF file and the signed approval form are required by the deadline.

Deadline dates for submitting are announced each semester or summer term in the Office of Graduate and Professional Studies Calendar (see Time Limit statement). These dates also can be accessed via the website http://ogaps.tamu.edu.

Each student who submits a document for review is assessed a one-time thesis/dissertation processing fee through Student Business Services. This processing fee is for the thesis/dissertation services provided. After commencement, dissertations are digitally stored and made available through the Texas A&M Libraries.

A dissertation that is deemed unacceptable by the Office of Graduate and Professional Studies because of excessive corrections will be returned to the student’s department head or chair of the intercollegiate faculty. The manuscript must be resubmitted as a new document, and the entire review process must begin anew. All original submittal deadlines must be met during the resubmittal process in order to graduate.

Additional Requirements

- Residence
- Time Limit
• Continuous Registration
• Admission to Candidacy
• Languages
• 99-Hour Cap on Doctoral Degree
• Application for Degree

Residence

A student who enters the doctoral degree program with a baccalaureate degree must spend one academic year plus one semester in resident study at Texas A&M University. A student who holds master’s degree when he/she enters doctoral degree program must spend one academic year in resident study. One academic year may include two adjacent regular semesters or one regular semester and one adjacent 10-week summer semester. The third semester is not required to be adjacent to the one year. Enrollment for each semester must be a minimum of 9 credit hours each to satisfy the residence requirement.

To satisfy the residence requirement, the student must complete a minimum of 9 credit hours per semester or 10-week summer semester in resident study at Texas A&M University for the required period. A student who enters a doctoral degree program with a baccalaureate degree may fulfill residence requirements in excess of one academic year (18 credit hours) by registration during summer sessions or by completion of a less-than-full course load (in this context a full course load is considered 9 credit hours per semester).

Students who are employed full-time while completing their degree may fulfill total residence requirements by completion of less-than-full time course loads each semester. In order to be considered for this, the student is required to submit a Petition for Waivers and Exceptions along with verification of his/her employment to the Office of Graduate and Professional Studies. An employee should submit verification of his/her employment at the time he/she submits the degree plan. See Registration.

Time Limit

All requirements for doctoral degrees must be completed within a period of ten consecutive calendar years for the degree to be granted. A course will be considered valid until 10 years after the end of the semester in which it is taken. Graduate credit for coursework more than ten calendar years old at the time of the final oral examination may not be used to satisfy degree requirements.

After passing the required preliminary oral and written examinations for a doctoral degree, the student must complete the final examination within four calendar years. Otherwise, the student will be required to repeat the preliminary examination.

A final corrected version of the dissertation or record of study in electronic format as a single PDF file must be cleared by the Office of Graduate and Professional Studies no later than one year after the final examination or within the 10-year time limit, whichever occurs first. Failure to do so will result in the degree not being awarded.
Continuous Registration

A student in a program leading to a Doctor of Philosophy who has completed all coursework on his/her degree plan other than 691, 5V98 or 5V99 (research) are required to be in continuous registration until all requirements for the degree have been completed. See Continuous Registration Requirements.

Admission to Candidacy

To be admitted to candidacy for a doctoral degree, a student must have:

1. completed all formal coursework on the degree plan with the exception of any remaining 681, 684, 690 and 691, 5V98 and 5V99, or 791.
2. a 3.0 Graduate GPA and a Degree Plan GPA of at least 3.0 with no grade lower than C in any course on the degree plan,
3. passed the preliminary examination (written and oral portions),
4. submitted an approved dissertation proposal,
5. met the residence requirements. The final examination will not be authorized for any doctoral student who has not been admitted to candidacy.

Languages

A student is required to possess a competent command of English. For English language proficiency requirements, see the Admissions section of this catalog. The doctoral (PhD) foreign language requirement at Texas A&M University is a departmental option, to be administered and monitored by the individual departments of academic instruction.

99-Hour Cap on Doctoral Degrees

In Texas, public colleges and universities are funded by the state according to the number of students enrolled. In accordance with legislation passed by the Texas Legislature, the number of hours for which state universities may receive subvention funding at the doctoral rate for any individual is limited to 99 hours. Texas A&M University and other universities will not receive subvention for hours in excess of the limit.

Institutions of higher education are allowed to charge the equivalent of nonresident tuition to a resident doctoral student who has enrolled in 100 or more semester credit hours of doctoral coursework.

A doctoral student at Texas A&M has seven years to complete his/her degree before being charged out-of-state tuition. A doctoral student who, after seven years of study, has accumulated 100 or more doctoral hours will be charged tuition at a rate equivalent to out-of-state tuition. Please note that the tuition increases will apply to Texas residents as well as students from other states and countries who currently are charged tuition at the resident rate. This includes those doctoral students who hold GAT, GANT, and GAR appointments of 20 or more hours and recipients of competitive fellowships who receive more than $1,000 per semester. Doctoral students who, after seven years of study, have not accumulated 100 hours are eligible to pay in-state tuition if otherwise eligible.
APPENDIX E – Graduate Course Offerings
CVEN – CIVIL Engineering – Graduate Courses

CVEN 601 Environmental Engineering Processes III
Credits 3.3 Lecture Hours.
Biological processes that describe behavior of materials in natural and engineered environmental systems including fundamental theory of kinetics, bioenergetics, genetics and cellular functions.
Prerequisites: CVEN 301/EVEN 301.

CVEN 602 Remote Sensing in Hydrology
Credits 3.3 Lecture Hours.
Precipitation; evaporation; soil moisture; snow and ice; terrestrial water storage variations; land surface properties; water quality.

CVEN 603 Environmental Engineering Management
Credits 3.3 Lecture Hours.
Federal and state regulatory framework for environmental engineering; techniques for environmental control; risk assessment; evaluation of critical environmental problems with multimedia aspects.
Prerequisite: CVEN 301/EVEN 301 or approval of instructor.

CVEN 604 Engineering Analysis of Treatment Systems
Credits 3.3 Lecture Hours.
Theory of processes used to treat water and wastewater; applications of theory to design and operation of treatment systems, including adsorption, coagulation (including precipitation), flocculation, media filtration and membrane filtration.
Prerequisites: CVEN 619 and CVEN 620.

CVEN 605 Environmental Measurement
Credits 3.1 Lecture Hour. 6 Lab Hours.
Theory and practice of analytical methods used in the environmental engineering field; instrumental and wet chemical techniques used in measurement of environmental quality parameters and pollutants.
Prerequisite: CVEN 620 or approval of instructor.

CVEN 606 Environmental Engineering Design
Credits 3.3 Lecture Hours.
Design of engineered environmental systems for water or wastewater treatment in domestic or industrial applications.
Prerequisite: CVEN 604 or approval of instructor.

CVEN 607 Engineering Aspects of Air Quality
Credits 3.3 Lecture Hours.
Characterization of air contaminants; health effects and legal aspects; dispersion of pollutants in the atmosphere; technology for the control of gaseous and particulate emissions.
Prerequisite: CVEN 311/EVEN 311.

CVEN 609 Environmental Control of Oil and Hazardous Materials
Credits 3.2 Lecture Hours. 3 Lab Hours.
Oil and hazardous material (OHM) spills in the engineering design process; evaluation of OHM properties and their behavior and impact to environmental systems; prevention programs and documents, technology for spill containment and removal; contingency planning cycle including administrative site-specific plans and resource acquisition; response organization; restoration and documentation.
Prerequisite: CVEN 301/EVEN 301 or approval of instructor.

CVEN 610/PHEO 650 Environmental Risk Assessment
Credits 3.3 Lecture Hours.
Risk assessment of the environment and human exposure in a statistically-based approach to determine allowable levels of exposure without significant deleterious effects; the basic approach of hazard identification; data collection and analysis; toxicity assessment; risk characterization; applications in ecological and human risk assessment; risk analysis performed.
Prerequisite: CHEM 222 or equivalent.
Cross Listing: PHEO 650.

CVEN 612 Tools for Highway Materials and Pavement Design
Credits 3.3 Lecture Hours.
Theory and practice in pavement design; pavement performance; structural design of pavement layers; types of materials used in pavement layers; characterization of pavement layer materials; concepts of pavement management; hands-on application of pavement design computational tools.
Prerequisite: Graduate classification in civil engineering or approval of instructor.

CVEN 613 Micromechanics of Civil Engineering Materials
Credits 3.2 Lecture Hours. 2 Lab Hours.
Discrete-particle and continuum micromechanics energy principles; finite-element and discrete-element formulations for constitutive modeling of asphalt, concrete, and coarse and fine-grained soils; adhesive and cohesive fracture and healing; stress-dependent
plasticity; principles and measurement of surface energy and pseudo-strain.

Prerequisite: CVEN 615, CVEN 616 or approval of instructor.

CVEN 614 Stabilization of Soil-Aggregate Systems
Credits 3. 3 Lecture Hours.
Theory and practice of chemical stabilization of soils and aggregate systems with traditional methods of chemical stabilization including Portland cement, lime, fly ash and by products (kiln dusts, fly ash and slag materials); selected non-traditional methods including polymers, ionic systems, and enzymes; mechanisms and methods to avoid deleterious reactions.

CVEN 615 Structural Design of Pavements
Credits 3. 3 Lecture Hours.
Characteristics of pavement loads, stress analysis in pavements, design practices, construction, rehabilitation and maintenance.

Prerequisite: CVEN 418.

CVEN 616 Systems Design of Pavements
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Optimization of the design of rigid and flexible pavement systems; empirical and mechanistic stochastic structural subsystems; utility theory, serviceability concept, cost studies, traffic delay, environmental deterioration, rehabilitation and maintenance optimization systems.

Prerequisite: CVEN 418.

CVEN 617 Traffic Engineering: Characteristics
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Human, vehicular and traffic characteristics as they relate to driver-vehicle-roadway operational systems; traffic studies and methods of analysis and evaluation.

Prerequisite: CVEN 457 or equivalent.

CVEN 618 Traffic Engineering: Operations
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Advanced theory and application of traffic control; signalization and freeway operations.

Prerequisite: CVEN 457 or equivalent.

CVEN 619 Environmental Engineering Processes I
Credits 3. 3 Lecture Hours.
Physical processes that describe behavior of materials in natural and engineered environmental systems including transport phenomenon, sorption, desorption, flocculation and sedimentation.

Prerequisite: CVEN 301/EVEN 301.

CVEN 620 Environmental Engineering Processes II
Credits 3. 3 Lecture Hours.
Chemical processes that describe behavior of materials in natural and engineered environmental systems including neutralization, precipitation, complex formation, adsorption, oxidation-reduction, coagulation, volatilization and absorption.

Prerequisites: CVEN 301/EVEN 301.

CVEN 621 Advanced Reinforced Concrete Design
Credits 3. 3 Lecture Hours.
Reinforced concrete principles; analysis of rigid building frames, design of building frames, slabs, biaxially loaded columns, rectangular and circular tanks, and deep beams.

Prerequisite: CVEN 444 or equivalent.

CVEN 622 Properties of Concrete
Credits 3. 3 Lecture Hours.
Materials, properties and behavior of concrete; cement, cement types, aggregate characteristics; properties of fresh concrete; structure of portland cement paste; mechanical properties of hardened concrete; durability and repair of concrete structures.

Prerequisites: CVEN 342.

CVEN 623 Nondestructive Pavement Evaluation
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Nondestructive measurements and analysis methods of pavement data collection to determine riding quality, vehicle dynamics, surface texture, layer thickness, stiffness, moisture and distress using seismic, laser, radar, infrared, impulse, image analysis, and wave propagation. Content applies to construction quality control and evaluation of risk, reliability and remaining life of pavements.

Prerequisite: CVEN 616 or approval of instructor.

CVEN 624 Infrastructure Engineering and Management
Credits 3. 3 Lecture Hours.
Defines the infrastructure deterioration problems in the United States and describes the engineering and management approaches to arrest the deterioration.

Prerequisite: Graduate classification in engineering or approval of instructor.

CVEN 625 Traffic Engineering: Design
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Design of traffic control device installations with special emphasis on traffic signal design and installation, including the design features of detector placement and operation; national and state design standards and guidelines for traffic control device installation.

**Prerequisite:** CVEN 457.

**CVEN 626 Highway Safety**  
Credits 3.3 Lecture Hours.  
Fundamental concepts for performing traffic safety analyses; crash data collection and database management; safety improvement programs; accident data analysis; development of statistical models; before-after studies; economic analyses; accident risk.

**CVEN 627 Engineering Surface Water Hydrology**  
Credits 3.3 Lecture Hours.  
Precipitation-runoff processes; watershed and streamflow modeling; frequency analysis; erosion and sedimentation engineering; hydrologic design of hydraulic structures and nonstructural stormwater management strategies.  
**Prerequisite:** Graduate classification in engineering or approval of instructor.

**CVEN 628 Advanced Hydraulic Engineering**  
Credits 3.3 Lecture Hours.  
Modeling of steady and unsteady flow in natural and constructed channels and hydraulic structures. Open channel hydraulics. Design and analysis of hydraulic structures, canals, and flood mitigation projects. Sediment and contaminant transport in river systems.  
**Prerequisite:** CVEN 339 or approval of instructor.

**CVEN 629 System Identification and Nondestructive Damage Evaluation of Civil Engineering Structures**  
Credits 3.3 Lecture Hours.  
Invasive assessment of civil structures; concepts of systems identification, damage detection, and safety evaluation; estimation of mass, damping, and stiffness properties; determination of load capacity and useful life.  
**Prerequisite:** Graduate classification in Civil Engineering, Aerospace Engineering or Mechanical Engineering.

**CVEN 630 Transportation Engineering: Economics**  
Credits 3.3 Lecture Hours.  
Engineering and economic principles for transportation systems; engineering evaluation using methods of travel demand, costs, equilibrium and pricing; use of economic principles for the finance, engineering and management of transportation systems.  
**Prerequisite:** CVEN 672 or approval of instructor.

**CVEN 631 Advanced Mechanics of Materials**  
Credits 3.3 Lecture Hours.  
Stresses and strains at a point, torsion of noncircular cross sections, beams with combined axial and lateral loads, energy methods, thick walled pressure vessels, theories of failure, introduction to the theory of elasticity, theory of plates, theory of elastic stability and solution to elementary problems.  
**Prerequisite:** MATH 308 or approval of instructor.

**CVEN 632 Street and Highway Design**  
Credits 3.3 Lecture Hours.  
Advanced concepts of the design of streets and highways, design criteria, controls and standards for design alignment, cross section, intersections and interchanges and environmental impacts of surface transport facilities.  
**Prerequisite:** CVEN 456 or equivalent.

**CVEN 633 Rigid Pavement Analysis and Design**  
Credits 3.3 Lecture Hours.  
Introduction to mechanistic rigid pavement design concepts; development of mathematical pavement models and application of the models to design analysis; relationship of pavement response to performance and fatigue damage concepts in design; evaluation of pavement design practice and procedures for highways and airports; rigid pavement overlay design concept.  
**Prerequisite:** CVEN 418.

**CVEN 634 Computer Integrated Construction Engineering Systems**  
Credits 3.3 Lecture Hours.  
Modeling concepts, issues and techniques of computer integrated construction engineering systems; current research and practice in design and implementation of computer integrated construction systems, with emphasis on the integration of engineering, construction planning, monitoring and control through management information systems, decision support systems, knowledge based systems and discrete event simulation systems.  
**Prerequisite:** CVEN 349.

**CVEN 635 Methods Improvement for Construction Engineers**  
Credits 3.3 Lecture Hours.  
Application of work methods and measurements to civil engineering construction; examination of factors that affect productivity in construction; study of motivational factors; review of the principles of accident prevention.  
**Prerequisites:** CVEN 405 and CVEN 473 or approval of instructor.

**CVEN 636 Project Development: Methods and Models**  
Credits 3.3 Lecture Hours.

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Development of new projects; public-private partnerships; flexible design and stage-based construction; project risk analysis and management; estimating and budgeting; optimal project decisions; advanced techniques for modeling project performance.

**Prerequisite:** STAT 601 or approval of instructor.

**CVEN 641 Construction Engineering Systems**

Credits 4. 3 Lecture Hours. 2 Lab Hours.

Application of systems theory to project planning and control; probabilistic network diagramming, resource allocation, statistical bidding analysis, activity planning, financial management of construction projects and project control.

**Prerequisite:** CVEN 473 or approval of instructor.

**CVEN 642/BAEN 642 Water-Energy-Food Nexus: Toward a Sustainable Resource Management**

Credits 3. 3 Lecture Hours.

Principles and application of the Water-Energy-Food nexus to state, national and international Water-Energy-Food securities and the interlinkages between them; exploration of quantitative framework to develop and assess sustainable tradeoffs of resources; hands on experiences; relevant real world projects or case studies.

**Prerequisites:** Strong analytical background; approval of instructor.

**Cross Listing:** BAEN 642/CVEN 642.

**CVEN 644 Project Risk Management**

Credits 3. 3 Lecture Hours.

Identifies causes of risks in projects; discusses probabilistic description of risks and formulation of risk models; Bayesian methods for revising probabilities; qualitative and quantitative risk assessment; setting contingencies on budgets and schedules; risk mitigation and risk management; handling technological risk; Utility theory and game theory in management of risks.

**Prerequisites:** ISEN 644/CVEN 644; STAT 211, STAT 601 or equivalent.

**CVEN 645 Geotechnical Site Investigation**

Credits 2. 2 Lecture Hours.

Soil sampling techniques to obtain disturbed and undisturbed samples; in situ field tests including standard penetration test, cone penetration test, vane test, pressuremeter test and their use in practice; other recent advances in sampling, in situ testing and site investigation both onshore and offshore.

**Prerequisites:** CVEN 365; CVEN 435 or equivalent.

**CVEN 646 Foundations on Expansive Soils**

Credits 3. 3 Lecture Hours.

Properties of partially saturated soils, analysis of beams and plates on foundations, slab-subgrade friction, design of slabs and drilled piers, soil improvement techniques, risk analysis and foundation rehabilitation operations.

**Prerequisites:** CVEN 365 and MATH 308 or approval of instructor.

**CVEN 647 Numerical Methods in Geotechnical Engineering**

Credits 3. 2 Lecture Hours. 2 Lab Hours.

Formulation and application of finite element and discrete element methods in solving geotechnical engineering problems related to seepage, diffusion, elasticity, plasticity, fracture and dynamic motion of soil masses, stability and convergence problems and use of existing computer programs in working applied problems.

**Prerequisite:** Degree in engineering or approval of instructor.

**CVEN 648 Advanced Numerical Methods in Geotechnical Engineering**

Credits 3. 3 Lecture Hours.

Formulation and application of finite difference and finite element methods in geotechnical problems related to elasticity, plasticity, seepage, consolidation, dynamic response, and pile analysis; constitutive models of soil behavior; and analysis of nonlinear systems.

**Prerequisites:** MEMA 646 or equivalent; CVEN 651 or registration therein.

**CVEN 649 Physical and Engineering Properties of Soil**

Credits 4. 3 Lecture Hours. 3 Lab Hours.

Introduction to physico-chemical properties of soils; soil structure; soil classification; permeability; principle of effective stress; stress-deformation and strength characteristics; partly saturated soils; testing procedures.

**Prerequisites:** CVEN 365 and CVEN 435 or approval of instructor.

**CVEN 650 Stochastic Mechanics**

Credits 3. 3 Lecture Hours.

Introduction to the use of Bayesian inference methods to solve mechanical inverse problems with varying evidence conditions; experimental observations, model complexity and expert beliefs; representation of the probabilistic calibration of models with varying parameters in space and time, in the form of boundary conditions, material properties, and even numerical parameters; improves the scientific and engineering inferences stemmed from research practice.

**Prerequisite:** STAT 201.

**CVEN 651 Geomechanics**

Credits 3. 3 Lecture Hours.

Fundamentals of mechanics of deformable bodies; theory and application of elasticity, plasticity, viscoelasticity and approximate rheological models to soil mechanics problems.

**Prerequisite:** Approval of instructor.

**CVEN 652 Soil Dynamics**
Credits 3.3 Lecture Hours.
Dynamic properties of soil; wave propagation in an elastic medium; analysis of dynamic soil-structure interaction and machine foundations; earthquake engineering; soil liquefaction; seismic design of foundations, dams, retaining walls and pipelines.
Prerequisite: MATH 308.

CVEN 653 Bituminous Materials
Credits 3.2 Lecture Hours. 3 Lab Hours.
Production, specifications and tests of bituminous materials; design and evaluation of asphaltic concrete for construction and maintenance; inspection control of street, parking and highway paving surfaces.
Prerequisite: Approval of instructor.

CVEN 654/ISEN 643 Strategic Construction and Engineering Management
Credits 3.3 Lecture Hours.
Strategic and systems perspectives applied to construction and engineering management projects, organizations and industries; system dynamics methodology to model construction and engineering systems; understanding drivers of performance; feedback and high leverage points for performance improvement.
Prerequisite: Graduate classification or approval of instructor.
Cross Listing: ISEN 643/CVEN 654.

CVEN 655 Structural Reliability
Credits 3.3 Lecture Hours.
Uncertainties in structural mechanics; probabilistic models for load and resistance variables, fundamentals of structural reliability theory, advanced first-order second moment methods and reliability of complex structural systems; applications to selected structures.
Prerequisites: CVEN 345 and CVEN 421.

CVEN 656 Bridge Engineering
Credits 3.3 Lecture Hours.
Overview of design of highway bridges, and an introduction to maintenance of highway bridges; history of bridge engineering, types of bridges and materials of construction, design rules, loads, inspection, rating and preventive maintenance, esthetics.
Prerequisite: CVEN 345.

CVEN 657 Dynamic Loads and Structural Behavior
Credits 3.3 Lecture Hours.
Dynamic modeling of single, multidegree of freedom and continuous systems; dynamic load factors; damping; node superpositions; numerical integration; dynamic behavior of structures and structural elements under action of dynamic loads resulting from wind, earthquake, blast, impact, moving loads and machinery.
Prerequisites: MATH 308 and MEMA 467 or approval of instructor.

CVEN 658 Civil Engineering Applications of GIS
Credits 3.2 Lecture Hours. 2 Lab Hours.
Use of geographic information system (GIS) concepts and methods to solve civil engineering problems; emphasis on different areas of civil engineering. Class presentations and laboratory sessions used to familiarize students with computer software.
Prerequisite: Graduate classification.

CVEN 659 Behavior and Design of Steel Structures
Credits 3.3 Lecture Hours.
Buckling and post-buckling strength of stiffened and unstiffened plate elements and members; torsional behavior and design of beams; stability of frames; frames subject to sidesway; bracing design; non-destructive evaluation and application of fracture mechanics principles to welded structures.
Prerequisite: 3 credit hours of structural steel design or approval of instructor.

CVEN 662 Experimental Methods in Civil Engineering
Credits 3.2 Lecture Hours. 3 Lab Hours.
Introduction to experimental methods, instrumentation, data acquisition and data processing; experimental aspects of static and dynamic testing in the various areas of civil engineering; overview of laboratory work with several hands-on applications in the laboratory.
Prerequisite: Graduate classification in engineering.

CVEN 663 Structural Stability
Credits 3.3 Lecture Hours.
Buckling of columns, frames, arches, rings, plates and shells, lateral and torsional buckling of beams, Newmark's method, equilibrium method, Rayleigh-Ritz, variational principles; Galerkin method, Trefftz method, review of current literature.
Prerequisites: MATH 308; approval of instructor.

CVEN 664 Water Resources Engineering Planning and Management
Credits 3.3 Lecture Hours.
Managing water resources; the planning process, systems analysis methods; institutional framework for water resources engineering; comprehensive integration of engineering, economic, environmental, legal and political considerations in water resources development and management.
Prerequisite: Graduate classification in engineering or approval of instructor.

CVEN 665 Water Resources Systems Engineering
Credits 3.3 Lecture Hours.
Linear and non-linear optimization models and simulation models for planning and management of water systems; single- and multi-objective analysis and deterministic and stochastic techniques.

Prerequisites: CVEN 339; CVEN 422 or equivalent.

CVEN 666 Foundation Structures
Credits 3.2 Lecture Hours. 3 Lab Hours.
Geological and soil mechanics principles including load bearing capacity, soil pressure and settlement; design of shallow foundation sub-structures including pedestals, spread footings, combined footings, mats and underream footings; design of deep foundations including piles and drilled piers; retaining walls, cofferdams and sheet piles.

CVEN 667 Slope Stability and Retaining Walls
Credits 3.2 Lecture Hours. 2 Lab Hours.
Slope stability; failure analysis including methods of slices; risk analysis; earthquake analysis; monitoring; remedial measures; retaining structures; basic theories; gravity walls; cantilever walls; tieback walls; mechanically stabilized walls; soil nailing; deflecting-based analysis.

Prerequisites: CVEN 365 or equivalent; graduate classification.

CVEN 668 Advanced EPC Project Development
Credits 3.3 Lecture Hours.
Examines the advanced project development process-business planning and pre-project planning for engineering, procurement and construction (EPC); a process approach is followed. Issues covered are project technical and economic feasibility; scope definition; project risks; preliminary budgeting; scheduling and parametric estimating; execution strategies; negotiations; organizational design and development.

Prerequisite: Graduate classification in engineering or approval of instructor.

CVEN 669 Design of Structures for Hazardous Environmental Loads
Credits 3.3 Lecture Hours.
Introduction to wind and earthquake engineering with focus on studying the characteristics and effects of various types of windstorms and earthquakes; development of tools that can be used in specifying wind and earthquake loads on structures.

Prerequisite: Approval of instructor.

CVEN 670 Behavior and Design of Composite Structures
Credits 3.3 Lecture Hours.
Design of composite structural systems comprising structural steel and reinforced concrete; composite slabs on steel beams; composite slabs on formed metal deck; columns; moment frame systems; shear wall systems; braced frame systems; dual systems; introduction to retrofitting applications.

Prerequisites: CVEN 444; CVEN 446 or equivalent; graduate classification.

CVEN 671 Behavior and Design of Prestressed Concrete Structures
Credits 3.3 Lecture Hours.
Introduction to the behavior and design of prestressed concrete structural members for several limit states; including flexure, shear, torsion and deflection; exposure to composite beams; indeterminate systems; bridge design and construction.

Prerequisites: CVEN 444; graduate classification in civil engineering or approval of instructor.

CVEN 672 Engineering and Urban Transportation Systems
Credits 3.3 Lecture Hours.
Characteristics of transportation engineering systems; transportation engineering data collection; modeling effects of engineering project planning, trip generation, trip distribution, mode choice and traffic assignment; use and interpretation of engineering modeling results; engineering project analysis.

Prerequisite: Graduate classification in engineering or urban and regional planning or approval of instructor.

CVEN 673 Transport Phenomena in Porous Media
Credits 3.3 Lecture Hours.
Transport phenomena in porous media with special emphasis on fundamentals and applications to various geo-environmental problems.

Prerequisites: CVEN 311/EVEN 311 and MATH 308 or approval of instructor.

CVEN 674 Groundwater Engineering
Credits 3.3 Lecture Hours.
Advanced groundwater hydrology, groundwater contamination, groundwater modeling, multiple-phase flow, salt water intrusion, artificial recharge, sustainable groundwater management.

Prerequisite: CVEN 462/EVEN 462, GEOL 410, or equivalent; or approval of instructor.

CVEN 675 Stochastic Hydrology
Credits 3.3 Lecture Hours.
Analysis, simulation and forecasting of hydro-climatic variables.

Prerequisites: CVEN 421 and CVEN 463/EVEN 463 or approval of instructor.

CVEN 679 Experimental Fluid Mechanics Modeling
Credits 3.3 Lecture Hours.
Dimensional analysis; modeling laws; measurement techniques and instrumentation; experimental control and data acquisition; sampling theory and signal processing; applications to coastal, ocean, and hydraulic engineering models.

**Prerequisite:** Approval of instructor.

**CVEN 680 Advanced Computation Methods for Fluid Flow**

**Credits 3. 3 Lecture Hours.**

Unsteady three-dimensional Navier-Stokes equations in general nonorthogonal curvilinear coordinates; algebraic and elliptic grid generation; turbulence modeling for complex flows; advanced numerical methods for unsteady incompressible turbulent flows; large-eddy simulations; Reynolds-averaged Navier-Stokes simulation; chimera domain decomposition and interactive zonal approach.

**Prerequisite:** [CVEN 688](#) or approval of instructor.

**CVEN 681 Seminar**

**Credits 1. 2 Lab Hours.**

Reports and discussion of current research and selected published technical articles.

**CVEN 682 Environmental Remediation of Contaminated Sites**

**Credits 3. 3 Lecture Hours.**

Aspects of characterization and design of plans for remediation of sites contaminated with hazardous wastes; review of federal and state regulations; risk assessment; remedial technology screening and design of remedial plans.

**Prerequisites:** [CVEN 601](#), [CVEN 619](#), [CVEN 620](#).

**CVEN 683 Dynamic Soil Structure Interaction**

**Credits 3. 3 Lecture Hours.**

Introduction to basic concepts of wave propagation; soil dynamics; applications to the design of machine foundations; geotechnical earthquake engineering; soil effects on the characteristics of earthquake motions; liquefaction; dynamic stiffness of foundations; seismic soil structure interaction.

**Prerequisite:** Graduate classification.

**CVEN 684 Professional Internship**

**Credits 1 to 3. 1 to 3 Other Hours.**

Training under the supervision of practicing professional engineers in settings appropriate to the student's professional objectives, away from Texas A&M campus. May be taken three times for credit.

**Prerequisites:** Approval of the department head and two semesters of graduate work completed.

**CVEN 685 Directed Studies**

**Credits 1 to 12. 1 to 12 Other Hours.**

Enables majors in civil engineering to undertake and complete with credit in their particular fields of specialization limited investigations not within their thesis research and not covered by other courses in established curriculum.

**CVEN 686 Offshore and Coastal Structures**

**Credits 3. 3 Lecture Hours.**

Fundamental design and analysis techniques; offshore platforms for shallow and deep water, pile supported, gravity based and floating platforms; new design problems faced by offshore industry will be examined by class during the semester.

**Prerequisite:** Approval of instructor.

**CVEN 687 Foundation Engineering**

**Credits 3. 3 Lecture Hours.**

Settlement and bearing capacity analysis of foundations; computer programs used to analyze axially-loaded piles, laterally-loaded piles and sheet-pile walls.

**Prerequisites:** [CVEN 365](#); approval of instructor.

**CVEN 688 Computational Fluid Dynamics**

**Credits 3. 3 Lecture Hours.**

Finite-difference and finite-element methods and basic numerical concepts for the solution of dispersion, propagation and equilibrium problems commonly encountered in real fluid flows; theoretical accuracy analysis techniques.

**Prerequisites:** Undergraduate course in fluid mechanics; [MATH 601](#) and/or basic course in linear algebra; knowledge of one programming language.

**CVEN 689 Special Topics in...**

**Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 6 Lab Hours.**

Selected topics in an identified area of civil engineering. May be repeated for credit.

**Prerequisites:** Approval of instructor and department head.

**CVEN 691 Research**

**Credits 1 to 23. 1 to 23 Other Hours.**

Research for thesis or dissertation.

**CVEN 695 Frontiers in Civil Engineering Research**

**Credits 1 to 3. 1 to 3 Lecture Hours.**
The present status of investigative work in a variety of civil engineering fields; content selected based on visiting lecturers of distinguished international recognition in their fields of research.

Prerequisite: Approval of instructor.

CVEN 696 Urban Traffic Facilities
Credits 3.3 Lecture Hours.
Driver, vehicle and roadway characteristics related to design and operation of traffic facilities; selection and design of traffic control devices and information systems for streets and highways; accident analysis and tort liability related to traffic engineering.

Prerequisite: Graduate classification.

CVEN 699 Engineering Risk Analysis
Credits 3.3 Lecture Hours.
Introduction to applications of probability theory, statistics, and decision analysis to civil engineering problems; emphasis on probabilistic modeling and analysis of civil engineering problems, Bayesian statistics, risk analysis, and decision under uncertainty.

Prerequisite: STAT 211 or approval of instructor.

CVEN 701 Mixing and Transport in Natural Civil Engineering Systems
Credits 3.3 Lecture Hours.
Introduction to mass transport in the hydrosphere with application to natural civil engineering systems; Fick's law; advective, reacting, diffusion equation; turbulence; dispersion; classical solutions to the diffusion equation; mixing in rivers, lakes, groundwater, estuaries, and the atmosphere; boundary exchange; outfall design.

Prerequisite: CVEN 311/EVEN 311 or equivalent.

CVEN 710 Civil Engineering Project Finance
Credits 3.3 Lecture Hours.
Fundamentals of financing civil engineering projects; Public-Private Partnerships (PPPs); interdependencies between engineering and financing decisions; equity and debt markets; type of debt instruments including loans vs. bonds; risk identification, quantification, and management; engineering due-diligence; pricing risk premium; hedging using civil engineering design strategies.

CVEN 717 Engineering Project Control
Credits 3.3 Lecture Hours.
Project controls bridge from information-based to physical-based development processes; includes detailed design, testing of designs, design realization, and preparation of facilities for steady state operations; application of basic project control theories, tools, and methods to development projects.

Prerequisite: Graduate classification in civil engineering or industrial and systems engineering or approval of instructor.

CVEN 740 Advanced Constitutive Behavior of Cementitious Materials
Credits 3.3 Lecture Hours.
Advanced multi-scale constitutive behavior of cementitious materials, including composite behavior, elasticity, viscoelasticity, aging, free strains, poromechanical behavior, thermal and moisture strains, and thermal, moisture, and ionic transport; focus on experimental observation and analytical modeling.

Prerequisite: CVEN 343 or CVEN 622 or approval of instructor.

CVEN 741 Tools for Highway Materials and Pavement Design
Credits 3.3 Lecture Hours.
Theory and practice in pavement design; pavement performance; structural design of pavement layers; types of materials used in pavement layers; characterization of pavement layer materials; concepts of pavement management; hands-on application of pavement design computational tools.

Prerequisite(s): Graduate classification in civil engineering or approval of instructor.

CVEN 750 Finite Element Applications in Structural Engineering
Credits 3.2 Lecture Hours. 2 Lab Hours.
Role of the finite element method (FEM) in structural engineering; use of commercial finite element software; application of FEM method for various structural engineering problems; selection of appropriate FEM models; types of elements and mesh sizes; use and interpretation of FEM results.

Prerequisite: CVEN 445 or approval of instructor.

CVEN 751 Advanced Dynamics and Control of Civil Engineering Structures
Credits 3.3 Lecture Hours.
Laplace transforms; nonlinear dynamics; base isolation; viscous dampers; classical control; state-space formulation; LQR controllers; estimator design; compensator design; advanced control techniques; emphasis on the issues and applications to bridges, buildings and other large civil structures.

Prerequisite(s): CVEN 657, MEMA 647 or equivalent, or approval of instructor.

CVEN 752 Smart Structures
Credits 3.3 Lecture Hours.
Fundamentals of smart structures including structural dynamics, damping, sensors, control concepts, smart materials, modeling of smart structures, and signal processing; semi-passive concepts, energy harvesting, semi-active concepts, active vibration control, active noise control, shape adaptation, and structural health monitoring.

Prerequisite: CVEN 363 or equivalent or graduate classification in CVEN or approval of instructor.
CVEN 753/MEMA 634 Damage Mechanics of Solids and Structures  
Credits 3. 3 Lecture Hours.  
Damage mechanics; constitutive modeling of damage behavior of materials; application of thermodynamic laws; computational techniques for predicting progressive damage and failure; plasticity; viscoplasticity; viscoelasticity; cohesive zone modeling; fatigue and creep damage; damage in various brittle and ductile materials (e.g., metal, concrete, polymer, ceramic, asphalt, biomaterial, composites).  
Prerequisite: CVEN 633 or approval of instructor.  
Cross Listing: MEMA 634/CVEN 753.  

CVEN 754 Advanced Structural Design Studio  
Credits 3. 1 Lecture Hour. 6 Lab Hours.  
Comparative design, construction, and service-life performance analysis of integrated and complex structural systems, including design loads, load paths, and structural detailing requirements; comparison of alternative structural system solutions; investigation into new technologies and structural design and/or construction approaches; examples drawn from bridges, buildings and other large civil structures.  
Prerequisites: CVEN 659 or registration therein, CVEN 671 or registration therein, CVEN 750 or registration therein, or approval of instructor.  

CVEN 765 Advanced Civil Engineering Systems  
Credits 3. 3 Lecture Hours.  
Formulation of decision making problems at different hierarchical levels including strategic, planning and operational; includes application problems in project selection, networks, allocation, routing/scheduling, distribution, and multi-objective; introduction to exact and approximate solving techniques including optimization, heuristics, simulation, and decision analysis; solution interpretation and sensitivity analyses.  
Prerequisite: CVEN 322 or approval of instructor.  

CVEN 766 Highway Design  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Theory and practice in highway design; highway classification and design criteria, location studies, design of vertical and horizontal alignment, cross section, intersections, environmental factors, and highway drainage elements.  
Prerequisites: CVEN 307 or approval of instructor.
APPENDIX F – Graduate Handbooks
Materials Engineering Graduate Student Handbook

Zachry Department of Civil Engineering
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Overview
Program Overview

The materials engineering program applies materials science to engineer improved construction materials to build our infrastructure. These materials traditionally include asphalt concrete, Portland cement concrete, steel and fiber reinforced concrete, unbound and chemically bound aggregates, and chemically treated and stabilized soils.

The civil engineering curriculum at Texas A&M covers a wide spectrum of topics in materials engineering, including materials science, general construction materials, pavement design, pavement management, micromechanics, and microstructure characterization and modeling. These courses provide undergraduate students with the scientific concepts and practical considerations underlying the selection, specification, and quality control of civil engineering materials. In addition, graduate students are provided with the knowledge necessary to advance in the practice and art of materials engineering.

During the past decade, the needs of the nation and the world have required civil engineers to also focus on the reuse of valuable materials and resources, which in turn has created exciting challenges in understanding how to chemically and mechanically stabilize these materials for reuse. Current challenges require the application of micromechanics, computer-assisted visualization tools, thermodynamics, kinetics, and an appreciation of construction processes to solve problems. Civil engineers have adapted and applied multidisciplinary principles to solve problems and have used similar approaches to those used in solid rocket propellants, adhesives, metals, and ceramics.

In our materials research program, we interact with and share the resources of the Texas Engineering Experiment Station, the Texas Transportation Institute, and several university-based national centers of expertise, including the International Center for Aggregates Research, the South Central Superpave Center, and the Center for Asphalt Materials and Chemistry. These centers offer the opportunity to provide funding for outstanding students and to demonstrate the application of engineering principles and research on a field scale.
Faculty Members
Administration

Interim Department Head: John Niedzwecki
Assoc. Dept. Heads: Jose Roesset, Roger Smith
Division Head: Gene Hawkins

Materials Engineering Faculty

<table>
<thead>
<tr>
<th>Name</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epps, Martin, Amy</td>
<td>979-862-1750</td>
<td><a href="mailto:a-eppsmartin@tamu.edu">a-eppsmartin@tamu.edu</a></td>
</tr>
<tr>
<td>Gharabeh, Nasir</td>
<td>979-845-3362</td>
<td><a href="mailto:ngharaibeh@civil.tamu.edu">ngharaibeh@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Grasley, Zachary</td>
<td>979-845-9961</td>
<td><a href="mailto:zgrasley@civil.tamu.edu">zgrasley@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Little, Dallas</td>
<td>979-845-9847</td>
<td><a href="mailto:d-little@tamu.edu">d-little@tamu.edu</a></td>
</tr>
<tr>
<td>Lytton, Robert</td>
<td>979-845-9964</td>
<td><a href="mailto:r-lytton@civil.tamu.edu">r-lytton@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Masad, Eyad</td>
<td>979-845-8308</td>
<td><a href="mailto:emasad@civil.tamu.edu">emasad@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Smith, Roger</td>
<td>979-845-0875</td>
<td><a href="mailto:roger-smith@tamu.edu">roger-smith@tamu.edu</a></td>
</tr>
<tr>
<td>Zollinger, Dan</td>
<td>979-845-9918</td>
<td><a href="mailto:d-zollinger@tamu.edu">d-zollinger@tamu.edu</a></td>
</tr>
</tbody>
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Degree Programs
Degree of Master of Engineering

The Master of Engineering (M.E.) degree requires 30 credit hours of coursework. This non-thesis degree also requires a professional report whose content is determined by the advisory committee. This report can include results of research conducted by the student, or it can be a report written for a specific course or as part of CVEN/OCEN 685 - Directed Studies. You must provide a minimum of 2 weeks for the review of the report and for the form to be signed. It is your responsibility to ensure enough time is provided in order to meet the deadlines by the university's Office of Graduate Studies (http://ogs.tamu.edu). In addition to fulfilling the University requirements for the Master of Engineering (M.E.) degree, a student enrolled in the Civil Engineering graduate program in the area of Materials Engineering must satisfy the following department requirements:

Advising Committee

Degree Plan: An advisory committee must be formed and a Degree Plan must be submitted and approved by the advisory committee by the end of the first semester of study.

Coursework

- No more than 3 hours of CVEN 685 (within the 6 hours allowed for CVEN 684 / CVEN 685).
- No more than 3 hours of CVEN 685 (within the 6 hours allowed for CVEN 684 / CVEN 685).
- A minimum of 15 hours must be CVEN/OCEN/MEMA coursework (exclusive of CVEN 681, CVEN 684, and CVEN 685).
- A minimum of 24\(^1\) hours must be taken from course offerings of the following colleges: Engineering\(^2\), Geosciences, and Science.
- A maximum of 9 hours of advanced undergraduate coursework (must be 400-level if CVEN/OCEN/MEMA courses).
- A minimum of 18 hours of graduate level coursework taken at Texas A&M University (excluding CVEN 684 and CVEN 685).
- The combination of CVEN 684, CVEN 685, transfer credit, and permissible undergraduate coursework may not exceed the greater of 12 hours or one-third (1/3) of the total hours on the degree plan.

---

\(^1\) 3 of these 24 hours may be outside of colleges of Engineering, Geosciences, and Science if selected from a list of courses approved by the student’s specialty area as outlined by the specialty area’s documented course work requirements.

\(^2\) Certain courses within the College of Engineering are prohibited from use on the degree plan unless written justification is made by the student’s advisor and approved by the Departmental Graduate Advisor prior to enrolling in the course. Please see Departmental Graduate Advisor for listing of prohibited courses.
And the following area requirements and/or recommendations:

- **Required Coursework:** CVEN 681 Seminar in Materials and 3 of following 4 Courses:
  - CVEN 622 Properties of Concrete
  - CVEN 653 Bituminous Materials
  - CVEN 615 Structural Design of Pavements
  - CVEN 616 Systems Design of Pavements
- **Recommended Coursework:**
  - CVEN 624 Infrastructure Engineering
  - CVEN 614 Stabilization of Soil-Aggregate Systems
  - CVEN 637 Rigid Pavement Analysis and Design
  - CVEN 613 Micromechanics of Civil Materials
  - CVEN 689 Aggregates in Civil Engineering
  - CVEN 689 Advanced Constitutive Properties of Cementitious Materials
  - STAT 601 Statistical Analysis
  - STAT 602 Statistical Methods of Regression Analysis

Relevant CVEN, MEMA, and other Graduate Courses per recommendations of the advisory committee and department requirements

- **Completion of Professional Report:** A draft Professional Report must be submitted to the advisory committee chair at least 2 weeks (10 working days) prior to revision and subsequent submittal to other members of advisory committee. These other members of the advisory committee will be provided at least 2 weeks (10 working days) to review the revised draft Professional Report prior to the Final Presentation. Thus, the draft Professional Report must be submitted to the advisory committee chair at least 4 weeks (20 working days) prior to the Final Presentation.

- **Final Presentation:** A Final Presentation consisting of an oral examination will be scheduled with all of the advisory committee members. At this examination, the student will give a presentation of the content of the Professional Report completed for the degree.

