Academic Program Review

Self-Study Report

for the

Zachry Department of Civil Engineering

Texas A&M University

College Station, Texas

April 29 - May 2, 2012
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1. The Department of Civil Engineering

Texas A&M University Mission Statement

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, 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.

This mission statement is published in the University Course Catalogs and on the University web site at: [http://www.tamu.edu/statements/mission.html](http://www.tamu.edu/statements/mission.html)

Dwight Look College of Engineering Mission Statement

The mission of the Dwight Look College of Engineering is to serve the state, nation and global community by providing engineering graduates who are well founded in engineering fundamentals, instilled with the highest standards of professional and ethical behavior, and are prepared to meet the complex technical challenges of society.

This mission statement is published in the University Course Catalogs and on the College web site at: [http://essap.tamu.edu/mission.htm](http://essap.tamu.edu/mission.htm)

Zachry Department of Civil Engineering Mission Statement

The mission of the Zachry Department of Civil Engineering at Texas A&M University is to prepare our graduates to become professional engineers and leaders in the civil engineering profession by providing our students with a solid education that will enable them to integrate fundamental scientific engineering principles and that will couple with the latest technological advances to facilitate the development of their problem solving skills. Additionally, the department provides opportunities for enhancement of the students’ educational experience through meaningful interactions with the profession.

This mission statement is published in the University Course Catalogs and on the Department web site at: [https://www.civil.tamu.edu/About/mission.htm](https://www.civil.tamu.edu/About/mission.htm)

Graduate Program Vision

The vision for the graduate programs in the Zachry Department of Civil Engineering is to provide world-class opportunities for teaching, learning, and research for our students and faculty. Excellence in these areas will enable us to continue to be recognized as one of the best civil engineering departments in the nation. The mission of the graduate program of the department is:

- to provide high quality educational programs at the graduate level for design, analysis, operations and maintenance of civil engineering structures and systems,
- to conduct basic and applied research in order to extend our knowledge in these areas and to advance technological capabilities of industry, and
- to provide public and professional service relating to civil engineering.
1.1 Reflections on 136 Years of Civil Engineering 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 M.S. was awarded. Figure 1-1 shows a picture of the civil engineering class of 1892. 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 M.S. degree. Through its early beginnings, the Civil Engineering Department changed names, descriptions, and missions several times to reflect its continued growth and success, all the while keeping in focus its ultimate goal, which is to provide a solid educational experience that prepares its students to be leaders in the profession of Civil Engineering.

Figure 1-1: Civil Engineering Class of 1892.

In 1920, the Civil Engineering Department contained the following divisions: Structural Engineering, Highway Engineering, which was believed to have the best equipped laboratory in the United States, 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.
From the first class days at Texas A&M College, constant changes were being made to keep the curriculum and facilities abreast of the changing times and capable of handling the ever growing number of students interested in the intriguing nature of applied science and engineering. The laboratory facilities in 1920 occupied only two rooms in the basement of Nagle Hall, but by 1957 the Civil Department grew from one building to five buildings, some of which were vacated by the School of Veterinary Medicine, which is shown being built in about 1940 in figure 1-2. In 1968, Engineering occupied facilities to be used primarily for research and graduate study in materials and structural mechanics was completed and occupied. Between 1964 and 1975, the Civil Engineering Department student headcount increased from 403 to 1,062 and the number of faculty increased from 28 to 68, and necessary expansion of the facilities was anticipated in the near future.

![Figure 1-2: School of Veterinary Medicine (now the Civil Engineering Building) under Construction (circa 1940.)](image)

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. Today the Department has four divisions, Coastal and Ocean Engineering; Environmental and Water Resources Engineering; Construction, Geotechnical and Structural Engineering; and Transportation and Materials Engineering.

During the formation of the Civil Engineering Department, several key individuals contributed much time, effort, talent, and knowledge to the successful development of the curriculum, administration and faculty. Mr. Charles Puryear was the first Head of the Civil Engineering and Physics Department at Texas A&M College in 1889 and held this position for one year. Following which, Mr. Puryear held the position of Head of Mathematics for forty-two years, was Dean of the College for twenty-five years and acting President for one year. Mr. James C. Nagle, one of the most influential and dynamic figures in the engineering history of Texas A&M College, began his connection with TAMC in 1882, as an assistant professor and was eventually named the first Dean of Engineering, when the position was created in 1911. Mr. Nagle continued his career as a professor and administrator until 1913, when he retired and became the first Chairman of the Texas Board of Water Engineers. He returned to A&M in 1917, as Head of the School of Engineering, but once again resigned in 1922 and entered private practice. Another significant figure in Civil Engineering history is David Wendel Spence. Mr. Spence followed in the footsteps of Mr. Nagle as Dean and Head of the Department of Civil Engineering. He served TAMC for eighteen years as a professor, Dean and Department Head until he resigned in 1913 to become a
member of the Texas State Board of Water Engineers, which he served as Chairman until 1917. He, once again, returned to teach at TAMC until 1922, when he resigned and began his career in private practice. Others with outstanding influence on and dedication to TAMC and the engineering sciences are individuals such as John J. Richey, whose career at Texas A&M lasted from 1912 to 1941. John Thomas Lamar McNew, who began his employment at TAMC in 1920, remained an innovative part of the institution until 1945. Mr. McNew had a brief interruption in 1943, when he served the nation in WWII, but returned to continue his career with TAMU in 1945. During his absence, Mr. Carl E. Sandstedt served as Head of the Department for three years. Another important historical figure for the Department is Samuel Robert Wright whose career at Texas A&M University spanned more than four decades, from 1923 to 1964. All of these remarkable individuals are remembered on the Texas A&M University campus by the dedication of buildings and streets with their honorable names.

Dr. Charles H. Samson, Jr. served as Head of the Department from 1964 to 1979. Dr. Samson left the department for a leadership position at the university level as Acting President. As department head, he was succeeded by Dr. Donald McDonald who served as head from 1979 to 1986 and later left Texas A&M to pursue research at the American University in Cairo, Egypt. From that point, Dr. Donald Maxwell served as Interim Head and shortly thereafter, Dr. James Yao came from Purdue University to serve as the Department Head from 1988 to 1993 and remained active with the Department until 2005. He was followed by Dr. Ignacio Rodriguez who came from MIT and served as department head from 1993 to 1997. Dr. Rodriguez left Texas A&M in 1997 to accept a chaired position at Princeton University. Dr. John Niedzwecki was then elected the Department Head and served his first term from 1997 to 2002. In 2002, he was tapped to become the Executive Associate Dean. Dr. Paul Roschke then took over as Interim Head, serving from 2002-2004. In 2004, Dr. David Rosowsky came from Oregon State University to head the Department. In 2009, he left to accept the position of Dean of Engineering at Rensselaer Polytechnic Institute. At that time, Dr. Niedzwecki returned from the Dean’s Office to head the department and is the current head. Dr. Niedzwecki is not the first to serve as Head of the Department more than once, but he is the first since Dr. James Nagle who served from 1899 to 1913 and 1917 to 1922.

The Ocean Engineering program was established as a separate degree granting program within the Department of Civil Engineering in 1972. Dr. John B. Herbich, who became the first head of the program, was the faculty leader who orchestrated its development. The Department awards degrees in both Civil and Ocean Engineering at the B.S., M.S., M.E., and Ph.D. levels. Students can also earn Doctor of Engineering (D.Eng) degrees from the College of Engineering in an emphasis in both Civil and Ocean Engineering.

Table 1-1 has been prepared to provide a very brief summary of those faculty who have led the Department of Civil Engineering from its early beginnings to the present day. It becomes quite evident that the Department has a tradition of its leaders contributing much time and talent to strengthening the department, the college and the university.
<table>
<thead>
<tr>
<th>Name</th>
<th>Significant Position</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Puryear</td>
<td>- Head of Civil Engineering &amp; Physics Depts.</td>
<td>1889-1890</td>
</tr>
<tr>
<td></td>
<td>- Head of Mathematics</td>
<td>1890-1932</td>
</tr>
<tr>
<td></td>
<td>- Dean of College</td>
<td>1907-1932</td>
</tr>
<tr>
<td></td>
<td>- Acting President of College</td>
<td>1913-1914r</td>
</tr>
<tr>
<td>Nagel</td>
<td>- Head of Civil Engineering Dept.</td>
<td>1894-1910</td>
</tr>
<tr>
<td></td>
<td>- Dean of Engineering</td>
<td>1911-1913</td>
</tr>
<tr>
<td></td>
<td>- Head of School of Engineering</td>
<td>1917-1922</td>
</tr>
<tr>
<td>Spence</td>
<td>- Head of Physics Dept.</td>
<td>1899-1903</td>
</tr>
<tr>
<td></td>
<td>- Dean of School of Civil Engineering</td>
<td>1913-1917</td>
</tr>
<tr>
<td></td>
<td>- Director of Texas Engineering Experiment Station</td>
<td>1914-1917</td>
</tr>
<tr>
<td>Richey</td>
<td>- Head of Civil Engineering Dept.</td>
<td>1922-1941</td>
</tr>
<tr>
<td>McNew</td>
<td>- Head of Civil Engineering Dept.</td>
<td>1941-1943</td>
</tr>
<tr>
<td></td>
<td>- Vice President for Engineering</td>
<td>1945-1946</td>
</tr>
<tr>
<td>Sandstedt</td>
<td>- Head of Civil Engineering Dept.</td>
<td>1943-1946 / 3 years</td>
</tr>
<tr>
<td>Wright</td>
<td>- Head of Municipal and Sanitary Engineering Dept.</td>
<td>1932-1946</td>
</tr>
<tr>
<td></td>
<td>- Head of Civil Engineering Dept.</td>
<td>1946-1964</td>
</tr>
<tr>
<td>Samson</td>
<td>- Head of Civil Engineering Dept.</td>
<td>1964-1979</td>
</tr>
<tr>
<td></td>
<td>- Interim Provost</td>
<td></td>
</tr>
<tr>
<td>McDonald</td>
<td>- Head of Civil Engineering Dept.</td>
<td>1979-1986</td>
</tr>
<tr>
<td></td>
<td>- Interim Provost</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Interim Dean</td>
<td></td>
</tr>
<tr>
<td>Maxwell</td>
<td>- Interim Civil Engineering Dept.</td>
<td>1986-1988</td>
</tr>
<tr>
<td></td>
<td>- Head</td>
<td></td>
</tr>
<tr>
<td>Yao</td>
<td>- Head of Civil Engineering Dept.</td>
<td>1988-1993</td>
</tr>
<tr>
<td>Rodriguez-Iturbe</td>
<td>- Head of Civil Engineering Dept.</td>
<td>1993-1997</td>
</tr>
<tr>
<td>Nedzwiecki</td>
<td>- Head of Civil Engineering Dept.</td>
<td>1997-2002</td>
</tr>
<tr>
<td></td>
<td>- Executive Associate Dean</td>
<td>2002-2009</td>
</tr>
<tr>
<td></td>
<td>- Head of Civil Engineering Dept.</td>
<td>2009-Present</td>
</tr>
</tbody>
</table>
Table 1-1. Heads of the Department of Civil Engineering Since 1889

<table>
<thead>
<tr>
<th>Name</th>
<th>Significant Position</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roschke</td>
<td>Interim Head of Civil Engineering Dept.</td>
<td>2002-2004</td>
</tr>
<tr>
<td>Rosowsky</td>
<td>Head of Civil Engineering Dept.</td>
<td>2004-2009</td>
</tr>
</tbody>
</table>

1.2 Administrative Organization

The administrative organization of the department is presented in Figure 1-3. The Department can be viewed as consisting of three interrelated operating groups that include departmental operations, academic program and department facilities and laboratories. The departmental operations are primarily the focal point of the service administration for the department faculty and students. In the main office all academic and business operations are housed near the department head on the second floor of the CE/TTI building, while the computer services are housed on the sixth floor in the same building. The staff operations in the main office are coordinated by the senior administrative coordinator, the business office operations are overseen by the academic business administrator and the computer services are coordinated and planned by the senior information technology professional. Each of these leaders is a direct report to the department head. Coordination of departmental events that include award events, correspondence with former students, professional day for the undergraduates, the golf tournament and many more faculty events is primarily handled by the program coordinator. The Department Head meets with his immediate staff and the departmental staff on a regular or as needed basis.

The academic programs includes the undergraduate programs the graduate office and the grouping of our faculty into four divisions by specialties. The grouping of the faculty is more an administrative convenience built around course and degree specializations. The undergraduate program has grown to be one of the largest in the country, over 1100 undergraduates and our graduate program has over 400 students. Both the undergraduate office and the graduate office have permanent staff reporting directly to the faculty members in charge of the offices are available to the students to walk in during the week. Dr. Terry Kohutek and Dr. Mark Burris in their role as Assistant Department Heads have the authority to handle admittance, probation and most student situations. Dr. Roger Smith the Associate Department Head handles the most difficult undergraduate cases and the Department Head works with similar graduate level cases. Drs. Smith and Niedzwiecki review all cases dealing with military veteran’s applications and provide appropriate counseling on graduate admissions. The Associate Head for assists and advises the Department Head as needed, especially with class scheduling, student appeals, etc.

The Construction, Geotechnical and Structural Engineering Division is led by Dr. Mary Beth Hueste, the Coastal and Ocean Engineering Division is led by Dr. Scott Socolofsky, the Environmental and Water Resources Engineering Division is led by Dr. Francisco Olvera and the Transportation and Materials Division is led by Dr. Amy Epps-Martin. Each division has one staff member-funded by the Department and in some cases student help. The Department has three technicians responsible to support the Geotechnical, Fluids and Materials laboratories, and they report directly to the appropriate division head. 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 meet with the Department Head on a bi-weekly or as needed basis to provide advice on planning, curriculum, faculty needs, faculty concerns, serve as the chair of division searches, etc. The Division Head of the coastal and ocean division is somewhat different in that the Ocean Engineering program is a separate degree granting and individually accredited program, and that adds additional responsibility to the division head and faculty. The faculty members in that division are integrated into department teaching and research activities.
The Department Facilities and Laboratories presents an interesting challenge as the Civil Engineering Department and its students are housed in the following seven buildings: the CE/TTI building (CETTI) and laboratory complex (CVLB), the "old" Civil Engineering building (CE), the concrete laboratory building (CLB), the Wisenbaker building (WERC), the "old" Hydrolab building (HYLB), the Emerging Technologies building (ET), and the Graphics Services Complex (GRPH) which are all closely located within the A&M campus. The Department administration and business offices are housed on the second floor of the CEI/TTI building, the Transportation and Materials division faculty have offices on the 3rd, 5th and 6th floors of that building and the Construction, Geotechnical, and Structures division and the Coastal and Ocean division are located on the 7th & 8th floor. The faculty in the Environmental and Water Resources division is located on the second floor of the WERC. The location of these various buildings are shown in Figure 1-4. In addition the Haynes Coastal Engineering Laboratory and the Offshore Technology Research Center are located in the research park close to the airport.
1.3 The Faculty

A detailed analysis of the departmental faculty by rank is presented in the table found in Appendix A. In brief the table shows that our nearly all of our tenured and tenure track faculty have earned their doctoral degrees from other top-rated universities including, Illinois, MIT, UC Berkeley, Stanford, Texas, and Michigan, to list a few. In addition, many of our faculty have professional practice experience and are licensed professional engineers, several in more than one state. We are proud that our tenure and tenure track faculty teach our both under graduate and graduate course and we highly value excellence in teaching and research. They actively participate in ASCE and many other professional societies.

Due to the large number of the faculty in the Department of Civil Engineering, and the breadth of their expertise, the Department is able to teach graduate and undergraduate classes in nine major areas of civil engineering that include:

1. Coastal and Ocean (This is also a separate degree granting program)
2. Construction and engineering management
3. Geotechnical engineering
4. Environmental engineering
5. Materials engineering
6. Structural engineering
7. Surveying & geomatics (surveying is undergraduate only)
8. Transportation engineering
9. Water resource engineering

The distribution of faculty in teaching and doing research in these areas along with their rank and number and are presented in Table 1-2. In general, the faculty teaching graduate level courses conduct research
related to the topics taught in those courses and those no longer actively engaged in research generally teach only undergraduate courses are expected to provide other service to the department.

The change in faculty size based on full time faculty (FT) and faculty full time equivalencies (FTE) is presented in Figure 1-5. The corresponding change in student faculty ratios based on full time faculty (FT) and faculty full time equivalencies (FTE) is presented in Figure 1-6. These figures illustrate an increase in the student faculty ratios due to both a decrease in faculty numbers and increase in student population, primarily at the graduate level. Table 1-2 indicates that the Department has a good distribution at the assistant, associate and professor levels, including in most of the major technical areas. There are four of our faculty serving almost exclusively in the administration of the college and the department. Two are with expertise in the structural engineering (Assistant Dean, Department Head) and two with expertise in environmental engineering (Dean and Associate Dean). In addition a full professor in the area of materials area continues to work in Qatar (Assistant Dean). Not included in the data are the two non-tenure track instructors in the technical writing area which were hired to work primarily with the undergraduates as their main role is addressing our designated writing intensive classes. During a typical semester, roughly 50 faculty members supervise the majority of the graduate student research and graduate students choosing the non-thesis Master of Engineering programs.

<table>
<thead>
<tr>
<th>Technical Area</th>
<th>Professo r</th>
<th>Associate Professor</th>
<th>Assistant Professor</th>
<th>Instructor</th>
<th>Full Time</th>
<th>Part Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal/Ocean</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td>1-Prof</td>
<td>9</td>
</tr>
<tr>
<td>Construction</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Environmental</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Geotechnical</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Materials</td>
<td>6</td>
<td>0</td>
<td>3</td>
<td>8</td>
<td>1-VisProf</td>
<td>9</td>
</tr>
<tr>
<td>Structural</td>
<td>5</td>
<td>9</td>
<td>1</td>
<td>1</td>
<td>16</td>
<td>1-Lect</td>
</tr>
<tr>
<td>Surveying</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1-Sr. Prof 2-Lect</td>
</tr>
<tr>
<td>Transportation</td>
<td>0</td>
<td>4</td>
<td>2</td>
<td>6</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Water Resources</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>1-Lect</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>22</td>
<td>14</td>
<td>1</td>
<td>61</td>
<td>67</td>
</tr>
</tbody>
</table>
The Department supports Professional Day as a way to encourage interactions among students, practitioners, and faculty. Although this was developed primarily for undergraduate students, several graduate students also participate. Several firms send practitioners to discuss what students should expect to be doing in their first years of work. Practitioners are often invited to participate in seminars, speak to student organizations, and present lectures in appropriate classes. Students pursuing Master of Engineering (non-thesis) degrees are more likely to be engaged in experiential internships, while faculty advising and supervising graduate Master of Science and PhD students involve as many students as practical in their research.
The faculty are the key to the capability of the Department to provide an exceptional civil engineering education. Selected faculty members are appointed to two key committees that impact the curriculum. The curriculum committee is currently chaired by Dr. James Morgan, and it is responsible for developing recommendations for changes to the curriculum. The Curriculum Committee is made up of faculty from the various technical areas, and they are responsible for communicating with other faculty about possible curriculum changes prior to recommending changes. Although the committee is currently focused on the undergraduate programs, the plan is for them to then address the graduate curricula with particular emphasis on how the undergraduate curricula interface with the graduate curricula. Although the Department faculty set general guidelines for graduate curricula, the faculty in each technical area have considerable leeway as to what specific courses are required or allowed for masters and doctoral level programs.

Requests for changes to the curriculum can come from a number of sources. In some cases, the University takes action, such as a change in the core curriculum that requires the Department to change its curriculum. The evaluation of the assessment data collected by the Department and College, or input from the Department Advisory Council may identify an issue that might be resolved with a change to the curriculum. Faculty members may identify issues of concern that they believe should be addressed with a change to the curriculum. The Advisory Council may also identify issues that the leadership thinks could be addressed with a change to the curriculum which is then submitted to the Curriculum Committee for review.

Minor changes to the curriculum, such as the modification of an existing course, will normally be presented by the Division Head and discussed at the Department Head Council meeting, and if it does not affect other courses can be made without further evaluation. A change that affects other courses, whether it is a change to an existing course or development of a new course, will often be brought first to the Department Head Council meeting and then referred to the Curriculum Committee for review and evaluation. Their recommendations are then presented to the Department Head Council meeting, and then to the faculty at a faculty meeting, presented to the Advisory Council, and finally adopted. A major change to the curriculum may include holding one or more retreats to gather information and get input from the faculty, develop recommendations, present recommendations to the faculty at a retreat, and taking a vote to adopt the change. Occasionally, a committee will be formed from the faculty or Advisory Council to look at some specific issue, and that report will be submitted to the Department Head Council meeting and then referred to the Curriculum Committee for review and evaluation.

**Faculty Development**

The Department has hired some of the most talented and capable faculty in the last ten or so years to strengthen our teaching and research programs in Civil and Ocean Engineering. The expectations of the Department are that teaching excellence is achieved and maintained, that independent research programs are developed with an output that has notable impact in academia and or the profession, and that service is commensurate with faculty career status. Clearly the Department faces many challenges including the continued evolution of our educational programs, and the development and retention of our faculty. The Department Head believes that the most important components in pursuing the development of the faculty at the various stages of their careers is continuous and direct two-way communication with the department head, encouragement, mentoring and financial support, and incentives that recognize the achievement of excellence. He believes we have the talent, the financial resources and the desire to succeed at continuous improvement and elevate the reputation of our Department as leaders in education that produce well-founded graduates and future leaders of our profession.

**Mandated Faculty Reviews**

As required by the State, each member of the faculty and staff are reviewed annually. The review of each faculty member addresses the courses taught and the quality of their teaching as reflected by student evaluations and departmental averages, undergraduate and graduate student advising, scholarly research activities, service appropriate to faculty rank, and plans for the coming year or years are discussed. For the untenured faculty they are required to select a senior mentor from our faculty, and each
year leading to tenure each year a different two-person team (one selected by the faculty member and one by the department) is charge with reviewing their course teaching and content. The result is that faculty from the various divisions get to know and interact with the faculty member. This is important for several reason not only their development but also because each of the tenured faculty members can participate in the promotion and tenure process for faculty of lesser rank.

**Competition, Incentives and Recognition**

As might be expected newly hired faculty members generally receive the most attention, as they are monitored on a regular basis regarding their needs, the quality of their teaching, research related activities and expenditure of start-up funds. As an added incentive, the Department Head has instituted an innovative research competition with the goal to get the faculty out to visit with research sponsors at NSF and other potential sponsor agencies that generally have integrated educational and diversity objectives. Any of our faculty members can apply for travel funds to provide or leverage support for our undergraduate students to travel to national society conferences, to present papers or participate in a variety of undergraduate design competitions.

For a faculty member who has recently passed through the tenure process and been promoted to the rank of Associate Professor, the Department has two-year endowed Career Development Professorships that provide financial help for them to focus on achieving promotion to the rank of professor. Endowed Professorships and Chairs provide incentives for our more senior faculty to excel in both teaching and research. Many of our former students look forward to the various annual Departmental events that recognize our students and reflect so well our faculties’ dedication to teaching excellence. The engagement of practitioners in the teaching of our surveying camp and our professional day activities are another way we foster the engagement of our faculty and their students with the profession.

**Funding for the Development and Recognition of our Faculty & Students**

The naming of our Department for the Zachry family provided us with endowment funds that complement the range of funds returned by the College affiliated State agencies, the Texas Engineering Experiment Station (TEES) and the Texas Transportation Institute (TTI). We have the full range of faculty endowments to incentivize the faculty to pursue excellence that include Career Development Professorships, Endowed Professorships and Endowed Chairs. The Department has two significant endowments that support for teaching excellence, the Truman Jones teaching award and the Dick and Joyce Birdwell teaching award, and the Zachry family has been providing funds for additional teaching awards. A new Professorship committed to support teaching innovation is expected to be in place shortly.

Student fees are assessed for both undergraduate and graduate coursework. These funds reflection our student populations are distributed competitively with the ratio of 75 percent undergraduate and 25 percent graduate to enhance our teaching programs and no balances are carried from year to year. Our faculty takes pride in garnering this support to improve divisional and specialty area laboratories. This complements our substantial scholarship and fellowship awards to students and the interest of our faculty in developing our students. For those faculty members working with the student societies, we have endowment funds that are specifically committed for student activities and competitions allowing all to focus. A growing aspect of our student body fostered by our faculty is a social consciousness that gives back to society and helps those in need, nationally and internationally. This is a credit to initiative and efforts of our faculty members.

**1.4 A Snapshot of our Student Body**

A composite of the undergraduate and graduate student enrollment in the Department during fall semesters over the last few years is presented in Figure 1-7. Figure 1-8 shows student enrollment in the Department by the two degree granting programs, civil engineering and ocean engineering. Figure 1-9
and 1-10 show each of the two degree granting programs (civil and ocean engineering) by undergraduate and graduate enrollments.

The target enrollment for the College of Engineering is about 10,000 students, of whom 25% should be graduate students. Presently the College has about 10,400 students, about 1650 of whom are graduate students.

Presently, in the Department of Civil Engineering, approximately 27% of the students are graduate students. Over the years the faculty has discussed a variety of ratios for the undergraduate to graduate population, including a possible target ratio of one graduate student to two to three undergraduate students. Our undergraduate population has remained about about 1100 students since 2007. During this same period, our graduate population has grown from about 350 students to just over 400 students. To meet these target ratios would mean a graduate population of 33%-50% of the total enrollment in the Department, and the major debate is over how to reach these ratios.

![Figure 1-7: Student Enrollment in the Department (Civil and Ocean) by Graduate and Undergraduate](image-url)
Figure 1-8  Student Enrollment in the Department (Graduate and Undergraduate) by Civil and Ocean

Figure 1-9  Student Enrollment in the Civil Engineering Program by Graduate and Undergraduate
It should be noted that graduate student recruiting activities are limited. One effort that has occurred during the last three years is to invite top prospective US citizens in for a tour of the facilities in early March (see Section 2.4). Another effort involves the development of a paper brochure (see Figure 1-11) to complement our website (https://www.civil.tamu.edu/graduate/index.html) Graduate students are admitted at the review of the Department faculty in the appropriate specialty areas, the admission of undergraduates rest primarily with the University. The balance between master's and doctoral student populations varies in each specialty area, but a reasonable target might be a graduate student population consisting of 60% masters and 40% doctoral, with the majority of the master students being in some type of thesis option. Currently, approximately 45 percent of our graduate students are PhD students (see section 2.2 for additional details).

This issue of balance continues to be a topic of discussion and consideration by our faculty. Recently we have begun to focus our attention on the recruitment of highly qualified graduate students and considerations necessary to place our top doctoral program graduates in the top research universities in the nation. These goals are considered attainable as we acquire a larger full-time faculty and efficiently manage our course offerings, but help from programs now being initiated at the college and university levels are crucial to our success.

A somewhat dated poll of the practicing civil engineers in the state of Texas (Litchfield and Willis, May 2000) provided the data for figure 1-11. Although dated, this data provides an indication of the the impact of the Department of Civil Engineering at Texas A&M University on the civil engineering profession in the State of Texas over the last several years.
The Zachry Department of Civil Engineering at Texas A&M University has what you need to get the most out of your graduate education in civil engineering. Whatever you’re looking for, it’s here.

Highly ranked programs, award winning faculty, state-of-the-art facilities. The most graduate students and faculty of any civil engineering program in the United States. Competitive financial support for qualified students. All these combine to make this a great environment for learning and discovery.

Programs Include:
- Coastal and Ocean Engineering
- Construction Engineering and Management
- Environmental Engineering
- Geotechnical Engineering
- Materials Engineering
- Structural Engineering
- Transportation Engineering
- Water Resources Engineering

https://www.civil.tamu.edu/graduate

Figure 1-11a: Graduate Program Brochure (Page 1)
Zachry Department of
CIVIL ENGINEERING

We offer:
• the professionally oriented Master of Engineering (ME) degree
• the Master of Science (MS) degree — often a step toward the doctoral degree
• the doctoral degree (PhD).

The Zachry Department of Civil Engineering is the place for you to get your graduate education in civil engineering. We are highly regarded:
• the department is ranked 8th nationally among public universities (U.S. News & World Report);
Our graduates are highly sought after:
• 2nd nationally for producing top graduates (Wall Street Journal);
We are very affordable:
• 9th most affordable (Princeton Review)
It is a great place for university students to live:
• A top 12 college town (American Institute for Economic Research);
And with 66 faculty members there are so many research areas your options are almost unlimited.

Finances shouldn’t keep you from graduate study in the Zachry Department of Civil Engineering. Tuition waivers and monthly stipends (such as fellowships, research assistantships or teaching assistantships) are available to qualified graduate students. We have more than $275,000 a year in fellowships alone available to qualified students.

Visit https://www.civil.tamu.edu/graduate/application.html for application instructions.

Talk to our graduate advisor:
Mark Burris
979.845.2498
ccegrad@civil.tamu.edu

TEXAS A&M☆ENGINEERING

Figure 1-11b: Graduate Program Brochure (Page 2)
Figure 1-12 Number of civil engineers employed in Texas graduating from various schools
1.5 Facilities

Space

Offices (Administrative, Faculty, Clerical, Teaching Assistants)

The Department administrative offices are located primarily on the 2nd floor of the CE/TTI Building and are adequate. They house the Department Head Office and the Business Office. The Computer Support office is located on the 6th floor of the CE/TTI Bldg and also has adequate space. Department facilities, safety, and shipping receiving are housed on the first floor of the Civil Lab Building which is adjacent to the CE/TTI Building. While most faculty have offices in the CE/TTI Bldg, the faculty of the environmental and water resources division are located on the second floor of the Wisenbaker Engineering Research Center which is connected to the CE/TTI Bldg through a second floor walkway. All division faculty are located within reasonable distance of each other; most CGS faculty are on the 7th floor of the CE/TTI Bldg while some are on the 8th floor. The materials faculty are mostly on the 5th and 3rd floors of the CE/TTI Bldg. The transportation faculty are on the 3rd floor of the CE/TTI Bldg. The coastal and ocean faculty are located on the 8th floor of the CE/TTI Bldg. There is adequate space for administrative support for each division. Faculty office space is adequate but not elaborate. The graduate office, which houses two administrative assistants who support the graduate program, is located in the Civil Engineering building and has adequate space. Figure 1-4 presented earlier shows the spatial relationship of these various buildings.

Office space for teaching and laboratory assistants is limited; however, teaching assistants are given priority to space in the CE and CE/TTI Buildings to keep them close to the students. Laboratory Assistants are often in offices in other buildings. All teaching assistants have office space, many in the newly refurbished rooms in the CE building. Office space for research assistants is limited, but the recent allocation of additional space on the 2nd floor of the Wisenbaker Engineering Research Center has helped ensure all students with RA employment have office space. Graduate students who do not have a TA or RA position may not get office space. This is particularly true at the masters level, but some unfunded PhD students (of which there are only a few) do get office space.

Classrooms

Most of our classes are taught in the Civil Engineering Building. Although this is an old veterinary medicine building that was converted to classroom use for the Department of Civil Engineering, the Department has continued to invest in the classrooms keeping them well equipped to support our instruction. 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. The Department was recently allocated a classroom in the Zachry Bldg that contains 42 computers and seats 84. The computer laboratory provided for undergraduate student use has been equipped so that one area containing more than 25 work stations can be separated to support additional classes that require intensive computer use with one student per computer for short periods; semester long classes are not scheduled in that room. Wireless microphones and sound systems are available for use in the larger classrooms and many of our medium sized rooms. The Civil Engineering Building 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 eleven classrooms shown in bold in table 1-3 which are located in three different buildings; the Civil Engineering Building (CE Bldg), the Zachry Engineering Center (Zachry), and the Civil Engineering Laboratory Building (CVLB). Of those eleven classrooms, the eight that are designated as "Teaching" under purpose will probably have classes from other programs placed in them 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 them. 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 Civil Engineering
Building. The Undergraduate Student Services Office (USSO) staff coordinates use of the rooms in the
Civil Engineering Building outside of regular classroom hours, and some rooms are regularly used by
ASCE, Chi Epsilon, ITE, SEAoT, and other student organizations.

Table 1-3. 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>
</thead>
<tbody>
<tr>
<td>CE Bldg</td>
<td>104</td>
<td>DESIGN</td>
<td>DESIGN LABORATORY</td>
<td>705</td>
<td>24</td>
<td>Tables &amp; Chairs</td>
<td>1 per 4 persons</td>
</tr>
<tr>
<td></td>
<td>110</td>
<td>TEACHING</td>
<td>AUDITORIUM</td>
<td>1,928</td>
<td>118</td>
<td>Fixed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>118</td>
<td>TEACHING</td>
<td>CLASSROOM</td>
<td>1,280</td>
<td>78</td>
<td>Fixed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>137</td>
<td>TEACHING</td>
<td>CLASSROOM</td>
<td>506</td>
<td>28</td>
<td>Fixed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>214</td>
<td>DESIGN</td>
<td>DESIGN LABORATORY</td>
<td>602</td>
<td>24</td>
<td>Tables &amp; Chairs</td>
<td>1 per 4 persons</td>
</tr>
<tr>
<td></td>
<td>215</td>
<td>COMPUTER</td>
<td>COMPUTER LABORATORY</td>
<td>1,911</td>
<td>75</td>
<td>Tables &amp; Chairs</td>
<td>1 per person</td>
</tr>
<tr>
<td></td>
<td>217</td>
<td>COMPUTER</td>
<td>COMPUTER LABORATORY</td>
<td>1,034</td>
<td>30</td>
<td>Tables &amp; Chairs</td>
<td>1 per 2 persons</td>
</tr>
<tr>
<td></td>
<td>219</td>
<td>TEACHING</td>
<td>CLASSROOM</td>
<td>880</td>
<td>44</td>
<td>Tables &amp; Chairs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>221</td>
<td>DESIGN</td>
<td>DESIGN LABORATORY</td>
<td>814</td>
<td>32</td>
<td>Tables &amp; Chairs</td>
<td>1 per 4 persons</td>
</tr>
<tr>
<td>Zachry</td>
<td>103</td>
<td>COMPUTER</td>
<td>COMPUTER LABORATORY</td>
<td>1,760</td>
<td>84</td>
<td>Tables &amp; Chairs</td>
<td>1 per 2 persons</td>
</tr>
<tr>
<td>CVLB</td>
<td>419</td>
<td>TEACHING</td>
<td>CLASSROOM</td>
<td>1,390</td>
<td>50</td>
<td>Tables &amp; Chairs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>109B</td>
<td>LABORATORY</td>
<td>PREP ROOM</td>
<td>639</td>
<td>20</td>
<td>Fixed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>114A</td>
<td>LABORATORY</td>
<td>PREP ROOM</td>
<td>582</td>
<td>24</td>
<td>Fixed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>115A</td>
<td>LABORATORY</td>
<td>PREP ROOM</td>
<td>526</td>
<td>24</td>
<td>Fixed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>116C</td>
<td>LABORATORY</td>
<td>PREP ROOM</td>
<td>555</td>
<td>24</td>
<td>Tables &amp; Chairs</td>
<td></td>
</tr>
</tbody>
</table>

The staff in the Undergraduate Student Services Office (USSO), located in the Civil Engineering Building,
act as coordinators for other equipment faculty wish to use in the classrooms such as traditional
photographic projectors, etc. They also coordinate maintenance of the electronic instructional equipment
in the classrooms to ensure it is working order.

The Department Computer Systems Administrator ensures that all of the appropriate software is installed
on the Department server and available to the instructors in the classrooms as well as students using the
computer lab, computer classroom, design rooms. The software is generally also available to students
both by wireless access and remote access. They are responsible for maintenance of the electronic
instructional equipment in the classrooms to ensure it is working order. The Department has, or has
access to, the full suite of Microsoft software, the AutoDesk software, MatLab, and many specialized
software packages.

3. Laboratories

A 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. 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. Table 1-4 summarizes the laboratories
available for instruction in the civil engineering program, including a description of their adequacy for
instruction, condition, number of student stations, and square feet of space. Although these laboratories are used heavily for undergraduate instruction, graduate courses using physical laboratories, especially materials and geotechnical courses, also use these facilities. Graduate courses also use research laboratories, and more detailed information is provided in Appendix D.