---

3 All coursework should be discussed with advisory committee chair before enrolling in course. All coursework must be consistent with the student’s chosen field of study and commensurate with graduate study.
Degree of Master of Science

A minimum of 32 semester credit hours of approved courses is required for the Master of Science degree (MS). At least 25 semester credit hours must be coursework. The university places limitations on these credit hours in addition to the requirements of the structural engineering program that are listed below. A complete discussion of all university requirements is found in the current Texas A&M University Graduate Catalog (available on the Internet at http://www.tamu.edu/admissions/catalogs/) under the heading “The Degree of Master of Engineering” For example, university requirements include a final examination and submission of a thesis to the university.

A. Degree Plan

The student must identify their research supervisor before the start of their second semester of study, at which point an advisory committee will be formed. The student’s advisory committee, in consultation with the student, will develop the proposed degree plan. The proposed degree plan must be typed on the official form as it appears on the Internet at http://ogs.tamu.edu/ and submitted electronically to your graduate advisor and advisory committee for their electronic endorsement. The office of graduate studies blocks students from further registration if a degree plan is not filed before the end of their second semester of study. If you are blocked, you are not considered a full-time student and become ineligible to receive any assistantship.

B. Research Proposal

A draft Research Proposal must be submitted to the advisory committee chair at least 2 weeks (10 working days) prior to revision and subsequent submittal to other members of advisory committee. These other members of the advisory committee will be provided at least 2 weeks (10 working days) to review the revised draft Research Proposal prior to the end of the second semester of study. Thus, the draft Research Proposal must be submitted to the advisory committee chair at least 4 weeks (20 working days) prior to the end of the second semester of study.

C. Completion of Thesis

A draft Thesis must be submitted to the advisory committee chair at least 2 weeks (10 working days) prior to revision and subsequent submittal to other members of advisory committee. These other members of the advisory committee will be provided at least 2 weeks (10 working days) to review the revised draft Thesis prior to the Final Defense. Thus, the draft Thesis must be submitted to the advisory committee chair at least 4 weeks (20 working days) prior to the Final Defense.

D. Final Defense

A Final Defense consisting of an oral examination will be scheduled with all of the advisory committee members. At this examination, the student will give a presentation of the research work completed for the degree and documented in the Thesis.
E. Required Coursework (18 semester credit hours):
In addition to fulfilling the University and requirements for the Master of Science (M.S.) degree, a student enrolled in the Civil Engineering graduate program in the area of Materials Engineering must satisfy the following department requirements:

- A minimum of 15 hours must be CVEN/OCEN/MEMA coursework (exclusive of CVEN 681 and CVEN 691).
- A minimum of 24 hours must be taken from course offerings of the following colleges: Engineering, Geosciences, and Science.
- A maximum of 9 hours of advanced undergraduate coursework (must be 400-level if CVEN/OCEN/MEMA courses).
- A minimum of 18 hours of graduate level coursework taken at Texas A&M University (excluding CVEN 691).
- A maximum of 7 hours of CVEN 691 or combination of CVEN 691 and CVEN 685.
- The combination of CVEN 691, CVEN 685, transfer credit, and permissible undergraduate coursework may not exceed the greater of 12 hours or one-third (1/3) of the total hours on the degree plan.

And the following area requirements and/or recommendations:

CVEN 681 Seminar in Materials and 3 of following 4 Courses:

- CVEN 622 Properties of Concrete
- CVEN 653 Bituminous Materials

3 of these 24 hours may be outside of colleges of Engineering, Geosciences, and Science if selected from a list of courses approved by the student's specialty area as outlined by the specialty area's documented course work requirements.

Certain courses within the College of Engineering are prohibited from use on the degree plan unless written justification is made by the student's advisor and approved by the Departmental Graduate Advisor prior to enrolling in the course. Please see Departmental Graduate Advisor for listing of prohibited courses.

All coursework should be discussed with advisory committee chair before enrolling in course. All coursework must be consistent with the student's chosen field of study and commensurate with graduate study.
• CVEN 615 Structural Design of Pavements
• CVEN 616 Systems Design of Pavements

F. Elective Coursework (14 semester credit hours):
The student’s advisory committee, in consultation with the student, will select a minimum of 14 additional semester credit hours of coursework to complement the overall objectives of the proposed degree plan. A maximum of 7 semester credit hours of CVEN 691 Research can be applied toward this requirement. The following is a list of recommended courses:

• CVEN 624 Infrastructure Engineering
• CVEN 614 Stabilization of Soil-Aggregate Systems
• CVEN 637 Rigid Pavement Analysis and Design
• CVEN 613 Micromechanics of Civil Materials
• CVEN 689 Aggregates in Civil Engineering
• STAT 601 Statistical Analysis
• STAT 602 Statistical Methods of Regression Analysis
• Relevant CVEN, MEMA, and other Graduate Courses per recommendations of the advisory committee and department requirements

Additional graduate level courses are offered throughout the CVEN department (and other departments) and may be used to satisfy the elective coursework requirement \textit{with approval of the student's advisory committee}. Particularly for the MS degree, courses must be chosen so as to complement your research program.
Degree of Doctor of Philosophy

The Doctor of Philosophy (Ph.D.) degree is a research-oriented degree requiring a minimum of 64 semester credit hours of approved courses and research beyond the Master of Science (M.S.) degree [96 credit hours beyond the Bachelor of Science (B.S.) degree]. The university places limitations on these credit hours in addition to the requirements of the Department of Civil Engineering and the Structural Engineering program listed below.

A complete discussion of all university requirements is found in the current Texas A&M University Graduate Catalog (available on the Internet at http://www.tamu.edu/admissions/catalogs/) under the heading "The Degree of Doctor of Philosophy." For example, university requirements include a preliminary examination, a final examination, and submission of a dissertation to the university.

**NOTE:** All documents requiring departmental signatures must be submitted to the Civil Engineering Graduate Office at least one day prior to the Office of Graduate Studies deadline.

A. Departmental Requirements

In addition to fulfilling the University requirements for the Doctor of Philosophy (Ph.D.) degree, a student enrolled in the Civil Engineering graduate program in the area of Structural Engineering must satisfy the following department requirements.

- A minimum of 32 credit hours of graduate level coursework taken through Texas A&M University (a minimum of 24 credit hours if the student already has taken at least another 24 credit hours of graduate coursework for the Master of Science (M.S.) or Master of Engineering (M.E.) degree).

- Remaining coursework requirement can be met by 32 hours of CVEN 691

B. Materials Area Requirements

The student must also satisfy the following area requirements and/or recommendations described below:

- **Qualifying Exam:** During the first semester of study, an oral and written Qualifying Examination will be scheduled with members of the Civil Engineering Materials faculty and a Civil Engineering faculty member outside the Materials area. The exam should be taken within the first two semesters of study. The written exam will be a take-home exam given to the student 1 week prior to the scheduled oral exam (at which time the completed written exam will be due). At the oral examination, the student will give a presentation of research work completed for a previous degree.
• **Degree Plan:** An advisory committee must be formed and a Degree Plan must be submitted and approved by the advisory committee after passing the Qualifying Exam and before course registration during their second semester (Fall or Spring) of study. The proposed degree plan must be typed on the official form as it appears on the Internet at http://ogs.tamu.edu/ with endorsements by the student’s advisory committee.

• **Research Proposal:** As soon as the research project can be outlined in reasonable detail, but no later than the end of the fifth semester (Fall or Spring) of study, the dissertation research proposal should be completed. The Research Proposal shall describe the proposed research, including relevant background information, and clearly demonstrate how this research will make a unique contribution of new knowledge to the student’s area of study. Upon approval of the Research Proposal by the advisory committee chair, the Research Proposal must be submitted to other members of the advisory committee at least 2 weeks (10 working days) prior to the Oral Preliminary Exam.

• **Oral Preliminary Exam:** No later than the end of the fifth semester (Fall or Spring) of study, an Oral Preliminary Examination will be scheduled with members of the advisory committee. At this examination, the student will give a presentation of the Research Proposal. The questions in this exam will cover the written proposal, the Oral Preliminary Exam presentation, and any relevant coursework.

• **Completion of Dissertation:** Upon approval of the Dissertation by the advisory committee chair, the Dissertation will be submitted to the other members of the advisory committee at least 2 weeks (10 working days) prior to the Final Defense.

• **Final Defense:** A Final Defense consisting of an oral examination will be scheduled with all of the advisory committee members. At this examination, the student will give a presentation of the research work completed for the degree and documented in the Dissertation. The student is encouraged to invite other interested individuals to the research presentation.

**C. Required and Recommended Coursework:**
A minimum of 32 credit hours of graduate level coursework taken through Texas A&M University\(^7\) (a minimum of 24 credit hours if the student already has taken at least another 24

\(^7\) Certain courses within the College of Engineering are prohibited from use on the degree plan unless written justification is made by the student's advisor and approved by the Departmental Graduate Advisor.
credit hours of graduate coursework for the Master of Science (M.S.) or Master of Engineering (M.E.) degree. The remaining coursework requirement can be met by 32 hours of CVEN 691.

Required Coursework:

- CVEN 681 Seminar in Materials and 3 of following 4 Courses:
- CVEN 622 Properties of Concrete
- CVEN 653 Bituminous Materials
- CVEN 615 Structural Design of Pavements
- CVEN 616 Systems Design of Pavements
- Equivalent coursework from other institutions will be accepted based on approval of advisory committee.

Recommended Coursework:

- CVEN 624 Infrastructure Engineering
- CVEN 614 Stabilization of Soil-Aggregate Systems
- CVEN 637 Rigid Pavement Analysis and Design
- CVEN 613 Micromechanics of Civil Materials
- CVEN 689 Aggregates in Civil Engineering
- STAT 601 Statistical Analysis
- STAT 602 Statistical Methods of Regression Analysis
- Relevant CVEN, MEMA, and other Graduate Courses per recommendations of the advisory committee and department requirements

prior to enrolling in the course. Please see Departmental Graduate Advisor for listing of prohibited courses.

All coursework should be discussed with advisory committee chair before enrolling in course. All coursework must be consistent with the student's chosen field of study and commensurate with graduate study.
Degree of Doctor of Engineering
The Doctor of Engineering (D.Eng.) degree requires 21 credit hours of professional development coursework, and an internship is required.

This degree program is administered by the College of Engineering through the Department of Civil Engineering. The applicant must first be admitted into the Department’s Ph.D. program and then interviewed by the College’s Admissions Subcommittee. To enter the D.Eng. program, the applicant must have earned an ABET-accredited bachelor’s degree (or equivalent). More information can be found at: http://eapo.tamu.edu/engr/.

NOTE: All documents requiring departmental signatures must be submitted to the Civil Engineering Graduate Office at least one day prior to the Office of Graduate Studies deadline.

A. Materials Area Requirements
- **Qualifying Exam**: During the first semester of study, an oral Qualifying Examination will be scheduled with members of the Civil Engineering Materials faculty and a Civil Engineering faculty member outside the Materials area. The exam should be taken within the first two semesters of study. At this examination, the student will give a presentation of research work completed for a previous degree and questions can cover material addressed in the required coursework for the Materials area.

- **Degree Plan**: An advisory committee must be formed and a Degree Plan must be submitted and approved by the advisory committee after passing the Qualifying Exam and by the end of the fourth semester of study.

- **Written Preliminary Exam**: After completion of the coursework listed on the Degree Plan (with the exception of ENGR 684 Professional Internship), a Written Preliminary Examination will be scheduled with members of the advisory committee. This exam consists of written questions from the advisory committee. Each question should be given over a period of one day, and the exam in total should be given over a period of one week.

- **Oral Preliminary Exam**: After passing the Written Preliminary Exam, an Oral Preliminary Examination will be scheduled with members of the advisory committee. At this examination, the student will give a presentation of the proposed Internship. The questions in this exam will cover the Written Preliminary Exam, the Oral Preliminary Exam presentation, and any relevant coursework.
Completion of Record of Study: A draft Record of Study must be submitted to the advisory committee chair at least 3 weeks (15 working days) prior to revision and subsequent submittal to other members of advisory committee. These other members of the advisory committee will be provided at least 2 weeks (10 working days) to review the revised draft Record of Study prior to the Final Defense. Thus, the draft Record of Study must be submitted to the advisory committee chair at least 5 weeks (35 working days) prior to the Final Defense.

Final Defense: A Final Defense consisting of an oral examination will be scheduled with all of the advisory committee members. At this examination, the student will give a presentation of the Internship experience completed for the degree and documented in the Record of Study.

B. Required and Recommended Coursework:
In addition to fulfilling the University requirements for the Doctor of Engineering (D.Eng.) degree, a student enrolled in the Civil Engineering graduate program in the area of Materials Engineering must satisfy the following requirements and/or recommendations:

Required Coursework:
- CVEN 681 Seminar in Materials
- 3 of following 4 Courses:
  - CVEN 622 Properties of Concrete
  - CVEN 653 Bituminous Materials
  - CVEN 615 Structural Design of Pavements
  - CVEN 616 Systems Design of Pavements
- Equivalent coursework from other institutions will be accepted based on approval of advisory committee.

Recommended Coursework:
- CVEN 624 Infrastructure Engineering
- CVEN 614 Stabilization of Soil-Aggregate Systems
- CVEN 637 Rigid Pavement Analysis and Design
- CVEN 613 Micromechanics of Civil Materials
- CVEN 689 Aggregates in Civil Engineering

All coursework should be discussed with advisory committee chair before enrolling in course. All coursework must be consistent with the student’s chosen field of study and commensurate with graduate study.
- STAT 601 Statistical Analysis
- STAT 602 Statistical Methods of Regression Analysis
- Relevant CVEN, MEMA, and other Graduate Courses per recommendations of the advisory committee and department requirements
Graduate Coursework
The following is a table indicating the typical course offering frequency and suggested pre-requisites. Keep in mind that the actual course offering schedule may differ from the table below.

<table>
<thead>
<tr>
<th>Course#</th>
<th>Title</th>
<th>Prerequisites</th>
<th>Typical frequency</th>
<th>Course level</th>
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<tr>
<td>CVEN 613</td>
<td>Micromechanics of Civil Materials</td>
<td>CVEN 615, 616</td>
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<td>Structural Design of Pavements</td>
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<td>Systems Design of Pavements</td>
<td>Graduate classification</td>
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<td>MS</td>
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<td>Properties of Concrete</td>
<td>Graduate classification</td>
<td>Annually</td>
<td>MS</td>
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<td>MS</td>
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<td>Bituminous Materials</td>
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<td>CVEN 681</td>
<td>Seminar in Materials</td>
<td>Graduate classification</td>
<td>Annually</td>
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<td>CVEN 688</td>
<td>Advanced Constitutive Behavior of Cementitious Materials</td>
<td>CVEN 622</td>
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<td>CVEN 689</td>
<td>Constitutive Models for Bituminous Materials</td>
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<td>Alternate years</td>
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<td>CVEN 698</td>
<td>Nondestructive Pavement Evaluation</td>
<td>CVEN 615</td>
<td>Alternate years</td>
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<tr>
<td>CVEN 689</td>
<td>Exp. Microstructural Characterization of Construction Materials</td>
<td>Graduate classification</td>
<td>Irregularly</td>
<td>MS</td>
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</table>
Funding Opportunities
Research Assistantships
Research Assistantship (RA) positions are offered through individual faculty members. There is no centralized list of available positions. You'll need to set-up appointments to meet with them individually. You are strongly recommended to through our department's web site to identify the different research areas each professor is working in before meeting with them.

Teaching Assistantships
New students are automatically considered for the small number of available positions based on their graduate application package. For all other students, a call for those interested in TA positions for future semesters will typically occur around the 10th week of the semester. Please wait for the email announcement and/or posted fliers announcing that TA applications.

If you are an international student, you must have satisfactorily passed the ELPE exam before being considered for a TA position.

Fellowships
Fellowships are typically awarded to incoming students, and there is no formal application process. Any request for fellowships must come from your research advisor, who is recommending you for this award, to Dr. John Mander, who coordinates those awards for our division.

Tuition Waivers & In-state Tuition
Tuition waivers do not exist by themselves – Research and Teaching Assistantship positions will include coverage of your tuition. Additionally, you can qualify for in-state tuition if you were awarded a Fellowship.

Other job opportunities
The faculty and graduate advisors do not coordinate nor know of any student worker positions in the department. If you are interested or need to pursue job opportunities beyond the TA/RA positions, you may want to look at: http://jobforaggies.com.
Additional Information
Full-Time Enrollment
Required credit hours to be certified as a full-time are:

- Fall and Spring semesters: 9 hours
- 10-week summer semester: 6 hours

Graduate students may be certified as full time with fewer than the required hours under special circumstances, including:

- During their final semester before graduation;
- Presence of a documented disability that mandates a reduced course load

These exceptions may or may not apply to a student's eligibility for certain types of financial aid. Students who have questions about how exceptions to the full time enrollment requirements will affect their scholarships, loans, grants, etc., should confer with their financial aid counselor.

In most cases, international students are eligible for the same exceptions to full time requirements; however, all international students requesting an exception to full time requirements must have their request approved by International Student Services. Students who are not U.S. citizens, but who are permanent U.S. residents (VISA TYPE = IM) are not required to clear with ISS on enrollment exceptions.

A student who is enrolled in less than a full-time course of study at Texas A&M may be in jeopardy of:

- being out of compliance with the Bureau of Citizenship and Immigration Services (formerly INS) if enrolled at Texas A&M on a student visa;
- losing their Research or Teaching Assistantship position
- losing insurance coverage under his or her parent/guardian’s insurance policy;
- being placed on a loan repayment schedule by a lender or guarantor if the student is the recipient of Federal financial aid; and/or
- losing a scholarship if the guidelines for receiving the scholarship require full-time enrollment, etc.

Student Offices
Students who will be funded on TTI research projects should contact Pam Kopf (5th floor of CE/TTI bldg) for a desk assignment. Students funded on TEES or other research projects should contact Dr. Amy Epps Martin (5th floor of CE/TTI bldg) for a desk assignment. Teaching assistants should contact the faculty member teaching the course they are assisting in for a desk assignment.
Academic Probation
Graduate students must maintain 3.0 GPR. This requirement includes courses in degree plan as well as all graduate courses taken. If a course is repeated, the last grade received will be the one utilized in GPR calculation. If a student's GPR falls below 3.0, the student will need to meet with their graduate advisor to set out a plan to raise GPR to above 3.0 within one semester. Under extenuating circumstances, a second semester may be allowed for the student to raise their GPR.

Once a plan has been devised, it will be forwarded to the main CE Graduate Office. If the student fails to raise their GPR, they will be removed from the structural engineering graduate program.
Frequently Asked Questions
Degree Plans

1. **What is the difference between the MS and MENG degree?**
   - MENG (Master of Engineering) - non-thesis option requiring 30 hours of graduate credit
   - MS (Master of Science) - thesis option requiring 32 hours of graduate credit

   Accordingly, the MS degree is more research oriented and MENG is more course oriented and geared towards professional practice.

2. **I have taken a graduate level course in which I got a C. This course is already present on my degree plan. Can I keep the course on the degree plan?**

   Yes. The requirement for graduate students is to maintain a GPA of 3.0 on the degree plan. The intent of the degree plan is to identify the appropriate course of study for your chosen degree as determined by your advisor. Once the courses have been chosen and placed on an approved degree plan, it is the student's responsibility to maintain a 3.0.

   It is NOT the intent of the degree plan to allow students to take courses and then, after taking the courses and receiving a grade, to choose whether or not the courses are to be included in the degree plan. A student is NOT to choose only those courses for inclusion in the degree plan for which he/she may receive grades of A or B!

3. **Can I change the courses on my degree plan once it is filed?**

   Yes, the student can change the courses by filing a Petition. The Petition must be signed by ALL committee members AND the department head. The Petition must subsequently be filed with the Office of Graduate Studies (OGS) and approved.

4. **Can I change my degree status once I’ve been admitted?**

   Yes, once admitted to graduate school, a student may file a Petition to change a degree status. The Petition must be signed by the department head and then filed with the Office of Graduate Studies (OGS) and approved. International students must check with the International Student Services Office to maintain legal status.

5. **Can I change my degree status once a degree plan is filed?**

   Yes, the student must file a Petition that is available electronically through the Office of Graduate Studies (OGS) website. The Petition will include any changes needed to the degree plan. The Petition must be signed by ALL committee members AND the department head.
The Petition must subsequently be filed with the Office of Graduate Studies (OGS) and approved.

6. Are leveling courses to be included in the degree plan even though they cannot be counted towards the required number of credits?

Leveling courses should be listed at the bottom of the degree plan as prerequisites.

7. When should I file the degree plan?

MENG degree: students should file within one month of starting their graduate coursework.

PhD and MS students: students must file before preregistration of the second semester, summer semester excluded.

Keep in mind: the Office of Graduate Studies will block you from registration after completing 9 hours of graduate courses. If you do not register, you run the risk of losing your full-time student status.

Assistantships

1. There are two different types of courses for the summer, 5-week courses and 10-week courses? How can I register to satisfy the full-time status for my RA/TA?

To be considered a full-time student for the Summer, a student must register for a minimum of 6 credit hours in one of the following ways:

- 6 credit hours during the 10-week summer term OR
- 3 credit hours during each 5-week summer term

To hold an assistantship for the Spring and Fall semesters, the student needs to register for a minimum of 9 hours in order to be considered full-time.

No other combinations are allowed.

2. How do I apply for a Teaching Assistant (GAT) position?

All new students are automatically considered for a Graduate Teaching Assistantship. About the 10th week of the fall and spring semesters, applications become available to structural engineering graduate students. In order to apply for a TA, complete the application and return it to the listed contact person.

3. How do I apply for a Research Assistant (RA) position?
In order to apply for a RA, a student must contact the professors in structural engineering. The individual professors handle funding and will be able to inform students about openings for research positions.

4. I am a foreign student and English is my second language. Can I apply for a TA? What is the requirement?

International students whose native language is not English and who wish to apply for a TA position must fulfill an English proficiency requirement. The English Proficiency Certification is required before a graduate student is eligible to apply to serve as a TA or in any other position considered to be a teaching position.

It is best to meet this proficiency requirement early in a student’s program. Contact the International Admissions Office at 409-845-1071 to arrange a test.

Probation

1. What is the criteria on probation?

Graduate students are expected to maintain a Grade Point Ratio (GPR) equal to or better than 3.0 throughout the duration of their graduate study. This requirement applies to each of cumulative, degree plan, and semester GPR. It is also a prerequisite for receiving a graduate degree in civil engineering.

2. What happens after one semester on probation if my GPR is not back up to 3.0?

When a student’s GPR (either cumulative, degree plan or semester) falls below 3.0, the student is placed on probation by the department. Notifications are made by letter to the student, the advisor, and other pertinent offices within the university. The student must then meet with their graduate advisor and determine a plan to bring their GPR up to a 3.0 within one semester.

3. What if the GPR requirement is satisfied after one semester, but falls again below 3.0 in another semester?

If after one semester on probation a student’s cumulative or degree plan GPR is not back up to 3.0, the Office of Graduate Studies will be asked to remove the student from the graduate studies program. If extenuating circumstances exist, probation time may be extended for one more semester, allowing the student a final chance to meet the minimum GPR requirement.

4. I took a course in which I got an I for incomplete. After one semester, it becomes an F. Now I am on probation. What can I do to change the F back to a better grade?
The student must complete the course work for which an I was received by submitting it to the professor. The professor will then submit a grade change form. This change may or may not change the student's GPR, depending on the final grade received. The student will remain on probation until the registrar has changed the grade in the system.

5. **Does I (incomplete) in 691 (research) 684 (professional internship), or 692 (Professional study) become an F after one semester?**

   No, these courses are excluded from that rule.

6. **Does an I (incomplete) of 685 (problems) become an F after one semester?**

   Yes, if you receive an F in 685, it will turn to an F after one semester. The course 685 is a letter grade course and therefore is not excluded from the rule.
Water Resources Engineering
Graduate Student Handbook

Zachry Department of Civil Engineering

2009-2010
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Overview
Program Overview

Water resources engineering has its roots in the tasks of supplying water for human use, removing water when humans are finished using it, and developing methods of avoiding damage from excess water (floods). Much of the work of water resource engineers involves the planning and management of constructed facilities that address these tasks. Positions for undergraduates and graduates who specialize in water resources engineering can be found in both engineering consulting firms and in government entities charged with supplying water or dealing with its hazards.

We offer a range of courses that address the training of a water resources engineer. At the undergraduate level, we offer a general water resources junior-level course that most undergraduates take for a basic knowledge of water resources. Our senior-level electives cover hydrology, hydraulics, and storm water management, and feature extensive use of computer programs used in engineering practice.

At the graduate level, we again offer core courses in hydrology and hydraulics, and more specialized courses in areas such as groundwater, water resources planning and management, GIS applications to water resources, and stochastic hydrology.

Research areas of our faculty include:

- Application of GIS technology to hydrologic modeling
- Water Rights Allocation modeling and decision support system
- Groundwater contaminant transport
- Irrigation planning optimization
- Water supply system safety
- Stochastic hydrology
- Evaporation, and hydrometeorology
Faculty Members

Administration

Interim Department Head: John Niedzwiecki
Assoc. Dept. Heads: Jose Roesset, Roger Smith
Division Head: Francisco Olivera

Water Resources Engineering Faculty

<table>
<thead>
<tr>
<th>Name</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brumbelow, Kelly</td>
<td>979-458-2678</td>
<td><a href="mailto:kbrumbelow@civil.tamu.edu">kbrumbelow@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Cahill, Anthony</td>
<td>979-862-3858</td>
<td><a href="mailto:tcahill@civil.tamu.edu">tcahill@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Chinn, Timothy</td>
<td>979-845-3011</td>
<td><a href="mailto:tchinn@civil.tamu.edu">tchinn@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Miller, Gretchen</td>
<td>979-862-2581</td>
<td><a href="mailto:gmiller@civil.tamu.edu">gmiller@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Olivera, Francisco</td>
<td>979-845-1404</td>
<td><a href="mailto:folivera@civil.tamu.edu">folivera@civil.tamu.edu</a></td>
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<td>Singh, Vijay P.</td>
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<td><a href="mailto:vsingh@tamu.edu">vsingh@tamu.edu</a></td>
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<tr>
<td>Zechman, Emily</td>
<td>979-845-2875</td>
<td><a href="mailto:ezechman@civil.tamu.edu">ezechman@civil.tamu.edu</a></td>
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Degree Programs
Degree of Master of Engineering

The Master of Engineering (M.E.) degree requires 30 credit hours of coursework. This non-thesis degree also requires a professional report whose content is determined by the advisory committee. This report can include results of research conducted by the student, or it can be a report written for a specific course or as part of CVEN/OCEN 685 - Directed Studies.

NOTE: All documents requiring departmental signatures must be submitted to the Civil Engineering Graduate Office at least one day prior to the Office of Graduate Studies deadline.

In addition to fulfilling the University requirements for the Master of Engineering (M.E.) degree, a student enrolled in the Civil Engineering graduate program in the area of Water Resources Engineering must satisfy the following department requirements:

• No more than 3 hours of CVEN 685 (within the 6 hours allowed for CVEN 684 / CVEN 685).

• A minimum of 15 hours must be CVEN/OCEN/MEMA coursework (exclusive of CVEN 681, CVEN 684, and CVEN 685).

• A minimum of 241 hours must be taken from course offerings of the following colleges: Engineering2 Geosciences, and Science.

• A maximum of 9 hours of advanced undergraduate coursework (must be 400-level if CVEN/OCEN/MEMA courses).

• A minimum of 18 hours of graduate level coursework taken at Texas A&M University (excluding CVEN 684 and CVEN 685).

• The combination of CVEN 684, CVEN 685, transfer credit, and permissible undergraduate coursework may not exceed the greater of 12 hours or one-third (1/3) of the total hours on the degree plan.
The following area requirements and/or recommendations:

- **Recommended Coursework:**
  - CVEN 423 Geomatics for Civil Engineers
  - CVEN 455 Urban Stormwater Management
  - CVEN 458 Hydraulic Engineering
  - CVEN 463 Hydrology
  - CVEN 627 Engineering Surface Water Hydrology
  - CVEN 628 Advanced Hydraulic Engineering
  - CVEN 658 Civil Engineering Applications of GIS
  - CVEN 664 Water Resources Engineering Planning and Management
  - CVEN 665 Water Resources Systems
  - CVEN 673 Transport Phenomena in Porous Media
  - CVEN 674 Groundwater Engineering
  - CVEN 675 Stochastic Hydrology
  - CVEN 681 Seminar in Environmental and Water Resources Engineering

Relevant CVEN, OCEN, MEMA, and other Graduate Courses per recommendations of the advisory committee and department requirements

- **Degree Plan:** An advisory committee must be formed and a Degree Plan must be submitted and approved by the advisory committee by the end of the first semester of study.

- **Completion of Professional Report:** A draft Professional Report must be submitted to the advisory committee chair at least 2 weeks (10 working days) prior to revision and subsequent submittal to other members of advisory committee. These other members of the
advisory committee will be provided at least 2 weeks (10 working days) to review the revised draft Professional Report prior to the Final Presentation. Thus, the draft Professional Report must be submitted to the advisory committee chair at least 4 weeks (20 working days) prior to the Final Presentation.

- Final Presentation: A Final Presentation consisting of an oral examination will be scheduled with all of the advisory committee members. At this examination, the student will give a presentation of the content of the Professional Report completed for the degree.

1. 3 of these 24 hours may be outside of colleges of Engineering, Geosciences, and Science if selected from a list of courses approved by the student’s specialty area as outlined by the specialty area’s documented course work requirements.

2. Certain courses within the College of Engineering are prohibited from use on the degree plan unless written justification is made by the student’s advisor and approved by the Departmental Graduate Advisor prior to enrolling in the course. Please see Departmental Graduate Advisor for listing of prohibited courses.

3. All coursework should be discussed with advisory committee chair before enrolling in course. All coursework must be consistent with the student’s chosen field of study and commensurate with graduate study.
Degree of Master of Science

The Master of Science (M.S.) degree requires 32 credit hours of approved courses and research. At least 25 credit hours must be coursework, and a thesis.

NOTE: All documents requiring departmental signatures must be submitted to the Civil Engineering Graduate Office at least one day prior to the Office of Graduate Studies deadline.

In addition to fulfilling the University and requirements for the Master of Science (M.S.) degree, a student enrolled in the Civil Engineering graduate program in the area of Water Resources Engineering must satisfy the following department requirements:

- A minimum of 15 hours must be CVEN/OCEN/MEMA coursework (exclusive of CVEN 681 and CVEN 691).
- A minimum of 241 hours must be taken from course offerings of the following colleges: Engineering, Geosciences, and Science.
- A maximum of 9 hours of advanced undergraduate coursework (must be 400-level if CVEN/OCEN/MEMA courses).
- A minimum of 18 hours of graduate level coursework taken at Texas A&M University (excluding CVEN 691).
- A maximum of 7 hours of CVEN 691 or combination of CVEN 691 and CVEN 685.
- The combination of CVEN 691, CVEN 685, transfer credit, and permissible undergraduate coursework may not exceed the greater of 12 hours or one-third (1/3) of the total hours on the degree plan.

The following area requirements and/or recommendations:

- Recommended Coursework:
  CVEN 423 Geomatics for Civil Engineers
  CVEN 423 Geomatics for Civil Engineers
  CVEN 455 Urban Stormwater Management
  CVEN 458 Hydraulic Engineering
  CVEN 463 Hydrology
  CVEN 627 Engineering Surface Water Hydrology
CVEN 628 Advanced Hydraulic Engineering
CVEN 658 Civil Engineering Applications of GIS
CVEN 664 Water Resources Engineering Planning and Management
CVEN 665 Water Resources Systems
CVEN 673 Transport Phenomena in Porous Media
CVEN 674 Groundwater Engineering
CVEN 675 Stochastic Hydrology
CVEN 681 Seminar in Environmental and Water Resources Engineering

Relevant CVEN, OCEN, MEMA, and other Graduate Courses per recommendations of the advisory committee and department requirements

- Degree Plan: An advisory committee must be formed and a Degree Plan must be submitted and approved by the advisory committee by the end of the first semester of study.

- Research Proposal: A draft Research Proposal must be submitted to the advisory committee chair at least 2 weeks (10 working days) prior to revision and subsequent submittal to other members of advisory committee. These other members of the advisory committee will be provided at least 2 weeks (10 working days) to review the revised draft Research Proposal prior to the end of the second semester of study. Thus, the draft Research Proposal must be submitted to the advisory committee chair at least 4 weeks (20 working days) prior to end of the second semester of study.

- Completion of Thesis: A draft Thesis must be submitted to the advisory committee chair at least 2 weeks (10 working days) prior to revision and subsequent submittal to other members of advisory committee. These other members of the advisory committee will be provided at least 2 weeks (10 working days) to review the revised draft Thesis prior to the Final Defense. Thus, the draft Thesis must be submitted to the advisory committee chair at least 4 weeks (20 working days) prior to the Final Defense.

- Final Defense: A Final Defense consisting of an oral examination will be scheduled with all of the advisory committee members. At this examination, the student will give a presentation of the research work completed for the degree and documented in the Thesis.
1. 3 of these 24 hours may be outside of colleges of Engineering, Geosciences, and Science if selected from a list of courses approved by the student’s specialty area as outlined by the specialty area’s documented course work requirements.
2. Certain courses within the College of Engineering are prohibited from use on the degree plan unless written justification is made by the student’s advisor and approved by the Departmental Graduate Advisor prior to enrolling in the course. Please see Departmental Graduate Advisor for listing of prohibited courses.
3. All coursework should be discussed with advisory committee chair before enrolling in course. All coursework must be consistent with the student’s chosen field of study and commensurate with graduate study.
Doctor of Philosophy

The Doctor of Philosophy (Ph.D.) degree requires 64 credit hours of approved courses and research beyond the Master of Science (M.S.) degree [96 credit hours beyond the Bachelor of Science (B.S.) degree], and a dissertation.

NOTE: All documents requiring departmental signatures must be submitted to the Civil Engineering Graduate Office at least one day prior to the Office of Graduate Studies deadline.

In addition to fulfilling the University requirements for the Doctor of Philosophy (Ph.D.) degree, a student enrolled in the Civil Engineering graduate program in the area of Water Resources Engineering must satisfy the following department requirements:

- A minimum of 32 credit hours of graduate level coursework taken through Texas A&M University1 (a minimum of 24 credit hours if the student already has taken at least another 24 credit hours of graduate course work for the Master of Science (M.S.) or Master of Engineering (M.E.) degree)
- Remaining coursework requirement can be met by 32 hours of CVEN 691

The following area requirements and/or recommendations2:

- Recommended Coursework:
  CVEN 423 Geomatics for Civil Engineers
  CVEN 423 Geomatics for Civil Engineers
  CVEN 455 Urban Stormwater Management
  CVEN 458 Hydraulic Engineering
  CVEN 463 Hydrology
  CVEN 627 Engineering Surface Water Hydrology
  CVEN 628 Advanced Hydraulic Engineering
  CVEN 658 Civil Engineering Applications of GIS
  CVEN 664 Water Resources Engineering Planning and Management
  CVEN 665 Water Resources Systems
  CVEN 673 Transport Phenomena in Porous Media
  CVEN 674 Groundwater Engineering
  CVEN 675 Stochastic Hydrology
  CVEN 681 Seminar in Environmental and Water Resources Engineering

Relevant CVEN, OCEN, MEMA, and other Graduate Courses per recommendations of the advisory committee and department requirements
• Qualifying Exam: During the first semester of study, an oral Qualifying Exam will be scheduled with members of the Civil Engineering Water Resources faculty and a Civil Engineering faculty member outside the Water Resources area. The exam should be taken within the first two semesters of study. At this examination, the student will give a presentation of research work completed for a previous degree and questions can cover material addressed in the required coursework for the Water Resources area.

• Degree Plan: An advisory committee must be formed and a Degree Plan must be submitted and approved by the advisory committee after passing the Qualifying Exam and by the end of the fourth semester of study.

• Written Preliminary Exam: After completion of the coursework listed on the Degree Plan (with the exception of CVEN 691 Research), a Written Preliminary Exam will be scheduled with members of the advisory committee. This exam consists of written questions from the advisory committee. Each question should be given over a period of one day, and the exam in total should be given over a period of one week.

• Research Proposal: A draft Research Proposal must be submitted to the advisory committee chair at least 2 weeks (10 working days) prior to revision and subsequent submittal to other members of the advisory committee. These other members of the advisory committee will be provided at least 2 weeks (10 working days) prior to the Oral Preliminary Exam to review the revised draft Research Proposal. Thus, the draft Research Proposal must be submitted to the advisory committee chair at least 4 weeks (20 working days) prior to the Oral Preliminary Exam.

• Oral Preliminary Exam: After passing the Written Preliminary Exam, an Oral Preliminary Exam will be scheduled with members of the advisory committee. At this examination, the student will give a presentation of the Research Proposal. The questions in this exam will cover the Written Preliminary Exam, the Oral Preliminary Exam presentation, and any relevant coursework.

• Completion of Dissertation: A draft Dissertation must be submitted to the advisory committee chair at least 3 weeks (15 working days) prior to revision and subsequent submittal to other members of advisory committee. These other members of the advisory committee will be provided at least 2 weeks (10 working days) to review the revised draft Dissertation prior to the Final Defense. Thus, the draft Dissertation must be submitted to the advisory committee chair at least 5 weeks (35 working days) prior to the Final Defense.

• Final Defense: A Final Defense consisting of an oral examination will be scheduled with all of the advisory committee members. At this examination, the student will give a presentation of the research work completed for the degree and documented in the Dissertation.
1 Certain courses within the College of Engineering are prohibited from use on the degree plan unless written justification is made by the student’s advisor and approved by the Departmental Graduate Advisor prior to enrolling in the course. Please see Departmental Graduate Advisor for listing of prohibited courses.

2 All coursework should be discussed with advisory committee chair before enrolling in course. All coursework must be consistent with the student’s chosen field of study and commensurate with graduate study.
Graduate Coursework
Funding Opportunities
Research Assistantships

Research Assistantship (RA) positions are offered through individual faculty members. There is no centralized list of available positions. You'll need to set-up appointments to meet with them individually. You are strongly recommended to through our department's web site to identify the different research areas each professor is working in before meeting with them.

Teaching Assistantships

New students are automatically considered for the small number of available positions based on their graduate application package. For all other students, a call for those interested in TA positions for future semesters will typically occur around the 10th week of the semester. Please wait for the email announcement and/or posted fliers announcing that TA applications.

If you are an international student, you must have satisfactorily passed the ELPE exam before being considered for a TA position.

Fellowships

Fellowships are typically awarded to incoming students, and there is no formal application process. Any request for fellowships must come from your research advisor, who is recommending you for this award, to Dr. Kelly Brumbelow, who coordinates those awards for our group.

Tuition Waivers & In-state Tuition

Tuition waivers do not exist by themselves – Research and Teaching Assistantship positions will include coverage of your tuition. Additionally, you can qualify for in-state tuition if you were awarded a Fellowship.
Additional Information
Full-Time Enrollment

Required credit hours to be certified as a full-time are:

- Fall and Spring semesters: 9 hours
- 10-week summer semester: 6 hours

Graduate students may be certified as full time with fewer than the required hours under special circumstances, including:

- During their final semester before graduation;
- Presence of a documented disability that mandates a reduced course load

These exceptions may or may not apply to a student's eligibility for certain types of financial aid. Students who have questions about how exceptions to the full time enrollment requirements will affect their scholarships, loans, grants, etc., should confer with their financial aid counselor.

In most cases, international students are eligible for the same exceptions to full time requirements; however, all international students requesting an exception to full time requirements must have their request approved by International Student Services. Students who are not U.S. citizens, but who are permanent U.S. residents (VISA TYPE = JH) are not required to clear with ISS on enrollment exceptions.

A student who is enrolled in less than a full-time course of study at Texas A&M may be in jeopardy of:

- being out of compliance with the Bureau of Citizenship and Immigration Services (formerly INS) if enrolled at Texas A&M on a student visa;
- losing their Research or Teaching Assistantship position;
- losing insurance coverage under his or her parent/guardian's insurance policy;
- being placed on a loan repayment schedule by a lender or guarantor if the student is the recipient of Federal financial aid; and/or
- losing a scholarship if the guidelines for receiving the scholarship require full-time enrollment, etc.
Academic Probation

Graduate students must maintain 3.0 GPR. This requirement includes courses in degree plan as well as all graduate courses taken. If a course is repeated, the last grade received will be the one utilized in GPR calculation. If a student's GPR falls below 3.0, the student will need to meet with their graduate advisor to set out a plan to raise GPR to above 3.0 within one semester. Under extenuating circumstances, a second semester may be allowed for the student to raise their GPR.

Once a plan has been devised, it will be forwarded to the main CE Graduate Office. If the student fails to raise their GPR, they will be removed from the structural engineering graduate program.
Frequently Asked Questions
Please see http://ceprofs.tamu.edu/kbrumbelow/GradAdv/ for further information and answers to frequently asked questions.
Transportation Engineering Graduate Student Handbook

Zachry Department of Civil Engineering

2017-2018
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Overview
Program Overview

Transportation Engineers are involved with the safe and efficient movement of both people and goods. They plan, design and maintain all types of transportation facilities, including:

- Highways and streets
- Mass transit systems
- Railroads
- Airfields
- Ports and harbors

Transportation Engineers apply technological knowledge as well as an understanding of the economic, political, and social factors in their projects. They must work directly with urban planners because the quality of a community is directly related to the quality of the transportation system.

Research areas of our faculty include:

Transportation Planning
Traffic Management
Traffic Control
Highway Capacity
Traffic Flow Theory
Intelligent Transportation Systems
Geometric Design
Safety
Transportation Economics
Automated and Connected Vehicles
Transportation Systems Modeling and Design
Transportation Network Optimization
Performance/Risk/Decision Analysis
Scheduling Algorithms
Innovative Transit
Demand Responsive Services
Freight transportation and logistics
WHY PURSUE A GRADUATE DEGREE?

- acquire advanced knowledge in your specific area of interest
- challenging courses that help you gain problem solving and engineering skills
- prepares you for a more challenging, more interesting, and higher paying job
- practice in solving complex problems using many skill sets
- additional post-graduation job opportunities and career advancement opportunities
Faculty Members

Administration

Department Head: Robin Autenrieth
Division Head: Nasir Gharabeh

Transportation Engineering Faculty

<table>
<thead>
<tr>
<th>Name</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burris, Mark</td>
<td>979-845-9875</td>
<td><a href="mailto:mburris@tamu.edu">mburris@tamu.edu</a></td>
</tr>
<tr>
<td>Hawkins, Gene</td>
<td>979-845-9946</td>
<td><a href="mailto:Gene-h@tamu.edu">Gene-h@tamu.edu</a></td>
</tr>
<tr>
<td>Lord, Dominique</td>
<td>979-458-3949</td>
<td><a href="mailto:d-lord@tamu.edu">d-lord@tamu.edu</a></td>
</tr>
<tr>
<td>Quadrifoglio, Luca</td>
<td>979-458-4171</td>
<td><a href="mailto:quadrifo@tamu.edu">quadrifo@tamu.edu</a></td>
</tr>
<tr>
<td>Talebpour, Alireza</td>
<td>979-845-0875</td>
<td><a href="mailto:atalebpour@tamu.edu">atalebpour@tamu.edu</a></td>
</tr>
<tr>
<td>Wang, Bruce</td>
<td>979-845-9901</td>
<td><a href="mailto:bwang@civil.tamu.edu">bwang@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Zhang, Yunlong</td>
<td>979-845-9902</td>
<td><a href="mailto:yzhang@civil.tamu.edu">yzhang@civil.tamu.edu</a></td>
</tr>
</tbody>
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Degree Programs
Degree of Master of Engineering

A minimum of 30 credit hours of approved courses is required for the Master of Engineering degree (M.E.). The university places limitations on these credit hours in addition to the requirements of the Transportation Engineering program that are listed below. A complete discussion of all university requirements is found in the current Texas A&M University Graduate Catalog (available on the Internet at http://www.tamu.edu/admissions/catalogs/) under the heading “The Degree of Master of Engineering.”