Table 1-4. Laboratory Facilities

<table>
<thead>
<tr>
<th>Physical Facility Building and 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>Civil Lab Bldg. -- Room 109</td>
<td>Fluid Mechanics and Wave Mechanics</td>
<td>Excellent</td>
<td>Excellent</td>
<td>6</td>
<td>4,000</td>
</tr>
<tr>
<td>Civil Lab Bldg. -- Room 114</td>
<td>Construction Materials – CVEN 622, CVEN 653</td>
<td>Excellent</td>
<td>Excellent</td>
<td>6</td>
<td>4,000</td>
</tr>
<tr>
<td>Civil Lab Bldg. -- Room 115</td>
<td>Materials Science – CVEN 622, CVEN 653</td>
<td>Excellent</td>
<td>Excellent</td>
<td>4</td>
<td>4,000</td>
</tr>
<tr>
<td>Civil Lab Bldg. -- Room 116</td>
<td>Soil Mechanics – CVEN 649</td>
<td>Excellent</td>
<td>Excellent</td>
<td>6</td>
<td>1,000</td>
</tr>
<tr>
<td>Civil Lab Bldg. -- Room 228</td>
<td>Biological/Biological Chemistry</td>
<td>Good</td>
<td>Good</td>
<td>6</td>
<td>1,000</td>
</tr>
<tr>
<td>Civil Lab Bldg. -- Room 229</td>
<td>Wet Chemistry</td>
<td>Good</td>
<td>Good</td>
<td>6</td>
<td>1,000</td>
</tr>
</tbody>
</table>

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. Currently available major laboratory equipment includes:
- Platform scales
- Drying ovens
- Assorted sieves and sieve shakers
- Hydraulic concrete compression testing machines
- Concrete air meters
- Electric concrete mixers
- Various molds and forms for concrete work
- Oil and Water baths for asphalt viscosity testing
- Texas gyratory compactor
- Varsol wash bank
- Marshall stability tester
- Marshall compactor

Materials Science Lab (CVLB – Room 115) – Room 115 was designed as a materials science instruction laboratory. The lab contains four student workstations, an enclosed classroom equipped with computer projection equipment, an office for a lab technician, a workshop and storage area, an office and storage for the Departmental Property Officer. The lab is used to test portland cement concrete specimens, wood, metals, and other materials for both civil engineering classes and the College of Engineering materials engineering class. Laboratory equipment includes Instron Electro Mechanical testing machines (four 1-Kip machines, one 22-Kip machine and one 44-Kip machine). The lab also includes a 400-Kip Tinius Olson servo hydraulic testing machine with computerized digital control. Other equipment includes Charpy impact machines, hardness testers, ovens of various capacities, Environmental chambers for use with the large Instron machines and precision measuring equipment for
the material sciences. The lab contains adequate space for multiple classes to be conducted without interference. Available laboratory equipment includes:

- Instron testing machines. (1) 22 Kip, (1) 44 Kip
- Wilson/Rockwell Hardness tester
- Charpy Impact test machine
- Tinius Olsen testing machine (1) 400 kip capacity
- Environmental chambers for use with the Instron testing machines
- Digital data acquisition systems
- Stereo microscopes for failure characterization
- Millermatic welder and various tools

**Geotechnical Lab (CVLB – Room 116)** – Room 116 was 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. Currently available laboratory equipment includes:

- Balance scales
- Sieve shakes and assorted sieves
- Hydrometers
- Permeameter test panels
- Compaction hammers and molds (4 in and 6 in)
- Sample extruder
- Direct shear devices
- Pneumatic and mechanical loading frames for consolidation testing
- Mechanical loading frames (10,000 lbs maximum capacity) with digital control systems
- Triaxial cells with load and displacement measurements and cell pressure control
- Drying ovens (conventional and microwave)
- Digital data acquisition systems, signal conditioning and control equipment
- Soil mixer

**Environmental Lab (CVLB – Rooms 227, 228 and 229)** – Room 229 was designed as a wet chemistry lab. It contains six student lab stations, a fume hood, chemical storeroom, glassware cleaning room, and lab technician’s office. Room 228 was designed as a biological/biochemistry lab. It contains a movable wall that can be configured to accommodate up to 14 lab stations. Usual practice is to utilize some of the stations as sample holding or instrumentation areas. Room 228 also contains a fume hood, biological stores area, microscope room and two equipment/instrument rooms. Room 227 contains low work counters around the perimeter and a high mount center island. This room is used for analytical work with a total of six stations, each station composed of one low and one high counter space. Room 227 also contains a balance room, multiple fume hoods and instrumentation spaces. The rooms between Rooms 227 and 228 are used for common equipment and material storage. Available laboratory equipment includes:

- UV-Visible Spectrophometer
- Computer Aided Titrimeter
- Turbidimeters
- Specific Ion Meters
- Liquid Scintillation Counter
- High Pressure Liquid Chromatographs
- Ion Chromatograph
- Gas Chromatographs
- Particle Analyzers
- Elutriaton Centrifuge unit
- Ozone Monitor
- NOX Monitor
- Benchtop Fermenter
Atomic Adsorption Spectrophotometer  
Defined Substrate Bacterial Assay Equipment  
Incubators  
FTIR Spectrophotometer  
Jar test Apparatus  
Aeration Apparatus  
Sediment Tank  
De-ionized Water Units  
Bio Oxidation System  
Deep Bed filter Column  
Sedimentation Study Apparatus  
TOC Analyzer  
Air Packs

A list of major instructional and laboratory equipment is provided in Appendix D

Resources and Support

1. Computing resources, hardware and software used for instruction
All of the classrooms listed in table 1-4 are equipped with computer projection and other modern instructional equipment for faculty use in instruction. The three rooms designated as Design Laboratories are equipped with workstations at each table and electronic instructional equipment to facilitate team activities in design experiences; most of our “Capstone Design” courses are taught in these classrooms. We have one Computer Laboratory (CE 217) equipped with 15 workstations at tables arranged for no more than two students per table to facilitate classes that require intensive computer use. The Department was recently allocated room 103B in the Zachry Bldg that contains 42 computers and seats 84. The computer laboratory provided for student use (CE 215) has been equipped with more than 75 work stations for individual student use; it is also organized so that one area containing more than 25 work stations can be separated to support additional classes that require intensive computer use with one student per computer a few times in a semester.

The Department has licenses for several software systems. Basic drawing software by Autodesk is through a University license. Other software, such as Matlab, licenses are maintained by the Department. Other software, such as Carlson, is licensed to the Department at no cost. Instructors request specific software through the Department, and after review, it is purchased if the request and costs are reasonable. In some cases, the Department requests that the instructor use different software already licensed. For instance, we have license to all Autodesk software, but several firms engaged in transportation engineering use Microstation because TxDOT uses Microstation. Because the cost of Microstation is high and the demand is limited, we have sent our transportation faculty to Autodesk training so that they can use the currently licensed software. We have, or have access to, the full suite of Microsoft software, the AutoDesk software, and many specialized software packages including those for finite element analysis, construction management, fluid flow, transportation planning, etc. Faculty can also use specialized software developed as a part of their research in their teaching activities. The Department Computer Systems Administrator and his staff provide support for all Department computer hardware and software installation on the Department servers and faculty computers. They work with the faculty to determine the software needed and ensure it is load onto the appropriate servers and workstations at the beginning of each semester. Faculty can access the software on the Department servers through workstations in the classrooms. Students can access the software using the computer lab, computer classrooms, design rooms, etc. Much of the software can be accessed through the wireless connections in the Civil Engineering Bldg and remotely through home computers.

Separate graduate computer laboratories set up exclusively for graduate student use are located in the east end of the old concrete laboratory (45 workstations) the HyrdoLab (14 computers), WERC (14 computers), and the Haynes Lab (8 computers) with appropriate printers, scanners, and associated equipment. Graduate teaching assistants are equipped with 21 computers in the CE and CE/TTI Buildings. There are about 150 additional computers allocated to non-teaching, and research. In
addition, graduate research assistants supported by the Texas Transportation Institute are normally supplied computer work stations by TTI and are not included in those listed earlier. The Civil Engineering Building 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.

Funds to purchase, maintain, and replace computers, servers, software, and other related instructional materials used in classrooms comes from funds from a special Instructional Engineering Enhancement Fee (IEEF) and to a lesser amount by the Computer Access Fee (CAF). They provide adequate funds to keep the facilities and classrooms operating in good condition. Consumables are funded from Institutional Funds (academic ops/local ops) or from Instructional Engineering Enhancement Fee (IEEF) funds. Many of the specialized software packages are provided at no cost to the Department for instructional purposes by developers and vendors.

2. Laboratory equipment planning, acquisition, and maintenance processes and their adequacy. The Department is fortunate to have excellent teaching laboratories. The laboratory equipment is maintained and replaced from funds generated by a special Instructional Engineering Enhancement Fee (IEEF) and to a lesser amount by the Computer Access Fee (CAF). Consumables are funded from Institutional Funds (academic ops/local ops) and/or from the Instructional Engineering Enhancement Fee (IEEF) funds. Some gifts funds are used for special programs such as the CE Surveying Camp (CVEN 403) which has specifically dedicated endowed funds.

The IEEF fees and CAF fee generate about $550,000 in funds each year. Those funds are distributed twice a year, and most of the money is spent on laboratory equipment, laboratory supplies, computer hardware, software, classroom equipment, related supplies, and related accessories. The Department Head, Associate Department Heads, and Division Heads meet as a group on a regular basis, and one of their responsibilities is to monitor use of these funds. Although much of the money is spent for recurring costs related to operating and maintaining the laboratories, related equipment, computers, and classrooms, some money is normally available to purchase new equipment. Once it is determined how much money is available to purchase new equipment, faculty are polled, and they request new equipment for laboratories through their division heads. The Department Head and Division Heads review the requests and prioritize the purchase of new equipment. The Department can also request money from a limited amount of these fee funds that are pooled at college level; the University occasionally has programs for purchasing equipment, computers, etc. which the Department can seek. Although not excessive, this has been adequate to provide appropriate equipment for teaching laboratories ensuring that students have access to state-of-the-art equipment in teaching laboratories.

3. Support personnel available to install, maintain, and manage departmental hardware, software, and networks
The Department Computer Systems Administrator has a staff of two full time qualified network administrators and five part time workers to provide support for all Department computer hardware and software installation on the Department servers and faculty computers. Additionally, he manages about ten part time workers who manage the help desk in the student computer laboratory in the Civil Engineering Bldg. This has proved to be adequate at this time.

4. Support personnel available to install, maintain, and manage laboratory equipment.
The Department has three full time laboratory technicians dedicated primarily to support of the teaching laboratories, one in the materials laboratory, one in the geotechnical laboratory, and one in the water laboratory. They are supported by part-time student workers. The surveying laboratory is supported by a Ph.D. student working half-time and a number of teaching assistants and part-time students who issue and receive equipment. There are a number of laboratory managers and technicians who are primarily responsible for research support who, on occasion, support teaching activities. These include personnel who work primarily in the Offshore Technology Research Center (OTRC), Haynes Coastal Engineering Laboratory, High Bay Structural and Materials Testing Laboratory, the Advanced Characterization of Infrastructure Materials (ACIM) Laboratory, the new instrumentation laboratory, and Texas Transportation Institute (TTI) research facilities.
This number of laboratory personnel is adequate to support our teaching laboratories. The presence of three full time technicians and other research technicians provides adequate support if one is ill or during personnel changes.

1.6 Support

Budget Process and Sources of Financial Support

The Department Head meets with the chief financial officer in the Department to plan the budget for the academic year. This budget is submitted to the Office of the Vice Chancellor for approval. Factors taken into consideration include anticipated allocations from the University as well as anticipated gifts and research grants that will generate indirect return for the Department. Both historical data and future directions of the Department as outlined in Departmental Vision and Strategic Plans are used to guide the process.

Sources of Financial Support

Funds are available from academic funds allocated from the University and College, Computer Access Fees, Engineering Equipment Access Fees, Instructional Enhancement Fees, indirect return on research contracts, and gifts, including endowments. The Zachry Foundation endowment and other gifts (such as the Civil Engineering Excellence Funds) provide the Department with flexible funds that are used to support student activities, special activities, travel, and other needs not normally covered by other academic funds; these funds also provide flexible funds to support research, service, and teaching activities. Several faculty hold chairs, professorships, and faculty fellowships that come from various gifts that created these endowed positions. Gifts have created both endowed and directly supported scholarships and fellowships for our students, civil, ocean, undergraduate, and graduate.

Adequacy of Budget

While budgets have constrained, they have been adequate to support program needs to this time. Table 1-5 provides expenditure information for the Zachry Department of Civil Engineering over the last three years. They include the civil engineering undergraduate program, the ocean engineering undergraduate program, and all graduate programs in the Department. It is not possible to separate out funding for individual programs. They show a decline in expenditures over the last three years. Due to budget reductions

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>FY 09</th>
<th>FY 10</th>
<th>FY 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expenditure Category</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operations (not including staff)</td>
<td>$627,134</td>
<td>$695,152</td>
<td>$687,045</td>
</tr>
<tr>
<td>Travel</td>
<td>$252,592</td>
<td>$257,644</td>
<td>$270,526</td>
</tr>
<tr>
<td>Equipment</td>
<td>$600,674</td>
<td>$612,687</td>
<td>$541,521</td>
</tr>
<tr>
<td>(a) Institutional Funds</td>
<td>$548,654</td>
<td>$559,627</td>
<td>$517,515</td>
</tr>
<tr>
<td>(b) Grants and Gifts</td>
<td>$52,020</td>
<td>$53,060</td>
<td>$24,006</td>
</tr>
<tr>
<td>Graduate Teaching Assistants</td>
<td>$454,138</td>
<td>$463,221</td>
<td>$435,762</td>
</tr>
<tr>
<td>Part-time Assistance (other than teaching) Stu Wkr</td>
<td>$174,978</td>
<td>$178,478</td>
<td>$132,270</td>
</tr>
<tr>
<td>Faculty Salaries</td>
<td>$6,800,012</td>
<td>$6,698,512</td>
<td>$6,291,536</td>
</tr>
</tbody>
</table>

The issue of sufficient operating budget continues to be a concern for the College of Engineering and the Department. While the State appropriations for academic expenditures had seen slight increases during prior years, there was a 5 percent reduction in State Appropriations for FY2010 and FY 2011. As a result of this budget reduction, there were no merit raises for faculty and staff for FY 2011. In order to meet further shortfalls in State revenues, all state agencies further reduced their budgets by 10 percent from current FY2011 levels for FY 2012, which had already been reduced by 5 percent as a result of the
previous reduction. This means that the University and TEES each reduced their state appropriations by an additional 10 percent for FY2012 and FY2013. To meet this, the University mandated this reduction and also set aside a merit raise pool for FY2012 and FY 2013, resulting in a total required reduction of $60M. However, the amount allocated to merit raises was also removed from the University budget to meet the overall budget reductions. The College’s portion of this reduction amounted to about $5.5M, and the Department’s portion was about $760,000, which includes both the civil and ocean engineering undergraduate and graduate programs. The impacted portions of the budget primarily affect faculty and staff salaries. The Department met their required amounts primarily through attrition of faculty and staff (losses and retirements). Impacts of faculty losses are discussed in the section on faculty and also shown in Appendix E, Personnel and Students. The student faculty ratios are increasing due to the loss of faculty while enrollments are steady or increasing. Further losses in faculty and staff due to funding reductions will create additional workloads on the faculty and staff that could hamper our ability to provide the same quality of education experience.

Traditionally, the Department has augmented State appropriations for academic expenditures through the use of overhead return on externally funded research projects administered through the Texas Engineering Experiment Station (TEES). The TEES Civil Engineering Division (which includes ocean engineering) receives 54 percent of the F&A/overhead generated on externally funded research projects. Many of the engineering programs continue to use these funds to supplement the State appropriated academic funds in order to meet operating budget requirements. Since TEES is a separate state agency, in order to meet the State’s mandate, TEES must also reduce its TEES state appropriation by $2.959M. This TEES reduction will likely impact the amount of funds available to the Department for augmenting the academic program.

The Department is fortunate to have the Zachry endowment funds that will help the Department through these tough budget times. Texas A&M Engineering and the Department are strong and will remain strong. The civil and ocean engineering undergraduate and graduate programs will continue to grow in quality and stature and we will not let this reduction stop our forward progress.

**Support of Faculty Professional Development**

Indirect cost return from research grants and contracts, gift funds (including endowments), Texas Transportation Institute (TTI) supplied funds, and institutional funds are used to support travel programs to annual meetings and workshops such as the annual Transportation Research Board, Western Dredging Association (WDA), FEMA on dam safety, and the ASCE Excellence in Civil Engineering Education (ExCEEd) workshops. Faculty are often required to cost-share travel expenses from their own research funds in order to support all members of the faculty and staff that need to travel. Faculty conducting research through the Texas Transportation Institute often travel to professional meetings such as Transportation Research Board, Institute of Transportation Engineers, etc. using funds provided by TTI. Faculty holding endowed chairs, professorships, and faculty fellowships normally use funds from their endowed positions to pay for development activities. The Department allocates funds for faculty travel from overhead and other institutional sources to fund Start-up funds for all new faculty. These funds are used in conjunction with academic funds to enhance educational/research opportunities for new faculty. Knowledge gained through these activities is a vital part of the teaching/instructional support to the students.

**Support of Facilities and Equipment**

The laboratory equipment is maintained and replaced from funds provide by a special Instructional Engineering Enhancement Fee (IEEF) and to a lesser amount by the Computer Access Fee (CAF). They provide adequate funds for the current teaching laboratories. Every year these institutional accounts are budgeted and used to replenish and/or replace lab equipment, computer labs and classrooms with equipment to facilitate innovative teaching in all areas of civil engineering. Consumables are funded from Institutional Funds (academic ops/local ops) or from Instructional Engineering Enhancement Fee (IEEF) funds. Some gifts funds are used for special programs such as the CE Surveying Camp.
Computational equipment, software, and laboratory equipment is, for the most part, adequate and even, in some cases, superior to that of peer institutions. However, large, expensive equipment items, such as up-to-date uniaxial testing machines and lasers are not available and some of the current equipment is not comparable with that found in top-ranked research institutions that encourage undergraduates to pursue advanced studies.

Adequacy of Support Personnel and Institutional Services

The number of support personnel in the Department has increased slightly over the past five years. The recent budget constraints have not reduced the support personnel and student help yet, but it may in the future. The support for personnel is adequate at this time to meet program needs.

Texas A&M University has a plethora of teaching enhancement opportunities available to faculty and graduate teaching assistants. For example, our faculty participate in several Center for Teaching Excellence programs and we support junior faculty participation in the ASCE ExCEED program. The Texas Engineering Experiment Station provides staff support to aid in authorship of both educational and research proposals that are sent to national funding agencies such as the National Science Foundation. Texas Transportation Institute assists faculty with preparation of research proposals prepared by faculty and submitted to agencies supporting transportation related research.

Both the Texas Engineering Experiment Station and the Texas Transportation Institute research support groups provide training to all new (and current) faculty on proposal preparation. They work individually with researchers in proposal preparation, research budget development, and provide other direct support related to both research proposals and contract management once the contract or grant has been awarded. Both agencies provide information about upcoming requests for research proposals from potential sponsors such as the National Science Foundation, the Department of Transportation, the National Cooperative Research Programs, the Department of Energy, the National Institute of Health, Department of Defense, state programs, and others.
2. Graduate Programs

2.1 A Snapshot of our Student Body

The Office of Graduate Studies (OGS) is responsible for administering the graduate program for the University. Responsibility directly related to graduate students, includes:

- Preparing and issuing policies, rules, and scheduling governing the graduate program and graduate assistantships
- Reviewing students' records to determine whether they have complied with all the necessary degree requirements at each stage of their progress
- Granting formal admission into the graduate program and approving the removal of students' probationary status
- Overseeing appeals for students regarding academic issues.

Additionally, the Office of Graduate Studies is responsible for administering the Graduate Faculty. The Graduate Faculty consists of the President, the Executive Vice President and Provost, the Associate Provost, the Executive Director of the Office of Graduate Studies, the Deans of all colleges, selected Directors, and a properly qualified academic group appointed by the Office of Graduate Studies. Members of the Graduate Faculty participate in the graduate degree programs of the University by serving on student advisory committees and teaching graduate courses. Individuals, regardless of rank, who are not members of the Graduate Faculty of Texas A&M University may not teach graduate courses or serve on student advisory committees unless special approval is granted by the Office of Graduate Studies.

The Department Head initiates nomination for membership on the Graduate Faculty. The Graduate Faculty is composed of Members, Associate Members, Adjunct Members, and Special Appointments. Members and Associate Members are selected from qualified individuals of the academic staff of Texas A&M University, from staff of other parts of the University, from the Texas A&M University System and from affiliated research organizations located in College Station. The Adjunct Member classification is used for recognized scholars who do not hold a permanent appointment to the faculty of the University, but who otherwise meet the basis requirements for the status of Member. Special Appointments are temporary appointments to the Graduate Faculty that allow for the teaching of a single graduate course or for membership on a specific student's advisory committee. The Special Appointment does not count towards the minimum number of graduate faculty necessary to form the committee. All fulltime faculty members in the Department are members of the graduate faculty.

The Assistant Department Head for Graduate Studies Advisor serves as a liaison between the Graduate Studies Office and the Department of Civil Engineering divisions on graduate matters. The Assistant Department Head for Graduate Studies is also responsible for establishing and maintaining a graduate student data base and will normally act for the Department Head in certain graduate matters. The Assistant Department Head for Graduate Studies also works with the different engineering divisions on recruiting students, maintaining a list of students on academic probation, removing students from the department for academic deficiency, developing agreements with other universities, compiling information for the annual SACS review and 18 characteristic of the doctoral programs, administers all internship classes (CVEN 684), overseeing admittance decisions, and working with department leadership on graduate student policies. Dr. Mark W. Burris serves as the Assistant Department Head for Graduate Studies and Mrs. Maxine Williams is the Program Assistant, and Ms. Laura Byrd is the Lead Office Assistant.

2.2 Graduate Degrees

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, including civil engineering and ocean engineering. Below is a brief description of each degree. (More detailed descriptions of each degree, along with their requirements, are given in Chapter Three of this report.)
The Degree of Master of Science

The degree requires 32 credit hours of course 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.

The Degree of Master of Engineering

The 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 Degree of Doctor of Philosophy

The degree requires a minimum of 64 credit hours beyond the master's 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.

The Degree of Doctor of Engineering

The degree requires a minimum of 64 hours beyond the master degree. The Doctor of Engineering degree is non-research orientated is intended to prepare the student to work at the highest levels of the engineering profession. The College of Engineering administers this degree.

Figure 2-1 shows the number and distribution of graduate degrees (civil and ocean engineering) conferred through the Civil Engineering Department for the past four years. Approximately 30 doctoral degrees are awarded per year, which is approximately 20 percent of all graduate degrees. Figure 2-2 provides the total number and distribution of graduate degrees awarded by the Civil Engineering Department for the past four years according to specialty area. Figure 2-3 shows the civil and ocean engineering graduate enrollment distribution, differentiated by masters and doctoral students, among the nine graduate specialty areas. While the data shown are for the Fall 2011 semester, the distribution is representative of recent years.

Note that the ratio of the number of students graduating with the different degrees does not reflect the ratio of the number of students in the department, since the PhD degree takes longer. As of April 2012, the department has 82 ME students (20 %), 140 MS students (35 %), 180 PhD students (45 %) and 2 Doctor of Engineering students (0 %).

2.3 Admission Process

The Texas A&M University formal graduate admission process is centralized and is administered by the Office of Admissions; students apply on-line through ApplyTexas.org. In addition to the application, the College requires the Graduate Record Examination (GRE), official transcripts from all previously attended institutions, and three letters of recommendation. Two letters are sufficient if the applicant is from a U.S. institution. Letters of recommendation are supplied on-line as well. International transcripts are evaluated by the OAR using the standards in the Handbook on Placement of Foreign Graduate Students by the National Association of Foreign Student Affairs in order to determine the applicant's equivalent Grade Point Ratio (GPR). GRE scores may be self-reported by the applicant but must be verified by the start of the first semester of enrollment.
Figure 2-1: Graduate Degrees Conferred by Year

Figure 2-2: Number of Graduate Degrees Conferred by Specialty (Spring 2007 to Fall 2011)
All of this information is stored on-line and accessible by the graduate office Staff and the Assistant Department Head for Graduate Studies. When the application is complete (or close to complete - in some cases the department does not wait for the Office of Admissions to calculate the equivalent GPR) the departmental graduate office enters the application into its own database and determines the specialty area in which the applicant is interested. The application is then routed to the graduate advisor in the specialty area. One or more faculty members may review the graduate application. In addition to making the preliminary admission decision, the specialty area graduate advisor can make recommendations with regard to prerequisite coursework, financial assistance, and English language requirements.

The routing of the application to the specialty area serves two purposes. One is to provide a critical review of the applicant to insure that his or her qualifications meet the expectations of the faculty. The second is to alert the faculty to potential graduate students.

Once the specialty graduate advisor has acted on the application, it is then routed back to the departmental graduate advisor who insures compliance with the departmental and university admission standards and makes the official recommendation to the Office of Graduate Studies. The Office of Admission and Records officially notifies the applicant of the admission decision.

Entrance Requirements for Graduate Students

The Department considers various factors when making the graduate admission decisions, such as 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 and, occasionally, personal interviews. Recent GRE scores from admitted students are shown in Figure 2-4. The selectivity of the department has also been increasing due to the increased number of quality applicants (see Table 2-1). Just 5 years ago, in 2007, the department accepted over 70 percent of applicants. This has dropped to below 50 percent and will likely continue to drop for 2012. As a consequence of accepting only the best students the percentage of students joining our department has also decreased – which is to be expected when going after the best students. Surprisingly, this has not impacted the average GRE scores of our enrolled students as this has remained steady the last few years (see Figure 2-5). As noted above, we consider a great deal more than just GRE scores when deciding on admittance.
### Table 2-1: Admissions Rates

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>Number of Applicants</th>
<th>Number Accepted by Department</th>
<th>Department Acceptance Ratio</th>
<th>Students Joining Department</th>
<th>Student Acceptance Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>473</td>
<td>341</td>
<td>72%</td>
<td>204</td>
<td>60%</td>
</tr>
<tr>
<td>2008</td>
<td>627</td>
<td>428</td>
<td>68%</td>
<td>192</td>
<td>45%</td>
</tr>
<tr>
<td>2009</td>
<td>691</td>
<td>446</td>
<td>65%</td>
<td>185</td>
<td>41%</td>
</tr>
<tr>
<td>2010</td>
<td>883</td>
<td>487</td>
<td>55%</td>
<td>188</td>
<td>39%</td>
</tr>
<tr>
<td>2011</td>
<td>856</td>
<td>403</td>
<td>47%</td>
<td>160</td>
<td>40%</td>
</tr>
</tbody>
</table>

**Figure 2-4: Average GRE Scores of Enrolled Students**

The University requires all international graduate students 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 550 (213 computer based) or GRE Verbal score of 146 (equivalent to 400 on the old scoring system). Those graduate applicants not so verified must take the English Language Proficiency Examination (ELPE) prior to registering for courses in their first semester. The ELPE evaluates English skills in the area of reading, listening, written composition, and oral communication. The English Language Institute (ELI) administers the ELPE as well as offering English courses in these areas. The Civil Engineering Department imposes a higher standard than the University for English language proficiency. A TOEFL score of at least 600 (250 computer based) is required for verification. Those applicants with TOEFL scores below 600 are required to take the ELPE as a condition of their acceptance into the graduate program, regardless of the GRE Verbal score. The Department requires a minimum score of 70 on each of the four sections of the ELPE or a letter grade of B or better in a corresponding ELI course. Those applicants with TOEFL scores below 550 and verbal below 146 are required to take the ELPE as a condition of their acceptance into the graduate program. In that case, the Department and the University require a minimum score of 80 on each of the four sections of the ELPE or a letter grade of B or better in a corresponding ELI course to be verified. Due to the complexity of these requirements a flowchart was developed (see Figure 2-5).
English language proficiency requirements for students from non-English speaking countries.

4-year bachelor’s degree at a US university?

Yes

No

GRE Verbal Score ≥ 146

Yes

No

PhD Student?

Yes

No

ELPE score of 70+ on all sections or ELI course(s) with A or B

TOEFL Score ≥ 100/600 or IELTS Score ≥ 7.0

Yes

No

ELPE score of 70+ on all sections or ELI course(s) with A or B

ELPE score of 80+ on all sections or ELI course(s) with A or B

No

TOEFL Score ≥ 100/600 or IELTS Score ≥ 7.0

Yes

No

ELPE score of 70+ on all sections or ELI course(s) with A or B

No ELPE test or ELI courses required

ELPE score of 70+ on all sections or ELI course(s) with A or B

Figure 2-5: Zachry Department of Civil Engineering, 2011
English language proficiency requirements for students from non-English speaking countries.
2.4 Characteristics of our Graduate Student Body

Figure 2-6 shows the total civil engineering enrollment (both undergraduate and graduate, Civil and Ocean) for the last 5 fall semesters. The overall civil engineering enrollment has changed little in the time period. Total graduate student enrollment in the department has held steady at approximately 420 over the past three years. 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.

![Number of Enrolled Students By Degree](image)

Figure 2-6: Number of Enrolled Students By Degree

Note that what is not evident from Figure 2-6 is the impact of recent budget tightening at Texas A & M and the impact that has had on student to faculty ratios. Although the total number of students has changed little, the number of faculty dropped from a high of 70 to only 60 as of the fall of 2011. This resulted in a student (both graduate and undergraduate in both Civil and Ocean) to faculty ratio climbing from 21.5 in the fall of 2007 to 24.3 in the fall of 2011. The ratios, broken down by graduate degree and by area of study are shown in Figure 2-7. The trend for graduate-student to faculty ratio is shown in Figure 2-8.

It is evident that different areas have very different ratios depending on the faculty and the objective of that area in preparing graduate students for life after Texas A & M. For example, the structures group appears to have a low student to faculty ratio. However, due to the large number of faculty in structures there are many students in the program (just under 100 in the Fall of 2011). Plus, there are several structures faculty who have considerable service responsibilities to undergraduate students and advise very few graduate students. So the graduate student-faculty ratio for those who do advise graduate students is quite high. Additionally, the structural engineering program has a large ME program. This is a structured degree program designed to prepare students for structural engineering consulting jobs with specific coursework and a capstone design studio.
Figure 2-7: Student Enrolled Per Faculty Member by Degree (2011)

Figure 2-8: Graduate Student Enrolled Per Faculty Member by Specialty Area
The percentage of females in our graduate program has remained close to 20 percent for the last 5 years (see Figure 2-9). The percentage of U.S. citizens in the program has risen recently (Figure 2-10) due to a focused effort on attracting more of our own undergraduates to pursue their graduate degree here and attracting students from other U.S. institutions. The percentage of U.S. citizens rose from 31 percent in 2007 to 38 percent in 2011. The recruiting efforts include a program where we automatically accept our top undergraduates into the graduate program. We screen the top students based on GPA and send e-mails alerting them to their acceptance – all they have to do is apply. This has been successful in attracting some students who were not considering graduate school. We also invite in prospective students from around the country to be part of the College of Engineer’s Graduate Invitational program. We went from not participating in the program in 2009 to accounting for more than one third of all students visiting college wide (from 10 departments) in 2012. The reason we can afford to do this is due to generous donations from former students (see Section 2.5). Without those funds we could not afford to bring the students here and could not afford to offer them competitive fellowships.

2.5 Graduate Financial Support

Financial support is available to civil engineering graduate students in various forms from several different sources within the University. The Civil Engineering Department offers the following financial assistance opportunities:

- Graduate Assistant - Teaching (GAT)
- Graduate Fellowships

The GAT assistantships are used to 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).

![Figure 2-9: Fall Graduate Student Enrollment by Gender](image-url)
For the Fall-2011 semester, the Department employed 35 GATs. Similar numbers are typical for the spring semester. The Department offers 3 to 5 GATs during the summer session. The 2011-2012 budget for teaching assistantship stipends is 400,000; up from $370,000 in 2000. During the Fall semester 19 of the TAs were PhD students and 16 were masters students.

Monthly stipends for graduate assistantships are $1250 and $1350 at the master's and doctoral levels, respectively. Non-resident graduate students are entitled to in-state tuition rates when holding a half-time assistantship. GAT Ph.D. students’ tuition is paid through OGS. All GATS’ pay their own fees. The above stated stipends are relatively low when compared to the stipends offered by peer institutions, as summarized in Table 2-2. However, the University's tuition and fee rates are among the lowest in the country. Additionally, Brazos County, Texas offers a very favorable cost of living.

Neither the University nor the Department provides full tuition waivers on a regular basis except for Ph.D. GATs. However, several sources of fellowship funds are available to department that can be used to offset tuition and fees (approximately $3,200 per semester for the in-state rate) for more qualified graduate students. The Department has approximately $300,000 in fellowship money available for graduate students each year. The minimum size fellowships awarded are for $1,000. While that dollar amount is relatively small, it is large enough to qualify the recipient for in-state tuition and, therefore, becomes a valuable recruiting tool.

Both the University and the College of Engineering 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. A very similar program, called the graduate diversity fellowship, is used to attract underrepresented groups to the graduate program. Civil Engineering graduate students have received 7 of these highly competitive fellowships in the past two years. There are also smaller fellowships at the College of Engineering Level (such as the University's Regent's Fellowship program, and the College of Engineering Excellence Fellowship) for which the Department's students fare well.
<table>
<thead>
<tr>
<th></th>
<th>Masters</th>
<th></th>
<th></th>
<th></th>
<th>Tuition /Fees</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TA</td>
<td>RA</td>
<td>TA</td>
<td>RA</td>
<td></td>
</tr>
<tr>
<td>Texas A&amp;M Univ.</td>
<td>$1,250.00</td>
<td>$1,350.00</td>
<td>$1,350.00</td>
<td>$1,450.00</td>
<td>RA- Full Tuition/ Partial Fees, TA- Full Tuition(PhD Only)</td>
</tr>
<tr>
<td>MIT</td>
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<td>$2,491.00</td>
<td>$2,408.00</td>
<td>$2,397.00</td>
<td>Full Tuition/ Fees</td>
</tr>
<tr>
<td>Pennsylvania State</td>
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<td>$1,906.88</td>
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</tr>
<tr>
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<td>$2,212.75</td>
<td>$2,212.75</td>
<td>$2,212.75</td>
<td>Full Tuition/ Fees</td>
</tr>
<tr>
<td>Univ. of Florida</td>
<td>$1,500.00</td>
<td>$1,500.00</td>
<td>$1,500.00</td>
<td>$1,500.00</td>
<td>Full Tuition/ Fees</td>
</tr>
<tr>
<td>Univ. of Illinois</td>
<td>$1,893.00</td>
<td>$1,893.00</td>
<td>$1,953.00</td>
<td>$1,953.00</td>
<td>Full Tuition/ Partial Fees</td>
</tr>
<tr>
<td>Univ. of Minnesota</td>
<td>$1,808.73</td>
<td>$1,808.73</td>
<td>$1,808.73</td>
<td>$1,808.73</td>
<td>Full Tuition/ Fees</td>
</tr>
<tr>
<td>Perdue Univ.</td>
<td>$1,700.00</td>
<td>$1,700.00</td>
<td>$1,850.00</td>
<td>$1,850.00</td>
<td>Full Tuition/ Partial Fees</td>
</tr>
<tr>
<td>Univ. of Texas</td>
<td>$1,492.00</td>
<td>$1,492.00</td>
<td>$1,667.00</td>
<td>$1,717.00</td>
<td>TA-Partial Tuition/Fees, RA-Full Tuition/Fees</td>
</tr>
</tbody>
</table>

Individual faculty members holding research contracts administer graduate research assistantships. Civil engineering graduate students held approximately 155 research assistantships during the fall of 2011. Other agencies and organizations, such as TEES, TTI and the Southwest University Transportation Center administered many of these assistantships. There were 109 PhD students supported and 46 masters students supported with a research assistantships.

One recently added funding opportunity for graduate students are the teaching fellowships for doctoral candidates (see Appendix K for details). These fellowships provide funds for a select few doctoral candidates (a PhD student who has passed their preliminary exam) to teach an undergraduate course. The funds are highly competitive and only our top PhD students will be selected for this opportunity. They will be mentored and will gain valuable experience in teaching a course. This will also help prepare them for a career in academia.

2.6 Exit Surveys

In the Fall of 1998 the Department began asking each graduate student to fill out an exit survey soon after completing degree requirements. A primary purpose of the survey is to seek information from students that will help the Department improve the quality of the graduate program. In particular, there is significant emphasis on identifying ways in which the individuals believe that the program could be made better than it currently is. A blank copy of the exit survey form is included as Appendix F.

The comments on the survey forms show that the students are generally very satisfied with the graduate programs of the Department. Most students indicate that they are very happy that they chose to enroll in graduate programs at Texas A&M.
3. Degree Requirements

3.1 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 (M.S.)

The Master of Science degree requires a minimum of 32 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, etc. 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.

Optional Certificate in Business

The Mays Graduate School of Business of Texas A&M University offers a Certificate in Business that complements graduate study in other departments. The requirements for the Certificate are the completion of four graduate courses:

- ACCT 640 Accounting concepts and procedures
- FINC 635 Financial Management for Non-Business
- MGMT 655 Survey of Management
- MKTG 621 Survey of Marketing

The Department of Civil Engineering allows up to two of these courses as part of the degree program of a Master of Engineering student, based on the recommendation of the student's advisory committee.

3.2 Doctoral Degree Requirements

Doctor of Philosophy (Ph.D.)

Work leading to the Ph.D. degree at Texas A&M 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 or co-chair must be from the student's department. At least one of these four members must be from a department other than the student's major 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 master's 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 master's degree, a minimum of 96 credit hours is required on the degree plan.

After passing the required preliminary oral and written examinations for the doctoral degree, the student must complete all remaining requirements for the degree within four calendar years.

To be admitted to candidacy for a doctoral degree, a student must have (1) satisfied the residency requirements, (2) passed the preliminary examination, (3) completed all formal course work, and (4) filed with the Office of Graduate Studies the approved dissertation proposal. The final examination is not authorized for any doctoral student who has not been admitted to candidacy.

The student's research proposal must 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 are reviewed. The approved proposal is submitted to the Office of Graduate Studies no later than 15 working days prior to the submission of "Request and Announcement of the Final Examination".

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.

**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 primarily administered by the Dwight Look 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 graduate portion of the student's Doctor of Engineering degree plan must include a minimum of 96 semester 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.

3.3 Doctoral Examinations

Qualifying Examination

Each student in the Doctor of Engineering program is required to pass a comprehensive written and oral exam called the Doctor of 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 master's 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.

Each student in the Ph.D. program in the Department of Civil Engineering is required to take a qualifying exam, approximately one semester after entering the 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.

The qualifying exam must generally be taken before the student begins a second semester of Ph.D. studies at TAMU. Departmental guidelines can be found online at: https://www.civil.tamu.edu/downloads/GraduateInfo/Guidelines_for_Qualifying_Exam_(2).pdf and is shown below:

Guidelines for Qualifying Exam

These guidelines are provided to maintain some degree of uniformity between the different areas of the Department while allowing them also some flexibility.

1. The qualifying exam shall consist of both a written and an oral component. The written component should include an essay type question asking the candidate to write, for example, about technical or research developments in the field. This question is intended to judge the ability to communicate in writing. The other questions will be intended to judge the understanding of basic material, graduate or undergraduate, at the graduate level. The decision of whether to use only undergraduate material or also graduate Master's level material is left at the discretion of each area.

2. The qualifying exam should be administered twice a year, preferably at the end of each semester. All students taking the exam on a given semester will take the written portion at the same time. Each area may select each year a committee to administer the exam. Once the written questions are prepared the faculty in the area should meet to discuss the questions. The oral exam should be administered no later than 2 weeks after the written exam unless there are special circumstances. The oral may be used to probe further into some of the questions in the written part, to explore breadth or depth of knowledge, and to assess oral communication skills.

3. The results of the written exam may be:
   a) Fail, last chance if failed previously.
   b) Fail, can be retaken again the next time it is offered.
   c) Pass. Take the oral

4. The results of the total exam, after taking the oral may be:
   a) Fail, last chance if failed previously. If the student fails the exam twice the student must leave the Zachry Department of Civil Engineering’s Ph.D. program and will not be readmitted to any other Ph.D. program within the department. The student cannot enter
the Doctor of Engineering program. The student cannot enter an interdisciplinary department as a Ph.D. student if their chair is in the Zachry Department of Civil Engineering.

b) Fail, can be retaken again the next time it is offered.

c) Conditional Pass with requirements to take technical or English courses and pass them, if the committee feels that the candidate is deficient in some areas but otherwise qualified.

d) Unconditional Pass.