A. Advising Committee

An advisor (chair) will be determined during the first semester. The Master of Engineering program in transportation does not require an advising committee.

B. Degree Plan

The degree plan of M.E. students should be prepared in consultation with the advisor (chair) and submitted before the end of the student’s second semester otherwise students will be blocked from registration for courses.

C. Courses

Required Courses in Transportation Engineering – M.E. students are required to take all of the following courses for a total of 13 Credit Hours:

- CVEN 617: Traffic Engineering: Characteristics
- CVEN 618: Traffic Engineering: Operations
- CVEN 635: Street and Highway Design (CVEN 766 may be taken in place of CVEN 635. Students that took CVEN 456 as an undergraduate are required to take CVEN 635)
- CVEN 672: Engineering and Urban Transportation Systems
- CVEN 681: Transportation Seminar (can use only 1 Credit Hour on degree plan)

Optional Courses in Transportation Engineering – M.E. students are required to take two of the following courses for a total of 6 Credit Hours.

- CVEN 454: Urban Planning for Engineers
- CVEN 625: Traffic Engineering: Design
- CVEN 626: Highway Safety
- CVEN 632: Transportation Engineering: Economics
- CVEN 635: Street and Highway Design (If CVEN 635 is taken as a required course, it cannot be taken as an optional course)
- CVEN 696: Urban Traffic Facilities (Stacked with CVEN 457, students that took CVEN 457 as an undergraduate cannot take CVEN 696 for credit)
- CVEN 689: Traffic Flow Theory for Connected and Automated Vehicles
- CVEN 765: Advanced Civil Engineering Systems
- CVEN 766: Highway Design (Stacked with CVEN 456, students that took CVEN 456 as an undergraduate cannot take CVEN 766 for credit. If CVEN 766 is taken as a required course in place of CVEN 635, it cannot be also considered as an optional course)

Courses Outside of Transportation Engineering – M.E. students may take any combination of other courses approved by their committee to satisfy the remaining 11 Credit Hours on their degree plan. Students may consider Optional Courses in Transportation Engineering listed above (and not yet included in their degree plan), other commonly taken courses listed below (Attachment A) and other courses as well.

The degree plan will be developed by the student and their advisor and will include core courses and other courses that are appropriate for that student’s specific interest/area of study within Transportation Engineering.

D. Writing Requirement and Waiver of Final Exam

The University has a writing requirement for all graduate degrees. The M.E. degree requires the preparation and defense of a report, which might be from one of the classes on the degree plan or be the result of CVEN 685: Directed Studies.

At the same time you submit your report, you will schedule the Final Exam, which might also be waived, if your chair agrees.

You must provide a minimum of 2 weeks for the review of the report. It is your responsibility to ensure enough time is provided in order to meet the deadlines by the university's Office of Graduate Studies (http://ogs.tamu.edu/).
Degree of Master of Science

A minimum of 32 credit hours of approved courses is required for the Master of Science degree (MS). At least 25 semester credit hours must be coursework. The university places limitations on these credit hours in addition to the requirements of the Transportation Engineering program that are listed below. A complete discussion of all university requirements is found in the current Texas A&M University Graduate Catalog (available on the Internet at http://www.tamu.edu/admissions/catalogs/) under the heading “The Degree of Master of Sciences”. For example, university requirements include a final examination and submission of a thesis to the university.

A. Advising committee

An advisor (chair) will be determined during the first semester. An advisory committee will have to be formed at the beginning of the second semester.

B. Degree Plan

The student’s advisory committee, in consultation with the student, will develop the proposed degree plan. The proposed degree plan must be typed on the official form as it appears on the Internet at http://ogs.tamu.edu/ and submitted electronically to your graduate advisor and advisory committee for their electronic endorsement. The office of graduate studies blocks students from further registration if a degree plan is not filed before the end of their second semester of study. If you are blocked, you are not considered a full time student and become ineligible to receive any assistantship.

C. Course

Required Courses in Transportation Engineering – MS students are required to take all of the following courses for a total of 13 credit hours:

- CVEN 617: Traffic Engineering: Characteristics
- CVEN 618: Traffic Engineering: Operations
- CVEN 635: Street and Highway Design (CVEN 766 may be taken in place of CVEN 635. Students that took CVEN 456 as an undergraduate are required to take CVEN 635)
- CVEN 672: Engineering and Urban Transportation Systems
- CVEN 681: Transportation Seminar (can use only 1 credit hour on degree plan)
- CVEN 691: Research (4 to 8 credit hours on the degree plan)
Optional Courses in Transportation Engineering – MS students are required to take one of the following courses for a total of 3 credit hours.

- CVEN 454: Urban Planning for Engineers
- CVEN 625: Traffic Engineering: Design
- CVEN 626: Highway Safety
- CVEN 632: Transportation Engineering: Economics
- CVEN 635: Street and Highway Design (If CVEN 635 is taken as a required course, it cannot be taken as an optional course)
- CVEN 689: Traffic Flow Theory for Connected and Automated Vehicles
- CVEN 696: Urban Traffic Facilities (Stacked with CVEN 457, students that took CVEN 457 as an undergraduate cannot take CVEN 696 for credit)
- CVEN 765: Advanced Civil Engineering Systems
- CVEN 766: Highway Design (Stacked with CVEN 456, students that took CVEN 456 as an undergraduate cannot take CVEN 766 for credit. If CVEN 766 is taken as a required course in place of CVEN 635, it cannot be also considered as an optional course)

Courses Outside of Transportation Engineering – M.S. students may take any combination of other courses approved by their committee to satisfy the remaining credit hours on their degree plan. Students may consider Optional Courses in Transportation Engineering listed above (and not yet included in their degree plan), other commonly taken courses listed below (Attachment A) and other courses as well.

D. Thesis Proposal

As soon as the research project can be outlined in reasonable detail, but no later than the end of the 3rd semester of study, the thesis research proposal should be completed. The Research Proposal shall describe the proposed research, including relevant background information, and clearly demonstrate how this research will make a unique contribution of new knowledge to the student’s area of study. Upon approval of the Research Proposal by the advisory committee chair, the Research Proposal must be submitted to other members of the advisory committee at least 2 weeks (10 working days) prior to the Oral defense of the proposal. An oral defense of the proposal can be waived upon approval of the chair and all members of the advising committee.
E. Final Exam

The M.S. degree requires the preparation and oral defense of a thesis. The completed thesis needs to be submitted to all committee members for review at least two weeks before the scheduled oral defense date.
ATTACHMENT A:
Masters Courses Outside of Transportation Engineering

The following courses are commonly taken by Masters students to complete their degree requirements:

- ACCT 640: Accounting Concepts and Procedures I
- CVEN 612: Tools for Highway Materials and Pavement Design (stacked with CVEN 418)
- CVEN 624: Infrastructure Engineering and Management
- CVEN 644: Project Risk Management
- CVEN 658: Civil Engineering Applications of GIS (stacked with CVEN 423)
- CVEN 685: Directed Studies (see catalog restrictions for limits)
- CVEN 699: Engineering Risk Analysis
- CVEN 710: Civil Engineering Project Finance
- ECON 629: Microeconomic Theory I
- FINC 635: Financial Management for Non-Business
- ISEN 430: Human Factors and Ergonomics
- ISEN 613: Engineering Data Analysis
- ISEN 630: Human Operator in Complex Systems
- ISEN 635: Human Information Processing
- MATH (any graduate level math course)
- MGMT 655: Survey of Management
- PLAN 612: Transportation in City Planning
- PLAN 616: Analyzing Risk/Hazard and Public Policy
- PLAN 670: Urban Public Transportation Planning
- PLAN 673: Design for Sustainable Analysis
- PLAN 674: Transportation Systems Analysis
- PLAN 676: Transportation Investment Decisions
- PLAN 678: Applied Transportation Studio: Site Planning and Traffic Impact
- PSAA 611: Public Policy Formation
- STAT 601: Statistical Analysis (4 hour credit)
- STAT 658: Transportation Statistics
Doctor of Philosophy

The Doctor of Philosophy (Ph.D.) degree is a research-oriented degree requiring a minimum of 64 semester credit hours of approved courses and research beyond the Master of Science (M.S.) degree [96 credit hours beyond the Bachelor of Science (B.S.) degree]. The university places limitations on these credit hours in addition to the requirements of the Department of Civil Engineering listed below.

A complete discussion of all university requirements is found in the current Texas A&M University Graduate Catalog (available on the Internet at http://www.tamu.edu/admissions/catalogs/) under the heading “The Degree of Doctor of Philosophy.” For example, university requirements include a preliminary examination, a final examination, and submission of a dissertation to the university.

**NOTE:** All documents requiring departmental signatures must be submitted to the Civil Engineering Graduate Office at least one day prior to the Office of Graduate Studies deadline.

A. Departmental Requirements

In addition to fulfilling the University requirements for the Doctor of Philosophy (Ph.D.) degree, a student enrolled in the Civil Engineering graduate program in the area of Transportation Engineering must satisfy the following department requirements.

- A minimum of 32 credit hours of graduate level coursework taken through Texas A&M University (a minimum of 24 credit hours if the student already has taken at least another 24 credit hours of graduate coursework for the Master of Science (M.S.) or Master of Engineering (M.E.) degree).
- Remaining coursework requirement can be met by 32 hours of CVEN 691

B. Transportation Area Requirements

The student must also satisfy the following area requirements and/or recommendations described below:

- **Qualifying Exam:** A Qualifying Examination will be scheduled with members of the Transportation Engineering faculty. The exam will include both written and oral components. The exam should be taken after the first semester (Fall or Spring) of study. The qualifying exam covers three major areas of Transportation Engineering: operations, planning, and design. English writing will be a separate part. The oral exam is generally scheduled within two weeks of the written exam. The students need to pass both the oral
and written parts. If a student fails the qualifying exam, he or she has to take it again at the end of the following semester. If the student fails again, he or she will have to leave the program.

- **Degree Plan**: An advisory committee must be formed and a Degree Plan must be submitted and approved by the advisory committee after passing the Qualifying Exam. The proposed degree plan must be typed on the official form as it appears on the Internet at http://ogs.tamu.edu/ with endorsements by the student's advisory committee.

- **Written Preliminary Exam**: After completion of the coursework listed on the Degree Plan (with the exception of CVEN 691 Research), but no later than the end of the fifth semester (Fall or Spring) of study, a Written Preliminary Examination will be scheduled with members of the advisory committee. This exam consists of written questions from the advisory committee. The exam in total should be given over a period of one week. The individual committee member decides whether a written exam will be given and whether it will be take-home or in-class, open-book or close-book if an exam is given.

- **Research Proposal**: As soon as the research project can be outlined in reasonable detail, but no later than the end of the fifth semester (Fall or Spring) of study, the dissertation research proposal should be completed. The Research Proposal shall describe the proposed research, including relevant background information, and clearly demonstrate how this research will make a unique contribution of new knowledge to the student's area of study. Upon approval of the Research Proposal by the advisory committee chair, the Research Proposal must be submitted to other members of the advisory committee at least 2 weeks (10 working days) prior to the Oral Preliminary Exam.

- **Oral Preliminary Exam**: After passing the Written Preliminary Exam, but no later than the end of the fifth semester (Fall or Spring) of study, an Oral Preliminary Examination will be scheduled with members of the advisory committee. At this examination, the student will give a presentation of the Research Proposal. The questions in this exam will cover the Written Preliminary Exam, the Oral Preliminary Exam presentation, and any relevant coursework.

- **Completion of Dissertation**: Upon approval of the Dissertation by the advisory committee chair, the Dissertation will be submitted to the other members of the advisory committee at least 2 weeks (10 working days) prior to the Final Defense.

- **Final Defense**: A Final Defense consisting of an oral examination will be scheduled with all of the advisory committee members. At this examination, the student will give a presentation of the research work completed for the degree and documented in the Dissertation. The student is encouraged to invite other interested individuals to the research presentation.
C. Recommended Coursework:

We do not have a fixed list of recommended courses for Ph.D. students as they have all completed core courses for the MS degree and work on specific areas of transportation that require different knowledge. Ph.D. students are encouraged to take the elective courses within the Transportation area and also take courses from other departments that will help them develop and complete dissertation research. The student should work closely with the committee chair for course selection.
Funding Opportunities
The Transportation Engineering Program offers competitive financial packages to graduate students working on research projects through Texas A&M University or the Texas Transportation Institute. The exact level of funding depends on several factors:

1. Doctor of Philosophy (Ph.D.) students earn the most, followed by Master of Science (M.S.) students, with Master of Engineering (M.E. - non-thesis) earning the least. Ph.D. students usually have earned a Master's degree prior to entering the Ph.D. program.

We also award a number of fellowships every year. A fellowship can qualify a student for paying in-state tuition. It can also be added on to a teaching assistant, research assistant, or a TSP offer.

**Tuition and Fees**

The amount of the student's monthly stipend is determined by how the tuition is paid. If the research sponsor allows direct payment of tuition, the student receives the base stipend. If the research sponsor does not allow direct payment of tuition, the student's stipend will be increased to compensate for the difference. Fees are not normally paid for funded graduate students.

**Salary Rates**

Projects beginning Fall 2017 (or later) will include salary rates for students who are Graduate Assistants in Research (GARs) equal to $2K/month + tuition (no paid fees). The GAR position requires that you are enrolled as a full time student making satisfactory progress towards your degree and work 20 hours per week on one of Texas A&M's/TTI's sponsored research projects.

**Health Insurance:**

- available for a very small cost to students.
Research Assistantships

Research Assistantship (RA) positions are offered through individual faculty members and TTI researchers. There is no centralized list of available positions. New students should send their resume to the Transportation Graduate Advisor so that he can work with any TTI researchers looking to hire graduate students.

Teaching Assistantships

New students are automatically considered for the small number of available positions based on their graduate application package. All other students who are qualified should contact the Departmental Graduate Advisor to be considered for TA positions in future semesters.

If you are an international student, you must have satisfactorily passed the ELPE exam and/or TOEFL Oral score (refer to Grad office for specific rules) before being considered for a TA position.

Fellowships

Many of our fellowships are awarded to incoming students and there is no formal application process for this. All incoming students are considered for these fellowships based on your application package. There are several transportation fellowships awarded to current students. Announcements for applications for these fellowships will be sent to students.

Tuition Waivers & In-state Tuition

Tuition waivers do not exist by themselves – Research and Teaching Assistantship positions always include coverage of the out-of-state portion of your tuition. Some Research and Teaching Assistantships cover both the in-state and out-of-state portion of your tuition. Additionally, you can qualify for in-state tuition if you were awarded a Fellowship of $1000 or more.

Other job opportunities

The faculty and graduate advisors do not coordinate nor know of any student worker positions in the department. If you are interested or need to pursue job opportunities beyond the TA/RA positions, you may want to look at: http://jobforaggies.com
IMPORTANT WEBSITES:

1) The Zachry Department of Civil Engineering: http://engineering.tamu.edu/civil

2) The Transportation Group's Website with course and degree information; http://engineering.tamu.edu/civil/academics/degrees/specialty/transportation-engineering

3) Texas Transportation Institute: information on current research; http://tti.tamu.edu/

4) Texas A&M University Institute of Transportation Engineers student chapter: information on student activities; https://maroonlink.tamu.edu/organization/ite
Additional Information
Full-Time Enrollment

Required credit hours to be certified as a full-time are:

- Fall and Spring semesters: 9 hours
- 10-week summer semester: 6 hours

Graduate students may be certified as full time with fewer than the required hours under special circumstances, including:

- During their final semester before graduation;
- Presence of a documented disability that mandates a reduced course load

These exceptions may or may not apply to a student's eligibility for certain types of financial aid. Students who have questions about how exceptions to the full time enrollment requirements will affect their scholarships, loans, grants, etc., should confer with their financial aid counselor.

In most cases, international students are eligible for the same exceptions to full time requirements; however, all international students requesting an exception to full time requirements must have their request approved by International Student Services. Students who are not U.S. citizens, but who are permanent U.S. residents (VISA TYPE = IM) are not required to clear with ISS on enrollment exceptions.

A student who is enrolled in less than a full-time course of study at Texas A&M may be in jeopardy of:

- being out of compliance with the Bureau of Citizenship and Immigration Services (formerly INS) if enrolled at Texas A&M on a student visa;
- losing their Research or Teaching Assistantship position
- losing insurance coverage under his or her parent/guardian's insurance policy;
- being placed on a loan repayment schedule by a lender or guarantor if the student is the recipient of Federal financial aid; and/or
- losing a scholarship if the guidelines for receiving the scholarship require full-time enrollment, etc.
Student Offices

Offices for students who are Teaching Assistants are made through the main CE Graduate Advising Office for Transportation Engineering students. You are responsible for contacting Mr. Chris Grunkemeyer, Ms. Laura Byrd and/or Dr. Yunlong Zhang for a desk assignment.

For students who become involved in research on a TTI or CE project, desk assignment will be made. We currently do not have guaranteed space for unfunded students.

Academic Probation

Graduate students must maintain 3.0 GPR. This requirement includes courses in degree plan as well as all graduate courses taken. If a course is repeated, the last grade received will be the one utilized in GPR calculation. If a student's GPR falls below 3.0, the student will need to meet with their graduate advisor to set out a plan to raise GPR to above 3.0 within one semester. Under extenuating circumstances, a second semester may be allowed for the student to raise their GPR.

Once a plan has been devised, it will be forwarded to the main CE Graduate Office. If the student fails to raise their GPR, they will be removed from the Transportation Engineering graduate program.
Frequently Asked Questions
Degree Plans

1. What is the difference between the MS and ME degree?
   - ME (Master of Engineering) - non-thesis option requiring 30 hours of graduate credit
   - MS (Master of Science) - thesis option requiring 32 hours of graduate credit
   Accordingly, the MS degree is more research oriented and ME is more course oriented and geared towards professional practice.

2. I have taken a graduate level course in which I got a C. This course is already present on my degree plan. Can I keep the course on the degree plan?

   Yes. The requirement for graduate students is to maintain a GPA of 3.0 on the degree plan. The intent of the degree plan is to identify the appropriate course of study for your chosen degree as determined by your advisor. Once the courses have been chosen and placed on an approved degree plan, it is the student’s responsibility to maintain a 3.0.

   It is NOT the intent of the degree plan to allow students to take courses and then, after taking the courses and receiving a grade, to choose whether or not the courses are to be included in the degree plan. A student is NOT to choose only those courses for inclusion in the degree plan for which he/she may receive grades of A or B!

3. Can I change the courses on my degree plan once it is filed?

   Yes, the student can change the courses by filing a Petition. The Petition must be signed by ALL committee members AND the department head. The Petition must subsequently be filed with the Office of Graduate Studies (OGS) and approved.

4. Can I change my degree status once I’ve been admitted?

   Yes, once admitted to graduate school, a student may file a Petition to change a degree status. The Petition must be signed by the department head and then filed with the Office of Graduate Studies (OGS) and approved. International students must check with the International Student Services Office to maintain legal status.

5. Can I change my degree status once a degree plan is filed?

   Yes, the student must file a Petition that is available electronically through the Office of Graduate Studies (OGS) website. The Petition will include any changes needed to the degree plan. The Petition must be signed by ALL committee members AND the department head.
The Petition must subsequently be filed with the Office of Graduate Studies (OGS) and approved.

6. Are leveling courses to be included in the degree plan even though they cannot be counted towards the required number of credits?

Leveling courses should be listed at the bottom of the degree plan as prerequisites.

**Assistantships**

1. There are two different types of courses for the summer, 5-week courses and 10-week courses? How can I register to satisfy the full-time status for my RA/TA?

To be considered a full-time student for the Summer, a student must register for a minimum of 6 credit hours in one of the two following ways:

- 6 credit hours during the 10-week summer term OR
- 3 credit hours during each 5-week summer term

To hold an assistantship for the Spring and Fall semesters, the student needs to register for a minimum of 9 hours in order to be considered full-time.

No other combinations are allowed.

2. How do I apply for a Teaching Assistant (GAT) position?

New students are automatically considered for the small number of available positions based on their graduate application package. All other students who are qualified should contact Dr. Yunlong Zhang to be considered for TA positions in future semesters.

If you are an international student, you must have satisfactorily passed the ELPE exam before being considered for a TA position.

3. How do I apply for a Research Assistant (RA) position?

Research Assistantship (RA) positions are offered through individual faculty members and TTI researchers. There is no centralized list of available positions. New students should send their resume to the Transportation Graduate Advisor so that he can work with any TTI researchers looking to hire graduate students.

4. I am a foreign student and English is my second language. Can I apply for a TA? What is the requirement?
International students whose native language is not English and who wish to apply for a TA position must fulfill an English proficiency requirement. The English Proficiency Certification is required before a graduate student is eligible to apply to serve as a TA or in any other position considered to be a teaching position.

It is best to meet this proficiency requirement early in a student's program. Contact the International Admissions Office to arrange a test.

**Probation**

1. **What is the criteria on probation?**

Graduate students are expected to maintain a Grade Point Ratio (GPR) equal to or better than 3.0 throughout the duration of their graduate study. This requirement applies to each of cumulative, degree plan, and semester GPR. It is also a prerequisite for receiving a graduate degree in Civil Engineering.

2. **What happens after one semester on probation if my GPR is not back up to 3.0?**

When a student's GPR (either cumulative, degree plan or semester) falls below 3.0, the student is placed on probation by the department. Notifications are made by letter to the student, the advisor, and other pertinent offices within the university. The student must then meet with their graduate advisor and determine a plan to bring their GPR up to a 3.0 within one semester.

3. **What if the GPR requirement is satisfied after one semester, but falls again below 3.0 in another semester?**

If after one semester on probation a student's cumulative or degree plan GPR is not back up to 3.0, the Office of Graduate Studies will be asked to remove the student from the graduate studies program. If extenuating circumstances exist, probation time may be extended for one more semester, allowing the student a final chance to meet the minimum GPR requirement.

4. **I took a course in which I got an I for incomplete. After one semester, it becomes an F. Now I am on probation. What can I do to change the F back to a better grade?**

The student must complete the course work for which an I was received by submitting it to the professor. The professor will then submit a grade change form. This change may or may not change the student's GPR, depending on the final grade received. The student will remain on probation until the registrar has changed the grade in the system.
5. Does I (incomplete) in 691 (research) 684 (professional internship), or 692 (Professional study) become an F after one semester?

No, these courses are excluded from that rule.

6. Does an I (incomplete) of 685 (problems) become an F after one semester?

Yes, if you receive an F in 685, it will turn to an F after one semester. The course 685 is a letter grade course and therefore is not excluded from the rule.
Structural Engineering Graduate Student Handbook

Zachry Department of Civil Engineering

2017-2018

Updated: August, 2017
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Overview
Program Overview

Structural engineering is the field of engineering particularly concerned with the design of load-bearing structures. The field crosses engineering disciplines, and structural engineering can be found within civil, mechanical, and aerospace engineering. Within civil engineering, it is largely the implementation of mechanics to the design of the large structures that are fundamental to basic living, such as buildings, bridges, walls, dams, and tunnels.

An experienced engineer would tend to design more complex structures, such as multistory buildings (including skyscrapers) or bridges. It is in the design of these more complex systems that a structural engineer must draw upon creativity in the application of mechanics principles. New structural systems and novel application of materials result from this process, and new technologies, such as control and damage detection systems, are now found in civil engineering structures, where traditionally they were only found in mechanical or aerospace systems. Courses at the graduate level build the basic structural knowledge of the traditional systems and materials of our field and expose students to new technologies and approaches that will become part of standard practice within the career of our students.

Research areas of our faculty include:

- Building, Transportation, & Offshore Structures
- Damage Detection and Assessment
- Engineering Risk Analysis
- Fatigue & Fracture
- Preservation of Historic Structures
- Resilience & Sustainability
- Seismic & Wind Performance
- Smart Materials & Structures
- Structural Reliability
- Vibrations, Sensing & Control
Faculty Members

Administration

Department Head: Robin Autenrieth
Division Head: Stefan Hurlebaus
Assistant Dept. Head – Graduate Programs: Yunlong Zhang

Structural Engineering Faculty

<table>
<thead>
<tr>
<th>Name</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barroso, Luciana</td>
<td>979-845-0290</td>
<td><a href="mailto:lbarroso@civil.tamu.edu">lbarroso@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Birely, Anna</td>
<td>979-862-6603</td>
<td><a href="mailto:abirely@civil.tamu.edu">abirely@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Bracci, Joe</td>
<td>979-845-3750</td>
<td><a href="mailto:bracci@civil.tamu.edu">bracci@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Hueste, Mary Beth</td>
<td>979-845-1940</td>
<td><a href="mailto:mhueste@civil.tamu.edu">mhueste@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Hurlebaus, Stefan</td>
<td>979-845-9570</td>
<td><a href="mailto:shurilebaus@civil.tamu.edu">shurilebaus@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Jones, Harry</td>
<td>979-845-4304</td>
<td><a href="mailto:h-jones@tamu.edu">h-jones@tamu.edu</a></td>
</tr>
<tr>
<td>Keating, Peter</td>
<td>979-845-9969</td>
<td><a href="mailto:keating@civil.tamu.edu">keating@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Koliou, Maria</td>
<td>979-845-4469</td>
<td><a href="mailto:maria.koliou@tamu.edu">maria.koliou@tamu.edu</a></td>
</tr>
<tr>
<td>Lowery, Lee</td>
<td>979-845-4395</td>
<td><a href="mailto:lowery@civil.tamu.edu">lowery@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Mander, John</td>
<td>979-862-8078</td>
<td><a href="mailto:jmander@civil.tamu.edu">jmander@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Niedzwecki, John</td>
<td>979-845-4707</td>
<td><a href="mailto:j-niedzwecki@tamu.edu">j-niedzwecki@tamu.edu</a></td>
</tr>
<tr>
<td>Noshadranv, Arash</td>
<td>979-845-2449</td>
<td><a href="mailto:noshadranv@civil.tamu.edu">noshadranv@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Paal, Stephanie</td>
<td>979-845-4394</td>
<td><a href="mailto:spaal@civil.tamu.edu">spaal@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Sideris, Petros</td>
<td>979-845-2708</td>
<td><a href="mailto:petros.sideris@tamu.edu">petros.sideris@tamu.edu</a></td>
</tr>
<tr>
<td>Yamold, Matthew</td>
<td>979-862-5659</td>
<td><a href="mailto:myamold@civil.tamu.edu">myamold@civil.tamu.edu</a></td>
</tr>
</tbody>
</table>
## Faculty Research Interests

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Research Interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Luciana R. Barroso</td>
<td>Associate Professor</td>
<td>Professor Barroso's research interests include structural health monitoring; structural control using active, passive and semi-active devices for multi-hazard mitigation; linear and nonlinear dynamics of structures; earthquake engineering; finite element modeling; probabilistic hazard analysis; engineering education.</td>
</tr>
<tr>
<td>Dr. Anna Birely</td>
<td>Assistant Professor</td>
<td>Professor Birely's research interests include reinforced concrete structures; earthquake engineering; performance-based design; fire resistance of structures.</td>
</tr>
<tr>
<td>Dr. Joe Bracci</td>
<td>Professor</td>
<td>Professor Bracci's research interests include the behavior, adequacy, preservation, and sustainability of building and bridge infrastructure that are exposed to a variety of slow-forming degrading material mechanisms and also to rapid-forming hazardous environmental loading.</td>
</tr>
<tr>
<td>Dr. Mary Beth Hueste</td>
<td>Professor</td>
<td>Professor Hueste's research interests include earthquake resistant design of reinforced concrete structures, structural rehabilitation and repair including seismic retrofitting, performance-based seismic design, probabilistic assessment of structural performance, and design and evaluation of prestressed concrete bridge structures.</td>
</tr>
<tr>
<td>Dr. Stefan Hurlebaus</td>
<td>Professor</td>
<td>Professor Hurlebaus's research interests include smart structures, structural health monitoring, nondestructive testing, laser ultrasonics, active vibration control, semi-active damping, active vibration isolation, wave propagation in elastic solids, vibrations.</td>
</tr>
</tbody>
</table>
Dr. Harry Jones
Associate Professor

Professor Jones's research interests include structural mechanics; optimization theory; application of operations research methodology to civil engineering systems.

Dr. Peter Keating
Associate Professor

Professor Keating's research interests include fatigue and fracture of welded structures; structural analysis and design; experimental stress analysis.

Dr. Maria Koliou
Assistant Professor

Professor Koliou's research interests include structural dynamics; earthquake engineering; collapse assessment of structural systems; multi-hazard performance-based design; system functionality; community resilience; risk and reliability analysis; experimental methods in structural engineering; seismic performance of electrical substation equipment.

Dr. Lee Lowery
Professor

Professor Lowery's research interests include structural failure analysis; structural design and analysis; offshore and coastal structures; instrumentation and experimental testing; structural foundations; computer programming and engineering applications.

Dr. John Mander
Professor

Professor Mander's research interests include reinforced, pre-stressed and structural concrete; earthquake engineering and structural dynamics; blast resistant design; bridge engineering; hazard analysis and financial loss estimation and mitigation; railroad engineering; construction and design integration.
Dr. John Niedzwiecki
Professor

Professor Niedzwiecki’s research interests include structural dynamics; probabilistic and statistical methods; structural system reliability; multi-hazard design methods including the prediction of lightning interaction with structures, analysis and design of deepwater and coastal structures, green energy systems.

Dr. Arash Noshadravan
Research Assistant Professor

Professor Noshadravan’s research interests include computational and probabilistic mechanics, multiscale modeling of materials, structural mechanics, uncertainty modelling and analysis, risk and reliability analysis, predictive analytics and model reduction, life cycle assessment.

Dr. Stephanie Paal
Assistant Professor

Professor Paal’s research interests include disaster assessment and routine inspection of civil infrastructure, machine vision, structural health monitoring techniques, earthquake engineering and analysis of reinforced concrete structures.

Dr. Petros Sideris
Assistant Professor

Professor Sideris’ research interests include development of damage-resistant bridge systems against seismic and other hazards, accelerated bridge construction, novel materials, performance-based design and assessment of reinforced concrete structures, aging effects, experimental methods and large-scale structural testing, energy harvesting from structural vibrations, numerical methods and software development.
<table>
<thead>
<tr>
<th>Dr. Matthew Yarnold</th>
<th>Assistant Professor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor Yarnold’s research interests include structural steel behavior; bridge engineering; field experimental assessment of structural systems; novel techniques for structural health monitoring.</td>
<td></td>
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</tbody>
</table>
Degree Programs
Degree of Master of Engineering

A minimum of 30 semester credit hours of approved courses is required for the Master of Engineering degree (MEng). The university places limitations on these credit hours in addition to the requirements of the structural engineering program that are listed below. **A key requirement is that approximately 1/3 of the 30 required credit hours of coursework must be taken outside the major area of study, which is structural engineering for our program.** A complete discussion of all university requirements is found in the current Texas A&M University Graduate Catalog under the heading "The Degree of Master of Engineering." (available on the Internet at http://www.tamu.edu/admissions/catalogs/)

A. Advising Committee

The Master of Engineering program for structural engineering has a standard advisory committee with only one departmental member:

- Dr. Joe Bracci (chair);

No external members are required for this degree plan. It is permissible for another faculty member from Structural Engineering Faculty to serve as your committee chair. In that event, unless explicitly waived, Dr. Bracci should be added as a committee member to double check that all requirements for the ME degree are met.

B. Prerequisites

All of the following courses (and their pre- and co-requisite coursework) are considered prerequisite to the MEng program of study in structural engineering: CVEN 302, CVEN 345, CVEN 363, CVEN 444, CVEN 445, CVEN 446, and MATH 308, or equivalents that are approved by the structural engineering program. Courses listed for which a student lacks credit must be completed, but those credits cannot be applied toward the 30 semester credit hour degree requirement. Pre-requisite coursework needs to be completed during your first semester at Texas A&M University, as they are pre-requisites for all our graduate courses.

C. Degree Plan

The degree plan for Master of Engineering Students has a set of common courses, and the elective courses listed are chosen to enhance the overall education for a practicing structural engineer. In order to meet the breadth requirement, 3 courses in the degree plan must be outside the focus area of structural engineering. One of the common required courses already meets this requirement while the other two must come from the elective coursework. Course labeled with (***) in the following sections satisfy this requirement.
The proposed degree plan must be typed on the official form as it appears on the Internet at http://ogs.tamu.edu/ and submitted electronically to your graduate advisor and advisory committee for their electronic endorsement. Master of Engineering students are expected to submit their degree plan within 1 month after the start of their second semester.

1. Required Coursework – 18 hours

1. Engineering Mechanics – 9 semester credit hours
   - CVEN 633 Advanced Mechanics of Materials (typically in Fall) (**)
   - CVEN 657 Dynamic Loads and Structural Behavior (typically in Fall)
   - A course in structural finite element analysis. The recommended course is:
     - CVEN 750 Finite Element Applications in Structural Engineering (typically in Spring).
   - Alternatives are:
     - MEEN 672 Introduction to Finite Element Analysis (typically in Fall).
     - MEMA 646 An Introduction to the Finite Element Method (typically in Spring)

2. Structural Element Behavior and Design – 6 semester credit hours
   You are required to take at least two structural design courses – one from each group listed below. The two courses all ME students should take are indicated with an R. In the case that extreme mitigating circumstances are identified and approved by the committee, the alternate course listed may be taken. The other courses in each group can be also be selected for your degree plan as electives, depending on individual student interest as well as course availability:

   Group 1:
   - CVEN 671 Behavior and Design of Prestressed Concrete Structures (typically in Fall) R
   - CVEN 621 Advanced Reinforced Concrete Design (typically in Spring)

   Group 2:
   - CVEN 659 Behavior and Design of Steel Structures (typically in Spring) R
   - CVEN 670 Behavior and Design of Composite Structures (typically alternate years)

3. Structural System Design – 3 semester credit hours
   - CVEN 754 Structural Design Studio (typically in Spring)

2. Elective Coursework – 12 hours
   The student, in consultation with the advisory committee, will select a minimum of 12 additional semester credit hours of coursework to complement the overall objectives of the
proposed degree plan. A maximum of 3 semester credit hours of CVEN 685 Directed Studies can be applied toward this requirement. Additionally, a minimum of 6 of those hours must be outside of structural engineering (note that they CAN be in other civil engineering disciplines). Course labeled with (***) in the following sections satisfy this requirement.

Note that the electives are broken up into two groups: (1) Targeted Electives, and (2) Open Electives. At least 6 credit hours of your elective coursework must come from courses listed in the Targeted Electives group. The Targeted Elective group includes courses with a strong mathematical, solid mechanics and/or civil engineering structural design content. The remaining 6 credit hours may come from either group of courses. Note that the overall degree plan MUST support a future career in structural engineering and provide a breadth of experience. *It is not appropriate to use all electives in a single secondary area of study.*

1. Targeted (Technical) Elective Courses – minimum of 6 hours

A minimum two of your elective courses must come from courses listed in this group. Courses within our department that fall in this category are:

- CVEN 631 – System Identification and Nondestructive Damage Evaluation (***)
- CVEN 655 – Structural Reliability (***)
- CVEN 656 – Bridge Engineering
- CVEN 662 – Experimental Methods in Civil Engineering
- CVEN 663 – Structural Stability
- CVEN 669 – Design of Structures for Hazardous Environmental Loads
- CVEN 686 – Offshore and Coastal Structures
- CVEN 751 – Advanced Dynamics and Structural Control
- CVEN 752 – Smart Structures
- CVEN 648 – Advanced Numerical Methods in Geotechnical Engineering (***)
- CVEN 651 – Geomechanics (***)
- CVEN 652 – Soil Dynamics (typically every other Spring) (***)
- CVEN 665 – Foundation Structures (typically every Fall) (***)
- CVEN 683 – Dynamic Soil Structure Interaction (***)
- CVEN 687 – Foundation Engineering (typically every other Spring) (***)
- CVEN 695 – Frontiers in Civil Engineering Research (variable credit hours 1-6)
- CVEN 699 – Engineering Risk Analysis (***)

All four courses listed under Structural Behavior and Design can be used to satisfy this elective requirement as well. The first two courses taken are used to satisfy the core coursework requirement, while additional courses in that group automatically can count towards elective requirements without prior approval.

Additional technical coursework related to the practice of structural engineering can be found outside the department. Those courses are:
2. Open Elective Courses – maximum of 6 hours

Additional courses that are not part of the targeted electives and that are relevant to structural engineering practice can be part of the degree plan. This includes some technical courses in other engineering areas, such as materials engineering and construction management. A maximum of 6 semester credit hours may be counted towards the required coursework. Some courses within civil engineering fall within this category, as well as some courses offered under Architecture and the Business School. Courses that are pre-approved for the ME degree:

- CVEN 624 – Infrastructure Engineering (**)
- CVEN 643 – Advanced Construction Methods and Analysis (**)
- CVEN 641 – Construction Engineering Systems (**)
- CVEN 644 – Project Risk Management (**)
- OCEN 671 – Ocean Wave Mechanics (**)
- OCEN 672 – Coastal Engineering (**)
- OCEN 675 – Nonlinear Wave Mechanics (**)
- ACCT 640 – Accounting Concepts and Procedures (**)
- MGMT 655 – Survey of Management (**)
- FINC 635 – Financial Management for Non-Business (**)
- MKTG 621 – Survey of Marketing (**)
- ARCH 628 – Tools for Green Building Design (**)
- ARCH 646 – Historic Preservation Theory and Practice (**)
- ARCH 648 – Building Preservation Technology (**)
- ARCH 653 – Building Information Modeling (BIM) in Architecture (**)
- COSC 626 – Mechanical and Electrical Construction (HVAC Systems) (**)

3. Sample Degree Plan:

**Fall Semester (12 hours)**

- CVEN 633 – Advanced Mechanics of Materials (Required) (**)
- CVEN 657 – Dynamic Loads and Structural Behavior (Required)
- CVEN 671 – Behavior and Design of Prestressed Concrete Structures (Design Req’t)
- CVEN 666 – Foundation Structures (Targeted Elective) (**)

**Spring Semester (12 hours)**

- CVEN 750 – Finite Element Applications in Structural Engineering (Required)
- CVEN 754 – Structural Design Studio (Required)
- CVEN 659 – Behavior and Design of Steel Structures (Design Req’t)
- CVEN 662 – Experimental Methods in Civil Engineering (Targeted Elective)
  
  **Summer Semester (6 hours)**
  
  - Two elective courses

**D. Writing Requirement and Waiver of Final Exam**

The University has a writing requirement for all graduate degrees (whether or not that requirement is met with a research thesis). In our department, we can waive the oral examination requirement for the MEng degree, but cannot waive the report requirement. In order to ensure University rules are met, students pursuing the MEng degree need to submit a report you have individually written that contains a minimum of 7,000 words, or approximately 10 pages of text. The requirement is for writing, so text in figures and equations do not count. The report will typically be satisfied through successful completion of the Advanced Design Studio course. To submit your form to your chair,

  Go to turnitin.com

  **ID 9757071 (Writing Requirement)**

  **PS CVENSTRME**

  There are 2 assignments. If you have only 1 report exceeding 7000 words, put it in the first assignment. If you have more than one report, put one file in the 1st assigned and the remainder in the 2nd assignment. When you upload everything to the site, send Dr. Bracci an email (bracci@civil.tamu.edu) so that he can verify everything.

  Once your report has been reviewed and certified to meet the writing requirements, the your committee chair will send an email to the CE graduate office to waive the final examination requirement. You must provide a minimum of 2 weeks for the review of the report. It is your responsibility to ensure enough time is provided in order to meet the deadlines by the university’s Office of Graduate Studies (http://ogs.tamu.edu/).
Degree of Master of Science

A minimum of 32 semester credit hours of approved courses is required for the Master of Science degree (MS). At least 25 semester credit hours must be coursework. The university places limitations on these credit hours in addition to the requirements of the structural engineering program that are listed below. A complete discussion of all university requirements is found in the current Texas A&M University Graduate Catalog (available on the Internet at http://www.tamu.edu/admissions/catalogs/) under the heading "The Degree of Master of Engineering". For example, university requirements include a final examination and submission of a thesis to the university.

A. Advising Committee

The student must select an Advisory Committee Chair, who will serve as their graduate advisor, from the Department's structural engineering graduate faculty. A student can have a Co-Chair from a faculty member that does not have an appointment with the Department's structural engineering group. A committee must have either one Chair or one Chair and one Co-Chair.

The chair and the student collaborate in selecting the remainder of the Advisory Committee. The advising committee for the Master of Science degree in structural engineering must have a minimum of three members from the Texas A&M graduate faculty (the chair counts as a member). There must be at least one member from outside the civil engineering department and there must be a majority from within the department.

B. Degree Plan

The student must identify their research supervisor before the start of their second semester of study, at which point an advisory committee will be formed including at least one full time structural engineering faculty member. The student's advisory committee, in consultation with the student, will develop the proposed degree plan. The proposed degree plan must be typed on the official form as it appears on the Internet at http://ogs.tamu.edu/ and submitted electronically to your graduate advisor and advisory committee for their electronic endorsement. The office of graduate studies blocks students from further registration if a degree plan is not filed within 1 month after the start of their second semester. If you are blocked, you are not considered a full time student and become ineligible to receive any assistantship.
C. Prerequisites

All of the following courses are considered prerequisite to the MS program of study in structural engineering: CVEN 302, CVEN 345, CVEN 363, CVEN 444, CVEN 445, CVEN 446, and MATH 308, or equivalents that are approved by the structural engineering program. Courses listed for which a student lacks credit must be completed, but those credits cannot be applied toward the 32 semester credit hour requirement. Note that you may have been required to complete additional pre-requisites as part of your admission into the program. Those classes also cannot be applied towards the degree credit hour requirement.

D. Required Coursework (18 semester credit hours):

All of the following courses are offered once each academic year unless otherwise noted.

1. **Applied Mathematics – 3 semester credit hours**
   - Any 600-level course in Applied Mathematics, Statistics, or Numerical Methods. Recommended courses are:
     - MATH 601 – Methods in Applied Mathematics
     - MATH 602 – Methods in Applied Partial Differential Equations
     - STAT 601 – Statistical Analysis
     - STAT 626 – Methods in Time Series Analysis

2. **Engineering Mechanics – 9 semester credit hours**
   - CVEN 633 Advanced Mechanics of Materials (typically in Fall)
   - CVEN 657 Dynamic Loads and Structural Behavior (typically in Fall)
   - Theory of Finite Elements course: choose one of the following
     - MEMA 647 – Theory of Finite Elements
     - MEMA 646 – Intro to Finite Elements
     - MEEN 672 – Introduction to Finite Element Method
     - Any equivalent course into the *theory* of finite elements (not an applications course) – requires prior approval for substitution

3. **Structural Behavior and Design – 6 semester credit hours**
   - CVEN 621 Advanced Reinforced Concrete Design (preferred – typically in Spring)
   - CVEN 659 Behavior and Design of Steel Structures (preferred – typically in Spring)
   - CVEN 670 Behavior and Design of Composite Structures (alternate years)
   - CVEN 671 Behavior and Design of Pre-stressed Concrete Structures (typically in Fall)

E. Elective Coursework (14 semester credit hours):

The student's advisory committee, in consultation with the student, will select a minimum of 14 additional semester credit hours of coursework to complement the overall objectives of the
proposed degree plan. A maximum of 7 semester credit hours of CVEN 691 Research can be applied toward this requirement.

1. Courses Offered Within the Department (typically alternate years)

The following is a list of some of the courses offered through the Civil Engineering Department that are specifically geared towards the master’s level.

- CVEN 631 – System Identification and Nondestructive Damage Evaluation
- CVEN 655 – Bridge Engineering
- CVEN 662 – Experimental Methods in Civil Engineering
- CVEN 663 – Structural Stability
- CVEN 669 – Design of Structures for Hazardous Environmental Loads
- CVEN 686 – Offshore and Coastal Structures
- CVEN 699 – Engineering Risk Analysis
- CVEN 687 – Foundation Engineering

Other courses that may be of interest towards students interested in research (at both the Masters and PhD levels) and can be used to satisfy the elective coursework requirement include:

- CVEN 655 – Structural Reliability
- CVEN 683 – Dynamic Soil Structure Interaction
- CVEN 695 – Frontiers in Civil Engineering Research (variable credit hours 1-6)
- CVEN 751 – Advanced Dynamics and Control
- CVEN 752 – Smart Structures
- CVEN 753 – Damage Mechanics of Solids and Structures

Additional graduate level courses are offered throughout the department and may be used to satisfy the elective coursework requirement with approval of the student’s advisory committee. Particularly for the MS degree, courses must be chosen so as to complement your research program. All four courses listed under Structural Behavior and Design can be used to satisfy this requirement as well. The first two courses taken are used to satisfy the core coursework requirement, while additional courses in that group automatically can count towards elective requirements without prior approval.