5. It would be desirable to have all the area faculty meet after the exam to learn about the results.

6. Students trying to get a Ph. D. should satisfy the language proficiency requirements before taking the Qualifying exam. These are: 600 or more on the TOEFL, 70 or more in the English language Proficiency Examination (ELPE), or a grade of at least B in the English Language Institute (ELI) courses at the 300 level or higher.

7. Students accepted to the Ph. D. program should normally take the exam at the end of their first semester here. If they have to take English courses before due to the language proficiency requirement, or other remedial courses in the estimation of their advisor, they will be allowed to postpone it, normally by one semester. They must have satisfied the language requirement by then.

Delays are approved only in unusual circumstances, such as a student who spends the first semester taking only or primarily undergraduate prerequisite courses or English language proficiency courses. The exam is usually given two times per year. There are four possible outcomes for any given student who is taking the Ph.D. qualifying exam:

1. Fail, last chance if failed previously. If the student fails the exam twice the student must leave the Zachry Department of Civil Engineering’s Ph.D. program and will not be readmitted to any other Ph.D. program within the department. The student cannot enter the Doctor of Engineering program. The student cannot enter an interdisciplinary department as a Ph.D. student if their chair is in the Zachry Department of Civil Engineering.

2. Fail, can be retaken again the next time it is offered.

3. Conditional Pass with requirements to take technical or English courses and pass them, if the committee feels that the candidate is deficient in some areas but otherwise qualified.


The procedures for administering the qualifying exam vary somewhat across the department, as does the scope of the questioning. The various formats are summarized below.

**Coastal and Ocean Engineering**

Each student takes a written examination covering three subjects areas at the undergraduate level: (1) Mathematics, (2) Fluid Mechanics, (3) either Statics and Dynamics or Strength of Materials. The students must complete the written examinations for all three subjects within six hours. The oral examination is conducted approximately 5-days after the written examination. The length of the oral examination is about one hour for each student and the examination committee consists of all Ocean Engineering faculty members. In the oral examination, the student is required to answer both undergraduate and master's levels questions. A decision is made on the student shortly after the oral examination. Students who fail to pass certain subject areas must retake and pass both the written and oral examinations for all three subjects during the following semester. In addition, they may also be required to take appropriate undergraduate course(s) to strengthen their fundamental knowledge in specific areas, in which they were judged to be inadequate. The student is removed from the graduate program if he/she fails to pass all portions of the exam by the second attempt.

**Construction Engineering Management**

A written qualifying exam of up to 5 hours is given to each potential CEM PhD student. The exam consists of questions contributed by the faculty based on a graduate level understanding of material covered in an undergraduate civil engineering degree as well as construction engineering and management principles. Students that pass the written qualifying exam are allowed to take the oral
qualifying exam of up to three hours. The oral exam for each student is administered by three or more members of the CEM faculty. To prepare for the oral exam each student is given a research topic based on an actual request for proposals for research. The research topic is specified not to be the intended topic of the doctoral dissertation. Students are instructed to prepare a research plan based on the topic. The oral exam starts with a discussion of the student's history and performance in the program by the testing faculty. Then the student presents their research plan. Up to one hour is spent on discussion of the research plan presented by the student. The discussion of research focuses on the student's understanding of the basic problem, the possible methods of investigation, appropriate simplifying assumptions, and the significance of the results. The student is then questioned on undergraduate civil engineering material related to construction engineering and management.

**Geotechnical, and Structural Engineering**

An oral qualifying exam of up to three hours in length is given to each student. Up to two hours of the exam investigates background preparation in the student's primary area and two secondary areas chosen by the student, in consultation with the graduate advisor. Up to one hour is spent on discussion of research presented by the student. The research is specified not to be the intended topic of the doctoral dissertation, and is usually the student's M.S. research topic. The exam for each student is administered by a three-person committee appointed by the Division Graduate Advisor and Division Head. The committee is chaired by a senior faculty member within the student's specialty area, but is not the student's dissertation advisor (if such has been chosen) or research employer. The other two are faculty members from the two secondary areas. The student is questioned on undergraduate material in the primary area and both secondary areas. In the secondary areas the expected level of knowledge is that of an undergraduate successfully completing an introductory course, whereas the student is expected to be prepared to teach such a course in the primary area. The discussion of research focuses on the student's understanding of the basic problem, the possible methods of investigation, appropriate simplifying assumptions, and the significance of the results.

**Environmental Engineering**

Both written and oral portions of the qualifying exam are given to each student. The student is allowed up to 6 hours for the written portion, while the oral exam is of 30 minutes to one-hour duration. All the faculty members in the student's specialty area (i.e., either environmental engineering or water resources) administer the exam, under the leadership of the graduate advisor for the area. Each environmental engineering student is questioned on graduate material covered in a set of four courses typically taken at the master's level - chemical, biological, and physical treatment processes, plus environmental management. Questioning for the student in water resources is within the general areas of hydrology, hydraulics, groundwater, and associated mathematical techniques.

**Water Resources Engineering**

The goal of the qualifying exam is for each student to demonstrate that she/he is capable of undertaking a lengthy, research-intensive, self-sufficient program of study towards completion of a Ph.D. The exam is a screening instrument to identify a student's strengths and weaknesses early in her/his Ph.D. program so that fundamental weaknesses can be addressed and/or unqualified students can exit the program before significant time and funds are spent.

The student should demonstrate knowledge of fundamental technical subjects in the field of water resources engineering through work completed during the exam and in prior academic study. The examining committee may tailor the full definition of "fundamental technical subjects" to suit each student's particular research focus. At its discretion, the examining committee may rely upon academic transcripts from prior study as documentation of such knowledge, but it is not required to do so.

The student should demonstrate a capacity for thinking about engineering problems in the manner necessary for successful research. Specifically, this thinking must be:
- Creative – it should go beyond rote solutions to standard problems;
Intensive – it should progress completely through a problem without skipping over important questions or leaving them ill-answered;
Self-starting – it should not rely on continual guidance from a supervisor; and
Sound – it should be technically correct and well-grounded in established knowledge.

The student should demonstrate that she/he is actively and successfully establishing her/himself within the academic program at Texas A&M University. This objective includes a mutually agreed choice of advisor, progress towards defining research topics, acceptably high performance in classes taken at Texas A&M, and performance in all other functions required by the university, college, and department. The student should demonstrate an ability to present technical work in both written and oral formats.

The qualifying exam is administered by an examining committee. This committee is responsible for all aspects of the exam including the final outcome. The committee will typically include all faculty in the water resources engineering group, but this composition may change each semester as circumstances require. All students will be notified of the examining committee composition prior to the exam administration.

Each student is assigned 2 lead faculty of the examining committee to carry out primary tasks for her/his exam. The 2 lead faculty are typically the student’s advisor and another faculty member whose expertise is outside that of the student’s expressed interests. The 2 lead faculty prepare exam questions, answer the student’s queries on the exam, provide any necessary guidance, and collect the student’s work. It is expected that the 2 lead faculty will be the primary evaluators of the student’s written work, but other examining committee members may review the written work as well.

Each student’s lead faculty have discretion to write exam questions to meet the exam goal and objectives in a manner appropriate to the student’s research interests.

The exam begins with assignment of the exam questions to the student followed by a period of approximately 1 week for the student to prepare written answers to the exam questions. The student’s written work is then reviewed by the examining committee for a period of a few days. The student will then give an oral presentation to the full examining committee that describes her/his work on the exam as well as other issues relevant to the exam goal and objectives. Written notice of the exam outcome will be provided to the student and the Civil Engineering Graduate Services Office after the examining committee has deliberated at the conclusion of the oral presentation.

**Materials Engineering**

A written take-home exam is given to the student about 1 week prior to an oral exam, which is up to two hours in length. The primary purpose of the written exam, which includes conceptual questions related to understating materials-related concepts, is to evaluate the student’s ability to communicate a fundamental concept in written form and to research a topic. A two or three person committee administers the oral exam for each student. The focus is on the assessment of the candidate’s technical capability, including the adequacy of their background as preparation to pursue the Ph.D. program. This is primarily accomplished by requiring the student to make a presentation on their master's work, with questions from the faculty probing the extent of the student's background knowledge and her/his ability to communicate. The questioning often leads into areas of the candidate's graduate and undergraduate course work, and allows for assessment of the candidate's ability to explain technical concepts, to reason on his/her feet, to field questions, and to communicate effectively in English.

**Transportation Engineering**

The exam is administered by a committed consisting of all the faculty members in transportation engineering, with the chairmanship varying from year to year. Both written and oral portions of the qualifying exam are given to each student with the oral exam being given approximately two to three weeks after the written exam. The written portion includes three separate exams that are generally two
hours in length. The topics of these exams are traffic characteristics and operations, geometric design, and transportation planning. The written exam includes both elementary questions that would usually be covered in undergraduate courses and intermediate questions that would be more likely to be covered at the master's level. In addition, the student is also instructed to compose an English composition regarding a specified transportation topic and the student is given two hours to complete this section. The oral exam is approximately two hours in length. The student is questioned on the three general areas of transportation engineering, and the outcome is based on the student's combined performance on the written and oral exams.

**Preliminary Examinations**

Each Ph.D. student is required to take a preliminary examination. 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 the end of the semester following the completion of this formal course work on the degree plan. Guidelines for this exam are available online at [https://www.civil.tamu.edu/downloads/GraduateInfo/GUIDELINES_FOR_THE_PRELIMINARY_EXAM.pdf](https://www.civil.tamu.edu/downloads/GraduateInfo/GUIDELINES_FOR_THE_PRELIMINARY_EXAM.pdf) and are shown below:

**Guidelines for the 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. This deadline can be extended by one more semester if the student has still more than 6 credit hours missing from his required courses, but should be no less than 6 months before the thesis defense.

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 wave 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 thesis 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. 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. 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:
Guidance for Scheduling the Preliminary Examination

The preliminary examination is an important milestone for PhD students. The preliminary examination is usually the first time that a student meets with their doctoral committee as a whole. By engaging the contributions of their doctoral committee members early in their doctoral studies, students stand to benefit significantly from the review and suggestions of their proposed work. Consequently, an early review of this type can help identify strengths and weaknesses of the proposed research and provide guidance that will enhance the quality of the dissertation.

Due to these reasons, scheduling a preliminary exam at a relatively early date can decrease the time required for completing a PhD degree. It is recommended that students complete their preliminary exam before the end of their 2nd year. This time frame allows students to finish much of the required coursework for the degree and to have a grasp of what the research entails. At the same time, it is sufficiently early in the program that the committee's feedback can have a significant impact on the doctoral research to be performed.

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. No student is given a final examination unless her/his current official GPR is 3.000 or better and she/he has been admitted to candidacy. There must be no unabolved 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.

3.4 Graduate Course Offerings

The Civil Engineering Department typically offers 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 G provides a syllabus for each graduate course currently being offered by the Department. Appendix H shows when each graduate course was taught for the past five academic years.
4. Department Vision: A way Forward

The Zachry Department of Civil Engineering faculties are dedicated to teaching excellence, the accomplishment of basic and applied research that impacts the broad field of Civil Engineering and to the service of that profession. Over the last 136 years the impact of that dedication and their graduates have impacted the State of Texas, the nation and many countries around the world. As examples of this impact consider that the director of the Panama canal is a graduate, that the department has produced the largest number of graduates from the Texas A&M University College of Engineering Departments who have gone on to teach in academia around the world, and that many of our students have gone on to practice civil engineering, found and lead companies in the State. Our faculty, in coordination with the college and university leadership, successfully led the competition to win the only NSF ERC at Texas A&M University, the Offshore Technology Research Center, by partnering with the University of Texas at Austin and the International Offshore Industry. The loyalty of our former students is exceptional and has led to the naming of the department (one of three in the college), endowments and annual gifts that strengthen a culture of excellence by providing incentives to reward the performance of our undergraduate students, graduate students and faculty. These last two categories are especially important for us to advance our graduate programs, allowing the department to attract and recognize the potential and accomplishment of the faculty and students.

4.1. Building on Departmental Strengths: Integrative Themes

In assessing the strengths of the faculty, our departmental laboratory facilities and considering our strong relationship with the Texas Transportation Institute, which had it founding in our department, two major themes emerge; Infrastructure Engineering and Offshore Systems. These themes have build on our record of teaching, research and close ties to the profession and practitioners around the state.

During the past two years, discussions in the department and with potential collaborators from academia and industry have resulted in a picture of where the department could provide leadership that would bring together the technical, policy and social expertise needed to address the major infrastructure issues faced by society. The major focus and breadth of the needed engagement is captured in part by Figure 4.1, and is the vision behind the revitalization of the Departments’ Center for Infrastructure Engineering. The Board of Regent’s established this engineering center in the College over a decade ago, and although it was proposed as an ERC to NSF at that time, it lost traction within the department and college for various reasons. However, the recently completed College strategic plan identifies infrastructure and transportation as a target necessary for developing a world-class research portfolio.

![Figure 4-1. Components of a comprehensive Infrastructure Initiative.](image)

The second major theme area for the Department is Offshore Systems. There are two world-class experimental facilities that offer a full suite of deep and shallow water industrial scale research and testing...
capabilities. Pictures of the Offshore Technology Research Center (OTRC) and the Rita and Bill Haynes Coastal Engineering model basin are presented in Figure 4-2. At this time we do not have enough graduate students or faculty involved in experimental studies in these facilities, and consequently we are missing a great opportunity to differentiate our graduate programs.

![OTRC model basin](image1.jpg) ![Haynes Coastal Engineering model basin](image2.jpg)

*Figure 4-2. (a) The OTRC wind wave current model basin and, (b) the Haynes Coastal Engineering wave-current model basin.*

The department advisory council and our faculty are beginning to seriously address the way forward on both of these focus areas. As the department faculty have become more engaged with our committees, they are recognizing that the divisional organization is simply administrative and graduate research must be accomplished without divisional or other bounds to engage the strongest teams. The other aspect is the desire to engage other top engineering programs in the U.S. and abroad in collaborative research and graduate education initiatives. We are upgrading the technology in our classrooms in order to take advantage of expertise outside of our campus both in the profession and at other academic institutions.

### 4.2. Faculty and Student Engagement: Evolution of our Curriculum and Research

The following departmental committees have been formed to engage our faculty and student leaders:

- **Curriculum Committee** – Chair Dr. Jim Morgan
- **Computation Committee** – Chair: Dr. Kelly Brumbelow
- **Sensors Committee** – Chair: Dr. Stefan Hurlebaus
- **Strategic Planning & Research Committee** – Holders of endowed professorships and chairs
- **Student Society Leadership Committee**
- **Faculty Awards Committee**

Several additional faculty committees that are consistent with our integrative themes are under discussion and will be formed:

- **International Programs Committee**
- **Sustainable Infrastructure**
- **Offshore Systems**

The membership of each committee covers each division and in some cases includes multiple faculty members from the various divisions based upon their interests. The first three committees are very active. The charge of the first committee is to first provide leadership in planning our undergraduate graduate curriculum; however, in the long-term, we expect to also review our graduate programs and how they interact with the undergraduate curriculum. The efforts of the committees on computations and sensors clearly are directed at strengthening a collective focus to advancing the department’s national leadership in teaching innovation, research impact and service to the profession. The membership of the first three committees and the student leadership committee are presented in Appendix L.
4.3 Engagement of our Former Students: Education and Research

This past year saw the approval of new by-laws that clearly stated the mission of the civil engineering advisory council (CEAC) challenging our council to be much more active in working with our students and faculty, as well as helping to evolve our curricula. The by-laws can be found in Appendix I. The list of active and emeritus CEAC members can be found in Appendix J. As a consequence of agreeing on by-laws, the CEAC has now formed the following committees: Regional Meetings, Membership, Professional Day, and Fundraising. Two additional committees are being formed to advise us on infrastructure and offshore systems.

The Civil Engineering Advisory Council is selected from the practicing Civil Engineers, primarily graduated from our department and working in the State of Texas. Their terms and charge can be found in the by-laws. Their primary charge is to advise the Department Head on practice and legislative issues that could impact the education of civil engineers and to provide constructive advice on maintaining and improving the quality of our educational programs. During the past several years, members have been added to increase the breadth and diversity of the membership and their background in keeping with the specialty areas within the educational programs. The Advisory Council is charged with the responsibility of providing guidance on educational issues of interest to licensed professionals that are impacting the practice of civil engineering and issues that are important to maintaining a nationally recognized program while developing its strengths and uniqueness.

As part of the attempt to better engage the council and many more of our former students, the department head has opted to have the fall meeting on campus, affectionately referred to as the “visit to the holy land,” during football season, while three to four regional meeting in cities such as Dallas or Fort Worth, San Antonio, Austin, and Houston are planned and held in the spring to early summer timeframe. A business luncheon meeting and a social gathering with former students, faculty and prospective council members are a normal part of the venue. In the process we learn about pressing local or state-wide issues and opportunities for engagement with the profession. The CEAC has taken on the responsibility for diversifying the council membership, overseeing the professional day lectures by practitioners from each of our specialty areas, the panel discussion with the students and the closing day pizza and soda event. The following day is generally our golf tournament and BBQ lunch event where team and individual golf scores are recognized and embellished.

Appointment to the Advisory Council is by invitation for a four-year term and all appointments are renewable. The Department Head also appoints Chair and co-Chair for the Council. The Chair serves for two years and co-Chair then rotates into the leadership position of CEAC Chair. A new co-Chair is then selected. Once members rotate from the council, they become emeritus members and are expected to help and attend the regional meetings in their region. They are always welcome to provide their input directly to the Department Head.

4.4 Preparing the Next Generation of Faculty: Graduate Teaching Fellows Program

We have begun a new program in the Department to provide mentored classroom experiences for our best PhD students with the potential to eventually join academia at leading tier one universities. The guidelines for this program can be found in Appendix K. The Department piloted this program for a year with Dr. Biscontin while evolving the guidelines. Her student Dr. Cassie Rutherford is now an Assistant Professor at the University of Illinois at Champaign-Urbana. This is the second year of the program and two doctoral students in the final phase of their doctoral research were selected by the committee and are currently teaching. They are Brett Story a structural engineering major who is teaching CVEN 305, Strength of Materials, under the mentorship of Drs. Gary Fry and Lynn Beason. The second is Michelle Bernhardt, shown in Figure 4-3. Both of these exceptional graduate students are expected to learn to balance teaching large undergraduate sections and their research as will be expected in their eventual academic careers.
4.5 Graduate Programs: Some Specific Challenges

There are several areas where additional emphasis is needed to continue to grow and improve our graduate programs. These include the following:

1.) Improve the graduate student to faculty ratio: This number has crept up over the last few years and we are becoming more selective. This ratio increased in part due to demand and has been impacted by faculty retirements and the loss of too many of our young faculty to aggressive recruiting coupled with uncertainties about the future. It is becoming increasingly difficult to provide the individual attention and guidance that each student needs and deserves from a top institution. There is no ‘right’ ratio, but with the large number of undergraduates, high percentage of PhD student (45%), and several faculty having significant administrative duties, the ‘right’ ratio is probably somewhere below 6 graduate students per research active faculty member.

2.) Attract U.S. and European graduate students: The graduate invitational event coupled with teaching assistantships and endowed fellowships funds are beginning be effective in recruiting US citizens and residents. However, we would also like to be more competitive in attracting top international students, especially from Europe.

3.) Find more effective paths of communication with the graduate students: On a daily basis we are inundated with funding opportunities, growth and development opportunities, exciting new classes, research opportunities, job opportunities, etc. However, we do not have the time or resources to match the appropriate students with the right opportunities. Historically, we simply e-mailed all students every opportunity that we were made aware of. The result was students ignoring (placing us in spam) e-mails from our graduate office – including critical e-mails regarding their degree or graduation. Therefore, we no longer e-mail these opportunities to the students and simply hope they discover the item on their own.

4.) Increase TA and RA opportunities: These funding opportunities are important for all students, especially MS and PhD students. We currently have approximately 140 MS and 180 PhD students, but only 35 TA positions and 155 RA positions (81 through TTI based projects and 74
through CVEN based projects). Thus, only 128 of 180 (71 percent) of PhD students are fully funded with TAs or RAs. Some do have smaller funding (student worker positions). If we were to reduce the size of the graduate student enrollment by approximately 10 percent (to approximately 6 students per faculty member) and maintained the current number of TA and RA positions this would improve the percentage of MS and PhD students that could be employed.

5.) Find ways to ease the increasing reporting demands: The faculty are constantly being asked to evaluate, measure and change. This includes annual evaluations by SACS, the 18 characteristics of the PhD degree, a new quality enhancement program by the university, and the list goes on. At some point we need to have time to implement the changes and work on them. The time to meet these administrative requests has in our view become excess and is diverting our time away from implementing improvements and simply focusing on our graduate program.

4.6 Closure

The Zachry Department of Civil Engineering faculty takes great pride in its service to the State and Nation by educating the next generation of civil engineer that will continue the traditions and professional leadership needed to address some of the most challenging technical problems faced by our global society. The faculty recognize that the graduate program must be strengthened and in our view be a continuum of a solid undergraduate program that itself is evolving. This report attempts to provide a comprehensive overview of the department whose undergraduate degree programs in civil and ocean engineering are accredited by ABET.

There are many topics that are under discussion, such as coordinating faculty development leave with the appropriate engineering firm, the effective use of the ranks of Professor of Practice positions, the effective use of differential tuition to support graduate teaching assistantship, the effective use of technology in the classroom, dealing with faculty losses and budget constraints, balancing faculty research course release with strong enrollment responsibilities and advising demands, effective stewardship of endowments and annual gifts to advance the department. We recognize that we are not alone in these challenges and that engineering programs across the country are facing many of these issues that have been articulated in this document. We look forward to your advice and counsel as we strive to elevate our graduate and research programs.
APPENDIX A Faculty Workload Summary
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Table A-1. Faculty Workload Summary
Zachry Department of Civil Engineering

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APPENDIX B  Faculty Analysis
# Table B-1. Faculty Analysis
Zachry Department of Civil Engineering

<table>
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<tr>
<th>Name</th>
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<th>Institution from which Highest Degree Earned &amp; Year</th>
<th>Years of Experience</th>
<th>Professional Registration/Certification</th>
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<td>ABU AL-RUB, Rashid K.</td>
<td>Assoc. Prof.</td>
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<td>PhD</td>
<td>Louisiana State Univ.</td>
<td>1</td>
<td>None</td>
<td>High - ASCE, ASME, AIAA, USACM, SES, EMI, High</td>
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<td>FT</td>
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<td>Med – AAENPC, IACMAG, InterPore</td>
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<tr>
<td>AUTENRIETH, Robin L.</td>
<td>Prof</td>
<td>T</td>
<td>FT</td>
<td>PhD</td>
<td>Clarkson 1986</td>
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<td>BARROSO, Luciana R.</td>
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<td>FT</td>
<td>PhD</td>
<td>Stanford 1999</td>
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<td>None</td>
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<td>BATECHOLOR, Bill</td>
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<td>Univ. of Iowa 2004</td>
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<td>NIEDZWECKI, John M.</td>
<td>Prof</td>
<td>T</td>
<td>FT, FT, PhD</td>
<td>Catholic Univ of America – 1977</td>
<td>2</td>
<td>34</td>
<td>32</td>
<td>PE-TX</td>
<td>Med – ASCE, CUREE, ASME, ASEE, ISOPE</td>
<td>Med Low</td>
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<tr>
<td>OETH, Laurence B.</td>
<td>Assoc. Lectur</td>
<td>NTT</td>
<td>PT, PT, MS</td>
<td>UC Berkeley 1978</td>
<td>30</td>
<td>3</td>
<td>3</td>
<td>PE-TX, CA, FL</td>
<td>Low – SEA0</td>
<td>Low High</td>
</tr>
<tr>
<td>OLIVERA, Francisco</td>
<td>Assoc. Prof</td>
<td>T</td>
<td>FT, FT, PhD</td>
<td>Texas 1996</td>
<td>0</td>
<td>27</td>
<td>10</td>
<td>PE-TX</td>
<td>Med – ASCE, AGU, AWRA, IAHS</td>
<td>Med None</td>
</tr>
<tr>
<td>PARK, Philip</td>
<td>Assoc. Prof</td>
<td>TT</td>
<td>FT, FT, PhD</td>
<td>Univ of Michigan 2011</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>None</td>
<td>ASCE, AAPT, EERI, KSCE, KISMI, KSSC, KCI</td>
<td>High None</td>
</tr>
<tr>
<td>QUADRAFOGLIO,</td>
<td>Assoc. Prof</td>
<td>TT</td>
<td>FT, FT, PhD</td>
<td>USC 2005</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>None</td>
<td>Med – TRB, INFORMS, ITE, ASCE</td>
<td>High None</td>
</tr>
<tr>
<td>RANDALL, Robert E.</td>
<td>Prof</td>
<td>T</td>
<td>FT, FT, PhD</td>
<td>Univ of Rhode Island 1965</td>
<td>7</td>
<td>36</td>
<td>36</td>
<td>PE-TX</td>
<td>High – ASEE, ASCE, ASME, MTS, IRFM</td>
<td>High Low</td>
</tr>
<tr>
<td>REINSCHMIDT, Kenneth F.</td>
<td>Prof</td>
<td>T</td>
<td>FT, FT, PhD</td>
<td>MIT 1965</td>
<td>28</td>
<td>24</td>
<td>12</td>
<td>None</td>
<td>Med – NAE, AAASF, INFORMS, ASCE, SAH</td>
<td>Med None</td>
</tr>
<tr>
<td>SANCHEZ, Marcelo J.</td>
<td>Assoc. Prof</td>
<td>TT</td>
<td>FT, FT, PhD</td>
<td>Univ Politecnica de Catalunya, 2004</td>
<td>0</td>
<td>13</td>
<td>2</td>
<td>PE-Argenti</td>
<td>Med – ASCE</td>
<td>High None</td>
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<tr>
<td>SMITH, Roger E.</td>
<td>Prof</td>
<td>T</td>
<td>FT, FT, PhD</td>
<td>Illinois 1986</td>
<td>14</td>
<td>25</td>
<td>25</td>
<td>PE-IL, TX</td>
<td>Med – ASCE, TRB, ASTM, ASEE, AAPT</td>
<td>Low Low</td>
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<tr>
<td>SOCOLOFSKY, Scott A.</td>
<td>Assoc. Prof</td>
<td>T</td>
<td>FT, FT, PhD</td>
<td>MIT 2001</td>
<td>2</td>
<td>8</td>
<td>8</td>
<td>None</td>
<td>Med – ASCE, IAHR, AGU, APS</td>
<td>High Low</td>
</tr>
</tbody>
</table>
Table B-1. Faculty Analysis  
Zachry Department of Civil Engineering

<table>
<thead>
<tr>
<th>Name</th>
<th>Rank</th>
<th>Type of Academic Appointment TT, T, NTT</th>
<th>FT or PT</th>
<th>Highest Degree and Field</th>
<th>Institution from which Highest Degree Earned &amp; Year</th>
<th>Years of Experience</th>
<th>Professional Registration/Certification</th>
<th>Level of Activity (high, med, low, none) in:</th>
</tr>
</thead>
<tbody>
<tr>
<td>STUBBS, Norris</td>
<td>Prof</td>
<td>T</td>
<td>FT</td>
<td>PhD</td>
<td>Columbia 1976</td>
<td>0</td>
<td>PE-TX</td>
<td>Low – ASCE, AIAA</td>
</tr>
<tr>
<td>WALEWSKI, John A.</td>
<td>Assist. Prof</td>
<td>TT</td>
<td>FT</td>
<td>PhD</td>
<td>Texas 2005</td>
<td>16</td>
<td>None</td>
<td>Med – ASCE, AICP, PMI, TRB</td>
</tr>
<tr>
<td>WANG, Bruce</td>
<td>Assist. Prof</td>
<td>TT</td>
<td>FT</td>
<td>PhD</td>
<td>UC Irvine 2001</td>
<td>1</td>
<td>None</td>
<td>Low – TRB, INFORMS, TRF</td>
</tr>
<tr>
<td>WOODS, Calvin E.</td>
<td>Sr. Prof</td>
<td>NTT</td>
<td>PT</td>
<td>PhD</td>
<td>Texas 1964</td>
<td>10</td>
<td>PE-TX, AK, LA</td>
<td>Low – TSA</td>
</tr>
<tr>
<td>WURBS, Ralph A.</td>
<td>Prof</td>
<td>T</td>
<td>FT</td>
<td>PhD</td>
<td>Cal State Univ 1978</td>
<td>10</td>
<td>PE-TX</td>
<td>Low – ASCE, AWRA</td>
</tr>
<tr>
<td>YING, Qi</td>
<td>Assist. Prof</td>
<td>TT</td>
<td>FT</td>
<td>PhD</td>
<td>UC Davis 2004</td>
<td>2</td>
<td>None</td>
<td>Low – AAAR</td>
</tr>
<tr>
<td>ZHANG, Jun</td>
<td>Prof</td>
<td>T</td>
<td>FT</td>
<td>PhD</td>
<td>MIT 1987</td>
<td>8</td>
<td>None</td>
<td>Low – ASCE</td>
</tr>
<tr>
<td>ZHANG, Yunlong</td>
<td>Assoc. Prof</td>
<td>TT</td>
<td>FT</td>
<td>PhD</td>
<td>VA Tech 1996</td>
<td>4</td>
<td>PE-CO</td>
<td>Med – ASCE, TRB, ITE, ASEE</td>
</tr>
<tr>
<td>ZOLLINGER, Dan G.</td>
<td>Prof</td>
<td>T</td>
<td>FT</td>
<td>PhD</td>
<td>Illinois 1989</td>
<td>5</td>
<td>PE-CA, TX</td>
<td>Med – ASCE, ISCP, ACI</td>
</tr>
</tbody>
</table>

The level of activity reflects an average over three previous years.

Column 3 Code: TT = Tenure Track    T = Tenured    NTT = Non-Tenure Track
Column 4 Code: FT = Full Time    PT=Part Time
APPENDIX C Faculty Vita
Name: Rashid K. Abu Al-Rub

Academic Rank: Assistant Professor, full time

Degrees:
- Bachelor of Science, Civil Engineering, Jordan University of Science & Technology, 1999
- Master of Science, Civil Engineering, Jordan University of Science & Technology, 2001
- Doctor of Philosophy, Civil Engineering, Louisiana State University, 2004

A&M Faculty: 4 years of service
- Assistant Professor, 2007-present

Related Experience:
- Assistant Professor, Materials Science & Engineering, Texas A&M, 2011-Present.
- Adjunct Assistant Professor, Air Force Institute of Technology, 2010-Present.
- Associate Research Engineer, Texas Transportation Institute, 2007-Present.
- Assistant Professor, Catholic University of America, 2007
- Visiting Assistant Professor, Louisiana State University, 2004-2007
- Research Associate, Louisiana State University, 2004
- Experimental Analyst, Øresund Tunnel Contractors Prestressed Concrete Laboratories, Denmark, 1998

Consulting & Patents: Department of Defense, 2008-Present

Prof. Licenses: N/A

Recent Publications:
- Abu Al-Rub, R.K., Voyiadjis, G.Z., and Aifantis, E.C. "On the thermodynamics of

Societies:
American Society of Civil Engineers (ASCE)
American Society of Mechanical Engineers (ASME)
American Institute of Aeronautics and Astronautics (AIAA)
U.S. Association for Computational Mechanics (USACM)
Society of Engineering Science (SES)
Engineering Mechanics Institute (EMI)
Transportation Research Board (TRB)
American Society for Engineering Education (ASEE)

Honors and Awards:
2011 Tenneco Meritorious Teaching Award, College of Engineering, Texas A&M University.
2010 Truman R. Jones Excellence in Graduate Teaching Award, Zachry Department of Civil Engineering, Texas A&M University.
Pathways to the Doctorate Research Assistantship Award, Texas A&M University, 2009
Marquis Who's Who in America, 2009
Department Achievement Award, Department of Civil & Environmental Engineering, Louisiana State University, 2006

Institutional Service:
Courses taught
CVEN 221
   Engineering Mechanics: Statics (3-0), 1 section, day, undergraduate, Spring 2011.
CVEN 305
   Mechanics of Materials (3-0), 1 section, day, undergraduate, Spring 2008, Fall 2008, Fall 2010; 2 sections, day, undergraduate, Fall 2009.
CVEN 633
   Advanced Mechanics of Materials (3-0), 1 section, day, graduate, Fall 2007, Fall 2008, Fall 2010.
CVEN 689
   Damage Mechanics of Solids and Structures (3-0), 1 section, day, graduate, Spring 2009, Spring 2010, Fall 2011.

Other Duties
Coordinator of the Southwest Mechanics Lecture Series (SWMLS), 2008-Present
Faculty Advisor of the Association of Civil Engineering Doctoral Students (AceDocs) at Texas A&M University, 2009-Present.
Professional Service: American Society for Engineering Education (ASEE), Member of the Mechanics Division.
ASCE/EMD- Committee Member of Modeling Inelasticity and Multiscale Behavior, 2005-Present.
Transportation Research Board (TRB), Committee Member (AFN15T): Nanotechnology-Based Concrete Materials, 2007-Present.
ASME-Applied Mechanics and Materials Divisions, Member, 2007-Present.
AIAA-Member of the Aerospace Materials and Structures Committee, 2008-Present.
Member of the Scientific Committee of the International Conference on "Advances in Nanotechnology for Aerospace Measurements and Testing," Montreal, Quebec, Canada, October 2009.

Percent Time Available for Research or Scholarly Activities: 70%

Percent Time Committed to the Program: 100%
Name: Stuart D. Anderson

Academic Rank: Professor, Full-time

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

A&M Faculty: 23 years of service
Professor and holder of the A.P. and Florence Wiley Chair, December 2011 to present
Zachry Professor in Design and Construction Integration II, October 2006 to November 2011
Professor, September 2004
Associate Professor, September 1996
Assistant Professor, September 1989
Senior Lecturer, January 1989

Related Experience: Manager, Construction Program, Texas Transportation Institute, 1998 to present
Research Engineer, Texas Transportation Institute, 2004 to present
Associate Research Engineer, Texas Transportation Institute, 1996 to 2004
Assistant Research Engineer, Texas Transportation Institute, 1990 to 1996
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

Iowa State University, NCHRP Project 10-78, “Nighttime Construction Impacts on Safety, Quality, and Productivity” June 2009 to March 2012.
Cost Estimation and Cost Management Training Course Development and Delivery and Tool Enhancement, Center for Transportation Research, University of Minnesota, January 1, 2011 to June 30, 2011.

Prof. Licenses: Professional Engineer, Texas, 89556


**Societies:**
- American Society of Civil Engineers, Member
- Transportation Research Board
- Project Management Institute, Member

**Honors and Awards:**
- 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

**Institutional Service:**
- Courses Taught:
  - CVEN 668 Advanced EPC Project Development, (3-0), 1 section, day, graduate, Fall 2004, Fall 2006, Fall 2007, Fall 2008, Fall 2010
  - CVEN 689 Highway Project Development and Project Management, (3-0), 1 section, day, graduate, Fall 2007, Fall 2009

- 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
Professional Service:
Head, TRB Construction Section
Past Chair, TRB Committee on Construction Management
Member, TRB Committee on Project Delivery Methods
Past 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
Specialty Editor for the Transportation Research Record, Journal of the Transportation Research Board, Construction

Percent Time Available for Research or Scholarly Activities: 50%

Percent Time Committed to the Program: 100%
Name: Chloé Arson

Academic Rank: Assistant Professor, full time

Degrees: Ph.D., Geotechnics, *École Nationale des Ponts et Chaussées (France)*, 2009  
Master of Science, Soil and Rock Mechanics and Geotechnical Engineering, *École Nationale des Ponts et Chaussées (France)*, 2006  
Master of Engineering, Civil Engineering, *École Nationale des Ponts et Chaussées (France)*, 2006  
Second-year Academic Degree, Philosophy, *University Paris I (Panthéon-Sorbonne)*, 2003

A&M Faculty: 2 years of service  
Assistant Professor, 2009 to present

Related Experience: Graduate Student Researcher, *École Nationale des Ponts et Chaussées*, 2006 – 2009  
Engineer Assistant, Vinci Construction consortium, August 2004 – July 2005

Consulting & Patents: none

Prof. Licenses: none

Recent Publications:


Societies: American Geophysical Union (AGU), since 2010
American Society for Engineering Education (ASEE), since 2010
InterPore network, since 2010. Scientific exchanges on porous media, yearly conference.
IACMAG association (International Association for Computer Methods and Advances in Geomechanics), since 2009. International conferences, advanced scientific seminars.
Alumni Organization of Ecole Nationale des Ponts et Chaussées (AAENPC), since 2006

Honors and Awards: October 2010: ALERT Geomaterials Ph.D. Prize (Alliance of Laboratories in Europe for Research and Technology), obtained ex aequo.
June 2010: Ph.D. Special Prize awarded by Ecole Nationale des Ponts et Chaussées (ENPC, France).

Institutional Service: CVEN 305: Mechanics of Materials (3-0), 1 section, day, undergraduate, Fall 2010, Spring 2011
CVEN 365, Introduction to Geotechnical Engineering (2-3), 3 sections, day, undergraduate, Fall 2011
MEMA 647: Theory of Finite Element Analysis (3-0), 1 section, day, graduate, Spring 2010, Spring 2011

Professional Service: Department Of Energy, Nuclear Energy University Programs, proposal reviewer, 2012
American Society of Civil Engineers, Geo-Institute, committee member in Rock Mechanics and Computational Geomechanics, 2012

Percent Time Available for Research or Scholarly Activities: 50%

Percent Time Committed to the Program: 100%
**Name:** Charles P. Aubeny

**Academic Rank:** Associate Professor, full time

**Degrees:**
- Doctor of Philosophy, Massachusetts Institute of Technology 1992
- Master of Science, University of Colorado (Denver) 1984
- Bachelor of Science, University of Arizona 1978

**A&M Faculty:**
- 12 years of service
  - Associate Professor, 2005-present
  - Assistant Professor, 1999 - 2005

**Related Experience:**
- Project Manager, GEI Consultants, Sacramento, 6/92 – 12/98
- Civil Engineer, U.S. Bureau of Reclamation, Denver, 6/78 – 7/86

**Consulting & Patents:**
- External Peer Reviewer for U.S. Army Corps of Engineers Projects, Battelle Memorial Institute, 6/08 to 1/12.
- Advanced Geomechanics, 7/11 to 1/12.
- Delmar Systems, 5/10 to 1/11.
- Trendsetter Corp/ExxonMobil, 10/10 to 12/10.
- Geoscience, Earth and Marine Sciences, Inc., 04/09 to 1/12.