2. Additional Technical Elective Courses: Applied Math and Other Engineering Disciplines

Additional coursework related to the practice of structural engineering can be found outside the department. Courses listed under MEMA, MATH and STAT can be particularly applicable, and any graduate level course in those departments is automatically acceptable pending approval of the student’s chair. Some suggested courses:
3. Other Relevant Non-Technical Coursework – maximum of 6 semester hours

Certain courses being offered under Architecture and the Business School are directly relevant to structural engineering practice and a maximum of 6 semester credit hours may be counted towards the required coursework. Courses pre-approved for the MS degree are:

- ACCT 640 Accounting Concepts and Procedures
- FINC 635 Financial Management for Non-Business
- MGMT 655 Survey of Management
- MKTG 621 Survey of Marketing
- ARCH 646 Historic Preservation Theory and Practice
- ARCH 647 Recording of Historic Buildings
- ARCH 648 Building Preservation Technology
Doctor of Philosophy

The Doctor of Philosophy (Ph.D.) degree is a research-oriented degree requiring a minimum of 64 semester credit hours of approved courses and research beyond the Master of Science (M.S.) degree in an approved and related program [96 credit hours beyond the Bachelor of Science (B.S.) degree]. The university places limitations on these credit hours in addition to the requirements of the Department of Civil Engineering and the Structural Engineering program listed below.

A complete discussion of all university requirements for the PhD degree is found in the current Texas A&M University Graduate Catalog, which is available on the Internet at http://www.tamu.edu/admissions/catalogs/, under the heading “The Degree of Doctor of Philosophy.” For example, university requirements include a preliminary examination, a final examination, and submission of a dissertation to the university.

NOTE: All documents requiring departmental signatures must be submitted to the Civil Engineering Graduate Office at least one day prior to the Office of Graduate Studies deadline.

A. Advising Committee

The student must select an Advisory Committee Chair, who will serve as their graduate advisor, from the Department's structural engineering graduate faculty. A student can have a Co-Chair from a faculty member that does not have an appointment with the Department’s structural engineering group. A committee must have either one Chair or one Chair and one Co-Chair.

The chair and the student collaborate in selecting the remainder of the Advisory Committee. The advising committee for the PhD degree in structural engineering must have a minimum of four members from the Texas A&M graduate faculty (the chair counts as a member). There must be at least one member from outside the civil engineering department and there must be a majority from within the department, with at least two members being from the structural engineering faculty (the chair counts as one of these members).

B. Departmental Requirements

In addition to fulfilling the University requirements for the Doctor of Philosophy (Ph.D.) degree, a student enrolled in the Civil Engineering graduate program in the area of Structural Engineering must satisfy the following department requirements.

- A minimum of 32 credit hours of graduate level coursework taken through Texas A&M University [a minimum of 24 credit hours if the student already has taken at least another
24 credit hours of graduate course work for the Master of Science (M.S.) or Master of Engineering (M.E.) degree.

- Remaining coursework requirement can be met by 32 hours of CVEN 691

C. Structures Area Requirements

The student must also satisfy the following area requirements and/or recommendations described below:

- **Qualifying Exam:** A Qualifying Examination will be scheduled with members of the Structural Engineering faculty. The exam will include both written and oral components. The exam should be taken after the first semester (Fall or Spring) of study and no later than the end of classes in the second semester (Fall or Spring) of study. A student may get special approval for a time extension of one additional semester if leveling courses (either technical or in English language) are required. In the structures area, the written component is typically taken the week before or within the first few weeks of the second semester of study. Currently, Dr. Hurelaus coordinates the qualifying exam for structures students and is the contact person for additional information.

- **Degree Plan:** An advisory committee must be formed that includes at least two structural engineering faculty members, and a Degree Plan must be submitted and approved by the advisory committee after passing the Qualifying Exam and early during their second semester (Fall or Spring) of study. The degree plan must be filed before the course registration for the third semester of study. The proposed degree plan must be typed on the official form as it appears on the Internet at http://ogs.tamu.edu/ with endorsements by the student’s advisory committee.

- **Written Preliminary Exam:** After completion of a majority of the coursework listed on the Degree Plan (with the exception of CVEN 691 Research), but ideally no later than the end of the fourth semester (Fall or Spring) of study, a Written Preliminary Examination will be scheduled with members of the advisory committee. The specific scope is defined by the committee members and may include any topic in structural engineering. The goal is to get preliminary feedback early during the research process, so the preliminary exam should not be delayed. This exam consists of written questions from the advisory committee. The exam in total should be given over a period of one week. The Office of Graduate Studies (OGS) requires that this exam be completed at least 90 days before the final defense.

- **Oral Preliminary Exam:** After passing the Written Preliminary Exam, but ideally no later than the end of the fourth semester (Fall or Spring) of study, an Oral Preliminary Examination will be scheduled with members of the advisory committee. The goal is to
get preliminary feedback early during the research process, so the preliminary exam should not be delayed. At this examination, the student will give a presentation of the Research Proposal. The questions in this exam will cover the material in the Research Proposal, Written Preliminary Exam, the Oral Preliminary Exam presentation, and any relevant coursework. The Office of Graduate Studies (OGS) requires that this exam be completed at least 90 days before the final defense.

- **Research Proposal**: As soon as the research project can be outlined in reasonable detail, but ideally no later than the end of the fifth semester (Fall or Spring) of study, the dissertation research proposal should be completed. The Research Proposal shall describe the proposed research, including relevant background information, and clearly demonstrate how this research will make a unique contribution of new knowledge to the student’s area of study. Upon approval of the Research Proposal by the advisory committee chair, the Research Proposal must be submitted to other members of the advisory committee at least 2 weeks (10 working days) prior to the Oral Preliminary Exam.

- **Completion of Dissertation**: Upon approval of the Dissertation by the advisory committee chair, the Dissertation will be submitted to the other members of the advisory committee at least 2 weeks (10 working days) prior to the Final Defense.

- **Final Defense**: A Final Defense consisting of an oral examination will be scheduled with all of the advisory committee members. At this examination, the student will give a presentation of the research work completed for the degree and documented in the Dissertation. The student is encouraged to invite other interested individuals to the research presentation.

**D. Recommended Coursework:**

The student’s advisory committee, in consultation with the student, will select coursework to complement the overall objectives of the proposed degree plan, with the majority of courses being in the field of structural engineering. Particularly for the Ph.D. degree, courses must be chosen so as to complement your research program as well as any future career goals. The courses listed below will typically have other graduate level courses as pre-requisites.

**1. Courses within Specialty Area Geared for Research Students**

<table>
<thead>
<tr>
<th>Course</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 655</td>
<td>Structural Reliability</td>
</tr>
<tr>
<td>CVEN 662</td>
<td>Experimental Methods in Civil Engineering</td>
</tr>
<tr>
<td>CVEN 663</td>
<td>Structural Stability</td>
</tr>
<tr>
<td>CVEN 683</td>
<td>Dynamic Soil Structure Interaction</td>
</tr>
</tbody>
</table>
2. Graduate Courses required for MF and MS students

The courses listed below are part of the core course requirements for our masters students. While none of these courses are required for our doctoral students, they frequently serve as prerequisite courses for higher level courses. Most students admitted into our program have already taken these courses as part of their own master’s curriculum.

<table>
<thead>
<tr>
<th>Course</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 621</td>
<td>Advanced Reinforced Concrete Design</td>
</tr>
<tr>
<td>CVEN 633</td>
<td>Advanced Mechanics of Materials</td>
</tr>
<tr>
<td>CVEN 657</td>
<td>Dynamic Loads and Structural Behavior</td>
</tr>
<tr>
<td>CVEN 659</td>
<td>Behavior and Design of Steel Structures</td>
</tr>
<tr>
<td>CVEN 670</td>
<td>Behavior and Design of Composite Structures</td>
</tr>
<tr>
<td>CVEN 671</td>
<td>Behavior and Design of Prestressed Concrete Structures</td>
</tr>
</tbody>
</table>

A student may decide to take one of these courses as part of their doctoral program to: (1) explore differences in design codes if their corresponding undergraduate coursework was in another country, or (2) their master’s degree was not in civil engineering and their curriculum would benefit from these core courses for a possible future in academia, or even in practice, within civil engineering.

3. Additional Graduate Elective Courses within Department

The courses listed below are also offered within the Structural Engineering specialty area and may be applicable to a student depending to their research focus:

<table>
<thead>
<tr>
<th>Course</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 656 Bridge Engineering</td>
<td>Alternate Years</td>
</tr>
<tr>
<td>CVEN 669 Design of Structures for Hazardous Environmental Loads</td>
<td>Alternate Years</td>
</tr>
<tr>
<td>CVEN 686 Offshore and Coastal Structures</td>
<td>Alternate Years</td>
</tr>
<tr>
<td>CVEN 753 Damage Mechanics of Solids and Structures</td>
<td>Alternate Years</td>
</tr>
</tbody>
</table>

Note that doctoral students are NOT allowed to enroll in:

- CVEN 750 – Finite Element Applications in Structural Engineering
- CVEN 754 – Advanced Structural Design Studio
Several other courses are available throughout the department that may also be applicable. Some recommended courses include:

- CVEN 613 Micromechanics of Civil Materials
- CVEN 623 Nondestructive Pavement Evaluation
- CVEN 658 Civil Engineering Applications of GIS
- CVEN 644 Project Risk Management
- CVEN 740 Advanced Construction and Behavior of Cement Materials

Additional coursework related to the practice of structural engineering can be found outside the department. Courses listed under MEMA, MATH and STAT can be particularly applicable. Some suggested courses:

- MEMA 601 Theory of Elasticity
- MEMA 602 Continuum Mechanics
- MEMA 605 Energy Methods
- MEMA 611 Fundamentals of Engineering Fracture Mechanics
- MEMA 633 Theory of Plates and Shells
- MEMA 641 Plasticity Theory
- MEMA 646 Introduction to the Finite Element Method
- MEMA 647 Theory of Finite Element Analysis
- MEMA 648 Nonlinear Finite Element Methods in Structural Mechanics
- MATH 601 Methods of Applied Mathematics I
- MATH 602 Methods and Applications of Partial Differential Equations
- STAT 601 Statistical Analysis
Graduate Coursework
**Pre-requisite Coursework**

All of the following courses (and their co- and pre-requisites) are considered prerequisite to any graduate program of study in structural engineering:

CVEN 302 – Computer Applications in Engineering and Construction
CVEN 345 – Theory of Structures
CVEN 363 – Engineering Mechanics – Dynamics (minimum of particle and rigid body dynamics)
CVEN 444 – Structural Concrete Design
CVEN 445 – Matrix Methods of Structural Analysis
CVEN 446 – Structural Steel Design
MATH 308 – Differential Equations

None of these courses may be counted towards any graduate degree in structural engineering. You may have been required to complete additional pre-requisites as part of your admission into the program. Those classes also cannot be applied towards the credit hour requirement. Pre-requisite coursework needs to be completed during your first semester at Texas A&M University, as they are pre-requisites for all our courses. It may be possible to take some prerequisite course along with graduate courses with the permission of the Graduate Advisor (Dr. Bracci) and the course instructors.

If you completed a pre-requisite before arriving at Texas A&M University and need it waived, you must bring a copy of your transcript showing the final grade in the course as well as a copy of the course syllabus to Dr. Bracci. You can drop it off in his box or with the Administrative Assistant on the 7th floor of the CE Office Building (DLEB). These will then be reviewed to see if indeed they satisfy the requirements, at which time this information will be communicated to the Civil Graduate Office. The review process can take up to two weeks.

**Course Description & Typical Schedule**

A range of courses are offered within the Zachry Department of Civil Engineering. For a full listing and description of the courses, please refer to the Graduate Course Catalog. Keep in mind that graduate courses are typically only offered once a year at most, with many of the elective courses only being offered on alternate years.

The following is a table indicating the typical course offering frequency and suggested pre-requisites. Keep in mind that the actual course offering schedule may differ from the table below. Pre-requisite coursework listed are course numbers in the Civil Engineering department unless otherwise noted. Keep in mind that all graduate courses have the program pre-requisites...
automatically applied, and any graduate course with a listed pre-requisite also has the option of "by approval of the instructor."

<table>
<thead>
<tr>
<th>Dept No</th>
<th>Title</th>
<th>Pre-Requisites</th>
<th>Typical Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 621</td>
<td>Advanced Reinforced Concrete Design</td>
<td>444</td>
<td>spring</td>
</tr>
<tr>
<td>CVEN 631</td>
<td>Indentification of Civil Engineering Systems</td>
<td>657</td>
<td>alternate years</td>
</tr>
<tr>
<td>CVEN 633</td>
<td>Advanced Mechanics of Materials</td>
<td>MATH 308</td>
<td>fall</td>
</tr>
<tr>
<td>CVEN 635</td>
<td>Structural Reliability</td>
<td>699</td>
<td>alternate years</td>
</tr>
<tr>
<td>CVEN 646</td>
<td>Bridge Engineering</td>
<td>444, 446</td>
<td>alternate years</td>
</tr>
<tr>
<td>CVEN 657</td>
<td>Dynamic Loads and Structural Behavior</td>
<td>MATH 308, CVEN 445 and 302</td>
<td>fall</td>
</tr>
<tr>
<td>CVEN 659</td>
<td>Behavior and Design of Steel Structures</td>
<td>446</td>
<td>spring</td>
</tr>
<tr>
<td>CVEN 660</td>
<td>Probabilistic Structural Dynamics</td>
<td>657, 655</td>
<td>irregularly</td>
</tr>
<tr>
<td>CVEN 662</td>
<td>Experimental Methods in Civil Engineering</td>
<td></td>
<td>alternate years</td>
</tr>
<tr>
<td>CVEN 663</td>
<td>Structural Stability</td>
<td>MATH 308</td>
<td>alternate years</td>
</tr>
<tr>
<td>CVEN 669</td>
<td>Design of Structures for Hazardous Environmental Loads</td>
<td>657</td>
<td>alternate years</td>
</tr>
<tr>
<td>CVEN 670</td>
<td>Behavior and Design of Composite Structures</td>
<td>444, 446</td>
<td>alternate years</td>
</tr>
<tr>
<td>CVEN 671</td>
<td>Behavior and Design of Prestressed Concrete Structures</td>
<td>444</td>
<td>fall</td>
</tr>
<tr>
<td>CVEN 683</td>
<td>Dynamic Soil Structure Interaction</td>
<td>657</td>
<td>alternate years</td>
</tr>
<tr>
<td>CVEN 686</td>
<td>Offshore and Coastal Structures</td>
<td>657</td>
<td>alternate years</td>
</tr>
<tr>
<td>CVEN 699</td>
<td>Engineering Risk Analysis</td>
<td>STAT 212</td>
<td>spring</td>
</tr>
<tr>
<td>CVEN 750</td>
<td>Finite Element Applications in Structural Engineering</td>
<td>445</td>
<td>spring</td>
</tr>
<tr>
<td>CVEN 751</td>
<td>Advanced Dynamics and Introduction to Structural Control</td>
<td>657</td>
<td>alternate years</td>
</tr>
<tr>
<td>CVEN 752</td>
<td>Smart Structures</td>
<td>657</td>
<td>alternate years</td>
</tr>
<tr>
<td>CVEN 753</td>
<td>Damage Mechanics of Solids and Structures</td>
<td>633</td>
<td>alternate years</td>
</tr>
<tr>
<td>CVEN 754</td>
<td>Advanced Structural Design Studio</td>
<td>657, 633, 671</td>
<td>alternate years</td>
</tr>
</tbody>
</table>

**Transfer Credit**

A maximum of two courses taken at other universities may be applied towards your Master's degree (ME or MS) at Texas A&M University. For the doctoral program, a maximum of three courses may be applied, pending permission of the student's research committee, as long as the number of credit hours does not exceed one-third of the total coursework hours taken at Texas A&M University.

In order to use transfer courses on your degree plan, the courses must have been taken in residence at an accredited U.S. institution or an approved international institution. You can verify its status with either Graduate Admissions or International Admissions. In addition, you must have earned a grade of "B" or better, and you must have been in degree seeking status at either that institution or at Texas A&M University at the time the course(s) were taken. Academic work used toward a previous degree may not be used again.

To receive departmental approval, the student must submit a detailed syllabus and sample coursework material to the structures graduate advisor after starting with the structures program. That material will be reviewed and you'll be notified of the approval decision in about 2 weeks.
Certificate Programs

Certificate programs are designed to provide students an edge over other students who have similar interests, but do not pursue a certificate program that compliments that interest. A graduate certification program represents an emphasis area within a particular field or it could be interdisciplinary and involve several fields. Two programs are of particular interest to structural engineering students and some of the courses required for those programs may be applied towards your engineering credit hour requirement.

Keep in mind that these programs are not offered through the Civil Engineering department, so for information please contact the specific department listed for the program directly. The information provided here is to serve as a preliminary source of information, but specific program requirements can only be determined through the department offering the certificate.

A. Certificate in Historic Preservation:

Certificate in Historic Preservation is open to students in any graduate degree program at Texas A&M University. The cross-disciplinary program in historic preservation draws on strong discipline-based academic programs that prepare graduates to further their career goals. The certificate assumes that historic preservation is a cross-disciplinary field, and the program is designed to ensure that students gain a sense of mutual respect for others in the field, and appropriate awareness, understanding, and ability within a specific body of knowledge.

Requirements

- Graduate students shall declare the intent to seek the Certificate by filing an application at the time they file a Degree Plan for their chosen degree.
- Certificate coursework must include ARCH 646: Historic Preservation Theory and Practice (3 credits),
- At least 12 additional credits of coursework with preservation content (equivalent to four courses). This requirement can sometimes be met through civil engineering coursework by choosing/defining a course project with preservation content.
- At least three (3) credits must be taken from courses outside of the student's major department. As the required course ARCH 646 is outside civil engineering, this requirement is automatically satisfied by taking the one required course.
- The degree program must include a professional study, professional paper, thesis or dissertation with a historic preservation focus.

For additional information, see: the web-site at:
http://archone.tamu.edu/chc/education/links/certificate%20in%20hp.html

Zachry Department of
CIVIL ENGINEERING | TEXAS A&M ENGINEERING
B. Certificate in Business:

Mays Business School offers a Certificate in Business to non-business graduate students at Texas A&M University. This certificate provides a general overview of the four major functional areas of business through a set of courses designed for non-business students. To complete the Certificate in Business, students must successfully complete the following four courses (12 credit hours). These courses do not have business course prerequisites:

- Accounting 640
- Finance 635 (prerequisite: ACCT 640)
- Management 655
- Marketing 621

If you have completed the undergraduate versions of any or all of these courses (business minor courses), then you must use a substitute for the course(s). The recommended substitutions are:

<table>
<thead>
<tr>
<th>COURSE</th>
<th>SUBSTITUTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 640</td>
<td>ACCT 641, 642</td>
</tr>
<tr>
<td>FINC 635</td>
<td>FINC 629, 632, 642, 645</td>
</tr>
<tr>
<td>MGMT 655</td>
<td>MGMT 630</td>
</tr>
<tr>
<td>MKTG 621</td>
<td>MKTG 650, 656</td>
</tr>
</tbody>
</table>

Any two of the above courses may be used to satisfy elective coursework requirements at the masters level. Keep in mind that these courses fall under “Non-Technical Elective Coursework”, and the master degrees allow a maximum of 6 semester hours of coursework in this category. So to complete the ME degree plus the Business Certificate, you would need to take a minimum of 36 hours.

For additional information, see: the web-site at: http://mays.tamu.edu/degrees-and-majors/certificate-programs/certificate-in-business/
Funding Opportunities
Research Assistantships

Research Assistantship (RA) positions are offered through individual faculty members. There is no centralized list of available positions. You'll need to set-up appointments to meet with them individually. You are strongly recommended to go through our department's website to identify the different research areas each professor is working in before meeting with them.

Teaching Assistantships

All students are automatically considered for the small number of TA positions based on their graduate application package (new students) and university standing (existing students). If needed, an email will be sent to all students to apply for TA openings. English Proficiency Certification is required by the State of Texas and Texas A&M before an international graduate student is eligible to serve as a Graduate Assistant-Teaching or in any other position considered to be a teaching position (e.g., instructor, lecturer, etc.). International graduate students can certify for English proficiency before enrollment by achieving requisite scores on the speaking section of the following standardized tests: TOEFL, IELTS or PTE exams. [See chart below.] If international graduate students who wish to serve in teaching positions do not achieve requisite standardized test scores prior to enrollment, they can certify by taking the on-campus English Language Proficiency exam (ELPE).

Eligibility levels for international graduate students serving in teaching positions:

- **Level 1:** Students eligible for teaching assignments
- **Level 2:** Students conditionally eligible for teaching assignments for one semester only, but must simultaneously participate in the Center for Teaching Excellence English Language Proficiency (CTE-ELP) instruction and achieve a certifying score on the ELPE by the end of the semester.
- **Level 3:** Students not eligible for teaching assignment. Students should participate in spoken language training (such as those provided by CTE-ELP) to assist them in meeting English language proficiency requirements.

<table>
<thead>
<tr>
<th>Level #</th>
<th>TOEFL speaking section</th>
<th>IELTS speaking section</th>
<th>PTE speaking section</th>
<th>ELPE oral exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>26-30</td>
<td>\geq 8.0</td>
<td>\geq 85</td>
<td>80</td>
</tr>
<tr>
<td>2</td>
<td>23-25</td>
<td>7.0-7.5</td>
<td>75-84</td>
<td>75</td>
</tr>
<tr>
<td>3</td>
<td>&lt;23</td>
<td>&lt;7.0</td>
<td>&lt;75</td>
<td>65</td>
</tr>
</tbody>
</table>
Fellowships

Fellowships are typically awarded to incoming students by the CE Graduate Office in consultation with the structures faculty graduate advisor (Dr. Bracci) and the Head of the Construction, Geotechnical and Structural Engineering Division (Dr. Hurlebus). All new students are automatically considered for available fellowships and no separate application form is required.

Tuition Waivers & In-state Tuition

**Tuition waivers do not exist at Texas A&M University.** For Research and Teaching Assistantship positions, your tuition may be paid by the Department or from the research project as a benefit of the position (note that student fees are not paid by the Department or by the research project and these fees are the responsibility of the student). Additionally, you may qualify for in-state tuition if you were awarded a Fellowship.

Other job opportunities

The faculty and graduate advisors do not coordinate nor know of any student worker positions in the department. If you are interested or need to pursue job opportunities beyond the TA/RA positions, you may want to look at: [http://jobforaggies.com](http://jobforaggies.com).
Additional Information
Full-Time Enrollment

Required credit hours to be certified as a full-time are:

- Fall and Spring semesters: 9 hours
- 10-week Summer semester: 6 hours

Graduate students may be certified as full time with fewer than the required hours under special circumstances, including:

- During their final semester before graduation;
- Presence of a documented disability that mandates a reduced course load

These exceptions may or may not apply to a student's eligibility for certain types of financial aid. Students who have questions about how exceptions to the full time enrollment requirements will affect their scholarships, loans, grants, etc., should confer with their financial aid counselor.

In most cases, international students are eligible for the same exceptions to full time requirements; however, all international students requesting an exception to full time requirements must have their request approved by International Student Services. Students who are not U.S. citizens, but who are permanent U.S. residents (VISA TYPE = IM) are not required to clear with ISS on enrollment exceptions.

A student who is enrolled in less than a full-time course of study at Texas A&M may be in jeopardy of:

- being out of compliance with the Bureau of Citizenship and Immigration Services (formerly INS) if enrolled at Texas A&M on a student visa;
- losing their Research or Teaching Assistantship position
- losing insurance coverage under his or her parent/guardian's insurance policy;
- being placed on a loan repayment schedule by a lender or guarantor if the student is the recipient of Federal financial aid; and/or
- losing a scholarship if the guidelines for receiving the scholarship require full-time enrollment
Mailboxes

All graduate students will have a mailbox assigned to them on the 7th floor of the CE Office building (DLEB). They usually get created for new students by the 2nd or 3rd week of classes. You must get in the habit of checking that mailbox on a regular basis, as sometimes critical information from the University and/or Department will be sent to your campus mailbox rather than your mailing address.

Student Offices

Offices for students who are Teaching Assistants are made through the main CE Graduate Advising Office for structural engineering students. You are responsible for contacting Ms. Laura Byrd and/or Mr. Chris Grunkemeyer for a desk assignment.

For students who become involved in research, desk assignments are centrally coordinated by the department. You must complete the Graduate Desk Registration form online to be considered for a desk assignment. The form is located at:

http://helpdesk.civil.tamu.edu/GraduateDeskRegistration.aspx

Academic Probation

Graduate students must maintain a minimum of 3.0 out of 4.0 grade point ratio (GPR). This requirement includes courses in degree plan as well as all graduate courses taken. If a course is repeated, the last grade received will be the one utilized in GPR calculation. If a student’s GPR falls below 3.0, the student will need to meet with their graduate advisor to set out a plan to raise GPR to above 3.0 within one semester. Under extenuating circumstances, a second semester may be allowed for the student to raise their GPR.

Once a plan has been devised, it will be forwarded to the main CE Graduate Office. If the student fails to raise their GPR, they will be removed from the structural engineering graduate program.
Frequently Asked Questions
Degree Plans

- **What is the difference between the MS and MENG degree?**
  - MENG (Master of Engineering) - non-thesis option requiring 30 hours of graduate coursework credit
  - MS (Master of Science) - thesis option requiring 32 hours of graduate credit, but only 25 hours of coursework (remaining hours are research)

Accordingly, the MS degree is more research-oriented and MENG is more course-oriented and geared towards professional practice.

- **Can I change my degree status once I've been admitted?**
  Yes, once admitted to graduate school, a student may file a Petition to change a degree status. The Petition must be signed by the department head and then filed with the Office of Graduate Studies (OGS) and approved. International students must check with the International Student Services Office to maintain legal status. Please read below for additional information on changing degree status for specific degrees.

- **Can I change my degree status once a degree plan is filed?**
  Yes, the student must file a Petition that is available electronically through the Office of Graduate Studies (OGS) website. The Petition will include any changes needed to the degree plan. The Petition must be signed by ALL committee members AND the department head. The Petition must subsequently be filed with the Office of Graduate Studies (OGS) and approved. Please read below for additional information on changing degree status for specific degrees.

- **I applied to the MENG program and now want to change to the MS program, is this possible and what is the procedure? I applied to the MS program and now want to change to the MENG program, is this possible and what is the procedure?**
  A student may file a Petition to change a degree status. The Petition must be signed by the department head and then filed with the Office of Graduate Studies (OGS) and approved. As long as you have not received financial support from the department in terms of an assistantship or a scholarship, switching between the MENG and MS degrees is straightforward prior to the submittal of your degree plan. In those cases, you simply submit your degree plan to the actual program you wish to pursue. After you have filed your degree plan or have been supported by the department through an assistantship, you will need to formally petition for a change of degree plan.
Petitions from an MENG to an MS degree will be approved by the faculty member accepting the student into their research program and willing to serve as their research advisor. No formal process is required other than the completion of the degree change form available at the Office of Graduate Studies (OGS) website.

Petitions from an MS to an MENG degree, in addition to the degree change form, require the following materials:

- A statement from the student describing why they feel they need to change degree programs. If the reason includes that the student could not find an advisor, then the committee will want to know that the student put in a good faith effort to find an advisor.
- A copy of their unofficial transcript, available via Howdy
- A listing of the support the student received during each semester they were enrolled. Include assistantships, fellowships, and scholarships. For each item, list the source of support and, if applicable, the supervisor.

- **I am completing my Meng or MS degree and wish to continue onto the PhD. What is the procedure?**

Continuing on for a Ph.D. after the Master’s will be handled by the Graduate Admissions Committee. The committee will evaluate the application as they do the other applications to that degree program. Every student completing a graduate degree who wishes to continue to enroll in pursuit of another graduate degree should do so by filing an approved letter of intent with the Office of Graduate Studies (OGS). A student must use the letter of intent form that is available on the OGS website.

This form is to be submitted to the Civil Engineering Graduate Studies Office for review. Simultaneously, petitions for degree “upgrades” should additionally include the materials listed below. They should be submitted electronically to the structural engineering graduate advisor: Dr. Joe Bracci (bracci@civil.tamu.edu) for review. The advising office will communicate the decision to the student.

- A statement of purpose for the desired degree program.
- A current vitae/resume and unofficial transcript.
- A letter of recommendation from your advisor, who should be a faculty member in structural engineering. If your advisor is from another specialty area in the department, then a second letter of recommendation from a structural engineering faculty member is required.
• I have taken a graduate level course in which I received a C. This course is already present on my degree plan. Can I keep the course on the degree plan?

Yes. The requirement for graduate students is to maintain a GPR of 3.0 on the degree plan. The intent of the degree plan is to identify the appropriate course of study for your chosen degree as determined by your advisor. Once the courses have been chosen and place on an approved degree plan, it is the student's responsibility to maintain a 3.0.

It is NOT the intent of the degree plan to allow students to take courses and then, after taking the courses and receiving a grade, to choose whether or not the courses are to be include in the degree plan. A student is NOT to select for inclusion only those courses in the degree plan for which he/she may receive grades of A or B!

• Can I change the courses on my degree plan once it is filed?

Yes, the student can change the courses by filing a Petition. The Petition must be signed by ALL committee members and the department head. The Petition must subsequently be filed with the Office of Graduate Studies (OGS) and approved.

• Are leveling courses to be included in the degree plan even though they cannot be counted towards the required number of credits?

Leveling courses MUST be listed at the bottom of the degree plan as prerequisites.

• Who should be on my degree plan committee?

MENG degree committee: a standard committee for all students

- Chair: Dr. Joe Bracci

MS and PhD degree committee: students must identify a professor within the area of structural engineering to serve as their research advisor, who serves as the chair. Other members will be selected based on discussions with the committee chair, with at least one member from outside the CEEN department. Note that for the MS at least one member must be a full-time structural engineering faculty member and that for the Ph.D. at least two members must be in the structural engineering faculty.

• When should I file the degree plan?

MENG degree: students should file within one month after starting their second semester of graduate coursework.
MS students: students should file within one month after starting their second semester of graduate coursework.

PhD students: students should file before their third semester of graduate coursework.

Keep in mind: the Office of Graduate Studies will block you from registration after completing 9 hours of graduate courses. If you do not register, you run the risk of losing your full-time student status. Also, the office frequently is overwhelmed as specific deadlines approach. If you wait until the last minute to submit your form(s), you may not be able to get them all signed on time, or run the risk of additional delays in OGS resulting in your being blocked from registration.

**Assistantships**

1. **There are two different types of courses for the summer, 5-week courses and 10-week courses. How can I register to satisfy the full-time status for my RA/TA?**

To be considered a full-time student for the Summer, a student must register for a minimum of 6 credit hours in one of the two following ways:

- 6 credit hours during the 10-week summer term OR
- 3 credit hours during each 5-week summer term

To hold an assistantship for the Spring and Fall semesters, the student needs to register for a minimum of 9 hours in order to be considered full-time.

No other combinations are allowed.

2. **How do I apply for a Teaching Assistant (GAT) position?**

All new students are automatically considered for a Graduate Teaching Assistantship. About the 10th week of the fall and spring semesters, if any positions are expected to be available then applications become available via email to structural engineering graduate students. In order to apply for a TA, complete the application and return it to the listed contact person.

3. **How do I apply for a Research Assistant (RA) position?**

In order to apply for a RA, a student must contact the professors in structural engineering. The individual professors handle funding and will be able to inform students about openings for research positions.

4. **I am a foreign student and English is my second language. Can I apply for a TA? What is the requirement?**
International students whose native language is not English and who wish to apply for a TA position must fulfill an English proficiency requirement. The English Proficiency Certification (ELPE) is required before a graduate student is eligible to apply to serve as a TA or in any other position considered to be a teaching position (see page 32). It is best to meet this proficiency requirement early in a student’s program. Contact the International Admissions Office at 979-845-1071 if you need to arrange a test.

**Non-Civil Engineering Undergraduates**

1. **I do not have an undergraduate degree in civil engineering. Can I still be admitted into the structural engineering graduate program?**

   It is possible to be admitted to the graduate program in structural engineering without an undergraduate degree in CVEN. That is true for all our graduate degrees. Generally students who do not have an undergraduate degree in civil engineering are required to take numerous undergraduate “leveling” courses but not necessarily all those required for the undergraduate degree.

   However, admission into the program is highly competitive and is particularly focused at a student’s technical abilities and potential chances to succeed in our engineering program. Your academic transcript must demonstrate your ability in math and science courses at a minimum in order to be a competitive applicant.

2. **Will I be able to become licensed as a professional engineer without an undergraduate degree in civil engineering if I complete the graduate structural engineering program?**

   You can be licensed in the state of Texas with only a graduate degree in civil engineering (CVEN) if the degree is obtained from a university that has a 4-year ABET accredited undergraduate program, which is the case for the civil engineering program at Texas A&M University. However, rules often change, so please the website of the Texas Board of Professional Engineers (http://engineers.texas.gov/) for the latest registration requirements. We cannot be responsible for licensure changes.

**Probation**

1. **What are the criteria for scholastic probation?**

   Graduate students are expected to maintain a Grade Point Ratio (GPR) equal to or better than 3.0 throughout the duration of their graduate study. This requirement applies to each of cumulative and degree plan GPR. It is also a prerequisite for receiving a graduate degree in civil engineering.
2. **What happens after one semester on probation if my GPR is not back up to 3.0?**

When a student’s GPR (either cumulative or in the degree plan) falls below 3.0, the student is placed on probation by the department. Notifications are made by email or letter to the student, the advisor, and other pertinent offices within the university. The student must then meet with their graduate advisor and determine a plan to bring their GPR up to a 3.0 **within one semester.**

3. **What if the GPR requirement is not satisfied after one semester?**

If after one semester on probation a student’s cumulative or degree plan GPR is not back up to 3.0, the Office of Graduate Studies will be asked to remove the student from the graduate studies program. If extenuating circumstances exist, probation time may be extended for one more semester, allowing the student a final chance to meet the minimum GPR requirement.

4. **I took a course in which I got an ‘I’ for incomplete. After one semester, it becomes an F. Now I am on probation. What can I do to change the F back to a better grade?**

It is the student’s responsibility to complete the pending work within one semester of the course end. The student must complete the course work for which an I was received by submitting it to the professor pending his/her approval. The professor will then submit a grade change form. This change may or may not change the student’s GPR, depending on the final grade received. The student will remain on probation until the registrar has changed the grade in the system.

5. **Does I (incomplete) in CVEN 691 (research), CVEN 684 (professional internship), or CVEN 692 (Professional study) become an F after one semester?**

No, these courses are excluded from that rule.

6. **Does an I (incomplete) of CVEN 685 (problems) become an F after one semester?**

Yes, if you receive an I in CVEN 685, it will turn to an F after one semester. The course CVEN 685 is a letter grade course and therefore is not excluded from the rule.
Geotechnical Engineering Graduate Student Handbook

Zachry Department of Civil Engineering

2018-2019
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Overview
Program Overview

Geotechnical engineering deals with earth materials including soil, rock, and groundwater. As most engineering projects are supported by ground, geotechnical engineering interfaces with most of the other civil sub-disciplines. For example, geotechnical engineers design foundations for structures, sub-grades for roadways, embankments for water storage and flood control, and containment systems for hazardous materials. In addition to participating in the design, construction, and operation of most civil engineering projects, geotechnical engineers also deal with various geologic hazards impacting our society, such as landslides, soil erosion, and earthquakes. Employers for graduates specializing in geotechnical engineering include consulting firms, design firms, contractors, public agencies, utilities, energy companies, and academia.

The geotechnical faculty at TAMU presently has active research programs in thrust areas that include expansive soils, scour and erosion, construction quality control, seafloor foundations and anchors, and stability of seafloor slopes. Graduate course offerings include engineering properties of soils, geomechanics, numerical methods in geotechnical engineering, foundation design, slope and retaining wall design, foundations on expansive soils, site investigations, and geotechnical earthquake engineering. Graduate degree options include the Master of Engineering, Master of Science, and Doctor of Philosophy.

Faculty Members

Administration

Department Head: Robin Autenrieth
Assist. Dept. Heads: Kelly Brumbelow, James Kanihata
Division Head: Stefan Hurlebaus
GEO Graduate Advisor: Marcelo Sanchez

Geotechnical Engineering Faculty

<table>
<thead>
<tr>
<th>Name</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aubeny, Charles</td>
<td>979-845-4478</td>
<td><a href="mailto:caubeny@civil.tamu.edu">caubeny@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Briaud, Jean-Louis</td>
<td>979-845-3795</td>
<td><a href="mailto:briaud@tamu.edu">briaud@tamu.edu</a></td>
</tr>
<tr>
<td>Cha, Minsu</td>
<td>979.862.5660</td>
<td><a href="mailto:mcha@civil.tamu.edu">mcha@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Medina-Cetina, Zenon</td>
<td>979-845-6567</td>
<td><a href="mailto:zmedina@tamu.edu">zmedina@tamu.edu</a></td>
</tr>
<tr>
<td>Sanchez, Marcelo</td>
<td>979-862-6604</td>
<td><a href="mailto:msanchez@civil.tamu.edu">msanchez@civil.tamu.edu</a></td>
</tr>
</tbody>
</table>
Degree Programs
Degree of Master of Engineering

A minimum of 30 semester credit hours of approved courses is required for the Master of Engineering degree (MEng). The university places limitations on these credit hours in addition to the requirements of the Geotechnical engineering program that are listed below. A complete discussion of all university requirements is found in the current Texas A&M University Graduate Catalog (http://catalog.tamu.edu/graduate/).

A. Advising

The Master of Engineering program has an initial advisor: Dr. Marcelo Sanchez

No external members are required for this degree plan.

B. Prerequisites

All of the following courses are considered prerequisite to the MEng program of study in Geotechnical engineering: CVEN 302, CVEN 305, CVEN 365, and MATH 308, or equivalents that are approved by the Geotechnical engineering program. Courses listed for which a student lacks credit must be completed, but those credits cannot be applied toward the 30 semester credit hour requirement. Pre-requisite coursework needs to be completed during your first semester at Texas A&M University, as they are pre-requisites for all our graduate courses.

C. Degree Plan

A standard degree plan has been devised for all Master of Engineering Students. Courses may only be changed to the proscribed alternates by the approval of the advisor (Dr. Sanchez).

An official degree plan must be submitted to the Office of Graduate and Professional Studies (OGAPS) for approval. The degree plan must be approved by your advisory committee members, your department head, and finally OGAPS. To submit a degree plan, log into the Document Processing Submission System (DPSS) https://ogsdpss.tamu.edu/. Tutorials are found at http://ogaps.tamu.edu/New-Current-Students/Workshops-and-Tutorials. Master of Engineering students must submit their degree plan by the second month of their second semester.

OGAPS will block student from further registration if a degree plan is not filed by the second semester deadline set by them. If you are blocked, you cannot register and therefore could jeopardize potential funding.
1. **Standard Degree Plan – ME Students Fall Semester**

The courses listed below are typically offered in Fall and Spring, as indicated. Note that most of these classes are offered every year, but not all of them. You need to check the University Graduate Catalog (http://catalog.tamu.edu/graduate/) and/or Howdy to confirm the classes that are available for the specific semester you are interested in.

**Fall Semester (10 hours)**
- CVEN 649 Physical and Engineering Properties of Soil (R)
- CVEN 651 Geomechanics (R)
- CVEN 648 Advanced Numerical Methods in Geotechnical Engineering
- CVEN 689 Case histories in geotechnical engineering
- CVEN 645 Geotechnical Site Investigation
- CVEN 689 Soil Improvement and Geosynthetics
- CVEN 647 Numerical Methods in Geotechnical Engineering
- CVEN 685 Directed Studies (R)
- 1-2 elective courses taken from section 2 below

**Spring Semester (9-12 hours)**
- CVEN 667 Slope Stability and Retaining Structures (R)
- CVEN 687 Foundation Engineering (R)
- CVEN 666 Geotechnical Engineering Design*
- CVEN 673 Transport Phenomena in Porous Media
- CVEN 652 Soil Dynamics
- CVEN 655 Structural Reliability
- CVEN 646 Foundations on Expansive Soils

**Notation:**
- R: Required course (no substitutions allowed);
- *: CVEN 666 may not be taken in substitution of CVEN 687
2. Elective Coursework – maximum of 3 semester hours:

The following courses are some suggested electives for the ME degree plan. You must choose one elective from the following [note not all courses may be offered]:

- CVEN 618 Environmental engineering Processes I
- CVEN 603 Environmental management
- CVEN 608 Solid waste engineering
- CVEN 615 Structural design of pavements
- CVEN 633 Advanced mechanics of materials
- CVEN 642 Construction engineering management
- CVEN 657 Dynamic loads and structural behavior
- CVEN 674 Groundwater hydrology and hydraulics
- GEOP 613 Near-surface applied geophysics
- GEOP 652 Earthquake seismology
- GEOL 635 Engineering geology
- MEMA 601 Theory of elasticity
- MEMA 646 Introduction to the finite element method
- MATH 601 Advanced math
- MATH 609 Numerical analysis
- MATH 619 Applied probability
- STAT 601 Statistical analysis
- STAT 651 Statistics in research I
Degree of Master of Science

A minimum of 32 semester credit hours of approved courses is required for the Master of Science degree (MS). At least 25 semester credit hours must be coursework. The university places limitations on these credit hours in addition to the requirements of the geotechnical engineering program that are listed below. A complete discussion of all university requirements is found in the current Texas A&M University Graduate Catalog (http://catalog.tamu.edu/graduate/).

The student must identify their research supervisor before the start of their second semester of study, at which point an advisory committee will be formed. The student's advisory committee, in consultation with the student, will develop the proposed degree plan. An official degree plan must be submitted to the Office of Graduate and Professional Studies (OGAPS) for approval. The degree plan must be approved by your advisory committee members, your department head, and finally OGAPS. To submit a degree plan, log into the Document Processing Submission System (DPSS) https://ogscpss.tamu.edu/. Tutorials are found at http://ogaps.tamu.edu/New-Current-Students/Workshops-and-Tutorials. Master of Science students must submit their degree plan by the second month of their second semester.

OGAPS will block student from further registration if a degree plan is not filed by the second semester deadline set by them. If you are blocked, you cannot register and therefore could jeopardize potential funding.

A. Prerequisites

All of the following courses are considered prerequisite to the MS program of study in geotechnical engineering: CVEN 302, CVEN 305, CVEN 365, and MATH 308, or equivalents that are approved by the geotechnical engineering program. Courses listed for which a student lacks credit must be completed, but those credits cannot be applied toward the 32 semester credit hour requirement. Note that you may have been required to complete additional pre-requisites as part of your admission into the program. Those classes also cannot be applied towards the degree credit hour requirement.
B. Required Coursework (18 semester credit hours):

1. **Soil Behavior and Geomechanics – 9 semester credit hours**

   - CVEN 645 Geotechnical Site Investigations
   - CVEN 649 Physical and Engineering Properties of Soil (Required)
   - CVEN 651 Geomechanics (Required)
   - CVEN 647 Numerical Methods in Geotechnical Engineering
   - CVEN 648 Advanced Numerical Methods in Geotechnical Engineering
   - CVEN 652 Soil Dynamics
   - CVEN 673 Transport Phenomena in Porous Media
   - CVEN 683 Dynamic Soil Structure Interaction

2. **Geotechnical Design – 9 semester credit hours**

   - CVEN 646 Foundations on Expansive Soils
   - CVEN 666 Geotechnical Engineering Design*
   - CVEN 667 Slope Stability and Retaining Walls (Required)
   - CVEN 687 Foundation Engineering (Required)
   - CVEN 689: Case histories in geotechnical engineering
   - CVEN 689: Soil improvement and geosynthetics
   - CVEN 655 Structural Reliability

C. Elective Coursework (14 semester credit hours):

   The student’s advisory committee, in consultation with the student, will select a minimum of 14 additional semester credit hours of coursework to complement the overall objectives of the proposed degree plan. A maximum of 7 semester credit hours of CVEN 691 Research can be applied toward this requirement.