**Prof. Licenses:**
- Professional Engineer, Texas, 85903
- Professional Engineer in Civil Engineering, California, 51323
- Professional Engineer, Colorado, 20624

**Recent Publications:**


Long, X., Aubeny, C., Bulut, R., Gay, D., and Lytton, R., “Two-dimensional moisture...


Societies:

American Society of Civil Engineers
Sigma Xi
Tau Beta Pi

Honors and Awards:

Australia Gledden Visiting Fellowship, Fall 2006
Norwegian Geotechnical Institute Visiting Fellow, Spring 2007
ASCE Thomas A. Middlebrooks Award, 2002

Institutional Service:

Courses taught in last 5 years:

- CVEN 400 Design Problems in Civil Engineering, (2-3), 1 section, day, undergraduate, Fall 2011, Fall 2010, Fall 2009, Fall 2008.
- CVEN 647 Numerical Methods in Geotechnical Engineering, (2-2), 1 section, day, graduate, Fall 2011, Fall 2007.
- CVEN 648 Advanced Numerical Methods in Geotechnical Engineering, (3-0), 1 section, day, graduate, Fall 2010, Fall 2008.
- CVEN 667 Slopes and Walls, (2-2), 1 section, day, graduate, Spring 2011, Spring 2010, Spring 2009

Other duties:

- Undergraduate and graduate student advisor
- Research Chair, Geotechnical Faculty Search Committee, 2007
- Member, Coastal/Ocean Faculty Search Committee, 2008
Professional Service:


Paper reviewer for following journals and symposia:

- *ASCE Journal of Geotechnical and Geoenvironmental Engineering*
- *International Journal for Numerical and Analytical Methods in Geomechanics*
- *International Journal of Geomechanics*
- *Geotechnique*
- *Canadian Geotechnical Journal*
- Proposal reviewer
- *Netherlands Technology Foundation (2010)*
- *Natural Sciences and Engineering Research Council of Canada (2009)*
- *British-Israel Research and Academic Exchange Partnership (2009-2010)*

**Percent Time Available for Research or Scholarly Activities:** 50%

**Percent Time Committed to the Program:** 100%
Name: Robin L. Autenrieth

Academic Rank: Professor – full time

Degrees: Ph.D., Civil & Environmental Engineering, Clarkson University, 1986
M.S., Civil & Environmental Engineering, Clarkson College of Technology, 1981
B.S., Biological Sciences, University of Maryland, 1977

A&M Faculty: 25 years of service
Professor, 2000 – present
Associate Professor, 1993 - 2000
Assistant Professor, 1986 – 1993

Related Experience: Joint appointment in the School of Rural Public Health, Department of Environmental & Occupational Health, 2000-present
Instructor, Clarkson College of Technology, 1983-1985
Research Assistant, Clarkson College of Technology, 1979-1983
Environmental Chemist/Biologist, Hess Oil Virgin Islands Corporation, 1977-1979

Consulting & Patents: None

Prof. Licenses: Professional Engineer, Texas, No. 77555

Recent Publications:


**Societies:**
- American Society of Civil Engineers, Fellow
- Water Environment Federation
- Association of Environmental Engineering and Science Professors
- Women in Engineering ProActive Network
- American Society for Engineering Education
- American Chemical Society

**Honors and Awards:**
- Aldo Leopold Leadership Fellow, 2004
- Neely ’52/Dow Chemical Fellow, 2003-2004
- Zachry Award for Excellence in Teaching, 1991
- Way Cool Scientist, Bill Nye the Science Guy Trading

**Institutional Service:**
- Courses taught:
  - CVEN 301 Introduction to Environmental Engineering (3-0), 1 section, day, undergraduate, Fall 2009
  - CVEM 406 Public Health and Environmental Protection (3-0), 1 section, day, undergraduate, Fall 2010
  - CVEN 610 Environmental Health Risk Assessment (3-0), 1 section, day, graduate, Spring 2010, 2009, 2008, 2007, 2006
  - CVEN 681 Environmental & Water Resources Seminar (1-0), 1 section, day, graduate, Fall 2008; 1 section, day, graduate, Fall 2007
  - ENGR 681 Future Faculty Seminar (1-0), 1 section, day, graduate, Spring 2011
- Other Duties:
  - Associate Dean for Academic Affairs, 2011-present
  - Associate Dean for Graduate Programs, 2008 - 2011
  - Head, Environmental & Water Resources Division, 2007-2008
  - Assistant Department Head, 2005 - 2007
  - Co-Advisor for Engineers without Borders
  - Co-Advisor for Society of Engineers Council
VPR Search Committee, 2007-2009
Chair, Committee for Academic Freedom and Responsibility

Percent Time Available for Research or Scholarly Activities: 15%

Percent Time Committed to the Program: 100%
<table>
<thead>
<tr>
<th>Name:</th>
<th>Luciana R. Barroso</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Rank:</td>
<td>Associate Professor, full time</td>
</tr>
</tbody>
</table>
| Degrees:      | 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 |
| A&M Faculty:  | 12 years of service  
Associate Professor, 2005 to present  
Assistant Professor, 1999 to 2005 |
| Related Experience: | None |
| Consulting & Patents: | None |
| Prof. Licenses: | None |
| Societies:     | American Society for Engineering Education, American Society of Civil Engineers, Chi Epsilon National Honor Society, Structural Engineers Association of Texas |
Barroso, Luciana R.

**Honors and Awards:**

- 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 from the Department of Civil Engineering at Texas A&M University

**Institutional Service:**

Courses taught:

- **ENGR 111:** Foundations of Engineering I (1-2), 1 section, day, undergraduate, Fall 2006, Fall 2007
- **CVEN 207:** Computer Applications in Engineering and Construction (1-0), 2 sections, undergraduate, day, Fall 2010, Fall 2011.
- **CVEN 302:** Computer Applications in Engineering and Construction (3-0), 1 section, undergraduate, day, Summer 2006, Summer 2007, Summer 2011.
- **CVEN 345:** Theory of Structures (3-0), 1 section, undergraduate, day, Fall 2005, Summer 2006, Spring 2010, Spring 2012
- **MEEN363:** Dynamics and Vibrations (2-2), 1 section, undergraduate, day, Spring 2005
- **CVEN 444:** Structural Concrete Design, 1 section, undergraduate, day, Summer 2005, Summer 2006, Summer 2008, Summer 2009, Fall 2009, Summer 2010, Spring 2011.
- **CVEN 483:** Analysis and Design of Structures (2-3), 1 section, undergraduate, day, Summer 2008, Summer 2009, Summer 2010.
- **CVEN 657:** Dynamic Loads and Structural Behavior (3-0), 1 section, graduate, day, Fall 2008, Fall 2011.
- **CVEN 669** Design of Structures for Hazardous Environmental Loads (3-0), 1 section, graduate, day, Spring 2008.
- **CVEN 689:** Special Topics: Advanced Dynamics and Introduction to Structural Control, 1 section, graduate, day, Spring 2007.
- **CVEN 689:** Special Topics: Advanced Structural Design Studio, 1 section, graduate, day, Spring 2010, Spring 2012.

Other service:

- Co-chair of University Quality Enhancement Plan committee, 2011 – present.
- Developing Study Abroad experiences for civil engineering students
- Member Faculty Advisory Board for the Center of Teaching Excellence, 2008—present
- Member of Selection Committee for University Professorships for Undergraduate Teaching Excellence, 2008
- Committee on Honors Experience for Civil Engineering Undergraduates, 2006—2007
- Task Force on Undergraduate Experience, 2005—2006
American Society of Engineering Education (ASEE), Educational Research Methods (ERM) Division, Apprentice Fellows Committee, Jan-Feb/2009

Percent Time Available for Research or Scholarly Activities: 45 %
Percent Time Committed to the Program: 100 %
Name: Bill Batchelor

Academic Rank: Professor, full time

Degrees: B.A., Chemical Engineering, Rice University, 1971
         M.S., Environmental Science and Engineering, Rice University, 1974
         Ph.D., Sanitary (Environmental) Engineering, Cornell University, 1976

A&M Faculty: 34 years of service
              Professor, 1986-present
              Director, Institute for Environmental Engineering, 1992-1998
              Associate Professor, 1981-1986
              Assistant Professor, 1976-1981

Related Experience: Technician, Wastewater Treatment Plant initiation, 1970

                       Black and Veatch, 2005-2011
                       U.S. Patent 5,789,649, "Method for Remediating Contaminated Soils"
                       U.S. Patent 6,492,572, "Method for Remediating Contaminated Soils"

Prof. Licenses: Professional Engineer, Texas, 47095

Recent Publications:


Han, D.S., Batchelor, B., Abdel-Wahab, A., "XPS Analysis of Sorption of Selenium(IV) and Selenium(VI) to Mackinawite (FeS)", Environmental Progress, accepted, 2011.


Ko, S., Batchelor, B., "Effect of Cement Type on Performance of Fe(II)-based

**Societies:**
- American Chemical Society
- American Society of Civil Engineers
- American Water Works Association
- Association of Environmental Engineering Professors
- International Water Association
- Water Environment Federation

**Honors and Awards:**
- Arthur McFarland Professorship, College of Engineering, Texas A&M University
- Truman R. Jones Excellence in Graduate Teaching Award, Zachry Department of Civil Engineering, Texas A&M University.
- Charles H. Barclay Jr. ’45 Fellow, College of Engineering, Texas A&M University.
- Klotz Associates Fellow, College of Engineering, Texas A&M University.
- E.D. Brockett Professor, College of Engineering, Texas A&M University.
- Environmental Science and Engineering Fellow, American Association for the Advancement of Science.
- Halliburton Professor, College of Engineering, Texas A&M University.
- Select Young Research Fellow, Texas Engineering Experiment Station.

**Institutional Service:**
- Courses taught in last 5 years
  - CVEN 402  Engineered Environmental Systems, (3-0), 1 section, day, Fall 2007, Fall 2008, Fall 2009, Fall 2010, Fall 2011.
  - CVEN 604  Engineering Analysis of Treatment Systems, (3-0), 1 section, day, Spring 2008, Spring 2009, Spring 2010, Spring 2011.
  - CVEN 606  Environmental Engineering Design I, (1-6), 1 section, day, Fall 2011.
  - CVEN 682  Environmental Remediation of Contaminated Sites, (3-0), 1 section, day, Spring 2007, Fall 2008, Fall 2009, Fall 2011.
- Other Duties in Department, with student organizations, etc. in last 5 yrs
  - Research
  - Undergraduate and graduate student advising
  - Advisor to organization of environmental engineering students
  - Departmental, College, & University Level Committees, etc. in last 5 yrs
  - Departmental Promotion and Tenure Committee
  - Departmental Graduate Studies Committee
  - Departmental Graduate Advisor for Environmental Engineering
  - Departmental Curriculum Committee
  - Departmental Ad-Hoc Committee on Chemistry in the Curriculum
  - Departmental Ad-Hoc Committee on Compensation of Graduate Students
  - Departmental Faculty Search Committees
  - Biological and Agricultural Engineering Departmental Faculty Search Committee
  - Water Management and Hydrological Sciences Faculty, Executive Committee
  - College of Engineering Promotion and Tenure Committee
  - College of Engineering, Awards Committee
  - University Graduate Appeals Panel
Professional Service: University Contact, Gulf Coast Hazardous Substance Research Center
Member, Steering Committee, Texas Hazardous Waste Research Center
Member, Technical Coordination Council, Texas Air Research Center
Faculty representative, Federal Development Project

Percent Time Available for Research or Scholarly Activities: 50%
Percent Time Committed to the Program: 87.5%
Name: Giovanna Biscontin

Academic Rank: Associate Professor

Degrees:
- Laurea, *University of Padova*, Italy, 1997
- Master of Science, *University of California, Berkeley*, 1998
- Doctor of Philosophy, *University of California, Berkeley*, 2001

A&M Faculty: 10 years of service
- Assistant Professor, 2002-2008
- Promoted to Associate Professor, 2008

Related Experience:
- Graduate Student Researcher, *University of California Berkeley*, 1997-2001
- Teaching Assistant, *University of California, Berkeley*, 1999-2001

Consulting & Patents: None

Prof. Licenses: None

Recent Publications:

**Proceedings**

**Refereed journal articles**

- Biscontin, G. and Pestana, J.M. (2006) "Factors Affecting the Seismic Response of


**Societies:**
- American Society of Civil Engineers and Geo-Institute of ASCE
- American Society for Engineering Education
- American Geophysical Union
- International Association for Computer Methods and Advances in Geomechanics
- International Society of Soil Mechanics and Foundation Engineering
- Consortium of Universities for Research in Earthquake Engineering (CUREE)
- Network for Earthquake Engineering Simulation (NEES)

**Honors and Awards:**
- Outstanding Young Investigator Award, International Association for Computer Methods and Advances in Geomechanics. 2011
- 2009-2010 Lockheed Martin Aeronautics Company Excellence in Engineering Teaching Award, Dwight Look College of Engineering, Texas A&M University
- Truman R. Jones Award for Excellence in Graduate Teaching, 2009
- Zachry Career Development Professorship, 2008
- 2006 ExCEEd New Faculty Excellence in Teaching Award, 2006
- Lockheed Martin Aeronautics Company Excellence in Engineering Teaching Award, 2005
- 2004-2005 Zachry Award for Excellence in Teaching, 2005
- National Science Foundation “CAREER” Award, 2005
- Outstanding Graduate Student Instructor Award, University of California Berkeley, 2000
- Harry Bolton Seed Award, University of California Berkeley, 1998
Institutional Service:

- Courses taught:
  - CVEN652  Soil Dynamics (3-0), 1 section, day, graduate, Spring 2008, 2010, 2012
  - CVEN689  Special Topics in Geotechnical Earthquake Engineering (3-0), 1 section, day, graduate, Spring 2004, 2006

Other Duties:
- Graduate Advisor, Geotechnical Engineering Group, 2011-present
- Assistant Division Head, Construction, Structure and Geotechnical Engineering, 2009
- Steering Committee, Women in Engineering Faculty Interest Group, Texas A&M University, 2003-2007
- Advisor, Local Students Chapter of the Geo-Institute of the ASCE, 2003-present.

Professional Service:

- Chair, Student and Younger Members Participation Committee, Board level committee of the Geo-Institute of the ASCE, 2007-present
- Board of the International Association of Computer Methods and Advances in Geomechanics (IACMAG) 2005- present
- Committee on Enhancing Membership, the International Association of Computer Methods and Advances in Geomechanics (IACMAG) 2005-present
- International Advisory Committee for the 12th, IACMAG conference, International Association for Computer Methods and Advances in Geomechanics, 2005-2008.
- Chair, Committee on Mentoring, US Universities Council for Geotechnical Education and Research (USUCGER), 2003-2007
- Member, Committee on Research, US Universities Council for Geotechnical Education and Research (USUCGER), 2003-2007
- Chair, Geo-Institute of the ASCE Committee on Geotechnics of Soil Erosion, 2005-2007
- Editor, Geotechnical Special Publication, Track on Geotechnics of Soil Erosion, GeoDenver, 2007

Percent Time Available for Research or Scholarly Activities: 25%

Percent Time Committed to the Program: 100%
Name: Bryan O. Boulanger

Academic Rank: Assistant Professor, full time

Degrees: Bachelor of Science, Civil and Environmental Engineering, University of Connecticut, 1998
Bachelor of Arts, German, University of Connecticut, 1998
Master of Science, Environmental Engineering, University of Connecticut, 2000
Doctor of Philosophy, Civil and Environmental Engineering, University of Iowa, 2004

A&M Faculty: 4 years of service
Assistant Professor, 2007 - present

Related Experience:
Federal Post-Doctoral Research, US Environmental Protection Agency (US EPA), 2006-07
National Research Council Associateship, National Academy of Science, 2005
Research Associate, University of Connecticut, 2000-01
Instructor – Engineering Hydrology, University of Connecticut, 2001

Consulting & Patents:
NSF STEP Big Thicket Summer Science Institute, Eastfield College, 2008-2009
Technical Consultant, Georgia Public Broadcasting, 2008
Technical Consultant, Michael Harris Architecture, 2008
Technical Consultant, Associated Marine Services, 2008


Recent Publications:
Carpenter, B. S., Muñoz, O., Muñoz, M., Arcak, C., Cornelius, A., & Boulanger, B. 2011 “Re/searching for clean water: Artists, community workers and engineers in partnership for positive community change” Creative Arts in Research for Community and Cultural Change, 41-64

**Societies:**
- Society of Environmental Toxicology and Chemistry
- Association of Environmental Engineering and Science Professors (AEESP)
- Chi Epsilon

**Honors and Awards:**
- Texas A&M Fish Camp Namesake, 2010
- Dick and Jane Birdwell Distinguished Teaching Award, 2009
- A&M Center for Housing and Urban Development Fellow, 2009 -
- Zachry Department of Civil Engineering Award for Excellence, 2007

**Institutional Service:**
- Courses taught
  - CVEN 301 Introduction to Environmental Engineering, (3-0), 1 section, day, undergraduate, Spring 2010; 1 section, day, undergraduate, Spring 2009
  - CVEN 413 Natural Environmental Systems, (3-0), 1 section, day, undergraduate, Spring 2010; 1 section, day, undergraduate, Spring 2009
  - CVEN 620 Environmental Engineering Processes II (3-0), 1 section, day, graduate, Fall 2011; 1 section, day, graduate, Fall 2010; 1 section, day, graduate, Fall 2009; 1 section, day, graduate, Fall 2008; 1 section, day, graduate, Fall 2007
  - CVEN 603 Environmental Management (3-0), 1 section, day, graduate, Spring 2010

- Other Duties in Department
  - Division Contact for Undergraduate Research
  - CE Sensor Committee Member

**Professional Service:**
- AEESP Education Committee Member, 2010-
- Editorial Board Member, Journal of Steroids & Hormonal Sciences, 2010-
- EPA-DuPont, Biodegradation SEP Panel Member, ILSI, Inc. 2009-
- Co-Founder, Partnership for Community Advancement, 2009
- EPA-3M, Site Specific Risk Assessment Panel Member, Menzie-Cura, 2008
- ASCE Body of Knowledge Contributing Member, 2007
- Active reviewer for three journals

**Percent Time Available for Research or Scholarly Activities:** 50%

**Percent Time Committed to the Program:** 100%
Name: Joseph M. Bracci

Academic Rank: Professor, full-time

Degrees: 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

A&M Faculty: 18 years of service
Professor, 2005-present
Associate Professor, 1999-2005
Assistant Professor, 1993-1999

Related 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

Consulting & Patents: None

Prof. Licenses: Professional Engineer, Texas No. 79855

Recent Publications:
Societies: American Society of Civil Engineers, member
American Concrete Institute, member
Tau Beta Pi National Honor Society
Chi Epsilon National Honor Society

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 444 Structural Concrete Design, (3-0), day, undergraduate, Summer 2007, Spring 2008, Spring 2009 Fall 2009, Spring 2010, Fall 2010, and Summer 2011
CVEN 221 Engineering Mechanics-Statics, (2-2), day, undergraduate, Fall 2007 and Fall 2008
Other duties:
Assistant Department Head for Operations, 8/09-12/10
Division Head for Construction, Geotechnical and Structural Engineering, 2004-2009
Faculty Fellow, Historic Resources Imaging Laboratory, College of Architecture, 2000-present
Faculty representative for TAMU with the American Concrete Institute, 1998-present
Undergraduate and Graduate Advising

Professional Service:
American Concrete Institute (ACI)
Committee 335 - Composite and Hybrid Structures, Member
Committee 374 - Performance-Based Seismic Design, Member
Committee 375 - Performance-Based Wind Design, former Chairman and Member
Concrete Research Council, Secretary
American Society of Civil Engineers (ASCE) - Member (National)
Committee on Composite Construction/Composite Joints
Committee on Seismic Effects

Percent Time Available for Research and Scholarly Activities: 50%
Percent Time Committed to the Program: 100%
Name: Jean-Louis Briaud

Academic Rank: Professor (full-time), Spencer J. Buchanan Chair.