1. **Courses Offered Within the Department (typically alternate years)**

   The following is a list of some of the courses offered through the Civil Engineering Department that are specifically geared towards the master’s level

   - CVEN 613 – Micromechanics of Civil Engineering Materials
   - CVEN 633 – Advanced Mechanics of Materials
   - CVEN 686 – Offshore and Coastal Structures
   - CVEN 689 – Special Topics: Engineering Risk Analysis

   Additional graduate level courses are offered throughout the department and may be used to satisfy the elective coursework requirement with approval of the student's advisor. Particularly for the MS degree, courses must be chosen so as to complement your research program.
All four courses listed under Geotechnical Design can be used to satisfy this requirement as well. The first two courses taken are used to satisfy the core coursework requirement, while additional courses in that group automatically can count towards elective requirements without prior approval.

2. Additional Technical Elective Courses: Applied Math and Other Engineering Disciplines

The following courses are some suggested electives for the ME degree plan. You must choose one elective from the following [note not all courses may be offered]:

- CVEN 618 Environmental engineering Processes I
- CVEN 603 Environmental management
- CVEN 608 Solid waste engineering
- CVEN 615 Structural design of pavements
- CVEN 633 Advanced mechanics of materials
- CVEN 642 Construction engineering management
- CVEN 657 Dynamic loads and structural behavior
- CVEN 674 Groundwater hydrology and hydraulics
- GEOP 613 Near-surface applied geophysics
- GEOP 652 Earthquake seismology
- GEOL 635 Engineering geology
- MEMA 601 Theory of elasticity
- MEMA 646 Introduction to the finite element method
- MATH 601 Advanced math
- MATH 609 Numerical analysis
- MATH 619 Applied probability
- STAT 601 Statistical analysis
- STAT 651 Statistics in research I

3. Other Relevant Non-Technical Coursework – maximum of 6 semester hours

Certain courses being offered under Architecture and the Business School are directly relevant to geotechnical engineering practice and a maximum of 6 semester credit hours may be counted towards the required coursework. Courses pre-approved for the MS degree are:

- ACCT 640 Accounting Concepts and Procedures
- FINC 635 Financial Management for Non-Business
- MGMT 655 Survey of Management
- MKTG 621 Survey of Marketing

Zachry Department of CIVIL ENGINEERING | TEXAS A&M ENGINEERING
Doctor of Philosophy

The Doctor of Philosophy (Ph.D.) degree is a research-oriented degree requiring a minimum of 64 semester credit hours of approved courses and research beyond the Master of Science (M.S.) degree [96 credit hours beyond the Bachelor of Science (B.S.) degree]. The university places limitations on these credit hours in addition to the requirements of the Department of Civil Engineering and the Geotechnical Engineering program listed below.

A complete discussion of all university requirements is found in the current Texas A&M University Graduate Catalog (http://catalog.tamu.edu/graduate/).

NOTE: All documents requiring departmental signatures must be submitted to the Civil Engineering Graduate Office in DLEB 101 at least one day prior to the Office of Graduate Studies deadline.

A. Departmental Requirements

In addition to fulfilling the University requirements for the Doctor of Philosophy (Ph.D.) degree, a student enrolled in the Civil Engineering graduate program in the area of Geotechnical Engineering must satisfy the following department requirements.

- A minimum of 32 credit hours of graduate level coursework taken through Texas A&M University [a minimum of 24 credit hours if the student already has taken at least another 24 credit hours of graduate course work for the Master of Science (M.S.) or Master of Engineering (MEng) degree].

- Remaining coursework requirement can be met by 32 hours of CVEN 691

B. Geotechnical Engineering Requirements

The student must also satisfy the following area requirements and/or recommendations described below:

- Qualifying Exam: A Qualifying Examination will be scheduled with members of the Geotechnical Engineering faculty. The exam will include both written and oral components. The exam should be taken after the first semester (Fall or Spring) of study and no later than the end of the second semester (Fall or Spring) of study. In the geotechnical area, the written component is typically taken the week before the second semester of study.
- **Degree Plan:** An advisory committee must be formed and a Degree Plan must be submitted and approved by the advisory committee after passing the Qualifying Exam. An official degree plan must be submitted to the Office of Graduate and Professional Studies (OGAPS) for approval. The degree plan must be approved by your advisory committee members, your department head, and finally OGAPS. To submit a degree plan, log into the Document Processing Submission System (DPSS) [https://ogsdpss.tamu.edu/](https://ogsdpss.tamu.edu/). Tutorials are found at [http://ogaps.tamu.edu/New-Current-Students/Workshops-and-Tutorials](http://ogaps.tamu.edu/New-Current-Students/Workshops-and-Tutorials). Doctor of Philosophy students must submit their degree plan by the second month of their fifth semester, or after completing 36 credit hours; whichever comes first.

- **Written Preliminary Exam:** After completion of the coursework listed on the Degree Plan (with the exception of CVEN 691 Research), but no later than the end of the fifth semester (Fall or Spring) of study, a Written Preliminary Examination will be scheduled with members of the advisory committee. This exam consists of written questions from the advisory committee. The exam in total should be given over a period of one week.

- **Research Proposal:** As soon as the research project can be outlined in reasonable detail, but no later than the end of the fifth semester (Fall or Spring) of study, the dissertation research proposal should be completed. The Research Proposal shall describe the proposed research, including relevant background information, and clearly demonstrate how this research will make a unique contribution of new knowledge to the student's area of study. Upon approval of the Research Proposal by the advisory committee chair, the Research Proposal must be submitted to other members of the advisory committee at least 2 weeks (10 working days) prior to the Oral Preliminary Exam.

- **Oral Preliminary Exam:** After passing the Written Preliminary Exam, but no later than the end of the fifth semester (Fall or Spring) of study, an Oral Preliminary Examination will be scheduled with members of the advisory committee. At this examination, the student will give a presentation of the Research Proposal. The questions in this exam will cover the Written Preliminary Exam, the Oral Preliminary Exam presentation, and any relevant coursework.

- **Completion of Dissertation:** Upon approval of the Dissertation by the advisory committee chair, the Dissertation will be submitted to the other members of the advisory committee at least 2 weeks (10 working days) prior to the Final Defense.
- **Final Defense:** A Final Defense consisting of an oral examination will be scheduled with all of the advisory committee members. At this examination, the student will give a presentation of the research work completed for the degree and documented in the Dissertation. The student is encouraged to invite other interested individuals to the research presentation.

C. Coursework:

The student's advisory committee, in consultation with the student, will select coursework to complement the overall objectives of the proposed degree plan. Particularly for the Ph.D. degree, courses must be chosen so as to complement your research program as well as any future career goals. The courses listed below will typically have other graduate level courses as pre-requisites.

1. Courses within Specialty Area Geared for Research Students

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<tr>
<td>CVEN 673</td>
<td>Transport Phenomena in Porous Media</td>
</tr>
<tr>
<td>CVEN 683</td>
<td>Dynamic Soil Structure Interaction</td>
</tr>
<tr>
<td>MEMA 647</td>
<td>Theory of Finite Element Analysis</td>
</tr>
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</table>

2. Graduate Courses required for MEng and MS students

The courses listed below are the core course requirements for our master's students. The same courses are required of all our Ph.D. students. An exception is made for students who obtained their MS or MEng in geotechnical engineering at Texas A&M University. These courses frequently serve as pre-requisite courses for higher level courses.

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<tr>
<th>Course</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 649 Physical and Engineering Properties of Soil</td>
<td>Yearly</td>
</tr>
<tr>
<td>CVEN 651 Geomechanics</td>
<td>Yearly</td>
</tr>
<tr>
<td>CVEN 667 Slope Stability and Retaining Walls</td>
<td>Yearly</td>
</tr>
<tr>
<td>CVEN 687 Foundation Engineering</td>
<td>Yearly</td>
</tr>
</tbody>
</table>

A student is required to take one of these courses as part of their doctoral program to: (1) to ensure knowledge of design codes if their corresponding graduate coursework was in another country, or (2) their master's degree was not in civil engineering and their curriculum would benefit from these core courses for a possible future in academia, or even in practice, within civil engineering.
The following courses are recommended for the MS and MEng students. While none of these courses are required for our doctoral students, these frequently serve as pre-requisite courses for higher level courses. Most students admitted into our program have already taken these courses as part of their own master’s curriculum.

<table>
<thead>
<tr>
<th>Course</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 645 Geotechnical Site Investigations</td>
<td>Alternate years</td>
</tr>
<tr>
<td>CVEN 647 Numerical Methods in Geotechnical Engr</td>
<td>Yearly</td>
</tr>
<tr>
<td>CVEN 652 Soil Dynamics</td>
<td>Alternate Years</td>
</tr>
</tbody>
</table>

3. Additional Graduate Elective Courses within Department

The courses listed below are also offered within the Geotechnical Engineering specialty area and may be applicable to a student depending to their research focus:

<table>
<thead>
<tr>
<th>Course</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 613 Micromechanics of Civil Engineering Materials</td>
<td>Alternate Years</td>
</tr>
<tr>
<td>CVEN 658 Civil Engineering Applications of GIS</td>
<td></td>
</tr>
<tr>
<td>CVEN 686 Offshore and Coastal Structures</td>
<td>Alternate Years</td>
</tr>
</tbody>
</table>

Several other courses are available throughout the department that may also be applicable. Some recommended courses include:

- AGRO 617 Advanced Soil Physics
- AGRO 624 Physical Chemistry of Soils
- AGRO 626 Soil Mineralogy
- GEOL 635 Engineering Geology
- MEMA 601 Theory of Elasticity
- MEMA 602 Continuum Mechanics
- MEMA 605 Energy Methods
- MEMA 611 Fundamentals of Engineering Fracture Mechanics
- MEMA 641 Plasticity Theory
- MEMA 647 Theory of Finite Element Analysis
- MEMA 648 Nonlinear Finite Element Methods in Structural Mechanics
- MATH 601 Methods in Applied Mathematics I
- MATH 602 Methods in Applied Partial Differential Equations
- OCNG 630 Geological Oceanography
- STAT 601 Statistical Analysis
Graduate Coursework
Pre-requisite Coursework

All of the following courses (and their pre-requisites) are considered prerequisite to any graduate program of study in geotechnical engineering:

- CVEN 302 – Computer Applications in Engineering and Construction
- CVEN 305 – Mechanics of Materials
- CVEN 365 – Introduction to Geotechnical Engineering
- MATH 308 – Differential Equations

None of these courses may be counted towards any graduate degree in geotechnical engineering.

You may have been required to complete additional pre-requisites as part of your admission into the program. Those classes also cannot be applied towards the credit hour requirement. Pre-requisite coursework needs to be completed during your first semester at Texas A&M University, as they are pre-requisites for all our courses.

If you completed a pre-requisite before arriving at Texas A&M University and need it waived, you must bring a copy of your transcript showing the final grade in the course as well as a copy of the course syllabus to Dr. Sanchez. You can drop it off in his box or with the Administrative Assistant on the 8th floor of the DLEB Building. These will then be reviewed to see if indeed they satisfy the requirements, at which time this information will be communicated to the Civil Graduate Office. The review process can take up to two weeks.

Course Description & Typical Schedule

A range of courses are offered within the Zachry Department of Civil Engineering. For a full listing and description of the courses, please refer to the Graduate Course Catalog. Keep in mind that graduate courses are typically only offered once a year at most, with many of the elective courses only being offered on alternate years.
Funding Opportunities
Research Assistantships

Research Assistantship (RA) positions are offered through individual faculty members. There is no centralized list of available positions. You'll need to set-up appointments to meet with them individually. You are strongly recommended to go through our department’s web site to identify the different research areas each professor is working in before meeting with them.

Teaching Assistantships

New students are automatically considered for the small number of available positions based on their graduate application package. For all other students, a call for those interested in TA positions will typically occur a few weeks before the semester starts. Please wait for the email announcement and/or posted fliers announcing that TA applications.

If you are an international student, you must have satisfactorily passed the ELPE exam before being considered for a TA position.

Fellowships

Fellowships are typically awarded to incoming students, and there is no formal application process. Any request for fellowships must come from your research advisor, who is recommending you for this award.

Tuition Waivers & In-state Tuition

Tuition waivers do not exist by themselves – Research and Teaching Assistantship positions will include coverage of your tuition. Additionally, you can qualify for in-state tuition if you were awarded a Fellowship.

Other job opportunities

The faculty and graduate advisors do not coordinate nor know of any student worker positions in the department. If you are interested or need to pursue job opportunities beyond the TA/RA positions, you may want to look at: http://jobforaggies.com
Additional Information
Full-Time Enrollment

Required credit hours to be certified as a full-time are:

- Fall and Spring semesters: 9 hours
- 10-week summer semester: 6 hours

Graduate students may be certified as full time with fewer than the required hours under special circumstances, including:

- During their final semester before graduation;
- Presence of a documented disability that mandates a reduced course load

These exceptions may or may not apply to a student's eligibility for certain types of financial aid. Students who have questions about how exceptions to the full time enrollment requirements will affect their scholarships, loans, grants, etc., should confer with their financial aid counselor.

In most cases, international students are eligible for the same exceptions to full time requirements; however, all international students requesting an exception to full time requirements must have their request approved by International Student Services. Students who are not U.S. citizens, but who are permanent U.S. residents (VISA TYPE = IM) are not required to clear with ISS on enrollment exceptions.

A student who is enrolled in less than a full-time course of study at Texas A&M may be in jeopardy of:

- being out of compliance with the Bureau of Citizenship and Immigration Services (formerly INS) if enrolled at Texas A&M on a student visa;
- losing their Research or Teaching Assistantship position
- losing insurance coverage under his or her parent/guardian’s insurance policy;
- being placed on a loan repayment schedule by a lender or guarantor if the student is the recipient of Federal financial aid; and/or
- losing a scholarship if the guidelines for receiving the scholarship require full-time enrollment, etc.
Mailboxes

All graduate students will have a mailbox assigned to them on the 7th floor of the DLEB building. They usually get created for new students by the 2nd or 3rd week of classes. You must get in the habit of checking that mailbox on a regular basis, as sometimes critical information from the University and/or Department will be sent to your campus mailbox rather than your mailing address.

Student Offices

Requests for desks in a graduate student office can be made by completing the request form here: https://helpdesk.civil.tamu.edu/. There are more graduate students than desk space, therefore assignments will be based on priority and availability of space. Funded students (assistantship, fellowship, etc.) are given first priority. If you have any questions, please contact the Graduate Advisor, Mr. Chris Grunkemeyer in the CVEN Graduate Office in DLEB 101.

Academic Probation

Graduate students must maintain 3.0 GPR. This requirement includes courses in degree plan as well as all graduate courses taken. If a course is repeated, the last grade received will be the one utilized in GPR calculation. If a student’s GPR falls below 3.0, the student will need to meet with their graduate advisor to set out a plan to raise GPR to above 3.0 within one semester. Under extenuating circumstances, a second semester may be allowed for the student to raise their GPR.

Once a plan has been devised, it will be forwarded to the main CE Graduate Office. If the student fails to raise their GPR, they will be removed from the geotechnical engineering graduate program.
Frequently Asked Questions
Degree Plans

1. **What is the difference between the MS and MENG degree?**
   - MEng (Master of Engineering) - non-thesis option requiring 30 hours of graduate credit
   - MS (Master of Science) - thesis option requiring 32 hours of graduate credit

   Accordingly, the MS degree is more research oriented and MENG is more course oriented and geared towards professional practice.

2. **I have taken a graduate level course in which I got a C. This course is already present on my degree plan. Can I keep the course on the degree plan?**

   Yes. The requirement for graduate students is to maintain a GPA of 3.0 on the degree plan. The intent of the degree plan is to identify the appropriate course of study for your chosen degree as determined by your advisor. Once the courses have been chosen and placed on an approved degree plan, it is the student’s responsibility to maintain a 3.0.

   It is NOT the intent of the degree plan to allow students to take courses and then, after taking the courses and receiving a grade, to choose whether or not the courses are to be included in the degree plan. A student is NOT to choose only those courses for inclusion in the degree plan for which he/she may receive grades of A or B!

3. **Can I change the courses on my degree plan once it is filed?**

   Yes, the student can change the courses by filing a Petition. The Petition must be signed by ALL committee members AND the department head. The Petition must subsequently be filed with the Office of Graduate Studies (OGS) and approved.

4. **Can I change my degree status once I’ve been admitted?**

   Yes, once admitted to graduate school, a student may file a Petition to change a degree status. The Petition must be signed by the department head and then filed with the Office of Graduate and Professional Studies (OGAPS) and approved. International students must check with the International Student Services Office to maintain legal status.

5. **Can I change my degree status once a degree plan is filed?**

   Yes, the student must file a Petition that is available electronically through the Office of Graduate and Professional Studies (OGAPS) website. The Petition will include any changes needed to the degree plan. The Petition must be signed by ALL committee members AND the
department head. The Petition must subsequently be filed with the Office of Graduate Studies (OGS) and approved.

6. **Are leveling courses to be included in the degree plan even though they cannot be counted towards the required number of credits?**

   Leveling courses should be listed at the bottom of the degree plan as prerequisites.

7. **Who should be on my degree plan committee?**

   MEng degree committee: a standard committee for all students
   - Chair: Dr. M. Sanchez

   MS and PhD degree committee: students must identify a professor within the area of geotechnical engineering to serve as their research advisor, who serves as the chair. Other members will be selected based on discussions with the committee chair, with at least one member from outside the CVEN department.

8. **When should I file the degree plan?**

   MEng and MS: students should file by the second month of their second semester.

   PhD: students must file after passing their Qualifying Exam and then by the second month of their fifth semester or after completing 36 hours; whichever comes first.

   Keep in mind: OGAPS will block student from further registration if a degree plan is not filed by the second semester deadline set by them. If you are blocked, you cannot register and therefore could jeopardize potential funding.

### Assistantships

1. **There are two different types of courses for the summer, 5-week courses and 10-week courses? How can I register to satisfy the full-time status for my RA/TA?**

   To be considered a full-time student for the Summer, a student must register for a minimum of 6 credit hours in one of the two following ways:
   - 6 credit hours during the 10-week summer term OR
   - 3 credit hours during each 5-week summer term

   To hold an assistantship for the Spring and Fall semesters, the student needs to register for a minimum of 9 hours in order to be considered full-time.
No other combinations are allowed.

2. **How do I apply for a Teaching Assistant (GAT) position?**

A call for those interested in TA positions will typically occur a few weeks before the semester starts. Please wait for the email announcement and/or posted fliers announcing that TA applications.

3. **How do I apply for a Research Assistant (RA) position?**

In order to apply for a RA, a student must contact the professors in geotechnical engineering. The individual professors handle funding and will be able to inform students about openings for research positions.

4. **I am a foreign student and English is my second language. Can I apply for a TA? What is the requirement?**

International students whose native language is not English and who wish to apply for a TA position must fulfill an English proficiency requirement. The English Proficiency Certification is required before a graduate student is eligible to apply to serve as a TA or in any other position considered to be a teaching position.

It is best to meet this proficiency requirement early in a student's program. More information is available at: [http://admissions.tamu.edu/international/graduate](http://admissions.tamu.edu/international/graduate) or with ISS (International Student Services) [http://iss.tamu.edu/Current-Students/Resources/English-Language-Proficiency-Exam-(ELPE)](http://iss.tamu.edu/Current-Students/Resources/English-Language-Proficiency-Exam-(ELPE))

### Probation

1. **What is the criteria on probation?**

Graduate students are expected to maintain a Grade Point Ratio (GPR) equal to or better than 3.0 throughout the duration of their graduate study. This requirement applies to each of cumulative, degree plan, and semester GPR. It is also a prerequisite for receiving a graduate degree in civil engineering.

2. **What happens after one semester on probation if my GPR is not back up to 3.0?**

When a student’s GPR (either cumulative, degree plan or semester) falls below 3.0, the student is placed on probation by the department. Notifications are made by letter to the student, the advisor, and other pertinent offices within the university. The student must then meet with their graduate advisor and determine a plan to bring their GPR up to a 3.0 within one semester.
3. **What if the GPR requirement is satisfied after one semester, but falls again below 3.0 in another semester?**

If after one semester on probation a student's cumulative or degree plan GPR is not back up to 3.0, the Office of Graduate Studies will be asked to remove the student from the graduate studies program. If extenuating circumstances exist, probation time may be extended for one more semester, allowing the student a final chance to meet the minimum GPR requirement.

4. **I took a course in which I got an ‘I’ for incomplete. After one semester, it becomes an F. Now I am on probation. What can I do to change the F back to a better grade?**

The student must complete the course work for which an ‘I’ was received by submitting it to the professor. The professor will then submit a grade change form. This change may or may not change the student's GPR, depending on the final grade received. The student will remain on probation until the registrar has changed the grade in the system.

5. **Does I (incomplete) in 691 (research) 684 (professional internship), or 692 (Professional study) become an F after one semester?**

No, these courses are excluded from that rule.

6. **Does an ‘I’ (incomplete) of 685 (problems) become an F after one semester?**

Yes, if you receive an F in 685, it will turn to an F after one semester. The course 685 is a letter grade course and therefore is not excluded from the rule.
Construction Engineering and Management Graduate Student Handbook

Zachry Department of Civil Engineering

Last updated: July, 2018
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Overview
Program Overview

The Construction Engineering and Management (CEM) program develops knowledge, tools, and methods that can add value to construction projects and organizations with a focus on risk management. In mature industries such as construction, successfully managing risk largely determines the success or failure of development projects and enterprises. By developing basic risk management skills and participating in leading edge research, students can position themselves to make enormous differences in for-profit, government, and non-profit development organizations. Understanding the nature and structure of development risk provides a foundation for modeling, quantifying, and mitigating those risks. The program integrates three themes in its research and teaching focus:

- development processes and management issues that drive and constrain progress, including the dynamics of rework, dysfunctional management teams, procurement process selection, fast-track implementation, and resource allocation;
- risks that threaten performance, including implementable quantitative assessment, performance prediction and control under uncertainty, real options in construction, and risk management decision-making;
- means of improving construction, including advanced materials, integrated modeling of processes and management, and information technology.

Construction engineering and management faculty apply a variety of research methods to these issues to build and test potential theories with data. For example, statistical models of dependence among construction phases and activities illuminate the effects of project structure on contingencies. Advanced construction materials are used to build and describe the behavior of structural members in laboratories. Controlled experiments with human subjects describe how managers assess and choose risk strategies for comparison with results from computer models based on theories from finance and economics. Surveys of experts and direct observations of construction operations form the basis for new processes and practices.
Interviews of practitioners about project management policies are integrated with dynamic simulation models of rework and quality to analyze resource allocation efficiencies.
Relevant Faculty Members

Administration

Department Head: Dr. Robin Autenrieth
Associate, Dept. Head: Dr. Yunlong Zhang (graduate)
Division Head: Dr. Stefan Hurlebaus (Construction, Geotechnical, & Structures)

Construction Engineering and Management Faculty

<table>
<thead>
<tr>
<th>Name</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anderson, Stuart</td>
<td>979-845-2407</td>
<td><a href="mailto:stuarta@civil.tamu.edu">stuarta@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Damnjanovic, Ivan</td>
<td>979-862-6616</td>
<td><a href="mailto:idamnjanovic@civil.tamu.edu">idamnjanovic@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Ford, David*</td>
<td>979-845-3759</td>
<td><a href="mailto:dford@civil.tamu.edu">dford@civil.tamu.edu</a></td>
</tr>
<tr>
<td>Mostafavi, Ali</td>
<td>979-845-4856</td>
<td><a href="mailto:mostafavi@exchange.tamu.edu">mostafavi@exchange.tamu.edu</a></td>
</tr>
<tr>
<td>Wolf, Charles</td>
<td>979.458.3359</td>
<td><a href="mailto:chuck.wolf@tamu.edu">chuck.wolf@tamu.edu</a></td>
</tr>
<tr>
<td>Walewski, John</td>
<td>979-862-5673</td>
<td><a href="mailto:jwalewski@civil.tamu.edu">jwalewski@civil.tamu.edu</a></td>
</tr>
</tbody>
</table>

* Graduate Student Advisor

Faculty Research Interests:

Prof. Ford: Recovery from disaster, Managerial real options, Construction as a product development process, Project management process design, System dynamics

Prof. Damnjanovic: Management of project development, Project finance, Construction management, Transportation infrastructure, Dynamics of reconstruction


Prof. Walewski: Risk management, international construction risk assessment, alternative project delivery methods, climate change and sustainable design and construction, construction technology
## Construction Engineering and Management Core Courses

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Name</th>
<th>Instructor</th>
<th>Typ. Sem. Taught</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 638</td>
<td>Computer Integrated Construction Engineering Systems</td>
<td>Walewski</td>
<td>Fall</td>
</tr>
<tr>
<td>CVEN 639</td>
<td>Method Improvements for Construction Engineering</td>
<td>Walewski</td>
<td>Spring</td>
</tr>
<tr>
<td>CVEN 640</td>
<td>Project Development: Methods and Models</td>
<td>Damnjanovic</td>
<td>Spring (typically taught in alternating years with CVEN 710 taught the other year)</td>
</tr>
<tr>
<td>CVEN 641</td>
<td>Construction Engineering Systems</td>
<td>Mostafavi</td>
<td>Spring</td>
</tr>
<tr>
<td>CVEN 644</td>
<td>Project Risk Management</td>
<td>Damnjanovic</td>
<td>Spring</td>
</tr>
<tr>
<td>CVEN 654</td>
<td>Strategic Construction and Engineering Management</td>
<td>Ford</td>
<td>Fall</td>
</tr>
<tr>
<td>CVEN 668</td>
<td>Advanced EPC Project Development</td>
<td>Mostafavi</td>
<td>Fall</td>
</tr>
<tr>
<td>CVEN 689</td>
<td>Engineering Project Estimating and Planning*</td>
<td>Wolf</td>
<td>Fall and Spring</td>
</tr>
<tr>
<td>CVEN 710</td>
<td>Engineering Project Finance</td>
<td>Damnjanovic</td>
<td>Spring (typically taught in alternating years with CVEN 640 taught the other year)</td>
</tr>
<tr>
<td>CVEN 717</td>
<td>Engineering Project Controls</td>
<td>Ford</td>
<td>Fall</td>
</tr>
</tbody>
</table>

* Cannot be taken if CVEN473 is a required prerequisite (leveling course) for entry into the CEM program. CVEN 644 Project Risk Management is a prerequisite for this course when CVEN 644 is taken in the fall and a co-requisite for this course when CVEN 644 is taken in the spring.
Not every course on this list is taught every year. However, the courses above are typically (but not always) taught in the semester indicated. Use the Texas A&M "Howdy" web based system to identify which courses will be offered in which semesters.
Degree Programs
Degree of Master of Engineering

A minimum of 30 semester credit hours of approved courses is required for the Master of Engineering degree (MEng). The university places limitations on these credit hours in addition to the requirements of the CEM program listed below. A key requirement is that approximately 1/3 of the 30 required credit hours of coursework must be taken outside the major area of study, Construction Engineering and Management for our program. A complete discussion of university requirements is found in the current Texas A&M University Graduate Catalog (available on the Internet at http://www.tamu.edu/admissions/catalogs/) under the heading “The Degree of Master of Engineering.” In addition to the University requirements, the Department of Civil Engineering also has limitations on credit hours for the MEng program. These requirements can be found at: https://www.civil.tamu.edu/downloads/GraduateInfo/CE-ME.pdf. Finally, the requirements of the construction engineering and management MEng program listed below are in addition to the University and Department requirements.

A. Advising Committee

The Master of Engineering program has a single advisor or chair. Students are assigned a CEM graduate student advisor from the CEM faculty by the CEM graduate program coordinator. No external members are required for this degree plan.

B. Prerequisites

All of the following courses and their pre- and corequisite coursework are considered prerequisites to the MEng program of study in construction engineering and management (CEM): CVEN 349, CVEN 405, CVEN 473, or equivalents that are approved by the CEM Graduate Advisor. Courses listed in acceptance papers for which a student lacks credit must be completed, but those credits cannot be applied toward the 30 semester credit hour requirement. Pre-requisite coursework must be completed during your first semester at Texas A&M University, as they are pre-requisites for all CEM graduate courses.

C. Degree Plans

The degree plan for Master of Engineering students has a set of common courses, and the elective courses listed are chosen to enhance the overall education for a practicing CEM engineer. A standard degree plan has been devised for all Master of Engineering students. In addition, two one year programs have been developed to support industry needs in the heavy
civil engineering sector of construction. Courses may only be changed to the prescribed alternates by the approval of the student’s advisor (chair).

Enter and submit your proposed degree plan on the internet at http://ogs.tamu.edu/electronically to your graduate advisor for their electronic approval. Master of Engineering students must submit their degree plan by the middle of their second semester after starting their coursework. The office of graduate studies blocks students from further registration if a degree plan is not filed before the end of their second semester of study. If you are blocked, you are not considered a full time student and become ineligible to receive any assistantship.

1. Standard Degree Plan – ME Students

Core Courses (must have 18 credit hours from courses below)

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Name</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>CVEN 717</td>
<td>Engineering Project Controls (Ford)</td>
<td></td>
</tr>
</tbody>
</table>

Not every course on this list will be taught every year. The student must confirm the availability of these courses when preparing a degree plan. Use the “Howdy” web based system to identify which courses will be offered in which semesters. If courses are not offered during your enrollment period and only if this prevents you from completing the required 18 credit hours by the time all course requirements can be met, replacement course(s) must be selected from courses listed in “Additional Coursework.” The student’s advisor must approve these courses.

2. Elective Coursework – 12 hours

The student’s advisory chair, in consultation with the student, will select a minimum of 12 additional semester credit hours of coursework to complement the overall objectives of the proposed degree plan (see requirements below). Depending on the degree plan, a maximum of 3 semester credit hours of CVEN 685, Directed Study, can be applied toward this requirement. The use of CVEN 685 credits for the proposed degree plan requires formal approval of the...
student's graduate advisor. Note that there is no minimum requirement for CVEN 685 credit. Further, depending on the degree plan, a maximum of two semester credit hours of CVEN 684, Professional Internship, can be applied toward this requirement. The use of CVEN 684 credits for the proposed degree plan requires formal approval of the student's graduate advisor, including objectives for the internship. A maximum of 12 credit hours of 689 courses are allowed.

**Additional Coursework (minimum of 12 semester credit hours):**

The following courses are the approved electives for the ME degree plan. You must choose one elective from the following. Not all courses may be offered:

- CVEN – Any graduate course with the approval of the CEM Advisor with the following courses recommended:
  - CVEN 689 Engineering Project Estimating and Planning (cannot be taken if CVEN473 is a prerequisite [leveling course]. CVEN 644 is a prerequisite for this course if taught in the fall and a co-requisite if taught in the spring.)
  - CVEN 689 – Machine Intelligence & Applications in Civil Engineering
  - CVEN 752 – Smart Structures (requires having passed a structural dynamics course)
  - CVEN 612 – Micromechanics of Civil Engineering Materials
  - CVEN 614 – Stabilization of Soil-Aggregate Systems
  - CVEN 615 – Structural Design of Pavements
  - CVEN 618 – Traffic Engineering: Operations
  - CVEN 622 – Properties of Concrete
  - CVEN 624 – Infrastructure Engineering and Management
  - CVEN 626 – Roadside Safety Design
  - CVEN 635 – Street and Highway Design
  - CVEN 637 – Rigid Pavement Analysis and Design
  - CVEN 646 – Geotechnical Site Investigation
  - CVEN 649 – Physical and Engineering Properties of Soil
  - CVEN 653 – Bituminous Materials
  - CVEN 658 – Civil Engineering Applications of GIS
  - CVEN 659 – Behavior and Design of Steel Structures
  - CVEN 667 – Slope Stability and Retaining Walls
- CVEN 689 Special Topics on: Engineering Project Estimating and Planning (cannot be part of degree plan if CVEN473 or equivalent has been taken or is a prerequisite, approval required)
Construction Engineering and Management Graduate Handbook

- CVEN 684 – Professional Internship (approval required)
- CVEN 685 – Directed Studies (approval required)
- STAT 601 – Statistical Analysis
- ISEN 625 – Simulation Methods and Applications
- ISEN 627 – Engineering Analysis of Decision Making
- ISEN 663 – Engineering Management Control Systems
- ISEN 667 – Engineering Economy
- ISEN 670 Theory of Socio-Technical Systems
- COSC 463 – Advanced topics in Construction Law (with advisor approval only)
- MGMT 655* – Survey of Management
- ACCT 640* – Accounting Concepts and Procedures
- FINC 635* – Financial Management for Non-Business
- MKTG 621* – Survey of Marketing

NOTES:

1) One-third of the required 30 credit hours of coursework must be taken in fields outside of the major field. For the purposes of meeting this requirement “outside of the major field” means not directly related to construction engineering and management.
2) Only two of the four courses marked with an asterisk (*) may be included in a degree plan.
3) The 689 course number is given to new courses. Once a 689 course is fully accepted by the university, a new course number is given.

3. One Year Construction Engineering Degree Plan – ME Students

Core Courses (must have 15 credit hours from courses below)

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Name</th>
<th>(Instructor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 638</td>
<td>Computer Integrated Construction Engineering Systems (Walewski)</td>
<td></td>
</tr>
<tr>
<td>CVEN 639</td>
<td>Method Improvements for Construction Engineering (Walewski)</td>
<td></td>
</tr>
<tr>
<td>CVEN 668</td>
<td>Advanced EPC Project Development (Mostafavi)</td>
<td></td>
</tr>
<tr>
<td>CVEN 640</td>
<td>Project Development: Methods and Models (Damnjanovic)</td>
<td></td>
</tr>
<tr>
<td>CVEN 641</td>
<td>Construction Engineering Systems (Mostafavi)</td>
<td></td>
</tr>
<tr>
<td>CVEN 644</td>
<td>Project Risk Management (Damnjanovic)</td>
<td></td>
</tr>
<tr>
<td>CVEN 717</td>
<td>Engineering Project Controls (Ford)</td>
<td></td>
</tr>
</tbody>
</table>

Not every course on this list will be taught every year. The student must confirm the availability of these courses when preparing a degree plan. See “Construction Engineering and Management, Core Courses”
above. Use the “Howdy” web based system to identify which courses will be offered in which semesters. It is recommended that the degree plan be prepared in the first semester of the student’s program. Additional graduate level courses are offered through the department and may be used to satisfy the elective coursework requirement with approval of the student’s advisor.

**Elective Coursework (minimum of 15 semester credit hours):**

The following courses are the approved electives for the ME degree plan under the Construction Engineering option. You must choose elective courses from the following list [note not all courses may be offered]:

- CVEN 689 Engineering Project Estimating and Planning (cannot be taken if CVEN 473 is a prerequisite (leveling course). CVEN 644 is a prerequisite for this course if taught in the fall and a co-requisite for this course if taught in the spring.)
- CVEN 689 – Machine Intelligence & Applications in Civil Engineering
- CVEN 752 – Smart Structures (requires having passed a structural dynamics course)
- CVEN 615 – Structural Design of Pavements
- CVEN 621 – Advanced Reinforced Concrete Design
- CVEN 635 – Street and Highway Design
- CVEN 641 – Construction Engineering Systems
- CVEN 644 – Project Risk Management
- CVEN 654 – Strategic Construction and Engineering Management
- CVEN 658 – Civil Engineering Applications of GIS
- CVEN 659 – Behavior and Design of Steel Structures
- CVEN 667 – Slope Stability and Retaining Walls
- CVEN 671 – Design and Behavior of Prestressed Concrete Structures
- CVEN 710 Engineering Project Finance
- COSC 631 – Supervision of Construction Workforce or COSC 664 Construction Safety Management (but not both)

4. **One Year Construction Project Management Degree Plan**

**Core Courses (must have 16 credit hours from courses below)**

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Name</th>
<th>(Instructor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 639</td>
<td>Method Improvements for Construction Engineering (Walewski)</td>
<td></td>
</tr>
<tr>
<td>CVEN 640</td>
<td>Project Development: Methods and Models (Damnjanovic)</td>
<td></td>
</tr>
</tbody>
</table>

Zacate Department of CIVIL ENGINEERING | TEXAS A&M ENGINEERING
CVEN 641 Construction Engineering Systems (Mostafavi)
CVEN 644 Project Risk Management (Damnjanovic)
CVEN 654 Strategic Construction and Engineering Management (Ford)
CVEN 717 Engineering Project Controls (Ford)

Not every course on this list will be taught every year. The student must confirm the availability of these courses when preparing a degree plan. See "Construction Engineering and Management, Core Courses" above. Use the "Howdy" web based system to identify which courses will be offered in which semesters. It is recommended that the degree plan be prepared in the first semester of the student's program. Additional graduate level courses are offered through the department and may be used to satisfy the elective coursework requirement with approval of the student's advisor.

**Elective Coursework (minimum of 14 semester credit hours):**

The following courses are the approved electives for the ME degree plan under the construction project management option. You must choose elective courses from the following list [note not all courses may be offered]:

- CVEN 689 Engineering Project Estimating and Planning (cannot be taken if CVEN473 is a prerequisite (leveling course). CVEN 644 is a prerequisite for this course if taken in the fall and a co-requisite for this course if taken in the spring.)
- CVEN 689 – Machine Intelligence & Applications in Civil Engineering
- CVEN 752 – Smart Structures (requires having passed a structural dynamics course)
- CVEN 638 – Computer Integrated Construction Engineering Systems
- CVEN 668 – EPC Advanced Project Development
- CVEN 689 – Engineering Risk Analysis
- MGMT 655 – Survey of Management
- FINC 635 – Financial Management for Non-Business

**D. Writing Requirement and Waiver of Final Exam**

The University has a writing requirement for all graduate degrees (whether or not that requirement is met with a research thesis). You will be writing a report as part of your MEng degree effort that will be used to satisfy this requirement. In order to ensure University rules are met, students pursuing the MEng degree need to submit a report you have individually written that contains a minimum of 7,000 words, or approximately 10 pages of text. The requirement is for writing, so text in
figures and equations do not count. Discuss the specific requirements of this report with your advisor and submit it to your advisor. Once your report has been reviewed and certified to meet the writing requirements, your committee chair will send an email to the CE graduate office to waive the final examination requirement. You must provide a minimum of 2 weeks for the review of the report. It is your responsibility to ensure enough time is provided in order to meet the deadlines by the university’s Office of Graduate Studies (http://ogs.tamu.edu/).

At the same time you submit your report(s), you should submit your request for the Waiver of Final Exam form (if you wish to forgo the exam), which is available online through Office of Graduate Studies. Once your report has been reviewed and certified to meet the writing requirements, the waiver form will be signed.

You must provide a minimum of 2 weeks for the review of the report and for the form to be signed. Failure to do so may delay your graduation. It is your responsibility to ensure enough time is provided in order to meet the deadlines by the university’s Office of Graduate Studies (http://ogs.tamu.edu/).


Degree of Master of Science

The Master of Science degree is a research-oriented degree requiring coursework and research. The degree also requires the student to complete and submit a thesis to the University. A minimum of 32 semester credit hours of approved courses is required for the Master of Science degree (MS). At least 25 semester credit hours must be coursework. The university places limitations on these credit hours in addition to the requirements of the CEM program that are listed below. A complete discussion of all university requirements is found in the current Texas A&M University Graduate Catalog (available on the Internet at http://www.tamu.edu/admissions/catalogs/) under the heading “The Degree of Master of Science.” For example, university requirements include a final examination and submission of a thesis to the university. In addition to the University requirements, the Department of Civil Engineering also has limitations on credit hours for the MS program. These requirements can be found at: https://www.civil.tamu.edu/downloads/GraduateInfo/CE-MS.pdf. Finally, the requirements of the construction engineering and management MS program listed below are also in addition to the University and Department requirements.

Advising Committee

The Master of Science program requires that the student have an advising committee consisting of at least a single chair from among the CEM faculty. Other requirements are available from the Zachry Department of Civil Engineering graduate student office.

The chair and the student collaborate in selecting the remainder of the Advisory Committee. The advising committee for the Master of Science degree in CEM must have a minimum of three members from the Texas A&M graduate faculty (the chair counts as a member). There must be at least one member from outside the civil engineering department and there must be a majority from the Department’s CEM graduate faculty.

A. Degree Plan

The student must identify their research supervisor before the start of their second semester of study, at which point an advisory committee will be formed. The student’s advisory committee, in consultation with the student, will develop the proposed degree plan. The proposed degree plan must be typed on the official form as it appears on the Internet at http://ogs.tamu.edu/ and submitted electronically to your graduate committee chair and advisory committee members for their electronic endorsement. The office of graduate studies blocks students from further registration if a degree plan is not filed before the end of their...
second semester of study. If you are blocked, you are not considered a full time student and become ineligible to receive any assistantship.

B. Prerequisites

All of the following courses and their pre- and co-requisite coursework are considered prerequisite to the MS program of study in construction engineering and management: CVEN 349, CVEN 405, CVEN 473, or equivalents that are approved by the CEM Graduate Advisor. Courses listed for which a student lacks credit must be completed in the first semester at Texas A&M, but those credits cannot be applied toward the 32 semester credit hour requirement. Note that you may have been required to complete additional pre-requisites as part of your admission into the program. Those classes also cannot be applied towards the 32 degree credit hour requirement.

C. Required Coursework (16 semester credit hours):

Core Courses (must have 16 credit hours from courses below)

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Name</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 638</td>
<td>Computer Integrated Construction Engineering</td>
<td>Walewski</td>
</tr>
<tr>
<td>CVEN 639</td>
<td>Method Improvements for Construction Engineering</td>
<td>Walewski</td>
</tr>
<tr>
<td>CVEN 640</td>
<td>Project Development: Methods and Models</td>
<td>Damnjanovic</td>
</tr>
<tr>
<td>CVEN 641</td>
<td>Construction Engineering Systems</td>
<td>Mostafavi</td>
</tr>
<tr>
<td>CVEN 644</td>
<td>Project Risk Management</td>
<td>Damnjanovic</td>
</tr>
<tr>
<td>CVEN 654</td>
<td>Strategic Construction and Engineering Management</td>
<td>Ford</td>
</tr>
<tr>
<td>CVEN 717</td>
<td>Engineering Project Controls</td>
<td>Ford</td>
</tr>
</tbody>
</table>

Not every course on this list will be taught every year. The student must confirm the availability of these courses when preparing a degree plan. Use the “Howdy” web based system to identify which courses will be offered in which semesters. If courses are not offered during your enrollment period, replacement courses must be selected from CEM Courses listed under Additional Coursework – CEM Courses. The student’s committee must approve these courses.

Elective Coursework (16 semester credit hours):

The student’s advisory committee, in consultation with the student, will select a minimum of 16 additional semester credit hours of coursework to complement the overall objectives of the proposed degree plan. A maximum of 7 semester credit hours of CVEN 691 Research can be applied toward this requirement.

CEM Courses:
CVEN 689 Engineering Project Estimating and Planning (cannot be taken if CVEN473 is a prerequisite (leveling course. CVEN644 is a pre-requisite for this course if taken in the fall and a co-requisite for this course if taken in the spring.))

CVEN 689 – Machine Intelligence & Applications in Civil Engineering (Paal)
CVEN 752 – Smart Structures (requires having passed a structural dynamics course) (Hurlebas)

CVEN 644 Project Risk Management (Damnjanovic)
CVEN 668 Advanced EPC Project Development (Mostafavi)
CVEN 710 Engineering Project Finance (Damnjanovic)
CVEN 717 Engineering Project Controls (Ford)
CVEN 689 Special Topics on: Engineering Project Estimating and Planning (cannot be part of degree plan if CVEN473 or equivalent has been taken or is a prerequisite, approval required)

Non-CEM Courses

CVEN 691 Research (up to a maximum of 7 credit hours to support Thesis)
CVEN Any graduate course with the approval of the student’s advisory committee (see list under standard ME degree)
STAT 601 Statistical Analysis
STAT 602 Statistical Methods of Regression Analysis
STAT 606 Design of Experiments
STAT 607 Sampling
STAT 608 Least Squares and Regression Analysis
STAT 609 Ordered Statistics and Non-Parametric Methods
STAT 659 Applied Categorical Data Analysis
ISEN 625 – Simulation Methods and Applications
ISEN 627 – Engineering Analysis of Decision Making
ISEN 668 – Engineering Management Control Systems
ISEN 667 – Engineering Economy
ISEN689 Theory of Socio-Technical Systems
MGMT 655 – Survey of Management

Additional graduate level courses are offered throughout the department and may be used to satisfy the elective coursework requirement with approval of the student’s advisory committee. Particularly for the MS degree, courses must be chosen so as to
complement the student’s research program. All five courses listed under Required Coursework can be used to satisfy this requirement as well.

Other Relevant Non-Technical Coursework – up to a total of 3 hours – replaces three hours of additional coursework listed under Elective Coursework

Certain courses being offered under the Architecture and the Business Schools are directly relevant to construction engineering and management practice and a maximum of 3 semester credit hours may be counted towards the required coursework. Courses pre-approved for the MS degree are:

- COSC 463  Introduction to Construction Law
- ACCT 640  Accounting Concepts and Procedures
- FINC 635  Financial Management for Non-Business
- MKTG 621  Survey of Marketing

A Master of Science Process

- **Step 1 – Find an advisor that you want to work with and who wants to work with you:** It helps if you have one or more topics that you would like to research for your thesis work. It also helps if those topics are of interest to your advisor, and is best if they are actively researching that topic.

- **Step 2 – Form an Advisory Committee:** Students are required to form an advisory committee within the first two semesters of study. The committee consists of 3 or more graduate faculty members. The chair of the committee must be from the Department of Civil Engineering. At least one member of the committee must be from outside the Department of Civil Engineering.

- **Step 3 - Submit Degree Plan:** A degree plan is required to be filed with the Office of Graduate Studies by the end of the student's second semester. The degree plan formally declares your degree objectives, the membership of your advisory committee, and the specific courses you will be required to complete as part of your degree program.

- **Step 4 - Submit Research Proposal:** The research proposal outlines the research that you will conduct in pursuit of a degree. This proposal outlines the strategies and methods that will be used, data required, etc. The proposal must be approved by the advisory committee.
Step 5 - Do the research and write the thesis: A draft of the thesis must be approved by the advisory committee. Consult the Thesis Clerk or review the Thesis Manual for the formatting guidelines.

Step 6 - Apply for Degree: Contact the Graduate Program office for specific dates.

Step 7 - Final Defense: A final oral examination is required. The student presents and defends his or her research efforts, as given by the thesis. The examination should emphasize the methodology and results of the thesis. The exam should also afford students an opportunity to make a logical, effective oral presentation, complete with visuals, and demonstrate their ability to respond to questions by the advisory committee. With the passing of the final examination and acceptance of the thesis by the advisory committee, the thesis, with approval from
Doctor of Philosophy

The Doctor of Philosophy (Ph.D.) degree is a research-oriented degree requiring a minimum of 64 semester credit hours of approved courses and research beyond the Master of Science (M.S.) degree [96 credit hours beyond the Bachelor of Science (B.S.) degree]. The university places limitations on these credit hours in addition to the requirements of the Department of Civil Engineering and the Construction engineering and management program listed below.

A complete discussion of all university requirements is found in the current Texas A&M University Graduate Catalog (available at http://www.tamu.edu/admissions/catalogs/) under the heading "The Degree of Doctor of Philosophy." For example, university requirements include a preliminary examination, a final examination, and submission of a dissertation to the university.

NOTE: All documents requiring departmental signatures must be submitted to the Civil Engineering Graduate Office at least one day prior to the Office of Graduate Studies deadline.

A. Advising Committee

The student must select an Advisory Committee Chair, who will serve as their graduate advisor, from the Department’s CEM graduate faculty. A student can have a co-chair from a faculty member that does not have an appointment with the Department’s structural engineering group, but only with the approval of the chair, who is a member of the Department’s CEM faculty. A committee must have either one Chair or one Chair and one Co-Chair.

The chair and the student collaborate in selecting the remainder of the Advisory Committee. The advising committee for the PhD degree in CEM must have a minimum of four members from the Texas A&M graduate faculty (the chair counts as a member). There must be at least one member from outside the civil engineering department and there must be a majority from within the department, with at least two members being from the Department's CEM faculty (the chair counts as one of these members).

B. Departmental Requirements

In addition to fulfilling the University requirements for the Doctor of Philosophy (Ph.D.) degree, a student enrolled in the Civil Engineering graduate program in the area of construction engineering and management must satisfy the following department requirements.

- A minimum of 32 credit hours of graduate level coursework taken through Texas A&M University (a minimum of 24 credit hours if the student already has taken at least another
24 credit hours of graduate course work for the Master of Science (M.S.) or Master of Engineering (M.E.) degree.

- Remaining coursework requirement can be met by 32 hours of CVEN 691

C. Construction Engineering and Management Area Requirements

The student must also satisfy the following area requirements and/or recommendations described below:

- **Qualifying Exam:** A Qualifying Examination will be scheduled with members of the Construction Engineering and Management faculty. The exam should be taken prior to the student’s second semester (Fall or Spring) of study. A student may get special approval for a time extension of one additional semester if leveling courses (either technical or in English language) are required. Contact Prof. Damjanovic or Walewski to apply for a time extension. For direct to PhD students, the exam should be taken prior to the student’s fourth semester of study. The exam will include both written and oral sessions (closed book) based on materials in undergraduate civil engineering courses with a focus on construction courses. The undergraduate construction courses in the department are a good guide to this part of the exam material. The student must demonstrate a graduate level understanding of the undergraduate material. Once the student’s written exam is graded and determined to have passed that portion of the exam, an oral examination will be scheduled, usually to occur during the first or second weeks of the semester. The purpose of the oral exam is: 1) to explore any fundamental deficiencies that were uncovered during the written exam (students should prepare to answer these questions again during the oral exam); and 2) to make sure that the student possesses an understanding of basic undergraduate civil engineering material (including material beyond CEM), 3) to make sure that the student possesses reasonable oral communication skills required to solve and articulate engineering problems and perform and present research. The committee will typically not inform the student of the results of the examination at the time of the oral exam. If a student fails the qualifying exam the first time, they are allowed to take both portions of the exam a second time at the start of the next semester (fall or spring). If a student fails the qualifying exam a second time, they will be terminated from the PhD program in CEM. In the CEM area, Professor Damjanovic manages the written component and Dr. Walewski manages the oral portion of the qualifying exams. Contact them for more detail.

- **Degree Plan:** An advisory committee must be formed that is chaired by a member of the Department’s CEM faculty and includes at least one additional member of the Department’s CEM faculty. A Degree Plan must be submitted and approved by the advisory committee after passing the Qualifying Exam and before course registration during their third semester (Fall or Spring) of study. The proposed degree plan must be typed on the official form as it appears on the Internet at http://ogs.tamu.edu/ with endorsements by the student’s advisory committee.
- **Written Preliminary Exam:** After completion of the coursework listed on the Degree Plan (with the exception of CVEN 691 Research), but ideally no later than the end of the fourth semester (Fall or Spring) of study, a Written Preliminary Examination will be scheduled with members of the advisory committee. The specific scope is defined by the committee members and may include any topic in CEM. The goal is to get preliminary feedback early during the research process, so the preliminary exam should not be delayed. The Office of Graduate Studies (OGS) requires that this exam be completed at least 90 days before the final defense.

- **Research Proposal:** As soon as the research project can be outlined in reasonable detail, but no later than the end of the fifth semester (Fall or Spring) of study, the dissertation research proposal should be completed. The Research Proposal shall describe the proposed research, including relevant background information, and clearly demonstrate how this research will make a unique contribution of new knowledge to the student’s area of study. Upon approval of the Research Proposal by the advisory committee chair, the Research Proposal must be submitted to other members of the advisory committee at least 2 weeks (10 working days) prior to the Oral Preliminary Exam.

- **Oral Preliminary Exam:** After passing the Written Preliminary Exam, but no later than the end of the fifth semester (Fall or Spring) of study, an Oral Preliminary Examination will be scheduled with members of the advisory committee. At this examination, the student will give a presentation of the Research Proposal. The questions in this exam will cover the Written Preliminary Exam, the Oral Preliminary Exam presentation, and any relevant coursework.

- **Completion of Dissertation:** Upon approval of the Dissertation by the advisory committee chair, the Dissertation will be submitted to the other members of the advisory committee at least 2 weeks (10 working days) prior to the Final Defense.

- **Final Defense:** A Final Defense consisting of an oral examination will be scheduled with all of the advisory committee members. At this examination, the student will give a presentation of the research work completed for the degree and documented in the Dissertation. The student is encouraged to invite other interested individuals to the research presentation.

**D. Recommended Coursework:**

The student’s advisory committee, in consultation with the student, will select coursework to complement the overall objectives of the proposed degree plan. Particularly for the Ph.D. degree, courses are selected to complement your research program as well as future career goals. The courses listed below will typically have other graduate level courses as pre-requisites.
1. Courses within Specialty Area Geared for Research Students

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 640</td>
<td>Project Development: Methods and Models</td>
</tr>
<tr>
<td>CVEN 644</td>
<td>Project Risk Management</td>
</tr>
<tr>
<td>CVEN 654</td>
<td>Strategic Construction and Engineering Management</td>
</tr>
<tr>
<td>CVEN 710</td>
<td>Engineering Project Finance</td>
</tr>
</tbody>
</table>

*Potential alternates CARC 601/602 and MGMT 687

2. Graduate Courses required for MF and MS students

The courses listed below are part of the core course requirements for CEM masters students. While none of these courses are required for our doctoral students, they frequently serve as prerequisite courses for higher level courses. Most students admitted into CEM program have already taken these courses as part of their own master’s curriculum.

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 638</td>
<td>Computer Integrated Construction Engineering Systems</td>
</tr>
<tr>
<td>CVEN 641</td>
<td>Construction Engineering Systems</td>
</tr>
<tr>
<td>CVEN 668</td>
<td>Advanced EPC Project Development</td>
</tr>
<tr>
<td>CVEN 717</td>
<td>Engineering Project Controls</td>
</tr>
</tbody>
</table>

Not every course on this list is taught every year. The student must confirm the availability of these courses when preparing a degree plan. Use the "Howdy" web based system to identify which courses will be offered in which semesters.

A student may decide to take one of these courses as part of their doctoral program to: (1) explore differences in construction and project management practices if their corresponding undergraduate coursework was in another country; or (2) their master's degree was not in civil engineering and their curriculum would benefit from these core courses for a possible future in academia, or even in practice, within civil engineering.
3. Additional Graduate Elective Courses Recommended

The courses listed below are also offered as part of the Construction Engineering and Management specialty area and may be applicable to a student depending on their research focus:

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 689</td>
<td>Engineering Risk Analysis</td>
</tr>
<tr>
<td>STAT 601</td>
<td>Statistical Analysis</td>
</tr>
<tr>
<td>STAT 602</td>
<td>Statistical Methods of Regression Analysis</td>
</tr>
<tr>
<td>STAT 606</td>
<td>Design of Experiments</td>
</tr>
<tr>
<td>STAT 607</td>
<td>Sampling</td>
</tr>
<tr>
<td>STAT 608</td>
<td>Least Squares and Regression Analysis</td>
</tr>
<tr>
<td>STAT 609</td>
<td>Ordered Statistics and Non-Parametric Methods</td>
</tr>
<tr>
<td>STAT 615</td>
<td>Stochastic Processes</td>
</tr>
<tr>
<td>STAT 632</td>
<td>Statistical Design Theory</td>
</tr>
<tr>
<td>STAT 659</td>
<td>Applied Categorical Data Analysis</td>
</tr>
<tr>
<td>ISEN 625</td>
<td>Simulation Methods and Applications</td>
</tr>
<tr>
<td>ISEN 627</td>
<td>Engineering Analysis of Decision Making</td>
</tr>
<tr>
<td>MGMT 634</td>
<td>Seminar in Organizational Behavior</td>
</tr>
<tr>
<td>MGMT 636</td>
<td>Seminar in Organizational Theory</td>
</tr>
<tr>
<td>MGMT 680</td>
<td>Business and Corporate Strategy</td>
</tr>
<tr>
<td>BUCH 676</td>
<td>Science and Technology Policy</td>
</tr>
</tbody>
</table>

E. Recommended Course Plans:

The following sample degree plans provide some possible courses to consider based on the stated emphasis areas. Final coursework selection is made in consultation with the advisory committee.
## Construction Engineering and Management Graduate Handbook

**PhD Student 1 (with MS Degree from another University)**

<table>
<thead>
<tr>
<th>Number</th>
<th>Course Description</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 640</td>
<td>Project Development: Methods and Models</td>
<td>3.0</td>
</tr>
<tr>
<td>CVEN 643</td>
<td>Advanced Construction Materials and Methods</td>
<td>3.0</td>
</tr>
<tr>
<td>CVEN 644</td>
<td>Project Risk Management</td>
<td>3.0</td>
</tr>
<tr>
<td>CVEN 654</td>
<td>Strategic Construction and Engineering Management</td>
<td>3.0</td>
</tr>
<tr>
<td>ISEN 625</td>
<td>Simulation Methods and Applications</td>
<td>3.0</td>
</tr>
<tr>
<td>COSC 690</td>
<td>COSC Research Theory</td>
<td>3.0</td>
</tr>
<tr>
<td>MGMT 680</td>
<td>Business and Corporate Strategy</td>
<td>3.0</td>
</tr>
<tr>
<td>MGMT 655</td>
<td>Survey of Management</td>
<td>3.0</td>
</tr>
<tr>
<td>STAT 601</td>
<td>Statistical Analysis</td>
<td>4.0</td>
</tr>
<tr>
<td>BUCH 671</td>
<td>Science and Technology Policy</td>
<td>3.0</td>
</tr>
<tr>
<td>CVEN 691</td>
<td>Research</td>
<td>32.0</td>
</tr>
</tbody>
</table>

**PhD Student 2 (with MS Degree from Texas A&M)**

<table>
<thead>
<tr>
<th>Number</th>
<th>Course Description</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 640</td>
<td>Project Development: Methods and Models</td>
<td>3.0</td>
</tr>
<tr>
<td>CVEN 689</td>
<td>Optimization Methods in Engineering and Design</td>
<td>3.0</td>
</tr>
<tr>
<td>CVEN 691</td>
<td>Research</td>
<td>40.0</td>
</tr>
<tr>
<td>ISEN 625</td>
<td>Simulation Methods and Applications</td>
<td>3.0</td>
</tr>
<tr>
<td>ISEN 667</td>
<td>Engineering Economy</td>
<td>3.0</td>
</tr>
<tr>
<td>MGMT 655</td>
<td>Survey of Management</td>
<td>3.0</td>
</tr>
<tr>
<td>MGMT 680</td>
<td>Business and Corporate Strategy</td>
<td>3.0</td>
</tr>
</tbody>
</table>
Graduate Coursework
Pre-requisite Coursework

All of the following courses (and their pre-requisites) are considered prerequisite to any graduate program of study in construction engineering and management:

- CVEN 322 – Civil Engineering Systems (PhD students only)
- CVEN 349 – Civil Engineering Project Management
- CVEN 405 – Construction Management of Field Operations

None of these courses may be counted towards any graduate degree in construction engineering and management.

You may be required to complete additional pre-requisites as part of your admission into the program. Those classes also cannot be applied towards the credit hour requirement. Pre-requisite coursework needs to be completed during your first semester at Texas A&M University, as they are pre-requisites for all our courses.

If you completed a pre-requisite before arriving at Texas A&M University and need it waived, you must bring a copy of your transcript showing the final grade in the course as well as a copy of the course syllabus to Dr. Ford. Additional information about the courses taken may be required. This transcript and syllabus will be reviewed to see if indeed they satisfy the requirements, at which time this information will be communicated to the Civil Graduate Office. The review process can take up to two weeks.

Course Description and Typical Schedule

A range of courses are offered within the Zachry Department of Civil Engineering. For a full listing and description of the courses, please refer to the Graduate Course Catalog. Keep in mind that graduate courses are typically only offered once a year at most, with many of the elective courses only being offered on alternate years. The following table indicates the typical course offering and pre-requisites. Keep in mind that the actual course offering schedule may differ from the table below.

<table>
<thead>
<tr>
<th>Dept</th>
<th>No</th>
<th>Title</th>
<th>Pre-Requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN</td>
<td>639</td>
<td>Methods Improvement for Construction Engineers</td>
<td>CVEN 349/405</td>
</tr>
<tr>
<td>CVEN</td>
<td>640</td>
<td>Project Development: Methods and Models</td>
<td>STAT 231/601</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Department Code(s)</td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------------------</td>
<td>--------------------</td>
<td></td>
</tr>
<tr>
<td>CVEN 641</td>
<td>Construction Engineering Systems</td>
<td>CVEN 473</td>
<td></td>
</tr>
<tr>
<td>CVEN 644</td>
<td>Project Risk Management</td>
<td>STAT 211/601</td>
<td></td>
</tr>
<tr>
<td>CVEN 654</td>
<td>Strategic Construction and Engineering Management</td>
<td>CVEN 349/405/473</td>
<td></td>
</tr>
<tr>
<td>CVEN 668</td>
<td>Advanced EPC Project Development</td>
<td>CVEN 473</td>
<td></td>
</tr>
<tr>
<td>CVEN 710</td>
<td>Engineering Project Finance</td>
<td>CVEN 349/405/473</td>
<td></td>
</tr>
<tr>
<td>CVEN 717</td>
<td>Engineering Project Controls</td>
<td>CVEN 349/405/473</td>
<td></td>
</tr>
</tbody>
</table>
Funding Opportunities
Funding Opportunities from Within the CEM Program

Research Assistantships

Research Assistantship (RA) positions are offered through individual faculty members. There is no centralized list of available positions. You will need to set up appointments to meet with faculty members individually. You are strongly recommended to review our department's website to identify the different research areas each professor is working in before meeting with them.

Teaching Assistantships

New students are automatically considered for the small number of available positions based on their graduate application package. All other students should send an email expressing interest with their resume attached to Professor Ford by November 1st for the spring semester and March 1st for the fall semester. The subject line of the email should be “CEM TA position application.” These will be collected and used in TA selection.

Eligibility levels for international graduate students serving in teaching positions:

Level 1: Students eligible for teaching assignments

Level 2: Students conditionally eligible for teaching assignments for one semester only, but must simultaneously participate in Center for Teaching Excellence English Language Proficiency (CTE-ELP) instruction and achieve a certifying score on the ELPE by the end of the semester.

Level 3: Students not eligible for teaching assignment. Students should participate in spoken language training (such as those provided by CTE-ELP) to assist them in meeting English language proficiency requirements.

<table>
<thead>
<tr>
<th>Level #</th>
<th>Global Standardized Tests</th>
<th>Locally Administered (on Texas A&amp;M campus) Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TOEFL speaking section</td>
<td>IELTS speaking section</td>
</tr>
<tr>
<td>1</td>
<td>25-30</td>
<td>&gt;=8.0</td>
</tr>
<tr>
<td>2</td>
<td>23-25</td>
<td>7.0-7.5</td>
</tr>
<tr>
<td>3</td>
<td>&lt;23</td>
<td>&lt;7.0</td>
</tr>
</tbody>
</table>
Fellowships

Fellowships are typically awarded to incoming students, and there is no formal application process. Any request for fellowships must come from your research advisor, who is recommending you for this award to Professor Ford, who coordinates those awards for the CEM program.

Tuition Waivers and In-state Tuition

*Tuition waivers do not exist at Texas A&M University.* For Research and Teaching Assistantship positions, your tuition may be paid by the Department or from the research project as a benefit of the position (note that student fees are not paid by the Department or by the research project and these fees are the responsibility of the student). Additionally, you may qualify for in-state tuition if you were awarded a Fellowship.
Funding Opportunities
Outside the CEM Program

Financial Aid at Texas A&M

The CEM faculty and graduate advisors do not coordinate nor keep records of student worker positions in the department outside the CEM program. To pursue job opportunities beyond the CEM TA/RA positions, you may want to:

- Contact department faculty members outside the CEM program about RA/TA positions
- Contact researchers at the Texas Transportation Institute about RA positions
- Look at: http://jobforaggies.com
- Look at: http://ogs.tamu.edu/prospective-students/funding-information/

for additional funding opportunities.

Financial Aid Outside Texas A&M

There are many organizations that provide funding for graduate studies. Each has its own set of objectives and requirements. See http://ogs.tamu.edu/prospective/financial/large-national-graduate-fellowship-programs.html for links to some of these.
Additional Information
Full-Time Enrollment

Required credit hours to be certified as a full-time are:

- Fall and Spring semesters: 9 hours
- 10-week summer semester: 6 hours

Graduate students may be certified as full time with fewer than the required hours under special circumstances, including:

- During their final semester before graduation;
- Presence of a documented disability that mandates a reduced course load

These exceptions may or may not apply to a student's eligibility for certain types of financial aid. Students who have questions about how exceptions to the full time enrollment requirements will affect their scholarships, loans, grants, etc., should confer with their financial aid counselor.

In most cases, international students are eligible for the same exceptions to full time requirements; however, all international students requesting an exception to full time requirements must have their request approved by International Student Services. Students who are not U.S. citizens, but who are permanent U.S. residents (VISA TYPE = IM) are not required to clear with ISS on enrollment exceptions.

A student who is enrolled in less than a full-time course of study at Texas A&M may be in jeopardy of:

- being out of compliance with the Bureau of Citizenship and Immigration Services (formerly INS) if enrolled at Texas A&M on a student visa;
- losing their Research or Teaching Assistantship position;
- losing insurance coverage under his or her parent/guardian's insurance policy;
- being placed on a loan repayment schedule by a lender or guarantor if the student is the recipient of Federal financial aid; and/or
- losing a scholarship if the guidelines for receiving the scholarship require full-time enrollment, etc.
Transfer Credit

A maximum of two courses taken at other universities may be applied towards your Master's degree (ME or MS) at Texas A&M University, if approved. For the doctoral program, a maximum of three courses may be applied, pending permission of the student's research committee, as long as the number of credit hours does not exceed one-third of the total coursework hours taken at Texas A&M University.

In order to use transfer courses on your degree plan, the courses must have been taken in residence at an accredited U.S. institution or an approved international institution. You can verify its status with either Graduate Admissions or International Admissions. The course must have included the same material covered in an equivalent course at TAMU. The student is responsible for providing documentation of transfer course content. A course syllabus is not adequate. In addition, you must have earned a grade of "B" or better, and you must have been in degree seeking status at either that institution or at Texas A&M University at the time the course(s) were taken. **Academic work used toward a previous degree may not be used again.**

To receive departmental approval, the student must submit a detailed syllabus, course teaching materials provided by the instructor, and sample coursework material generated by the student during the course to the CEM graduate advisor after starting with the CEM program. That material will be reviewed and you'll be notified of the approval, or not, decision in about 2 weeks.

Certificate Programs

A graduate certificate program represents an emphasis area within a particular field or it could be interdisciplinary and involve several fields. Two programs are of particular interest to CEM students and some of the courses required for those programs may be applied towards your engineering credit hour requirement.

Keep in mind that these programs are **not** offered through the Civil Engineering department, so for information please contact the specific program coordinator listed for the program directly. The information provided here is to serve as a preliminary source of information, but specific program requirements can only be determined through the office offering the certificate.
Mays Business School offers a Certificate in Business to non-business graduate students at Texas A&M University. This certificate provides a general overview of the four major functional areas of business through a set of courses designed for non-business students. To complete the Certificate in Business, students must successfully complete the following four courses (12 credit hours). These courses do not have business course prerequisites:

- Accounting 640
- Finance 635 (prerequisite: ACCT 640)
- Management 655
- Marketing 621

If you have completed the undergraduate versions of any or all of these courses (business minor courses), then you must use a substitute for the course(s). The recommended substitutions are:

<table>
<thead>
<tr>
<th>COURSE</th>
<th>SUBSTITUTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 640</td>
<td>ACCT 641, 642</td>
</tr>
<tr>
<td>FINC 635</td>
<td>FINC 629, 632, 642, 645</td>
</tr>
<tr>
<td>MGMT 655</td>
<td>MGMT 630</td>
</tr>
<tr>
<td>MKTG 621</td>
<td>MKTG 650, 656</td>
</tr>
</tbody>
</table>

Any two of the above courses may be used to satisfy elective coursework requirements at the masters level. Keep in mind that these courses fall under "electives", and the master degrees allow a maximum of 6 semester hours of coursework in this category. So to complete the ME degree plus the Business Certificate, you would need to take a minimum of 36 hours.

For additional information, see the web-site at: [http://mays.tamu.edu/degrees-and-majors/certificate-programs/certificate-in-business/](http://mays.tamu.edu/degrees-and-majors/certificate-programs/certificate-in-business/)

**Mailboxes**

All graduate students will have a mailbox assigned to them on the 7th floor of the DLEB building. They are usually created for new students by the 2nd or 3rd week of classes. Remember to check your mailbox on a regular basis, as sometimes critical information from the University and/or Department will be sent to your campus mailbox rather than your mailing address.
Student Offices

Offices for students who are Teaching Assistants are made through the main CE Graduate Advising Office for construction engineering and management students. You are responsible for contacting the department graduate office for a desk assignment.

For students who become involved in research, desk assignments are coordinated by Ms. Theresa Traeger on the 7th floor of the DLE8 building. Once you start working on a research project with your advisor, you need to see him/her about a desk. There is often a waiting list, so do not expect an immediate desk assignment. The department is currently working to open up additional office space for graduate students.

Academic Probation

Graduate students must maintain 3.0 GPA or better throughout the duration of their graduate study. This requirement includes courses in degree plan and all graduate courses taken. If a course is repeated, the last grade received will be the one utilized in GPA calculation. When a student's GPA (either cumulative, degree plan or semester) falls below 3.0, the student is placed on probation by the department. Notifications are made by letter to the student, the advisor, and other pertinent offices within the university. If a student's GPA falls below 3.0, the student must develop an evaluation of the causes of the performance problem and a plan to raise GPA to above 3.0 within one semester. Submit that evaluation and plan to the graduate advisor, Professor Ford, and meet with him.

Once a plan has been devised and accepted, it will be forwarded to the main CE Graduate Office. If the student fails to raise their GPA, they will be removed from the construction engineering and management graduate program. Under extenuating circumstances, a second semester may be allowed for the student to raise their GPA.
Frequently Asked Questions
Degree Plans

1. **What is the difference between the MS and MENG degree?**

   - MEng (Master of Engineering) - non-thesis option requiring 30 hours of graduate credit
   - MS (Master of Science) - thesis option requiring 32 hours of graduate credit

   Accordingly, the MS degree is more research oriented and the MEng degree is more course work oriented and geared towards professional practice.

2. **I have taken a graduate level course in which I got a C. This course is already present on my degree plan. Can I keep the course on the degree plan?**

   Yes. The requirement for graduate students is to maintain a GPA of 3.0 on the degree plan. The intent of the degree plan is to identify the appropriate course of study for your chosen degree as determined by your advisor. Once the courses have been chosen and placed on an approved degree plan, it is the student's responsibility to maintain a 3.0.

   It is NOT the intent of the degree plan to allow students to take courses and then, after taking the courses and receiving a grade, to choose whether or not the courses are to be included on the degree plan. A student is NOT to choose only those courses for inclusion in the degree plan for which he/she may receive grades of A or B!

3. **Can I change the courses on my degree plan once it is filed?**

   Yes, the student can change the courses by filing a Petition. The Petition must be signed by ALL committee members or advisor (MENG degree) AND the department head. The Petition must subsequently be filed with the Office of Graduate Studies (OGS) and approved.

4. **Can I change my degree status once I have been admitted?**

   Yes, once admitted to graduate school, a student may file a Petition to change a degree status. The petition and the student's original application package and performance at Texas A&M will be reviewed by the CEM faculty in a manner similar to the review of new applications. Requirements for acceptance into a specific degree program are the same for enrolled students as for new students. If granting the request in approved by the CEM Program the Petition must be signed by the department head and then filed with the Office of Graduate Studies (OGS) and approved. International students must check with the International Student Services Office to maintain legal status.
5. Can I change my degree status once a degree plan is filed?

Yes, the student must file a Petition that is available electronically through the Office of Graduate Studies (OGS) website. The Petition will include any changes needed to the degree plan. The Petition must be signed by ALL committee members AND the department head. The Petition must subsequently be filed with the Office of Graduate Studies (OGS) and approved. Requirements for acceptance into a specific degree program are the same for enrolled students as for new students.

6. Are leveling courses to be included in the degree plan even though they cannot be counted towards the required number of credits?

Leveling courses should be listed at the bottom of the degree plan as prerequisites.

7. Who should be on my degree plan committee?

MEng degree committee: chair as assigned by the graduate advisor.

MS and PhD degree committee: students must identify a professor within the area of construction engineering and management to serve as their research advisor, who serves as the chair. Other members are selected based on discussions with the committee chair, with at least one member from outside the CVEN department.

8. When should I file the degree plan?

MEng degree: students should file by the middle of the second semester after starting their graduate coursework (can be completed earlier).

PhD and MS students: students must file before preregistration of the second semester, summer semester excluded.

Keep in mind: the Office of Graduate Studies will block you from registration after completing 9 hours of graduate courses. If you do not register, you run the risk of losing your full-time student status.

Assistantships

1. How can I register to satisfy the full-time status for my RA/TA?

To hold an assistantship for the Spring and Fall semesters, the student needs to register for a minimum of 9 hours in order to be considered full-time.
To be considered a full-time student for the Summer, a student must register for a minimum of 6 credit hours in one of the two following ways:

- 6 credit hours during the 10-week summer term OR
- 3 credit hours during each 5-week summer term

No other combinations are allowed.

2. **How do I apply for a Teaching Assistant (GAT) position?**

See the Funding Opportunities of this handbook.

3. **How do I apply for a Research Assistant (RA) position?**

See the Funding Opportunities of this handbook.

4. **I am an international student and English is my second language. Can I apply for a TA? What is the requirement?**

International students whose native language is not English and who wish to apply for a TA position must fulfill an English proficiency requirement. The English Proficiency Certification is required before a graduate student is eligible to apply to serve as a TA or in any other position considered to be a teaching position.

It is best to meet this proficiency requirement early in a student’s program. Contact the International Admissions Office for more information on proficiency testing.

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**Academic Probation**

1. **What is the criteria on probation?**

Graduate students are expected to maintain a Grade Point Ratio (GPR) equal to or better than 3.0 throughout the duration of their graduate study. This requirement applies to each of cumulative, degree plan, and semester GPR. It is also a prerequisite for receiving a graduate degree in civil engineering.
2. **What happens after one semester on probation if my GPR is not back up to 3.0?**

   If after one semester on probation a student's cumulative or degree plan GPR is not back up to 3.0, the Office of Graduate Studies will be asked to remove the student from the graduate studies program. If extenuating circumstances exist, probation time may be extended for one more semester, allowing the student a final chance to meet the minimum GPR requirement.

3. **What if the GPR requirement is satisfied after one semester, but falls again below 3.0 in another semester?**

   The student is placed on probation again.

4. **I took a course in which I got an I for incomplete. After one semester, it becomes an F. Now I am on probation. What can I do to change the F back to a better grade?**

   The student must complete the course work for which an I was received by submitting the required course work to the professor. The professor will then submit a grade change form. This change may or may not change the student's GPR, depending on the final grade received. The student will remain on probation until the registrar has changed the grade in the system.

5. **Does I (incomplete) in 691 (research) 684 (professional internship), or 692 (Professional study) become an F after one semester?**

   No, these courses are excluded from that rule.

6. **Does an I (incomplete) of 685 (problems) become an F after one semester?**

   Yes, if you receive an I in 685, it will turn to an F after one semester. The course 685 is a letter grade course and therefore is not excluded from the rule.
Department of Civil Engineering
Master of Science (M.S.) Degree Requirements
Area of Study: Environmental Engineering

The Master of Science (M.S.) degree requires 32 credit hours of approved courses and research. At least 25 credit hours must be coursework, and a thesis.

NOTE: All documents requiring departmental signatures must be submitted to the Civil Engineering Graduate Office at least one day prior to the Office of Graduate Studies deadline.

In addition to fulfilling the University requirements for the Master of Science (M.S.) degree, a student enrolled in the Civil Engineering graduate program in the area of Environmental Engineering must satisfy the following:

- A minimum of 24 hours must be taken from course offerings of the following colleges: Engineering, Geosciences, and Science.
- Core course requirements (13 credits):
  - CVEN 619 Environmental Engineering Processes I (3 credits)
  - CVEN 620 Environmental Engineering Processes II (3 credits)
  - CVEN 601 Environmental Engineering Processes III (3 credits)
  - CVEN 603 Environmental Engineering Management (3 credits)
  - CVEN 681 Environmental Engineering Seminar (1 credit)
- A maximum of 9 hours of advanced undergraduate coursework (must be 400-level if CVEN/OCEN/BAEN courses).
- A minimum of 18 hours of graduate level coursework taken at Texas A&M University (excluding CVEN 691).
- A maximum of 7 hours of CVEN 691 or combination of CVEN 691 and CVEN 685.
- The combination of CVEN 691, CVEN 685, transfer credit, and permissible undergraduate coursework may not exceed the greater of 12 hours or one-third (1/3) of the total hours on the degree plan.
- Courses offered through the Business Certificate program can be used toward the M.S. degree requirements (http://maysbschool.tamu.edu/masters/businessCert.htm).

The following are requirements and/or recommendations:

**Other Suggested CVEN Courses**
Relevant Geotechnical or Ocean Engineering courses w/pre-requisites.

**Other Suggested STAT Courses**
STAT 601 Statistical Analysis
STAT 602 Statistical Methods of Regression Analysis

**Water Resources Courses**
CVEN 627 Engineering Surface Water Hydrology
CVEN 628 Advanced Hydraulic Engineering
CVEN 658 Civil Engineering Applications of GIS
CVEN 664 Water Resources Engineering Planning and Management
CVEN 665 Water Resources Systems Engineering
CVEN 673 Transport Through Porous Media
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 674</td>
<td>Groundwater Engineering</td>
</tr>
<tr>
<td>CVEN 675</td>
<td>Stochastic Hydrology</td>
</tr>
<tr>
<td>CVEN 679</td>
<td>Theory of Fluid Mechanics Models</td>
</tr>
<tr>
<td>CVEN 680</td>
<td>Advanced Computation Methods for Fluid Flow</td>
</tr>
<tr>
<td>CVEN 688</td>
<td>Computational Fluid Dynamics</td>
</tr>
</tbody>
</table>

**Other Classes**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATMO 602</td>
<td>Principles of Atmospheric Physics and Chemistry</td>
</tr>
<tr>
<td>ATMO 613</td>
<td>Advanced Atmospheric Chemistry</td>
</tr>
<tr>
<td>BICH 601</td>
<td>Fundamentals of Biochemistry I</td>
</tr>
<tr>
<td>BAEN 651</td>
<td>Geographic Information Systems</td>
</tr>
<tr>
<td>BAEN 652</td>
<td>Advanced Topics in GIS</td>
</tr>
<tr>
<td>BAEN 669</td>
<td>Water Quality Engineering</td>
</tr>
<tr>
<td>BAEN 670</td>
<td>Air Pollution Engineering</td>
</tr>
<tr>
<td>BAEN 672</td>
<td>Small Watershed Hydrology</td>
</tr>
<tr>
<td>BAEN 673</td>
<td>Modeling Small Watersheds</td>
</tr>
<tr>
<td>BIOL 650</td>
<td>Genomics</td>
</tr>
<tr>
<td>BIOT 601</td>
<td>Biotechnology Principles and Techniques I</td>
</tr>
<tr>
<td>BIOT 602</td>
<td>Biotechnology Principles and Techniques II</td>
</tr>
<tr>
<td>CHEN 651</td>
<td>Biochemical Engineering</td>
</tr>
<tr>
<td>CHEN 629</td>
<td>Transport Phenomenon</td>
</tr>
<tr>
<td>CHEN 624</td>
<td>Chemical Engineering Kinetics and Reactor Design</td>
</tr>
<tr>
<td>OCEN 678</td>
<td>Fluid Dynamics for Ocean and Environmental Engine</td>
</tr>
<tr>
<td>GEOL 621</td>
<td>Contaminant Hydrogeology</td>
</tr>
<tr>
<td>GEOL 641</td>
<td>Environmental Geochemistry</td>
</tr>
<tr>
<td>MATH 601</td>
<td>Methods of Applied Math</td>
</tr>
<tr>
<td>MATH 602</td>
<td>Partial Differential Equations</td>
</tr>
<tr>
<td>MATH 609</td>
<td>Numerical Analysis</td>
</tr>
<tr>
<td>RLEM 601</td>
<td>Rangeland Resource Management</td>
</tr>
<tr>
<td>RLEM 601</td>
<td>Ecology and Land Uses</td>
</tr>
<tr>
<td>RLEM 640</td>
<td>Wetland Delineation</td>
</tr>
<tr>
<td>RENR 650</td>
<td>Leadership Development and Management of Environmental NGOs</td>
</tr>
<tr>
<td>RENR 659</td>
<td>Ecological Economics</td>
</tr>
<tr>
<td>RENR 660</td>
<td>Environmental Impact Analysis for Renewable Natural Resources</td>
</tr>
<tr>
<td>RENR 662</td>
<td>Environmental Law and Policy</td>
</tr>
<tr>
<td>RENR 664</td>
<td>Coastal Zone Management</td>
</tr>
<tr>
<td>AGRO 614</td>
<td>Biodegradation and Bioremediation (VAPH 614)</td>
</tr>
<tr>
<td>AGRO 615</td>
<td>Reclamation of Drastically Disturbed Lands</td>
</tr>
<tr>
<td>AGRO 616</td>
<td>Land Disposal of Waste</td>
</tr>
<tr>
<td>AGRO 670</td>
<td>Basic Environmental Toxicology</td>
</tr>
<tr>
<td>WFSC 628</td>
<td>Wetland Ecology</td>
</tr>
</tbody>
</table>

- Degree Plan: An advisory committee must be formed and a Degree Plan must be submitted and approved by the advisory committee by the end of the first semester of study.
- Research Proposal: A draft Research Proposal must be submitted to the advisory committee chair at least 2 weeks (10 working days) prior to revision and subsequent submission to other members of advisory committee. These other members of the advisory committee will be provided at least
2 weeks (10 working days) to review the revised draft Research Proposal prior to the end of the second semester of study. Thus, the draft Research Proposal must be submitted to the advisory committee chair at least 4 weeks (20 working days) prior to end of the second semester of study.

- Completion of Thesis: A draft Thesis must be submitted to the advisory committee chair at least 2 weeks (10 working days) prior to revision and subsequent submittal to other members of advisory committee. These other members of the advisory committee will be provided at least 2 weeks (10 working days) to review the revised draft Thesis prior to the Final Defense. Thus, the draft Thesis must be submitted to the advisory committee chair at least 4 weeks (20 working days) prior to the Final Defense.

- Final Defense: A Final Defense consisting of an oral examination will be scheduled with all of the advisory committee members. At this examination, the student will give a presentation of the research work completed for the degree and documented in the Thesis.

1. 3 of these 24 hours may be outside of colleges of Engineering, Geosciences, and Science if selected from a list of courses approved by the student’s specialty area as outlined by the specialty area’s documented course work requirements.

2. Certain courses within the College of Engineering are prohibited from use on the degree plan unless written justification is made by the student’s advisor and approved by the Departmental Graduate Advisor prior to enrolling in the course. Please see Departmental Graduate Advisor for listing of prohibited courses.

3. All coursework should be discussed with advisory committee chair before enrolling in course. All coursework must be consistent with the student’s chosen field of study and commensurate with graduate study.
Department of Civil Engineering  
Master of Engineering (M.E.) Degree Requirements  
Area of Study: Environmental Engineering

The Master of Engineering (M.E.) degree requires 30 credit hours of coursework. This non-thesis degree also requires a professional report whose content is determined by the advisory committee. This report can include results of research conducted by the student, or it can be a report written for a specific course or as part of CVEN/OCEN 685 - Directed Studies.

NOTE: All documents requiring departmental signatures must be submitted to the Civil Engineering Graduate Office at least one day prior to the Office of Graduate Studies deadline.

In addition to fulfilling the University requirements for the Master of Engineering (M.E.) degree, a student enrolled in the Civil Engineering graduate program in the area of Environmental Engineering must satisfy the following:

- A minimum of 24 hours must be taken from course offerings of the following colleges: Engineering, Geosciences, and Science.
- All students are required to take the core courses (13 credits):
  - CVEN 619 Environmental Engineering Processes I (3 credits)
  - CVEN 620 Environmental Engineering Processes II (3 credits)
  - CVEN 601 Environmental Engineering Processes III (3 credits)
  - CVEN 603 Environmental Engineering Management (3 credits)
  - CVEN 681 Environmental Engineering Seminar (1 credit)
- No more than 3 hours of CVEN 685 (within the 6 hours allowed for CVEN 684 / CVEN 685).
- A minimum of 15 hours must be CVEN/OCEN/BAEN coursework (exclusive of CVEN 681, CVEN 684, and CVEN 685).
- A maximum of 9 hours of advanced undergraduate coursework (must be 400-level if CVEN/OCEN/BAEN courses).
- A minimum of 18 hours of graduate level coursework taken at Texas A&M University (excluding CVEN 684 and CVEN 685).
- The combination of CVEN 684, CVEN 685, transfer credit, and permissible undergraduate coursework may not exceed the greater of 12 hours or one-third (1/3) of the total hours on the degree plan.
- Courses offered through the Business Certificate program can be used toward the M.E. degree requirements (http://maysbschool.tamu.edu/masters/businessCert.htm).

The following are requirements and/or recommendations:

Other Suggested CVEN Courses
Relevant Geotechnical or Ocean Engineering courses w/pre-requisites.

Other Suggested STAT Courses
STAT 601 Statistical Analysis
STAT 602 Statistical Methods of Regression Analysis

Water Resources Courses
CVEN 627 Engineering Surface Water Hydrology
CVEN 628 Advanced Hydraulic Engineering
CVEN 658  Civil Engineering Applications of GIS  
CVEN 664  Water Resources Engineering Planning and Management  
CVEN 665  Water Resources Systems Engineering  
CVEN 673  Transport Through Porous Media  
CVEN 674  Groundwater Engineering  
CVEN 675  Stochastic Hydrology  
CVEN 679  Theory of Fluid Mechanics Models  
CVEN 680  Advanced Computation Methods for Fluid Flow  
CVEN 688  Computational Fluid Dynamics  

**Other Classes**  
ATMO 602  Principles of Atmospheric Physics and Chemistry  
ATMO 613  Advanced Atmospheric Chemistry  
BICH 601  Fundamentals of Biochemistry I  
BAEN 651  Geographic Information Systems  
BAEN 652  Advanced Topics in GIS  
BAEN 669  Water Quality Engineering  
BAEN 670  Air Pollution Engineering  
BAEN 672  Small Watershed Hydrology  
BAEN 673  Modeling Small Watersheds  
BIOI 650  Genomics  
BIOT 601  Biotechnology Principles and Techniques I  
BIOT 602  Biotechnology Principles and Techniques II  
CHEN 651  Biochemical Engineering  
CHEN 629  Transport Phenomenon  
CHEN 624  Chemical Engineering Kinetics and Reactor Design  
OCEN 678  Fluid Dynamics for Ocean and Environmental Engineering  
GEOL 621  Contaminant Hydrogeology  
GEOL 641  Environmental Geochemistry  
MATH 601  Methods of Applied Math  
MATH 602  Partial Differential Equations  
MATH 609  Numerical Analysis  
RLEM 601  Rangeland Resource Management  
RLEM 601  Ecology and Land Uses  
RLEM 640  Wetland Delineation  
RENR 650  Leadership Development and Management of Environmental NGOs  
RENR 659  Ecological Economics  
RENR 660  Environmental Impact Analysis for Renewable Natural Resources  
RENR 662  Environmental Law and Policy  
RENR 664  Coastal Zone Management  
AGRO 614  Biodegradation and Bioremediation (VAPH 614)  
AGRO 615  Reclamation of Drastically Disturbed Lands  
AGRO 616  Land Disposal of Waste  
AGRO 670  Basic Environmental Toxicology  
WFSC 628  Wetland Ecology
• Degree Plan: An advisory committee must be formed and a Degree Plan must be submitted and approved by the advisory committee by the end of the first semester of study.

• Completion of Professional Report: A draft Professional Report must be submitted to the advisory committee chair at least 2 weeks (10 working days) prior to revision and subsequent submittal to other members of advisory committee. These other members of the advisory committee will be provided at least 2 weeks (10 working days) to review the revised draft Professional Report prior to the Final Presentation. Thus, the draft Professional Report must be submitted to the advisory committee chair at least 4 weeks (20 working days) prior to the Final Presentation.

• Final Presentation: A Final Presentation consisting of an oral examination will be scheduled with all of the advisory committee members. At this examination, the student will give a presentation of the content of the Professional Report completed for the degree.

1. 3 of these 24 hours may be outside of colleges of Engineering, Geosciences, and Science if selected from a list of courses approved by the student’s specialty area as outlined by the specialty area’s documented course work requirements.

2. Certain courses within the College of Engineering are prohibited from use on the degree plan unless written justification is made by the student’s advisor and approved by the Departmental Graduate Advisor prior to enrolling in the course. Please see Departmental Graduate Advisor for listing of prohibited courses.

3. All coursework should be discussed with advisory committee chair before enrolling in course. All coursework must be consistent with the student’s chosen field of study and commensurate with graduate study.
Department of Civil Engineering
Texas A&M University

DOCTOR OF PHILOSOPHY DEGREE
Requirements for Environmental Engineering

The Doctor of Philosophy (Ph.D.) degree is a research-oriented degree requiring a minimum of 64 semester credit hours of approved courses and research beyond the Master of Science (M.S.) degree [96 credit hours beyond the Bachelor of Science (B.S.) degree]. The university places limitations on these credit hours in addition to the requirements of the Department of Civil Engineering and the Environmental Engineering program listed below. A complete discussion of all university requirements is found in the current Texas A&M University Graduate Catalog (available on the Internet at http://www.tamu.edu/admissions/catalogs/) under the heading "The Degree of Doctor of Philosophy." For example, university requirements include a preliminary examination, a final examination, and submission of a dissertation to the university.

NOTE: All documents requiring departmental signatures must be submitted to the Civil Engineering Graduate Office at least one day prior to the Office of Graduate Studies deadline.

In addition to fulfilling the University requirements for the Doctor of Philosophy (Ph.D.) degree, a student enrolled in the Civil Engineering graduate program in the area of Environmental Engineering must satisfy the following department requirements:

- A minimum of 32 credit hours of graduate level coursework taken through Texas A&M University or equivalent university [a minimum of 24 credit hours if the student already has taken at least another 24 credit hours of graduate course work for the Master of Science (M.S.) or Master of Engineering (M.E.) degree].

- Remaining coursework requirement can be met by 32 hours of CVEN 691.

The student must also satisfy the following area requirements and/or recommendations described below:

- Qualifying Exam: Once per year in January, a Qualifying Examination will be scheduled with members of the Environmental Engineering faculty. The exam will include both written and oral components. Students entering the program in the Fall semester are expected to take the exam the following January. Students entering in the Spring or summer semesters are expected to take the next available exam.

- Degree Plan: An advisory committee must be formed and a Degree Plan must be submitted and approved by the advisory committee after passing the Qualifying Exam and by the end of the second semester (Fall or Spring) of study. The proposed degree plan must be typed on the official form as it appears on the Internet at http://oegs.tamu.edu with endorsements by the student’s advisory committee.

- Written Preliminary Exam: After completion of the coursework listed on the Degree Plan (with the exception of CVEN 691 Research), but no later than the end of the fifth semester (Fall or Spring) of study, a Written Preliminary Examination will be scheduled with members of the advisory committee. This exam consists of written questions from the advisory committee. The exam in total should be given over a period of one week.
• **Research Proposal:** As soon as the research project can be outlined in reasonable detail, but no later than the end of the fifth semester (Fall or Spring) of study, the dissertation research proposal should be completed. The Research Proposal should describe the proposed research, including relevant background information, and clearly demonstrate how this research will make a unique contribution of new knowledge to the student’s area of study. Upon approval of the Research Proposal by the advisory committee chair, the Research Proposal must be submitted to other members of the advisory committee at least 2 weeks (10 working days) prior to the Oral Preliminary Exam.

• **Oral Preliminary Exam:** The Oral Preliminary Examination will be scheduled with members of the advisory committee at the time the Written Preliminary Examination is scheduled. The Oral Preliminary Examination is to occur within two weeks of having taken the Written Preliminary Examination. At the Oral examination, the student will give a presentation of their Research Proposal. The questions in this exam will cover the Written Preliminary Exam, the Oral Preliminary Exam presentation, and any relevant coursework.

• **Completion of Dissertation:** Upon approval of the Dissertation by the advisory committee chair, the Dissertation will be submitted to the other members of the advisory committee at least 2 weeks (10 working days) prior to the Final Defense.

• **Final Defense:** A Final Defense consisting of an oral examination will be scheduled with all of the advisory committee members. At this examination, the student will give a presentation of the research work completed for the degree and documented in the Dissertation. The student is encouraged to invite other interested individuals to the research presentation.

**Recommended Coursework**
As noted above, the coursework included in the Degree Plan must be approved by the student’s advisory committee. Suggested courses that may be considered for inclusion in the Degree Plan are listed below.

**Ph.D. Level Environmental Engineering Courses**
The following courses are a complete listing of the Environmental Engineering courses offered. Due to the diverse backgrounds of graduate students entering the program, courses should be selected to ensure the foundation coursework has been completed prior to taking more advanced courses. Ph.D. students are expected to have either taken the core classes (or their equivalent) or deficits will be filled in their degree plans. Coursework outside the department must be approved by the committee and meet the University restrictions to be included in the degree plan.

**ENVIRONMENTAL ENGINEERING GRADUATE PROGRAM @ TEXAS A&M**
May 2008
<table>
<thead>
<tr>
<th>Course</th>
<th>MS or PhD</th>
<th>Frequency (per year)</th>
<th>Comments</th>
</tr>
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<tbody>
<tr>
<td>CVEN 601 Environmental Engineering Processes III</td>
<td>MS/ME</td>
<td>1</td>
<td>Core class</td>
</tr>
<tr>
<td>CVEN 619 Environmental Engineering Processes I</td>
<td>MS/ME</td>
<td>1</td>
<td>Core class</td>
</tr>
<tr>
<td>CVEN 620 Environmental Engineering Processes II</td>
<td>MS/ME</td>
<td>1</td>
<td>Core class</td>
</tr>
<tr>
<td>CVEN 603 Management Environmental Engineering</td>
<td>MS/ME</td>
<td>1</td>
<td>Core class</td>
</tr>
<tr>
<td>CVEN 604 Engineering Analysis of Treatment Systems</td>
<td>MS/ME</td>
<td>Var</td>
<td></td>
</tr>
<tr>
<td>CVEN 605 Environmental Measurements</td>
<td>MS/ME</td>
<td>Var</td>
<td></td>
</tr>
<tr>
<td>CVEN 606 Environmental Engineering Design I</td>
<td>MS/ME, PhD/DE</td>
<td>Var</td>
<td></td>
</tr>
<tr>
<td>CVEN 609 Environmental Control of Oil and Hazardous Materials</td>
<td>MS/ME, PhD</td>
<td>1/3</td>
<td></td>
</tr>
<tr>
<td>CVEN 610 Environmental Risk Assessment</td>
<td>ME/ME, PhD</td>
<td>1/3</td>
<td></td>
</tr>
<tr>
<td>CVEN 682 Environmental Remediation of Contaminated Sites</td>
<td>MS/ME, PhD</td>
<td>1/3</td>
<td></td>
</tr>
<tr>
<td>CVEN 681 Environmental Seminar</td>
<td>MS/ME</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>CVEN 684 Professional Internships</td>
<td>DE</td>
<td>Var</td>
<td></td>
</tr>
<tr>
<td>CVEN 685 Directed Studies</td>
<td>MS/ME, PhD</td>
<td>Var</td>
<td></td>
</tr>
<tr>
<td>CVEN 689 Special Topics</td>
<td>PhD</td>
<td>Var</td>
<td></td>
</tr>
<tr>
<td>CVEV 691 Research</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Other Suggested CVEN Courses**

Relevant Geotechnical or Ocean Engineering courses w/pre-requisites.

**Other Suggested STAT Courses**

STAT 601 Statistical Analysis
STAT 602 Statistical Methods of Regression Analysis

**Water Resources Courses**

CVEN 627 Engineering Surface Water Hydrology
CVEN 628 Advanced Hydraulic Engineering
CVEN 658 Civil Engineering Applications of GIS
CVEN 664 Water Resources Engineering Planning and Management
CVEN 665 Water Resources Systems Engineering
CVEN 673 Transport Through Porous Media
CVEN 674 Groundwater Engineering
CVEN 675  Stochastic Hydrology
CVEN 679  Theory of Fluid Mechanics Models
CVEN 680  Advanced Computation Methods for Fluid Flow
CVEN 688  Computational Fluid Dynamics

Other Classes
ATMO 602  Principles of Atmospheric Physics and Chemistry
ATMO 613  Advanced Atmospheric Chemistry
BICH 601  Fundamentals of Biochemistry I
BAEN 651  Geographic Information Systems
BAEN 652  Advanced Topics in GIS
BAEN 669  Water Quality Engineering
BAEN 670  Air Pollution Engineering
BAEN 672  Small Watershed Hydrology
BAEN 673  Modeling Small Watersheds
BIOL 650  Genomics
BIOT 601  Biotechnology Principles and Techniques I
BIOT 602  Biotechnology Principles and Techniques II
CHEN 651  Biochemical Engineering
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OCEN 678  Fluid Dynamics for Ocean and Environmental Engineering
GEOL 621  Contaminant Hydrogeology
GEOL 641  Environmental Geochemistry
MATH 601  Methods of Applied Math
MATH 602  Partial Differential Equations
MATH 609  Numerical Analysis
RLEM 601  Rangeland Resource Management
RLEM 601  Ecology and Land Uses
RLEM 640  Wetland Delineation
RENR 650  Leadership Development and Management of Environmental NGOs
RENR 659  Ecological Economics
RENR 660  Environmental Impact Analysis for Renewable Natural Resources
RENR 662  Environmental Law and Policy
RENR 664  Coastal Zone Management
AGRO 614  Biodegradation and Bioremediation (VAPH 614)
AGRO 615  Reclamation of Drastically Disturbed Lands
AGRO 616  Land Disposal of Waste
AGRO 670  Basic Environmental Toxicology
WFSC 628  Wetland Ecology
Zachry Department of Civil Engineering
Graduate Degree Programs
Coastal and Ocean Engineering

The Zachry Department of Civil Engineering offers three graduate degrees with a special focus in Coastal and Ocean Engineering. These are the Master of Engineering, Master of Science, and Doctor of Philosophy. Coastal and Ocean Engineers deal with facilities on the coasts and in the oceans, including beaches, piers, ports, bridges, boats, ships, floating structures, and underwater pipelines, including facilities in the offshore oil and gas sector. Graduate degrees in Coastal and Ocean Engineering prepare students for careers in consulting engineering firms, governmental agencies, large engineering corporations, and research and academia. Each degree combines fundamental principles and methods in the areas of fluid dynamics, structural mechanics, and mathematics to solve engineering and oceanographic problems in the marine environment.

The prerequisite for degree candidates entering the Coastal and Ocean engineering graduate program is a Bachelor of Science degree in an engineering discipline, physics, applied mathematics, or geosciences. Student-specific prerequisite requirements may also be imposed by the faculty after reviewing applicants' preparation in the fundamental engineering aspects of Coastal and Ocean Engineering, including dynamics, fluid mechanics, and mechanics of materials.

Requirements for each graduate degree are described below. Students may be granted a deviation from these requirements through a written petition from the student to the graduate advisor in Coastal and Ocean Engineering. The written request must include a strong justification by the student with the written support of the student's faculty advisor. Typical justification for a deviation may include similarity of course requirements to courses taken by the student at another institution or a multi-disciplinary research topic requiring significant coursework not on the approved curriculum. In the latter case, the student must also demonstrate that the research topic belongs in the category of Coastal and Ocean Engineering.

Each degree program described below conforms to the degree requirements of the Zachry Department of Civil Engineering and Texas A&M University. Each student develops an individualized degree plan with the advice and approval of a faculty advisory committee consisting of the student's principal advisor and at least two other faculty members. Students are required to form an advisory committee and submit a degree plan by the end of the first semester of study. All Coastal and Ocean Engineering graduate students have the responsibility of knowing and adhering to all relevant University, Departmental and Coastal and Ocean Engineering curriculum requirements. Schedules, forms, and procedures for graduate students are provided by the Office of Graduate Studies (http://ogs.tamu.edu).
Master of Engineering

The Master of Engineering (M.E.) degree is intended for students who seek a Master's degree to prepare them for engineering practice and do not intend to continue in a research career. The M.E. degree requires a minimum of 30 credit hours and a written project report in addition to the requirements to meet the program prerequisites. A full-time student could complete the program in 12 months or, with a concentrated effort, in nine months (the fall and spring semesters). Students working as teaching assistants or employed by engineering firms normally require one or more additional semesters to graduate.

Curriculum requirements for the Coastal and Ocean Engineering focus include:

Required courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCEN 678</td>
<td>Fluid Dynamics for Ocean and Environ. Engineering</td>
<td>3.0</td>
</tr>
<tr>
<td>OCEN 671</td>
<td>Ocean Wave Mechanics</td>
<td>3.0</td>
</tr>
<tr>
<td>XXXX 681*</td>
<td>Seminar (every semester in residence)</td>
<td>1.0</td>
</tr>
<tr>
<td>CVEN 685</td>
<td>Directed Studies</td>
<td>3.0 (minimum)</td>
</tr>
<tr>
<td>MATH 601</td>
<td>Higher Math. for Engrs. and Physicists I</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Select three courses from:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>OCEN 672</td>
<td>Coastal Engineering</td>
<td>3.0</td>
</tr>
<tr>
<td>OCEN 676</td>
<td>Dynamics of Offshore Structures</td>
<td>3.0</td>
</tr>
<tr>
<td>OCEN 677</td>
<td>Environmental Fluid Mechanics</td>
<td>3.0</td>
</tr>
<tr>
<td>OCNG 608</td>
<td>Physical Oceanography</td>
<td>3.0</td>
</tr>
</tbody>
</table>

* Students must enroll in CVEN 681, OCEN 681, or OCNG 681 every semester in residence.

M.E. Written Report

The written project report for the M.E. degree is a written report submitted to and approved by the advisory committee. The report can include results of research and/or literature study conducted by the student as part of CVEN 685 Directed Studies.

Additional Recommended Courses to complete the required 30 credit hours of course work are provided at the end of this document.
Master of Science

The Master of Science (M.S.) degree is intended for students who seek a Master's degree to prepare them for engineering practice and who are interested in a research component to their degree, especially students who plan to continue to the Ph.D. degree. The M.S. degree requires a minimum of 32 credit hours, of which seven can be CVEN 691 Research hours, and submission and successful defense of an acceptable thesis based on the student's original research; all students must also meet the program prerequisites. The Final Examination for the M.S. Degree consists of an oral thesis defense administrated by the thesis committee. A full-time student typically completes the program in a minimum of 21 months.

Required courses:
- OCEN 678 Fluid Dynamics for Ocean and Environ. Engineering 3.0
- OCEN 671 Ocean Wave Mechanics 3.0
- XXXX 681* Seminar (every semester in residence) 1.0
- OCEN 691 Research (toward MS Degree) 6.0 (minimum)
- MATH 601 Higher Math. for Engrs. and Physicists I 3.0

Select two courses from:
- OCEN 672 Coastal Engineering 3.0
- OCEN 676 Dynamics of Offshore Structures 3.0
- OCEN 677 Environmental Fluid Mechanics 3.0
- OCNG 608 Physical Oceanography 3.0

* Students must enroll in CVEN 681, OCEN 681, or OCNG 681 every semester in residence.

Additional Recommended Courses to complete the required 25 credit hours of course work are provided at the end of this document.

M.S. Thesis

The following items discuss expectations for the major steps toward completion of the M.S. thesis and defense. A number of other requirements related and in addition to these steps are specified by the Office of Graduate Studies (http://ogs.tamu.edu), and many are described in the university catalog (http://www.tamu.edu/admissions/catalogs). Each graduate student has the obligation to be informed of these requirements and to adhere to them.

A thesis advisory committee should be formed and a degree plan should be submitted and approved by the advisory committee before the end of the first full semester of study.

The M.S. degree candidate must prepare a thesis proposal that describes the research to be conducted in fulfillment of the requirements for the degree. The proposal should be written as soon as the research project can be outlined in reasonable detail, but usually no later than the end of the third full semester (Fall or Spring) of study. The research proposal should describe the proposed research, including relevant background information, and clearly demonstrate how this research will make a unique contribution of new knowledge to the student's area of study.

A draft Research Proposal must be submitted to the advisory committee chair at least 10 working days prior to revision and subsequent submittal to other members of the thesis committee. The committee members will be provided at least 10 working days to review the revised draft Research Proposal prior to
the end of the second semester of study. Thus, the draft Research Proposal must be submitted to the advisory committee chair at least 20 working days prior to end of the second semester of study.

A draft Thesis must be submitted to the advisory committee chair at least 10 working days prior to revision and subsequent submittal to other members of the thesis committee. The committee members will be provided at least 10 working days to review the revised draft Thesis prior to the Final Examination (Thesis Defense). Thus, the draft Thesis must be submitted to the advisory committee chair at least 20 working days prior to the Thesis Defense.

A Final Defense consisting of an oral examination will be scheduled with all of the advisory committee members. At this examination, the student will give a presentation of the research work completed for the degree and documented in the Thesis.
Doctor of Philosophy

The Doctor of Philosophy (Ph.D.) degree is a research-oriented degree requiring performance of independent research that is the original work of the candidate. The Ph.D. degree prepares graduates for careers in engineering practice, education, leadership, and research, including academia.

The Ph.D. degree requires a minimum of 64 credit hours beyond the candidate’s previous degree (usually beyond the Master’s Degree) and a dissertation in addition to the requirements necessary to meet the program prerequisites. The Ph.D. dissertation is a written document that reports the results of the candidate’s independent research. Students must pass a Qualifier Exam, a Preliminary Exam oriented around the dissertation proposal, and a final Dissertation Defense in addition to the coursework on the student’s degree plan.

Of the 64 credit hours required for the PhD degree, 24 hours must be in coursework as follows:

Required courses:
- Satisfy the course requirements of the Master of Science in Coastal and Ocean Engineering
- MATH 602 Methods and App. of Partial Differential Eqns. 3.0
- XXXX 681* Seminar (every semester in residence) 1.0
- Three more credit hours in Mathematics, statistics or numerical methods
- Three more credit hours in fluid mechanics

* Students must enroll in a 681 seminar every semester in residence. This course must be selected under direction of the dissertation committee from OCEN 681, CVEN 681, OCNG 681 or any other science or engineering graduate seminar meeting the dissertation committee’s approval.

Additional Recommended Courses to complete the required 24 credit hours of coursework are provided at the end of this document.

Ph.D. Qualifier Examination

Students are formally admitted to the Ph.D. Program after passing a written and oral Qualifier Exam, to be taken before the end of the first year of Ph.D. studies. The Qualifier Exam is administrated by the Coastal and Ocean Engineering faculty in the Zachry Department of Civil Engineering. The Qualifier is designed to ensure broad understanding at an undergraduate level of the key concepts of Coastal and Ocean Engineering (fluid mechanics, wave mechanics, and mathematics) and to test the research creativity of the applicant. Candidates may take the Qualifier Exam a maximum of two times.

Ph.D. Preliminary Examination

In the Preliminary Examination, a Ph.D. candidate presents their research plan to the dissertation committee in the form of a written Dissertation Proposal followed by an oral presentation of the research plan and optional written examination.

A draft Dissertation Proposal must be submitted to the advisory committee chair at least 10 working days prior to revision and subsequent submittal to other members of the dissertation committee. The committee members will be provided at least 10 working days to review the revised draft Dissertation Proposal prior to the date of the Preliminary Exam. Thus, the draft Dissertation Proposal must be submitted to the advisory committee chair at least 20 working days prior to Preliminary Exam date. The Preliminary Exam consists of an optional written exam (the dissertation committee members either prepare or waive the written portion of the exam) and an oral defense of the dissertation proposal. The candidate must pass the Preliminary Exam at least 14 weeks before the Dissertation Defense.
Ph.D. Dissertation

The Ph.D. dissertation is a written document reporting the research that is the original work of the candidate.

A draft Dissertation must be submitted to the advisory committee chair at least 15 working days prior to revision and subsequent submittal to other members of the thesis committee. The committee members will be provided at least 10 working days to review the revised draft Dissertation prior to the Final Examination (Dissertation Defense). Thus, the draft Dissertation must be submitted to the advisory committee chair at least 25 working days prior to the Dissertation Defense.

The Dissertation Defense, consisting of an oral examination, will be scheduled with all of the advisory committee members. At this examination, the student will give a presentation of the research work completed for the degree and documented in the Dissertation.
Recommended Courses

Each student’s Degree Plan is comprised of the courses required in the sections above and courses chosen by the student in consultation with the advisory committee from various other auxiliary areas reflecting the individual student’s interests and career goals. Additional courses recommended for consideration include the following:

Ocean Engineering Focus
OCEN 676 Dynamics of Offshore Structures
OCEN 679 Nonlinear Wave Mechanics
OCEN 677 Environmental Fluid Mechanics
CVEN 688 Computational Fluid Dynamics
CVEN 679 Experimental Fluid Mechanics Modeling
CVEN 680 Advanced Computation Methods for Fluid Flow

OCEN 671 Ocean Wave Mechanics
OCEN 672 Coastal Engineering
OCEN 673 Nonlinear Hydrodynamics Problems in Ocean Engineering
OCEN 678 Fluid Dynamics for Ocean and Environmental Engineering
OCEN 682 Coastal Sediment Processes
OCEN 688 Marine Dredging

Civil Engineering
CVEN 645 Geotechnical Site Investigation
CVEN 655 Structural Safety
CVEN 686 Offshore and Coastal Structures
CVEN 687 Foundation Engineering

Mathematics and Statistics
MATH 601 Higher Mathematics for Engineers and Physicists 1 (Required)
MATH 602 Methods and Applications of Partial Differential Equations (Required for PhD)
STAT 601 Statistical Analysis
STAT 629 Methods in Time Series Analysis

Other Suggested Courses
MEEN 636 Turbulence: Theory and Engineering Applications
OCNG 608 Physical Oceanography
OCNG 689 Data Methods and Graphical Representation in Oceanography
APPENDIX G – Faculty Workload
## Faculty Workload Compliance Report - Campus Summary

<table>
<thead>
<tr>
<th>College</th>
<th>CTC</th>
<th>TTC</th>
<th>FTE</th>
<th>CTC / FTE</th>
<th>TTC / FTE</th>
<th>CTC / TTC %</th>
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<tbody>
<tr>
<td>AGRICULTURE AND LIFESCIENCE</td>
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<td>4062.7</td>
<td>288.3</td>
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<td>14.1</td>
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<td>ARCHITECTURE</td>
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<td>BUSINESS ADMINISTRATION</td>
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### Faculty Workload Compliance Report - Campus Summary

**Texas A&M University, Fall 2017**

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**TAMU Graduate Assistants Totals**

1939.2  1942.2  856.0  2.3  2.3  99.8

*Note: There are no University workload requirements for Graduate Assistants. Each department sets the workload and determines compliance for their GATs.*

**TAMU Totals**

28600.9  33242.6  3353.9  8.5  9.9  86.0

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Monday, February 26, 2018  Office of Data and Research Services  Page 3
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Monday, February 26, 2018
Office of Data and Research Services
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1) **Assignment of courses to academic departments** – Courses are assigned to the department paying the faculty member. If a faculty member is paid by more than one academic department or if the teacher of a course is not paid by any academic department, the courses are assigned to the department that administers the course. If the course is interdisciplinary it goes to the college that administers the course, for example ENGR courses would go to CLEN (College of Engineering).

   a. Team taught courses – a portion of a team taught course is assigned to each faculty member teaching the course. If the faculty are in different departments, each portion of the course is assigned to different department

   b. Cross-listed courses – are assigned to the department paying the faculty. If a cross-listed course is team taught by faculty from different departments, the courses are assigned to multiple departments

2) **Teaching FTE** – Faculty member’s percent of time paid to perform the teaching function. A faculty member may be budgeted at 100% time but only 80% of their salary may be from teaching salaries (1410 object class code or 1415 for GATs) which would make them 80% FTE teaching. Faculty members who are teaching courses but who are not paid from faculty salaries will show a formula FTE based on the courses taught with a maximum of 33% FTE.

3) **Faculty FTE by Level** – The faculty members’ teaching FTE is distributed to the Lower Division, Upper Division, Masters, or Doctorate levels based on the credit hour value (and course level) of each course taught by the faculty member. If a faculty member has no teaching assignments, the FTE is included in the total FTE, but not in the count by level.

4) **SCH per Faculty FTE** – is computed by dividing the SCH generated at a certain level by the Faculty FTE at the same level. The FTE of Faculty and GATs who are not teaching are excluded in the calculation by level but are included in the Total column.

5) **Student FTE** – is computed by dividing all SCH by level, by the appropriate factor as follows:

   - 15 for Undergraduate SCH (Lower Division and Upper Division)
   - 12 for Masters SCH, and
   - 9 for Doctorate SCH

6) **Student FTE to Faculty FTE Ratio (Excludes GAT FTE)** – Student FTE divided by Faculty FTE by level and total. The FTE of Faculty who are not teaching are excluded in the calculation by level but are included in the Total column.
7) **Weighted SCH (WSCH)** – is calculated using the latest weight factors provided by THECB. Therefore, on the *University Summary by College by Department – Change from Last Year*, the WSCH for the two semesters compared may be calculated using different weighting factors.

8) **SCH, WSCH, Faculty FTE and GAT FTE** are certified data.

9) **Faculty Rank** codes in the Teaching Load Report section are THECB ranks. Codes 1 through 4 include tenured and tenure/track faculty only as follows:

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10) **Excess PhD** on the *Teaching Analysis Report* refers to the WSCH for PhD students who have exceeded 99 funded doctoral SCH. Their WSCH is subtracted from the total WSCH for the University.

**Note:** Since the teaching load report is no longer being published, report scope is limited to aggregate data only. Professional VetMed courses (SCH) are excluded from the report.
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<tr>
<td>(06) Engineering</td>
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<td>42,921</td>
<td>42,921</td>
<td>1,044</td>
<td>41,877</td>
<td>20.5</td>
<td>$3,155,763</td>
<td>$3,155,763</td>
<td>$1,245.9</td>
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<td>Total</td>
<td>2,559</td>
<td>43,260</td>
<td>43,260</td>
<td>1,236</td>
<td>42,025</td>
<td>21.4</td>
<td>$3,427,566</td>
<td>$3,427,566</td>
<td>$1,339.4</td>
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## Budgeted, Not Teaching

<table>
<thead>
<tr>
<th></th>
<th>Total SCH</th>
<th>WSCH (incl. Excess PhD)</th>
<th>Teaching Salary</th>
<th>Excess PhD FTE</th>
<th>Total WSCH</th>
<th>Teaching Salary</th>
<th>FTE</th>
<th>Total Teaching Salary</th>
<th>Cost per WSCH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LD</td>
<td>UD</td>
<td>MS</td>
<td>PhD</td>
<td>Total</td>
<td>Faculty</td>
<td>GAT</td>
<td>Faculty</td>
<td>GAT</td>
</tr>
<tr>
<td>Budgeted, Not Teach</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Total</td>
<td>1.6</td>
<td>12.6</td>
<td>1.6</td>
<td>12.6</td>
<td>$199,511</td>
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## Total

<table>
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<tr>
<th></th>
<th>Total SCH</th>
<th>WSCH (incl. Excess PhD)</th>
<th>Teaching Salary</th>
<th>Excess PhD FTE</th>
<th>Total WSCH</th>
<th>Teaching Salary</th>
<th>FTE</th>
<th>Total Teaching Salary</th>
<th>Cost per WSCH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LD</td>
<td>UD</td>
<td>MS</td>
<td>PhD</td>
<td>Total</td>
<td>Faculty</td>
<td>GAT</td>
<td>Faculty</td>
<td>GAT</td>
</tr>
<tr>
<td>CVEN</td>
<td>24,903</td>
<td>7,780</td>
<td>48,198</td>
<td>22,512</td>
<td>43,260</td>
<td>3,674</td>
<td>1,236</td>
<td>124,189</td>
<td>50.7</td>
</tr>
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</table>
APPENDIX H – Faculty by Specialty Area & Research
Faculty by Specialty Area

CONSTRUCTION, GEOTECHNICAL & STRUCTURAL ENGINEERING DIVISION (22) DIVISION HEAD: Stefan Hurlebaus

Construction (4)
ANDERSON, Stuart
DAMNJANOVIC, Ivan
FORD, David
MOSTAFAVI, Ali

Geotechnical (5)
AUBENY, Charles
BRIAUD, Jean-Louis
CHA, Minsu
MEDINA-CETINA, Zenon
SANCHEZ, Marcelo

Structural (13)
BARROSO, Luciana
BIRELY, Anna
BRACCI, Joseph
HUESTE, Mary Beth
HURLEBAUS, Stefan
KEATING, Peter
KOLIOU, Maria
LOWERY, Lee
MANDER, John
NIEDZWECKI, John
PAAL, Stephanie
SIDERIS, Petros
YARNOLD, Matthew

ENVIRONMENTAL, WATER RESOURCES, & COSTAL ENGINEERING DIVISION (17)
DIVISION HEAD: Scott Socolofsky

Water Resources (6)
BRUMBELOW, Kelly
CAHILL, Anthony
GAO, Huilin
MILLER, Gretchen
OLIVERA, Francisco
TRACY, John (TWRI)

Coastal (5)
CHANG, Kuang-An CHEN, Hanm-Ching KAIHATU, James M.
MERCIER, Richard
SOCOLOFSKY, Scott

Environmental (6)
AUTENRIETH, Robin
BANKS, Katherine
CHELLAM, Shankar
CHU, Kung-Hui (Bella)
MA, Xingmao (Samuel)
YING, Qi

TRANSPORTATION & MATERIALS
ENGINEERING DIVISION (16) DIVISION HEAD: Nasir Gharaibeh

Materials (9)
BIRGISSON, Bjorn
EPPS MARTIN, Amy
GHARAIBEH, Nasir
GRASLEY, Zachary
LITTLE, Dallas
LYTTON, Robert
MASAD, Eyad
ZOLLINGER, Dan

Transportation (7)
Burris, Mark
HAWKINS, Harvey E., Jr. (Gene)
LORD, Dominique
QUADRIFOGLIO, Luca
TALEBPOUR, Alireza
WANG, Bruce (Xiubin)
ZHANG, Yunlong
ACADEMIC PROFESSIONAL TRACK (19)
APPLETON, Robert
BARTON, John
BATCHelor, Bill (EWRCE)
BRACKIN, Michael (CGS)
CHINN, Timothy
ENGLAND, Peter
HUTCHINSON, Richard
JONES, Harry (CGS)
KANTA, Lufthansa (EWRCE)
LONDON, Mara (EWRCE)
NELSON, James (EASA)
NOSHADRAVAN, Arash (CGS)
OTEY, Jeffrey
PITTMAN, Les
ROGERS, Alton
SCARFUTO, Jessica
WALEWSKI, John (CGS)
WOLF, Charles (CGS) WURBS, Ralph (EWRCE)
Research Areas

Coastal Engineering
- Marine Foundation Systems
- Marine Renewable Energy
- Natural Hazard
- Nearshore Circulation Ocean Structures
- Ocean Structures
- Structural Engineering
- Structural Reliability

Geotechnical Engineering
- Constitutive Modeling
- Earthquake Susceptible Soils
- Expansive Soils
- Instrumentation, Health Monitoring & Assessment
- Scour
- Soil Mechanics
- Soil-Structure Interaction

Construction Engineering & Management
- Construction Materials
- Construction Planning & Field Operations
- Process Modeling
- Project Development & Financing
- Project Management
- Risk Management & Decision Analysis
- Stochastic Simulation

Infrastructure Management & Security
- Condition Assessment
- Infrastructure Security
- Infrastructure & Transportation Asset Management
- Pavement Management
- Performance Modeling & Prediction

Environmental Engineering
- Aerosols: Sources & Composition
- Air Pollution Membranes
- Hazardous Wastes/Remediation
- Marine Oil Spill Modeling
- Renewable Energy & Products
- Risk Assessment
- Water/Energy Nexus
- Water/Wastewater

Materials Engineering
- Asphaltic & Concrete Pavements
- Construction Materials
- Corrosion Within Structures
- Fracture & Damage Mechanics
- Mechanical Properties & Transport in Concrete Materials
- Micromechanics & Microstructure Characterization
- Nondestructive Testing
- Pavement Evaluation
- Recycled Materials

Structural Engineering
- Building, Transportation & Offshore Structures
- Damage Detection
- Engineering Risk Analysis
- Fatigue & Fracture
- Preservation of Historic Structures
- Seismic & Wind Performance
- Smart Materials & Structures
- Structural Reliability
- Vibrations, Sensing & Control

Transportation Engineering
- Automated Vehicles
- Connected Vehicles
- Geometric Design
- Intelligent Transportation Systems
- Planning
- Scheduling Algorithms
- Traffic Control Devices
- Transit Systems
- Transportation Economics
- Transportation Operations
- Transportation Safety
- Transportation Systems Modeling

Water Resources Engineering
- Groundwater
- Hydraulics
- Hydrology
- Remote Sensing
- Sustainability
- Systems Analysis
- Water Resources Planning & Management
APPENDIX æ- Exit Survey (WEAVE)/PhD Annual Review
Survey of Graduating Graduate Students

Name: ________________________________

Directory Information:
Degree received:  ○ ME  ○ MS  ○ PhD  ○ DEng
Term of graduation: ______________________
Specialty:

Other university degrees and dates:
____________________________________
____________________________________

New home address: ______________________
____________________________________

New phone number: ____________________

New e-mail address: ____________________

Employer (*): ________________________

Work address: _________________________
____________________________________
____________________________________

Work phone: __________________________

Work e-mail address: __________________

Position: _____________________________

*If you will be continuing in graduate school, please identify the school and department. If entering military service please identify the branch. If you have not yet accepted employment, please enter “undecided”

Department of Civil Engineering (CVEN)

Today’s Date: _________________________

Confidential Information

Now that you have graduated, you will:

☐ Continue on for another degree.
   ○ Which University?
   _______________________________________

☐ What Degree? ________________________
   ○ Which University?
   _______________________________________

☐ Take a faculty position.
   ○ Which University?
   _______________________________________

☐ Research at a national lab or research center.
   ○ Which one?
   _______________________________________

☐ Take a post-doc position.
   ○ Which University?
   _______________________________________

☐ Working at none of the above.
   Undecided.

Starting annual salary $ _____________

Number of job offers received: _______

Did you take the ELPE?
   If yes, when? _____________
   If yes, did you pass the ELPE? ☐ Yes  ☐ No

Did you publish any journal papers? ☐ Yes  ☐ No
   If yes, number published: _______
   Number submitted: _______

Did you attend any technical conferences? ☐ Yes  ☐ No
   If yes:
   How many did you attend? _______
   Did you make a presentation? ☐ Yes  ☐ No
   If yes, how many presentations? _______

Thanks! Please return the completed survey in person to CE106 or via email:
Laura Byrd - lbyrd@civil.tamu.edu
Chris Grunkemeyer - cgrunk@civil.tamu.edu

Continued on reverse side ➔
Please tell us how you rate the Civil Engineering graduate program at Texas A&M in the following areas:

<table>
<thead>
<tr>
<th>Area</th>
<th>Excellent</th>
<th>Good</th>
<th>Average</th>
<th>Poor</th>
<th>Very Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>How would you rate your mastery of civil engineering knowledge</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Did you get a good breadth of education?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>How would you rate your communication skill?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>How would you rate the social environment?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>How would you rate the interaction with the faculty?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>How would you rate the interaction with the other students?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>How would you rate the advising?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>How would you rate the difficulty/fairness of the degree requirements/exams?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>If you had to make the decision of going to graduate school again would you decide to go?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Would you come again to TAMU?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Are you primarily interested in a professional or an academic career?

Your perception of the strengths in your graduate program?

Your perception of any weakness in your graduate program?

Your suggestions as to how the graduate program could be improved?

Professors/staff who you believe did an exceptional job in preparing you for your civil engineering career?
Doctoral Student Annual Self-Evaluation

(To be completed by student, then submitted to advisor/chair)

Expected Graduation / Completion Date (semester/year) ______________________

Dissertation/Advisory Committee Formed ________________ (date)

Chair ___________________________ Member ___________________________

Member ___________________________ Member ___________________________

Member ___________________________

If your committee has not been formed, please describe what progress you are making:

What were your accomplishments for the past academic year (please list only those relating to the last academic year, not all accomplishments for your degree program)?

a) Publications (with full bibliographic reference for publications, including status, i.e., submitted/in press/published):

b) Presentations (indicate date, venue/conference name, and title for presentations, and whether it is oral or poster. Include all presentations, including those made within the department, or even within your own research group):

c) Other accomplishments: (awards, service, etc.):

Goals
Please list your goals for the upcoming year:

Support
How are you currently supporting yourself while working on your PhD?

☐ Teaching Assistantship in (Department) ____________________________

☐ Research Assistantship with (Faculty member) ____________________________

☐ Other ____________________________

ckg 09/01/2017
## Self-Assessment

Please rate yourself. If other than 'Satisfactory' is selected, you must add comments regarding improvement.

<table>
<thead>
<tr>
<th>Item</th>
<th>Satisfactory</th>
<th>Need Improvement</th>
<th>Unsatisfactory</th>
<th>Plan for improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mastery of knowledge of mathematics, science and engineering <strong>theories</strong> to identify, formulate and solve engineering problems</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth of knowledge, including theories and concepts in your area of research and specialization</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to apply critical thinking to engineering problems and research methods</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to communicate effectively, both written &amp; oral</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to work collaboratively on multidisciplinary teams</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your understanding of the need to engage in life-long learning in your field.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to demonstrate ethical, social, cultural and global competence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Advisor/Chair Feedback:

Meeting Requirements/Expectations - [ ] Needs Improvement - [ ]

Feedback:

--

[Advisor/Chair name / signature / date]

**General Explanation of Feedback (Description provide by advisor/chair):** Individual advisor/chair should include statement defining how the assessed student, particularly if student is rated as 'Meeting Expectations'. This allows the student to understand what the advisor/chair means by this rating.

ckg/06/01/2017
APPENDIX J  - CE Advisory Council bylaws and members
TEXAS A&M UNIVERSITY
ZACHRY DEPARTMENT OF CIVIL ENGINEERING ADVISORY COUNCIL
BYLAWS
ARTICLE 1 NAME AND PURPOSE OF THE ORGANIZATION

Section 1

The name of the organization shall be the Civil Engineering Advisory Council (CEAC) for the Zachry Department of Civil Engineering at Texas A&M University, College Station, Texas.

Section 2

The mission of the CEAC shall be to provide advice, support, and counsel to the Department Head with the express purpose of helping to maintain the highest level of academic excellence so that its graduates remain at the forefront of the Civil Engineering professional practice in Texas and the nation.

The CEAC shall accomplish this mission by working with the Department Head to strengthen the depth and breadth of our existing degree program specialty areas, help to foster constructive interactions with leading civil engineering practitioners, participate in the ABET accreditation process, and serve as a resource to the department’s faculty and students. The CEAC membership shall be expected to provide advice to the Department Head as representatives of all department graduates as well as firms employing its graduates.

In addition to providing timely guidance on critical issues and challenges facing the profession, the CEAC shall be expected to provide guidance on student recruitment and retention, diversity initiatives, faculty retention, updating of equipment and facilities, participating in requested fund raising activities, and help to promote significant achievements by the Department’s faculty and students to the citizens of Texas and beyond.

ARTICLE II MEMBERSHIP

Section 1

The CEAC shall typically have a membership of no more than twenty-five active engineers, with a preference to those holding a professional engineering license. The majority of the membership will consist of civil engineering graduates whose achievements serve as examples of excellence in the practice of the broad field of Civil Engineering. The membership shall be selected to provide representation of the technical specialty areas of the department and its educational programs, the evolving demographics of the State of Texas, and the diversity of Zachry Department of Civil Engineering graduates in the broadest senses. The disciplinary specialization within the Department’s educational program currently include: Coastal, Construction, Environmental, Geotechnical, Materials, Water Resources, Structures, Transportation, and General Civil Engineering. The CEAC will support the Coastal and Ocean disciplines until the formal establishment of a separate department.
At that time, any designate representative of these disciplines may remain on the CEAC until the expiration of their service. The CEAC may include graduates from other well-respected engineering programs who will enhance the national and international perspective of the department on the practice of Civil Engineering.

Nominations for the CEAC membership can come from students, former students, faculty, retired faculty, the Department Head or active or Emeriti CEAC members. Nominees must be in professional practice for a period of time consistent with Texas professional licensure requirements, have a demonstrated record of leadership in the profession, and actively employed in their selected discipline. The council chairperson, in consultation with the Department Head, will appoint and lead a membership committee up to four CEAC members. This committee will review all nominations for any open positions on the advisory council and be charged with reviewing and reporting on the participation level of the current membership. This committee will be selected from the active council membership and may include one Emeriti member. After reviewing the recommendations of the membership committee, the Department Head will make a selection from the list of nominees, in consultation with the chairperson. Those individuals will receive a letter of invitation from the Department Head, with a copy to the Advisory Council Chairperson and Co-Chairperson. The letter will define the expectations and responsibilities of membership, and the terms of appointment. Upon acceptance by the nominee, the Department Head will notify the Council membership. A $1,000 per year donation, due annually on July 1, is requested of all members.

Section 2

The term for an appointment to the CEAC shall be four years. Service may be renewed with consideration given to the individual’s involvement in Council activities and attendance at meetings or special events. Renewed terms, as with initial membership, may be one year and no longer than four years in duration. No member may serve for more than nine consecutive years (Two-four year terms plus one year as immediate Past Chair). The Department Head may terminate an appointment of the advisory council upon request of that council member, or upon the recommendation of the membership committee. Upon the completion of their two consecutive terms, members may be named Emeriti member of the Council depending on their level of service to the department and impact on its educational, research and service mission. Emeriti members will be welcome to attend all of the scheduled meetings and will remain a resource for the department. Any member who does not participate in four meetings within a two-year period or five meetings in a three-year period will have their membership reviewed by the Department Head and Chair for termination of service.

One position on the CEAC shall be designated for the entity holding the department naming rights. Other positions on the CEAC can be designated based on significant support to the department and approval of the Department Head. Individuals serving in those designated positions are subject to approval by the Department Head, but are not limited to time of service as a CEAC member.

The Chair of the CEAC shall remain on the council for a minimum of one year after serving as Chair, subject to the approval of the Department Head.
Section 3

At the request of the Department Head, the CEAC will form committees to address membership, special opportunities, and critical issues needed to support the department. In addition, there will be times when matters will require the Department Head to utilize the special skills and experience of a select group of individuals drawn from current council members, Emeriti Council Members or other professionals to explore options and possible solutions. The Advisory Council Chair will be notified at the initiation of such an activity and the council members will be engaged at the appropriate time for additional advice and recommendations.

Section 4

There will be times that information may be presented by the Department Head or discussed by the Advisory Council or committees that must be kept confidential due to the nature of the subject. Information designated as confidential shall not be discussed or distributed by the Advisory Council membership to non-members of the Advisory Council unless previously cleared by the Department Head. Any violation of confidentiality may result in dismissal from the CEAC.

ARTICLE III OFFICERS

Section 1

A Chair and Co-chair will provide the leadership of the CEAC for the Zachry Department of Civil Engineering. Their selection will be based upon their demonstrated leadership and participation in council activities, meetings and willingness to serve. The terms of office for the CEAC Chair shall be two years, with the expectation that the Co-chair will serve as the next Chair. The terms will begin June 1st. The Co-chair shall assist the Chair as needed and lead meetings in the absence of the Chair. Both of these individuals will be selected by the Department Head with the advice of senior colleagues and members of the advisory council as appropriate.

Section 2

The Chair of the CEAC shall preside at all meetings of the Zachry Department of the CEAC and will coordinate the meeting dates and agenda with the Department Head, the lead departmental staff member and the department’s Special Events Coordinator.

Section 3

The Department Head shall select the chairs of any committees formed to address specific topics. The committee chairs shall be current or emeriti members of the Advisory Council.
ARTICLE IV MEETINGS

Section 1

Regular meeting of the Zachry Department of CEAC shall be held twice a year. The fall meeting will normally occur in September or October and the spring meeting will normally be held in March or April. Additional regional or group meetings may be held during the year.

Section 2

Additional meetings may be held at the discretion of the Department Head. These meetings may include administrative and fundraising activities; or they may coincide with other college or university special events. At these meetings, the Department Head will typically meet at the event with various current or Emeriti council members. The Department Head may also arrange for the Advisory Council Chair and members of the Council to meet with students, college or university officials, as appropriate.

Section 3

Regional meeting may be scheduled during the fall and spring academic semesters. The meeting will be organized with the help of both the current local members of the council and local emeriti members. The meeting will consist of three parts; a luncheon where faculty and the council members will discuss regional issues and opportunities for collaboration, a closed business meeting with a briefing by the department and a short social event to brief and meet a larger group of former students that might include future council member nominees. The location of the regional meeting may vary, but in general will be held in Austin, Corpus Christi, Dallas/Fort Worth, Houston and San Antonio areas. Not all regions will have meetings each year. In addition, meetings outside Texas, e.g. California, may be held if deemed beneficial by the Department Head.

The business luncheon meeting shall be an opportunity to discuss regional needs and future opportunities with a pre-selected group of faculty and students with relevant expertise. The outcomes should include closer relations with the next generation of faculty and opportunities of collaborative work and meaningful field trips for the students. The closed business meeting is an opportunity for frank discussion between the department leadership and the advisory council members on the current status of the department and future directions including areas that need immediate attention. The intent of the third component of the regional meetings the social event is to provide an opportunity for the Department Head and the accompanying faculty to meet professionals who, based upon their achievements, might be future candidates for the CEAC, possible sources of fundraising for the department, and others who have an interest in TAMU graduates or research. At this event there will be a brief presentation by the Department Head followed by a question and answer session, and informal discussions.
ARTICLE V REPORTS

The Chair of the CEAC, together with the Department Head and departmental staff shall be responsible for preparing a written summary including minute and action items for each meeting of the Council. Committee Chairs shall be responsible for preparing a written report summarizing their activities and highlighting their suggested action items for member of the Council and for the Department Head.

ARTICLE VII STRATEGIC PLANNING

The CEAC will conduct a Strategic Planning Session to align goals, objectives, and appropriate metrics for the Council with those of the Zachry Department of Civil Engineering. Upon adoption of a CEAC Strategic Plan, reporting of efforts by assignees will be included in the time frames designated. Should the Zachry Department of Civil Engineering amend its Strategic Plan, the CEAC shall review the changes for any adjustments to the strategies adopted by the CEAC. Those adjustments would be implemented within two meetings.
Mr. David S. Zachry, P.E., ‘85 (Chair)
Chief Executive Officer
Zachry Corporation
P. O. Box 33240
San Antonio, TX 78265-3240
Tel: (210) 871-2700
Fax: (210) 871-6909
david.zachry@zachrycorp.com

Mr. Juan Contreras, P.E., ‘85 (Co-chair)
Vice President
Michael Baker International
1501 LBJ Freeway, Suite 650
Dallas, TX 75234
Tel: (469) 801-8503
Cell: (817) 905-7054
jcontreras@mbakerintl.com

Mr. Lamberto “Bobby” Balli, P.E., ’86
Vice President
CP&Y
12500 San Pedro Avenue
Suite 450
San Antonio, TX 78216
Tel: (210) 494-8004
Cell: (210) 846-1097
Bballi64@icloud.com
bballi@cpyi.com

Mr. C. Harold Cobb, P.E. ‘82
Executive Vice President
Central Operating Group Manager
Terracon
TBPE Firm Registration No. F-3272
11555 Clay Road, Suite 100 I Houston, TX 77043
P [713] 939-6428 I M [713] 480-8315
Harold.Cobb@terracon.com

Mr. Mike Beattie, P.E., ’87
Director
International and Deepwater Project. Mgmt.
Anadarko Petroleum Corporation
1201 Lake Robbins Drive
The Woodlands, TX 77380
Tel: (832) 636-2961
mike.beattie@anadarko.com

Mr. John Doucet, P.E., ’81 (Past Chair)
Doucet & Associates, Inc.
7401B Hwy 71 West
Suite 160
Austin, TX 78735
Tel: (512) 583-2600
Fax: (512) 583-2601
John.doucet@doucet-austin.com

Ms. Bonnie Black, P.E., ’89
Vice President
Permian Well Planning & Permitting
Pioneer Natural Resources USA, Inc.
5646 Milton Street, Ste. 500
Dallas, TX 75206
Tel: (214) 753-8100
Cell: (214) 793-2747
rachel@haydenconsultants.com

Ms. Rachel Hayden, P.E., ‘89
Hayden Consultants, Inc.
5646 Milton Street, Ste. 500
Dallas, TX 75206
Tel: (214) 753-8100
Cell: (214) 793-2747
rachel@haydenconsultants.com

Mr. Joe E. Gregory, P.E., ’82
President
Project Resources Company
A Division of Chevron USA
1400 Smith Street
Houston, TX 77002
Tel 713 372-6744
Fax 713 372-6741
JEGregory@Chevron.com

Mr. Michael Inabinet, P.E.,’94
Western U.S. President
HNTB Corporation
1301 Fannin Street, Suite 1800
Houston, TX 77002
Tel: (346) 352-5644
minabinet@HNTB.com

Ms. Jessica L. Brown, P.E. ‘97
Principal
Freese & Nichols, Inc.
4055 International Plaza, Suite 200
Fort Worth, TX 76109
Tel: (817) 735-7406
JLB@freese.com

Mr. James Jones, P.E.,’05
Jones & Carter, Inc.
6330 West Loop South, Suite 150
Bellaire, Texas 77401
Tel: (713) 777-5337
Fax: (713) 777-5976
jcjones@jonescarter.com
Mr. Patrick L. Kunz, P.E., ’79
President
Halff Associates
1201 North Bowser Rd.
Richardson, TX 75081
Tel: (214) 346-6200
Fax: (214) 739-0108
pkunz@halff.com

Mr. Calvin Ladner, P.E., ’80
President
LJA Engineering
2929 Briarpark Drive
Suite 600
Houston, TX 77042
Tel: (713) 953-5246
Fax: (713) 953-5026
cladner@lja.com

Mr. Robert (Bob) Lanham, P.E., ’81
President
Williams Brothers Construction Co., Inc.
PO Box 66428
Houston, Texas 77266
Office: 713.522.9821
Fax: 713.520.5247
Cell: 832.435.5819
Email: blanham@wbctx.com

Mr. D. Brent Moore, P.E., ’93
Ports & Harbors – Gulf Coast Program Mgr.
HDR Engineering
555 N. Carancahua, Suite 1600
Corpus Christi, TX 78401
Tel: (361) 696-3374
brent.moore@hdrinc.com

Home address:
13762 Eaglesnest Bay
Corpus Christi, TX 78418

Mr. Dennis Mudd, P.E., ’85
EMRE Global Project SSH&E DTL
22777 Springwoods Village Parkway
E1.3A.446
Spring, TX 77389
Tel: (832) 625-5549
Cell: (281) 734-4140
Email: dennis.r.mudd@exxonmobil.com

Home address preferred:
4820 Kendall Road
Baytown, Texas 77523

Mr. Dennis Rion, P.E., ’84
Executive Vice President
Pape-Dawson Engineers, Inc.
2000 NW Loop 410
San Antonio, TX 78213
Tel: (210) 375-9000
Fax: (210) 375-9040
drion@papedawson.com

Mr. Floyd Scurry, P.E., ’87
Vice President
Cobb Fendley
13430 Northwest Freeway, Suite 1100
Houston, TX 77040
Tel: (713) 462-3242
FLOYD@cobbendley.com

Ms. Monica Silver, P.E., ’91
Vice President
Cobb Fendley
13430 Northwest Freeway, Suite 1100
Houston, TX 77040
Tel: (713) 462-3242
msilver@cobbendley.com

Mr. Richard Watts, P.E., ’85
Senior Vice President
Granite Construction
1800 Hughes Landing Blvd.
Suite 800
The Woodlands, TX 77380
Tel: (281) 475-2691
Richard.watts@gcinc.com

Mr. Dennis Wittry, P.E., S.E., ’91
Principal
Managing Director of Structural Engineering
Services-Houston and Central Texas
Walter P. Moore and Associates, Inc.
1301 McKinney, Suite 1100
Houston, TX 77010
Tel: (713) 630-7300
Fax: (713) 630-7396
Dwittry@walterpmoore.com
EMERITUS MEMBERS

Ms. Fiona Allen, P.E., '82
Northern Regional Manager
Trinity River Authority
5300 South Collins St.
Arlington, TX 76018
Tel: (817) 493-5100
Fax: (817) 417-0367
allenf@trinityra.org

Ms. Debra L. Anglin, P.E. '77
1221 Stafford Rd.
Plainfield, IN 46168-2317

Mr. Fred Balda, '82
President
Hillwood Communities
Victory Park
3090 Olive Street, Suite 300
Dallas, TX 75219
Tel: (972) 201-2940
Cell: (214) 232-1780
Fred.Balda@hillwood.com

Mr. Michael W. Behrens, P.E. '70
319 CR 404
Yoakum, TX 77995
Tel: (361) 208-5039
Fax: (412) 375-3985
mbehrens@mbakercorp.com

Mr. J. R. (Dick) Birdwell '53
Consulting Engineer
#3 Forest Drive
College Station, TX 77840
Compuserve 71544,2137
Tel: (979) 260-2076
Fax: (979) 260-1288

Mr. Byron C. Blaschke, P.E. '60
1002 Woodhaven Circle
College Station, TX 77840
bblaschke@suddenlink.net

Mr. Paul Bury, P.E., '74
Bury + Partners
221 West Sixth Street, Suite 600
Austin, TX 78701
Tel: (512) 328-0011
pbury@burypartners.com

Mr. George Cozart, P.E., '74
Executive Vice President
Terracon Consultants, Inc.
5307 Industrial Oaks Blvd., Suite 16C
Austin, TX 78735
Tel: (512) 442-1122
Fax: (512) 442-1181
gdcozart@terracon.com

Mr. Robert (Bob) Cuellar, P.E. '69
CobbFendley
bcuellar@cobbfendley.com

Mr. Dale Fisseler, P.E. '81
City Manager
City of Waco
P.O. Box 2570
Waco, TX 76702-2570
Tel: (254) 750-5640
Cell: (254) 709-0664
Home: (254) 757-0522
DaleF@ci.waco.tx.us

Dr. Davis L. Ford '59
Davis L. Ford & Associates
#1310
3300 Bee Cave Rd., Ste. 650
Austin, TX 78746
Tel: (512) 327-6599
Fax: (512) 327-6408
dfordphd@aol.com

Mr. John L. German, P.E. '62
Director of Infrastructure Services
HNTB Corporation
Austin Office
301 Congress Avenue, Suite 600
Austin, Texas 78701
512 447 5590 X 14943
210 621 5889 Cell
Home:
5105 Bandera Creek Trail
Austin, TX 78735
Tel: (210) 828-9494
Fax: (210) 828-7282
jgerman1962@gmail.com

Mr. William F. Goldston, P.E. '69
WFGCON, PLLC
Tel: (713) 828-5701
w.goldston@wfgcon.com
preferred address:
13721 Tajamar
Corpus Christi, TX 78418

Mr. Denis J. Graham, P.E. '76
Vice President – Engineering
Parker Drilling
1401 Enclave Parkway, Ste 600
Houston, TX  77077
Tel:  (281) 406-2072
Fax: (281) 406-2073
denis.graham@parkerdrilling.com

Mr. Jack M. Graham
7875 Pecan Drive
Beaumont, TX 77713-9247
Tel:  (409) 834-2129

Mr. Dennis Hirschfeld ’74
Vice President and CFO
Hirschfeld Steel Co., Inc.
Corporate Headquarters
P.O. Box 3768
San Angelo, TX  76902
Tel: (915) 653-3211
Fax: (915) 486-0319
Dennis_hirschfeld@hirschfeld.com

Mr. C. Darrow Hooper ’53
6 Braemore Place
Dallas, TX  75230-1958
darrowhooper@sbcglobal.net

Mr. James (Jim) Jacobi, P.E.
Walter P. Moore and Associates, Inc.
1301 McKinney, Suite 1110
Houston, TX 77019-1919
Tel: (713) 630-7300
Fax: (713) 630-7394
Jjacobi@walterpmoore.com

Mr. James R. (Bob) Jones, P.E. ’69
Jones Engineering Solutions, LLC.
402 Bayou Cove Court
Houston, TX  77042
Tel: (713) 816-6181
bobjones@jonesengineeringolutions.com

Mr. W. A. (Bill) Kinney, P.E. ’76
MCS Kenney
15115 Park Row, 3rd Floor
Houston, TX 77084
Tel: (281) 646-4198 (Ext 2084)
Cell: (832) 857-5780
wakinney@oceanengr.com

Mr. Richard W. Kistner, P.E. ’65
President & Vice Chairman of Board
Raba-Kistner Consultants
12821 W. Golden Lane

Mr. D. Wayne Klotz, P.E. ’74
1607 Mission Springs
Katy, TX  77450
Tel: (281) 589-7257
Fax:  (210) 699-6426
rkistner@rkci.com

Mr. Tommy E. Knight ’61
14077 Memorial Dr. #234
Houston, TX  77079
Tel:  (281) 558-2144
teknight_01@sbcglobal.net

Mr. Dan S. Leyendecker, P.E., ’90
President
LNV Engineering
801 Navigation, Suite 300
Corpus Christi, TX  78408
Tel:  (361) 883-1984
Fax:  (361) 883-1986
danl@lnvinc.com

Mr. John H. Lindner, P.E., ’82
COO
Walker Partners, LLC
804 Las Cimas Parkway, Suite 150
Austin, TX  78746
Tel:  (512) 382-0021
Cell:  (512) 560-9381
jlindner@walkerpartners.com

Mr. W. A. (Bill) Kinney, P.E. ’76
MCS Kenney
15115 Park Row, 3rd Floor
Houston, TX 77084
Tel: (281) 646-4198 (Ext 2084)
Cell: (832) 857-5780
wakinney@oceanengr.com

Mr. Richard W. Kistner, P.E. ’65
President & Vice Chairman of Board
Raba-Kistner Consultants
12821 W. Golden Lane

Col. (Ret) Frank Lane Lynch, P.E. ’60
3421 Coles Point Way Unit D
Mr. Richard I. Mueller, P.E. ’77
Technical Services Manager
Ameron International
Water Transmission Group
10681 Foothill Blvd., Ste. 450
Rancho Cucamonga, CA 91730
Tel: (909)-944-4100 x192
Fax: (909)-944-4112
rimueller1955@yahoo.com

Mr. Robert F. Pence, P.E. ’72
President and CEO
Freese and Nichols, Inc.
4055 International Plaza, Suite 200
Fort Worth, TX  76109-4895
Tel: (817) 735-7300
Fax: (817) 735-7492
Metro Tel: (817) 429-1900
rfp@freese.com

Mr. Randy C. Pierce, P.E., ‘86
randy.pierce64@icloud.com
Cell: (303)981-7796
Home: (857)350-4129

Home Address:
24 Commonwealth Avenue #3
Boston, MA 02116

Mr. James W. (Bud) Porter ’51
4420 McFarlin Blvd.
Dallas, TX  75205
Tel: (214) 346-9030

Dr. Carl F. Raba, Jr. ’59
Raba-Kistner Consultants
12821 W. Golden Lane
San Antonio, TX  78249
Tel: (210) 699-9090
Fax:(210) 699-6426
craba@rkci.com

Mr. Roy L. Wilshire, P.E. ’62
Kimley-Horn & Associates, Inc.--Retired
Home:
3521 Emily
Plano, TX  75093
Tel: (972) 596-5153
Cell: (214) 914-1193
roy.wilshire@tx.rr.com

Mr. H. B. Zachry, Jr. ’54
7603 Shadylane
San Antonio, TX  78209
Tel: (210) 258-2121
Fax: (210) 258-2125
Civil Engineering Faculty Committee Information – December 2018

Zachry Department of Civil Engineering Committees

Executive Committee
Distance Learning Committee
Curriculum Committee
Curriculum Assessment & Implementation Team
Promotion and Tenure Committee
CE/TTI Collaboration Team
CE Awards Committee
Endowed Appointment Ad Hoc Committee
Scholarship Committee
Distinguished Graduate Awards Committee
ABET Core Committee
ENVE Committee
ARCH-E Committee
Strategy and Vision Committee
Peer Teaching
Endowed Appointment

Texas A&M Engineering Committee Representatives
Texas A&M Engineering Research Council Representative
Texas A&M Engineering – College of Engineering Tenure and Promotion Advisory Committee (CETPAC)
Texas A&M Engineering Systems Committee
Texas A&M Engineering Honors and Awards Committee
Texas A&M Engineering Project Management Committee
Texas A&M Engineering Advanced Manufacturing
Texas A&M Engineering Advanced Materials for Energy Applications
Texas A&M Engineering Autonomous Systems Engineering (CANVASS) working group
Texas A&M Engineering Undergraduate Advisors Committee
Texas A&M Engineering Graduate Instruction Committee (GIC)
Texas A&M Engineering Faculty Advisory Council
Texas A&M Engineering Honors Program Committee
College of Engineering Endowed Position Selection Advisory Committee (CEPSAC)
Emerging Learning Technologies Advisory Council (ELTAC)
Junior Faculty Advisory Committee
APPENDIX L – Institutional and Departmental Strategic Plans
Strategic Plan  
Zachry Department of Civil Engineering

Vision  
*We Build our World:* leading education, research, and service in civil and environmental engineering.

Mission  
To educate students who are well grounded in civil and environmental engineering fundamentals and equipped for life-long learning so that they will succeed in a multi-disciplinary, global profession and to conduct research that solves current and future problems facing society for the betterment of the state, nation, and world. By focusing on excellence, we achieve impact *via* the quality of our students, our research, and our service.

Goals and Objectives  
To fulfill our mission and to achieve our Departmental vision, we will pursue the following broad goals and specific objectives.

1. Advance the education of our undergraduate students through rigorous courses, grounded in theory and application; through high-impact learning experiences inside and outside the classroom; through meaningful study abroad opportunities; and through awareness of workforce needs.  
   a. Launch two new ABET-accredited degree programs (Architectural Engineering and Environmental Engineering)  
   b. Create space in the curriculum for students to create custom tracks and to engage with areas of expertise outside of civil engineering  
   c. Evolve the departmental curriculum to keep pace with innovation impacting the civil, architectural, and environmental engineering fields  
   d. Hire faculty with expertise beyond traditional civil engineering fields to expand the multi-disciplinary talent within the department  
   e. Provide and promote opportunities for undergraduate research experiences  
   f. Support career paths among our students that include leadership in government  
   g. Provide a range of opportunities for students to engage with industry experts to enhance their awareness of workforce needs  
   h. Cultivate the importance of staying connected with professional societies and professional licensure  
   i. Develop a portfolio of online courses that undergraduate students can take in the summer while participating in off-site internships  
   j. Offer summer study abroad programs across the globe that have a diverse range of course offerings  
   k. Increase the number of teaching assistants and utilize their teaching potential to enhance student learning  
   l. Reduce the student to faculty ratio and review class sizes and teaching support

2. Maintain the high quality of our undergraduate student recruiting to allow freshmen to learn about civil and environmental engineering and to attract the best students to our program from a diverse pool of applicants.  
   a. Recruit a diverse population of undergraduate students that represent the State of Texas and the nation  
   b. Continue outreach activities to freshmen that teach them about the diverse curriculum of the department  
   c. Encourage freshmen to participate in undergraduate student activities within the department
d. Continue to conduct a holistic review of student applications through the Entry to a Major (ETAM) process
e. Provide a transparent explanation of the ETAM process and the Department’s priorities in selecting students for our programs

3. Enhance the education of our graduate students through rigorous courses grounded in theory and application, world-class research, multi-disciplinary course offerings, and a diverse range of career development opportunities.
   a. Launch two new graduate degree programs (Architectural Engineering and Environmental Engineering)
   b. Evolve the departmental curriculum to keep pace with innovation impacting the civil, architectural, and environmental engineering fields
   c. Hire faculty with expertise beyond traditional civil engineering fields to expand the multi-disciplinary talent within the department
   d. Use some of the graduate enhancement funds to elevate the national and international recognition of our program (e.g., fund student travel to conferences, invite international leaders in civil engineering to our seminar series, invest in professional marketing campaigns, etc.)
   e. Maintain and enhance our research portfolio to support the research activities of our graduate students.
   f. Create a focused writing program to support all thesis degree students, including mentoring and resources for authoring journal publications and technical reports
   g. Create a professional development track to mentor some doctoral students toward an academic profession
   h. Ensure that all our doctoral students are funded to conduct their research
   i. Develop curricula in multiple appropriate focus areas, dependent on workforce needs, for students to earn one-year masters degrees
   j. Participate in the five-year masters program, in which students earn simultaneous Bachelors and Masters degrees after five years of study.
   k. Develop a portfolio of online courses that graduate students and practicing professionals can take to obtain certificates and masters degrees

4. Improve graduate student recruiting to allow for timely and competitive support offers that will attract the best domestic and international student to our research programs from a diverse pool of applicants.
   a. Recruit a diverse population of graduate students that represent the global civil, architectural, and environmental profession.
   b. Develop a timeline and process for all recruiting efforts
   c. Identify key arenas and locations to focus recruiting efforts
   d. Identify key people (faculty, current students, graduates, and industrial advisory committee members) to be involved in the graduate student recruiting process
   e. Invite top domestic students to a newly-designed graduate student invitational in late January or early February so that we are able to enroll 30 new students per year from this cohort
   f. Create a social media and marketing strategy that enhances our student recruitment
   g. Use some of the graduate enhancement funds to create departmental graduate fellowships
   h. Identify roadblocks to timely and competitive graduate student support offers and address accordingly
   i. Give timely offers (no later than March 1) to top students for admission with funding
   j. Improve coordination and communication between faculty, area graduate advisors, and the graduate advising office
5. Provide our faculty with the resources they need to achieve their potential for excellence in teaching, research, and service.
   a. Maintain and develop state-of-the-art research facilities, including highly skilled technical staff, to support teaching and research activities.
   b. Encourage and recognize multi-disciplinary collaboration across departments, colleges, and with other institutions.
   c. Hire faculty with expertise beyond traditional civil engineering fields to expand the multi-disciplinary talent within the department.
   d. Organize teams to compete for large center- or consortium-level research grants.
   e. Enhance faculty members’ recognition and visibility through effective promotion and award nominations at the national and international level.
   f. Mentor our assistant and associate professors toward promotion and for success in the national and international research arena.
   g. Compensate faculty adequately for on-line course development and other significant service activities.
   h. Provide funds to support the career development of our academic professional track (APT) faculty to continually improve their teaching, service, and research pursuits.
   i. Provide three-year rolling contracts for APT faculty that are delivered in a timely manner.
   j. Seek to increase endowments to the department for professorships, chairs, and the Excellence Fund.
   k. Publish a quarterly or semi-annual newsletter, which can be used for fund raising, recruiting, and marketing.
   l. Market and publicize our scholastic and research accomplishments.

6. Facilitate and support the innovation and entrepreneurship activities of our students, researchers, and faculty.
   a. Develop and recognize the value of short courses and webinars.
   b. Encourage partnership with industry and with government laboratories (ACE, DOE, DOD, etc.).
   c. Protect the intellectual property rights of the faculty.
   d. Facilitate patenting of ideas spawned by departmental research.
   e. Organize participation by departmental teams in university-wide grant competitions.

7. Streamline departmental administrative services.
   a. Make departmental decisions and respond to college requests based on recommendations in this strategic plan.
   b. Hire a business administrator to track faculty contracts and facilitate the post-award process within Sponsored Research Services.
   c. Clearly communicate and publish the organization and responsibilities of the business office, Department Head’s office, and the Sponsored Research Services offices.
   d. Train division administrative staff on best practices to help support faculty activities.
   e. Empower staff to make decisions within their range of expertise and job duties.
   f. Improve connectivity between staff that works for a centralized group in the college while serving the specific needs of our department and staff employed by the department.
   g. Establish accountability metrics for administrative services.
   h. Increase training of staff on new financial and research support systems.
Texas A&M University: An Ideal 21st Century University

Texas A&M University will attain the ambitious ideals of Vision 2020 by its commitment to the founding principles of the Morrill Act of 1862, also known as the Land-Grant College Act:

- to provide students across the population access to higher education,
- to generate meaningful research and scholarship, and
- to transfer discoveries to the people of the State and beyond; and

by its commitment to the modern purposes of AAU research universities:

- to serve society through basic and applied research,
- to lead in graduate education, and
- to be an engine of social transformation and economic growth.

This balanced commitment to founding principles and expectations is the mandate from students, faculty, legislators, and the public for excellent universities of the 21st century.

To achieve our vision, Texas A&M University will:

GOAL 1: Provide an outstanding educational experience for all students as evidenced by:

- Enhanced learning outcomes
- Strong appreciation for the value of the educational experience
- High completion rates
- Timely graduation norms
- High placements upon graduation

Texas A&M University’s mission requires that we provide an exceptional education to undergraduate and graduate students that reflects the changing social and cultural demographics of Texas and the Nation. We must ensure that our graduates are highly sought after, and are prepared to lead, learn, and serve for a lifetime. We must do this while serving the State and Nation in the effective utilization of resources, by striving for high completion rates, in a timely manner, which will lead to lower student debt accumulation. We must accomplish this educational aspect of our mission by enhancing innovative approaches and strong standards in our curricula.

In the 2013-14 academic year in the State of Texas, Texas A&M University had the lowest average time to degree for full-time undergraduates (4.1 years), the highest percentage of 4-year graduating full-time students (53.6%), the highest 5-year and 6-year graduation rates (77% and 80.4%), and the highest 4-year graduation rate for community college transfer students (85%). Large percentages of our graduate students complete their degrees, 73.1% of master’s students in two years and 72.4% of doctoral students, in 6 years. The average time for students to receive a master’s degree was 2.1 years, and for the doctorate it was 5.9 years. Over 78% of our students had job or graduate school placement within 3 months of graduation. All programs are achieving appropriate learning outcomes near or above national norms. In a survey of our graduating students, we found that 79% were sure the cost of attendance was well worth the benefits received, and 20% indicated it was probably worth it. Greater than 75% of the graduating students believed that their experience at Texas A&M enhanced their communication skills, reasoning skills, social and global awareness, team participation and leadership skills, and respect for other cultures. Twenty-two percent of our former students contributed funds to the University in 2014.
WE CAN DO EVEN BETTER.

Among our Vision 2020 peers, we are 15th in 4-year undergraduate completion rates and 13th in 6-year completion rates; our graduate student completion rate appears to be in line with our Vision 2020 peers, and our student satisfaction at the time of graduation and beyond seems to compare well among these peers. (Alumni donations to Texas A&M are second only to Georgia Tech among these peers.) Among our graduating students, only 69% believe we have helped them to effectively integrate knowledge from other fields into their efforts in their own field, only 40% believe we have helped them appreciate history, art and literature and their effect on society.

To improve, we will:

STRATEGY 1: Commit to a University culture that values timely completion of degrees at all levels.

STRATEGY 2: Commit to a University culture that ensures all students engage in high-impact learning experiences in their curricular, co-curricular, and extra-curricular experiences.

STRATEGY 3: Review and enhance all academic units’ curricular, pedagogical, and career preparation activities, especially the development of our instructors, to optimize value to our students.

STRATEGY 4: Strengthen multidisciplinary programs and initiatives, and reinforce their alignment with and recognition by existing disciplinary structures.

STRATEGY 5: Enhance our ability to ensure that all faculty, staff, and students, regardless of their identity, are recognized and valued for their contributions at Texas A&M University.

GOAL 2: Produce impactful new knowledge, innovations, and creative works as evidenced by:

- High citation, utilization, and display of scholarly outputs
- High levels of support for our scholars
- Recognition of our scholars
- Contributions to solving society’s grand challenges

Our research, scholarly, and creative activities must redefine fields of study, steer future pursuits, and improve the quality of life in Texas and the world. We will use the full resources of Texas A&M University to address society’s grand challenges – tough problems that can only be solved through large-scale collaboration involving experts representing the full spectrum of knowledge and competencies at our University.

In the 2013-14 academic year, we had the highest total research expenditures in the State of Texas (over $850 million), the second highest number of citations, and 628 faculty members who received prestigious awards.
WE CAN DO EVEN BETTER.

Among our Vision 2020 peers, we are 13th in total research expenditures, 18th in federal research expenditures, 15th in faculty with prestigious awards, 18th in number of National Academy members, and 18th in citations for our scholars’ work.

To improve, we will:

**STRATEGY 4:** (same as above) Strengthen multidisciplinary programs and initiatives, and reinforce their alignment with and recognition by existing disciplinary structures, especially in University focused areas of grand challenges.

**STRATEGY 6:** Review and refine faculty and staff annual performance and promotion evaluation processes and merit-based incentives to reinforce expectations and reward impact and productivity.

**STRATEGY 7:** Facilitate and support our faculty to publish and exhibit in top-tier venues, to succeed in garnering external funding for their work, and be successfully nominated for significant awards and recognitions.

**STRATEGY 8:** Refine and implement unit budgeting processes to ensure investments are made in facilities, equipment, and personnel that reinforce University expectations.

**GOAL 3:** Place the needs of the public good at the forefront of our mission as evidenced by:

- Graduating a large number of students who share the University’s commitment to serve the public good
- Increasing the number of graduating students who identify as African-American or Hispanic
- Graduating more than 25% of our students who are first generation college attenders or whose family income is below the State poverty level
- Graduating students with a low student debt burden
- Translating rapidly our scholarly and creative works to serve and improve society’s natural environment, economic environment, and human condition
- Exercising responsible stewardship of the State’s resources

To realize our Vision 2020 aspirations, we commit to even greater effectiveness, efficiency, and excellence. Excellence demands that we establish and be accountable to University-wide and unit-based metrics that measure progress toward meeting our mission as a first class land-grant public research university. Our faculty, students, and staff must influence communities and serve the public good. We will provide students from Texas and around the globe with hope and direction for a brighter and stronger future by helping families understand, value, and plan for their childrens’ educational aspirations; and by working with practitioners to incorporate new ideas and knowledge into daily practices. In the 2013-14 academic year, we interacted with numerous pre-college students and assisted hundreds of school teachers and administrators through development and research. We awarded 13,913 degrees. Of the degrees awarded, 48.8% were to women and 17.1% were to graduating students who identified as African Americans, Native Americans, or Hispanics. Our students’ debt was below the national average. We submitted 18 invention disclosures and had 5 patents issued. Our administrative costs were the lowest in the State at 3.6%.
WE CAN DO EVEN BETTER.

Although we have an increasingly diverse University community (students, faculty, and staff) compared to some of our peers, considering the changing demographics of the State of Texas, we can do even better. We strive to be an even more diverse and inclusive institution of higher education. Our faculty continue to encounter cumbersome procedures for bringing their ideas to the public, so administrative hurdles must be minimized to increase the amount of time dedicated to achieving our goals.

To improve, we will:

STRATEGY 5:  *(same as above, but ensure University wide)* Enhance our ability to ensure that all faculty, staff, and students, regardless of their identity, can thrive at Texas A&M University.

STRATEGY 8:  *(same as above but ensure University wide)* Refine and implement *University wide* budgeting processes to reinforce University expectations.

STRATEGY 9:  Align partnerships with other Agencies and our administrative procedures and operations to optimize our teaching, research, and service mission.

STRATEGY 10:  Reinforce and support procedures and initiatives to improve the recruitment and retention of faculty, staff, and students at all levels and from all backgrounds.
REPORT OF THE REVIEW TEAM
FOR THE
ZACHRY DEPARTMENT OF CIVIL ENGINEERING
TEXAS A&M UNIVERSITY

Submitted to the
Office of the Provost

By the review team:
Dr. Jerome Connor
Dr. Catherin French
Dr. Martin Lipinski
Dr. Juan Pestana

8 June 2012
Executive Summary

This report presents the observations and recommendations of the external team charged with reviewing the Academic Program offered by the Zachry Department of Civil Engineering, Texas A&M University (TAMU). The information transmitted here was developed during a two-day on-site visit conducted on 29 April-2 May, 2012. The team was requested to look at the following aspects of the Department's activities: the undergraduate and graduate educational programs; the experimental and computational facilities; the quality of the graduate research programs; the allocation of human and fiscal resources within the Department; the level of support that the University provides and how this support is leveraged; and lastly, the potential for interaction with other Departments and groups within TAMU.

Prior to the start of the review, the team was briefed by administrators from the Office of the Provost, the Office of the Dean of the College of Engineering, and the Head of the Department. These briefings were concerned primarily with the fiscal constraints facing TAMU and their impact on future programs such as the Vision 2020 plan currently being implemented at TAMU. During the visit, the team met with Departmental administrators, faculty, students, and alumni serving on the Advisory Council. Tours of all the major Departmental facilities were conducted. Discussions with the individual divisions about curriculum and resources were held. The team felt that adequate time was provided to assess the Academic Program and commends the Department for organizing an effective visit experience.

Based on the team’s observations, all the members felt that the Academic Program was excellent. The facilities are adequate; the faculty are of high quality and strongly motivated; the Departmental leadership is strong, visionary, and fully engaged; and the alumni are extremely supportive. The team was impressed with the quality of both the undergraduate and graduate student populations. However, the team felt that there are some potentially serious problems that need to be addressed to ensure the continued excellence of the program.

The first problem concerns the loss of key faculty over the past few years and lack of replacement. The positions returned to the college office are often required to address demands on the college budget, without regard to key holes that have been created by loss of faculty. Additionally, the student to faculty ratio has approached an unacceptable level and threatens to impact in a negative way the quality of the educational and research programs. TAMU has worked very hard to improve its ranking (currently 7th amongst public universities) and maintaining that ranking requires hiring additional faculty.

The second problem concerns the excessive workload of the Department Head and division heads. Regarding the Department Head, the team feels that he is doing an exceptional job managing one of the largest Departments in the US but is concerned that his current effort is not sustainable. Based on our observations, it is clear that he needs help in dealing with the volume of day to day operations. One solution would be to appoint a senior faculty member who could handle the intermediate level of Departmental administration associated with the educational and research programs. This position could also serve as a training experience for future Department Heads and provide continuity of leadership. The Associate Head could also facilitate the communication between the administration and
the divisions. At the division head level, some of the division heads are responsible for the administration of faculty groups that are the size of an entire department at some universities. The division heads should be provided with some dedicated staff support who could assist with high priority tasks required by the division heads.

The third problem relates to the uncertainty with respect to future financial support for educational and research activities created by recent policy and organizational modifications introduced at the University level. Specific sources of uncertainty are: the shift in research support and administration from TEES to OSRS which is expected to lead to a reduction in administrative support an indirect cost recovery; the unreasonable constraints imposed on the use of differential tuition remission funding for TA support; and the downward trend in State funding for TAMU in the immediate future. The team feels that these uncertainties are eroding faculty morale and causing an exodus of promising faculty to seek other academic opportunities.

With TEES structured as a service organization within the college, the faculty were able to realize a reliable high level of service in proposal development, submission, and grants administration. TEES was working for the college and worked as a team to ensure that the proposals were submitted following the appropriate guidelines and by the deadline even if it took extra measure. The in-depth staff knowledge of the particular grant requirements enabled the faculty to rely on them. The organizational structure seemed to be extremely efficient and effective providing a great resource and reducing administrative burden from the faculty to be more effective.

TTI is another organization within the college which has the potential to be a great resource, but also has the potential to compete with the faculty for research grants to support their own research staff. There could be greater integration of TTI to better serve the academic program. Some of the faculty serve in an administrative role within TTI, which can help to facilitate the coordination. This may not be the case among all divisions.

The fourth problem concerns the Department’s facilities. The decision to demolish the Hydromechanics laboratory in order to provide “green” space without first relocating the laboratory does not seem prudent since it will impact in a major way the educational experimental program. The team felt that this decision should be revisited. Other issues are the sprawling nature of the Department and the lack of common space for the graduate students. Consolidating these facilities is recommended by the team.

Team observations and recommendations

Given the voluminous data collected during the visit, the team decided to focus their comments on the following components of the Department:

- Administration - Departmental leadership
- Faculty
- Students - undergraduate and graduate
- Resources - human and financial
Each component was examined with respect to its strengths and weaknesses. Recommendations suggested by the individual team members were discussed in detail until unanimous consensus was achieved. Results of these deliberations are summarized below.
© ADMINISTRATION

Strengths:

- Department head is strong
- Supportive
- Accessible (open door policy)
- Visionary
- Resourceful
- Engaged and pro-active (e.g., fund-raising)

Weaknesses:

- Communication (e.g., departmental vision is not clearly articulated including opportunities for the department participation in the new college initiatives)
- Control of department resources is too centralized
- Allocation of resources is not transparent

Recommendations

- Continue to encourage/support the development of faculty at all levels.
- Continue fundraising activities and interaction with alumni and industry.
- Continue use of Advisory Council to engage loyal alumni and support proactive/innovative ways of funding lecturers and providing a flexible funding stream.
- Create an intermediate level of administration to address detailed day to-day operations and guarantee the continuity of leadership (next generation) and encourage/support the development of faculty at all levels.
STUDENTS

Strengths

- Good diversity of graduate student population
- Broad research spectrum and involvement of all groups
- Strong demand for the graduate program is a reflection of increased research visibility
- Graduate Teaching Fellows Program provides opportunities for an academic career
- Very good intellectual quality of students

Weaknesses

- Increased student to faculty ratio
- Financial support does not appear to be competitive (even if fees would be covered)
- The high fees seem to catch students off guard
- Large classes and/or limited offerings of classes (due to decreased number of faculty) may impact “attractiveness” of program

Recommendations

- Cover all fees and increase student stipend
- Continue Open House for attracting high quality US graduates
- Evaluate Graduate Teaching Fellows Program
  - Positive but may not be sustainable due to high faculty involvement
  - Work with university to expand preparing future faculty program to provide more students with sustainable opportunities
- Continue to evaluate faculty to student ratio and gradually reduce number of students and course offerings if necessary
- Provide opportunities to encourage greater graduate student interaction within and amongst groups (e.g., common rooms, departmental seminars)
Provide information regarding out-of-department courses that may be advantageous to research (i.e., instrumentation; statistics; GIS)

As an alternative to keeping "cream of the crop," encourage strong students to get grad degrees elsewhere and develop pipelines

- Students from strong liberal arts programs (i.e., Mathematics; Chemistry; Physics)
- Students from engineering programs without grad degrees (e.g., give seminars at universities who have required undergrad backgrounds)
- Exchange "cream of the crop" with other strong institutions

FACULTY

Strengths

- Breadth of interest; diversity in interests
- Diversity in gender and ethnicity
- Strong-level of research involvement
- Dedicated; cohesive; collegial
- "Can-do" attitude even though taxed with administrative & teaching burdens/requests (faculty not replaced; faculty filling administrative roles; faculty on extended leave)—they have clearly reached the limit

Weaknesses

- Dominated by traditional areas
- Department had a lot of momentum—loss of faculty through retirements and moves—makes it difficult to plan and to address needs
- Some divisions do not have good age distribution (lack of senior or junior faculty)
- Demands on time:
  - Administrative (e.g., division heads, graduate advisors)
  - Teaching (e.g., large numbers of students, lack of sufficient TA support; mentoring future faculty program)
- Two ABET accredited degrees (CivEn & OCEN) both require a lot of effort in accreditation

- Faculty do not seem to be aware/engaged in university initiatives

- Reduction in research services support (e.g., loss of TEES—personal contact, attention to detail, level of service, uncertainty in ICR recovery)

- Reduced morale (associated with Regent’s and State)

- Inadequate access to equipment for research (in some cases)

- Disconnect between involvement in planning process and “closing the loop”—feedback to faculty (e.g., faculty or group leads receive requests for information, but often it is unclear how the information will be used or who is the audience, and the final outcome resulting from providing the information is not known—or might have been communicated at a meeting which the group lead was unable to attend).

**Recommendations**

- Replace faculty lines within the department (administration indiscriminately uses positions that become available to plug gaps—e.g. to provide merit increase without consideration of impact on programs)

- Engage/communicate with faculty with regard to University initiatives (e.g., energy, etc.)

- Enable division heads to use release-time funding for discretionary use

- Provide divisions with some pool of funding to give them control for making group decisions (e.g.; from group lunch to grader to small piece of equipment/instrumentation)

- Provide more lead time and close the loop with faculty in regards to requests for information (equipment needs; student numbers; info for website) – provide background on how info is to be used and ensure the outcome is communicated

- Develop a means for faculty to provide “wish list” of needs to realize vision that is periodically re-evaluated so that department can respond quickly to opportunities that might arise through the University (via university initiatives, endowment opportunities, RFPs, etc.). The wish list should include needs for faculty positions, equipment, facilities, etc.

- Hire mid-career faculty who might serve multiple disciplines with joint appointments (e.g., material science)
RESOURCES

Strengths

- Adequate Education and Laboratory Facilities
- Strong industry/alumni ties
- Endowment support provides for financial stability
- TTI provides administrative services for transportation-related funding

Weaknesses

- Departure/retirement of faculty leaves programmatic needs uncovered
  - Rapid decline in faculty size
  - Uncertainty in faculty staffing
- Need new faculty in new nontraditional areas who can also respond to new initiatives
- Shifting in research support and administration from TEES to OSRS
- Uncertainty in allocation of indirect cost recovery due to the shift from TEES to OSRS
- Uncertainty in budgeting for operational costs
- Inadequate funding to acquire, maintain and replace equipment
- Differential tuition remission cannot be used to support graduate TA
- Coastal Lab is an under-utilized valuable resource
- TTI has the potential to compete with faculty for research grants to support their own research staff and overhead, which reduces potential funding opportunities to support graduate students.
Recommendations

① Modify mode of college operation to avoid negatively impacting the quality of programs (attrition of faculty to address budget needs and merit raises without concern for critical voids that are created)

② Hire new faculty in new nontraditional areas who can also respond to new initiatives

③ Continue to grow endowments and gifts

④ Work to attract more research grants and contracts to the Coastal Lab

⑤ Maintain a symbiotic relationship with TTI that supports the academic research program. Give priority of funding opportunities to faculty to support graduate students in order to support the academic mission of the university.

⑥ Consider creating a new building to consolidate the department which is currently spread across the campus. At a minimum provide some common space for graduate students and faculty to better facilitate networking.