Degrees: Engineer Degree, Civil Engineering, E.S.T.P., Paris, France, 1972
M.S. in Geotechnical Engineering, University of New Brunswick, Canada, 1974
Ph.D. in Geotechnical Engineering, University of Ottawa, Canada, 1979

A&M Faculty: 33 years of service
Assistant Professor, Civil Engineering, Texas A&M University, 1978-1982
Associate Professor, Civil Engineering, Texas A&M University, 1982-1986
Professor, Civil Engineering, Texas A&M University, 1986-Present
Buchanan Professorship, Texas A&M University, 1992-2002
Buchanan Chair, Texas A&M University, 2002-present

Related Experience: President, Briaud Engineers, 1982-present
Area Leader, Geotechnical Engineering and Surveying, Texas A&M University, 1988-1993
Program Manager, Geotechnical & Geoenvironmental Program, Texas Transportation Institute, 1989-present
Lecturer, University of New Brunswick, Canada, 1974-1976


Inventions:
The TEXAM Pressureememter (no patent, sold by ROCTEST Inc.)
The Erosion Function Apparatus (patent, sold by HUMBOLDT Mfg Co.)
The Briaud Compaction Device (patent, sold by ROCTEST Inc.)

Prof. Licenses: Professional Engineer, Texas, No. 48690

Recent Publications:


**Honors and Awards:**
- President of ISSMGE the International Society for Soil Mechanics and Geotechnical Engineering, 2009-2013.
- President of the Geo-Institute of ASCE, 2008-2009
- Ralph Peck Lecture and Award, ASCE, 2007
- G. Geoffrey Meyerhof Award, Canadian Geotechnical Society, 2006
- Martin Kapp Award for Excellence in Foundation Engineering, ASCE, 2006
- Holder of the Spencer J. Buchanan Chair in Civil Engineering, 2002-present
- The TTI/Zachry Senior Researcher Award, 1998
- Holder of the Spencer J. Buchanan Professorship in Civil Engineering, 1992-2002
- Zachry Award for Excellence in Teaching, 1993
- TEES Fellow Award, 1988, 1990
- The Kersten Lecture, University of Minnesota, 1990
- The 1987 Walter L. Huber Civil Engineering Research Prize, ASCE, 1987
- Halliburton Award of Excellence, TAMU, 1985
- H.B. Hawley Award for best paper, ASCE, Texas Section, 1983
- Hogentogler Award, ASTM, 1981

**Institutional Service:**
- Undergraduate and Graduate Courses Taught
  - CVEN 687 Foundation Engineering, 1 section, day, graduate, Spring 2011, Spring 2010, Spring 2009, Spring 2008
  - CVEN 666 Geotechnical Engineering Design, 1 section, day, graduate, Fall 2011, Fall 2010, Fall 2009, Fall 2008.
  - CVEN 400 Capstone Design, 1 section, day, undergraduate, Spring 2006.
  - CVEN 435 Geotechnical Engineering Design, 1 section, day, undergraduate, Fall 2009, Fall 2008, Fall 2007, Fall 2006, Fall 2005, Fall 2004.
  - CVEN 645 Geotechnical Site Investigation, 1 section, day, graduate, Fall 2007, Fall 2004, Fall 2002, Fall 2000

- Other duties:
  - Graduate Advisor for Geotechnical Engineering, 2004-2007
  - Promotion and Tenure Committee for Department of Civil Engineering
  - Organizer of the Buchanan Lecture every Fall.
Professional Service:
President of ISSMGE the International Society for Soil Mechanics and Geotechnical Engineering, 2009-2013.
President of the Geo-Institute of ASCE, 2008-2009
President of USUCGER (Association of Geotechnical Engineering Professors) 2004-2006
American Society of Civil Engineers
Geotechnics of Soil Erosion Committee, 2003, ASCE, Chair; International Conference on Scour of Foundations, 2002, Chair; Specialty Conference Settlement 94 ASCE Committee Chair; Shallow Foundations, Chair, National 1989-94; Deep Foundations Control, group member, National Committee 1986-88;
American Society of Testing Materials:
Pressuremeter Testing Committee, Chair, 1986-91; Deep Foundations Committee, member, 1986-91; Marine Geotechnics Committee, member, 1983-91
International Society of Soil Mechanics and Foundational Engineering:
Committee on Geotechnics of Soil Erosion, Chair, 1997-2009; Committee on Pressuremeters and Dilatometers, member, 1989-present Society member, 1980-present

Percent Time Available for Research or Scholarly Activities: 25%

Percent Time Committed to the Program: 100%
<table>
<thead>
<tr>
<th>Name:</th>
<th>Mark W. Burris</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Rank:</td>
<td>Associate Professor, full time</td>
</tr>
<tr>
<td>Degrees:</td>
<td>Bachelor of Engineering, Civil Engineering, Technical University of Nova Scotia, 1993</td>
</tr>
<tr>
<td></td>
<td>Master of Science in Engineering, Civil Engineering, University of New Brunswick, 1995</td>
</tr>
<tr>
<td></td>
<td>Doctor of Philosophy, Civil Engineering, University of South Florida, 2001</td>
</tr>
<tr>
<td>A&amp;M Faculty:</td>
<td>10 years of service</td>
</tr>
<tr>
<td></td>
<td>Associate Professor, 2007</td>
</tr>
<tr>
<td></td>
<td>Assistant Professor, 2001</td>
</tr>
<tr>
<td>Related Experience:</td>
<td>Associate Research Engineer, Texas Transportation Institute, 2007 to present</td>
</tr>
<tr>
<td></td>
<td>Assistant Research Scientist, Texas Transportation Institute, 2001 to 2007</td>
</tr>
<tr>
<td></td>
<td>Senior Research Associate, Center for Urban Transportation Research, University of South Florida, 2001</td>
</tr>
<tr>
<td></td>
<td>Research Associate, Center for Urban Transportation Research, University of South Florida, 1995 to 2001</td>
</tr>
<tr>
<td>Courses Taught at University of South Florida</td>
<td>TTE 4004 Transportation Engineering I, (3-0), 1 section, night, undergraduate, Summer 1999, Fall 2000, Summer 2001</td>
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<td></td>
<td>TTE 4005 Transportation Engineering II, (3-0), 1 section, night, undergraduate, Spring 2001</td>
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<td></td>
<td>TTE 5205 Traffic Systems Engineering, (3-0), 1 section, night, graduate, Spring 2000</td>
</tr>
<tr>
<td>Consulting &amp; Patents:</td>
<td>HDR, Inc, 2011</td>
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<td></td>
<td>Zachry American Infrastructure, 2009</td>
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<td></td>
<td>Georgia Tech, 2007</td>
</tr>
<tr>
<td>Prof. Licenses:</td>
<td>Professional Engineer, Texas, No. 93123</td>
</tr>
<tr>
<td>Recent Publications:</td>
<td>Goel, R.* and Burris, M. (2012) “HOT Lane Policies and their Implications.” Accepted for publication in the journal Transportation.</td>
</tr>
<tr>
<td></td>
<td>Sperry, B.*, Burris, M., and Dumbaugh, E. (2012) “A Case Study of Induced Trips at Mixed-Use Developments.” Accepted for publication in Environment and Planning Part B.</td>
</tr>
</tbody>
</table>


**Societies:**
- Institute of Transportation Engineers
- Transportation Research Board
- Chi Epsilon
- Tau Beta Pi

**Honors and Awards:**
- E.B. Snead ‘25 Developmental Professorship I
- Texas A & M Engineering Faculty Fellow, Charles H. Barclay, Jr. ’45 Faculty Fellow, April 2008.
- Council of University Transportation Centers (CUTC) New Faculty Member Award.
  Annual award to one tenure track faculty member to recognize outstanding teaching and research in transportation, 2007.
- Dick and Joyce Birdwell Endowed Teaching Award in Civil Engineering Teaching Award for outstanding teaching in the Zachry Department of Civil Engineering at Texas A & M, 2007.

**Institutional Service:**
- Courses taught in last 5 years
  - CVEN 307 Transportation Engineering, (3-0), 1 section, day, undergraduate, Spring 2005, Spring 2006, Fall 2007, Fall 2008
  - CVEN 454 Urban Planning for Engineers (2-3), 1 section, day, undergraduate, Spring 2008, Spring 2009, Fall 2009
  - CVEN 672 Engineering and Planning Urban Transportation Systems, (3-0), 1 section, day, graduate, Fall 2005, Fall 2006
- Other Duties, Department Level
  - Director of the Graduate Office, 2009 - present
Graduate Student Program Coordinator for Transportation, 2004 - 2009
Texas A&M Engineering Scholars Program (ESP) Faculty Advisor, 2004 - 2009
Search committee for an Assistant Professor in the Transportation and Materials
Division, Chair: 2006, Member 2007/2008.

Civil Engineering representative for the College of Engineering’s Engineering
Faculty Advisory Council, 2007 - 2010.

Other Duties, University Level

Executive Committee, Transportation Scholars Program, 2006 - 2011.

Advisory Committee, University Transportation Center for Mobility, 2007 – 2011.

Professional Service:
Institute of Transportation Engineers, Engineering Education Council, Member, 2001
- present
Transportation Research Board Value Pricing Committee, Member, 2003 – 2011.
Transportation Research Board Committee on Transportation Economics Member,
2001 – present, Chair of the paper review committee 2008 – 2009, Committee
Chair 2010 - present.
Expert Panel, Lessons Learned Regarding the Value Pricing Program, FHWA Panel,
Expert Panel, Benefit-Cost Analyses of Transportation Systems, Appointed as part of
a project for FHWA being run by Cambridge Systematics, 2010.

Percent Time Available for Research or Scholarly Activities: 25%
Percent Time Committed to the Program: 100%
Name: Kuang-An Chang

Academic Rank: Professor, full time

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

A&M Faculty: 12 years of service
Promoted to Professor, 2011
Promoted to Associate Professor, 2005
Appointed Assistant Professor, 2000

Related Experience:
Visiting Associate Professor, Kyoto University, Japan, 10/2009-8/2010
Visiting Associate Professor, Cornell University, 6/2009-10/2009
Postdoctoral Associate, Cornell University, 8/1998-12/1999

Consulting & Patents:
National Cheng Kung University, Taiwan, 2006-present
National Chung Hsing University, Taiwan, 2000-present

Prof. Licenses: Professional Engineer, Texas, No. 98741

Recent Publications:


**Societies:**
American Society of Civil Engineers
American Geophysical Union

**Honors and Awards:**
*Zachry Award for Excellence in Teaching*, Zachry Department of Civil Engineering, Texas A&M University, 2009
*Invitation Fellowship Award*, Japan Society for the Promotion of Science, 2009
*VSJ SGI Award* for Excellent Visualized Image, Visualization Society of Japan, 2001

**Institutional Service:**
Courses Taught
CVEN 302 Computer Applications in Engineering and Construction, day, undergraduate, fall 2010, fall 2011
CVEN 311 Fluid Dynamics, day, undergraduate, fall 2007, spring 2008, spring 2009
OCEN 410 Ocean Engineering Lab, day, undergraduate, spring 2011
OCEN 462 Hydromechanics, day, undergraduate, 2007, spring 2008, spring 2009
CVEN 679 Experimental Fluid Mechanics Modeling, day, graduate, fall 2008, fall 2010

Other Duties
Undergraduate Advisor, Ocean Engineering Program, 2010-present
Graduate Advisor, Ocean Engineering Program, 2004-2009
Coordinator, Ocean Engineering Laboratory, 2003-present
Professional Service: Associate Editor, ASCE *Journal of Engineering Mechanics*, 2006-present

Percent Time Available for Research or Scholarly Activities: 50%

Percent Time Committed to the Program: 100%
Name: T. David Chinn

Academic Rank: Assistant Lecturer, 50% part-time

Degrees: Bachelor of Science, Civil Engineering, Texas A&M University, 1980

A&M Faculty: 3 years service
Assistant Lecturer/Practitioner, 2008 to present

Degrees: Bachelor of Science, Civil Engineering, Texas A&M University, 1980

A&M Faculty: 3 years service
Assistant Lecturer/Practitioner, 2008 to present

Related Experience:
Senior Vice President, National Director – Drinking Water Program, HDR Engineering, Inc., 1995 to 2003 and 2007 to 2008

Vice President & Global Director- Business Development, Zenon Environmental, Inc. (Toronto) 2003 to 2007

Vice President, Montgomery Watson, (formerly, James M. Montgomery), 1991 to 1995

Assistant Director for Governmental Affairs, American Water Works Association (AWWA), Washington, DC, 1988 to 1991

Principal, Co Owner – Kling Engineering, 1977 to 1988

Prof. Licenses: Professional Engineer, Texas - No. 57630
Registered Professional Land Surveyor, Texas - No. 4138

Recent Publications:


Societies:
American Water Works Association
Past) American Membrane Technology Association
American Society of Civil Engineers
Association of Metropolitan Sewerage Agencies
National Society of Professional Engineers
Texas Society of Professional Engineers
District of Columbia Professional Engineers
Texas Society of Professional Surveyors
Honors and Awards:


Young Engineer of the Year, Texas Society of Professional Engineers, 1986

Institutional Service:

Courses taught in last 5 years:

- ENGR 112A Fundamentals of Engr., (1-3), 2 sections, day, undergraduate, spring 2009
- ENGR 112A Fundamentals of Engr., (1-3), 2 sections (honors), day, undergrad, spg 2011
- ENGR 112A Fundamentals of Engr., (1-3), 2 sections (honors), day, undergrad, spg 2012
- ENGR 111A Fundamentals of Engr., (1-3), 1 section (honors), day, undergrad, fall 2009
- ENGR 111A Fundamentals of Engr., (1-3), 2 sections (honors), day, undergrad, fall 2010
- ENGR 111A Fundamentals of Engr., (1-3), 2 sections, day, undergraduate, spring 2010
- ENGR 111A Fundamentals of Engr., (1-3), 2 sections (honors), day, undergrad, fall 2011
- CVEN 333 Project Management, (3-0), 2 sections, day, undergraduate, spring 2010
- CVEN 303 Civil Engr. Measurement, (2-3), 1 section, day, undergraduate, fall 2010
- CVEN 303 Civil Engr. Measurement, (2-3), 3 sections, day, undergraduate, spring 2011
- CVEN 303 Civil Engr. Measurement, (2-3), 4 sections, day, undergraduate, fall 2011
- CVEN 303 Civil Engr. Measurement, (2-3), 3 sections, day, undergraduate, spring 2012

Professional Service:

- AWWA - Desalination Committee (2008 – Present)
- National Teleconference Planning Committee (SDWA Regulatory Compliance)
  - Chair, Arsenic Task Force, 1992-Present
  - National Technical Advisory Workgroup on IOC's and Corrosion By-Productions, 1990-Present
  - National Technical Advisory Workgroup on Radionuclides, 1990-Present
  - Water Conservation and Reuse Committee, Texas Section
  - ASCE - President, Brazos Branch, Texas State Director, 1988-1990
  - Government Affairs Committee, 1984-1990
  - General Co-Chairman, Fall 1988 Section Meeting, Texas A&M University Student Contact Member
  - TSPS – Director Brazos Chapter - Charter and Founding Member, Director

Percent Time Available for Research or Scholarly Activities: 15%

Percent Time Committed to the Program: 50%
Name: Ivan Damnjanovic

Academic Rank: Assistant Professor, full time

Degrees:
- Diploma in Engineering, Civil Engineering, University of Nis, Serbia, 2000
- Doctor of Philosophy, Civil Engineering, University of Texas at Austin, 2006

A&M Faculty:
- 5 years service
- Assistant Professor, 2006-Present

Related Experience:
- Associate Research Engineer, Texas Transportation Institute, 2006-present

Consulting & Patents:
- N/A

Prof. Licenses:
- N/A

Recent Publications:
- Zhang, Z and Damnjanovic, I. “Applying Method of Moments to Model Reliability of


Societies:
- American Society of Civil Engineers, Fellow
- Transportation Research Board
- Institute for Operations Research and the Management Sciences (INFORMS)

Honors and Awards:
- N/A

Institutional Service:
- Courses Taught
  - CVEN 322 Civil Engineering Systems (3-0), 1 section, day, undergraduate, Fall 2007.
  - CVEN 333 Project Management of Engineers (3-0), 1 section, day, undergraduate, Spring 2010.
  - CVEN 349 Civil Engineering Project Management (3-0), 1 section, day, undergraduate, Fall 2006; 1 section, day, undergraduate, Spring 2008; 1 section, day, undergraduate, Fall 2008, 1 section, day, undergraduate, Fall 2009; 1 section, day, undergraduate, Fall 2010, 1 section, day, undergraduate, Fall 2011.
  - CVEN 640 Project Development: Methods and Models (3-0), 1 section, day, graduate, Spring 2007, 1 section, day, graduate, Spring 2008, 1 section, day, graduate, Spring 2009.
  - CVEN 689 Civil Engineering Project Finance (3-0), 1 section, day, graduate, Spring 2010.

Other Duties
- Coordinator of Engineering Project Management Certificate, 2008-Present
- Undergraduate Research Advisor, 2007-Present

Professional Service:
- Transportation Research Board (TRB), Construction Management Committee, Member of the Committee.
- Transportation Research Board (TRB), Taxation and Finance Committee, Member of the Research Subcommittee.
- Transportation Research Board (TRB), Aviation Economics and Forecasting Committee, Member of the Committee.
- American Society of Civil Engineers (ASCE), Transportation & Development Institute, Infrastructure Systems, Member of the Committee.

Percent Time Available for Research or Scholarly Activities: 25%

Percent Time Committed to the Program: 100%
Name: Amy Epps Martin

Academic Rank: Professor

Degrees: 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

A&M Faculty: 14 years service
Appointed Assistant Professor, 1997
Promoted to Associate Professor, 2003
Promoted to Professor, 2011

Related Experience:
Research Engineer, Texas Transportation Institute, 2011- present
Associate Research Engineer, Texas Transportation Institute, 2003-2011
Assistant Research Scientist, Texas Transportation Institute, 1997-2003

Consulting & Patents: None

Prof. Licenses: Professional Engineer, Texas, No. 91053

Recent Publications:


Societies:
- American Society of Civil Engineers (ASCE)
- Association of Asphalt Paving Technologists (AAPT)
- International Society for Asphalt Pavements (ISAP)
- Transportation Research Board (TRB)
- National Society of Professional Engineers (NSPE)
- American Society for Engineering Education (ASEE)
- Chi Epsilon
- Tau Beta Pi

Honors and Awards:
- Association of Asphalt Paving Technologists (AAPT) Award of Recognition, 2012
- Texas A&M University Fish Camp Namesake, 2008
- 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

Institutional Service:
- Courses Taught
  - CVEN 306 Materials Engineering for Civil Engineers (2-2), 1 section, day, undergraduate, Spring 2007; Spring 2008; Spring 2009; Spring 2010
  - CVEN 342 Materials of Construction (2-3), 1 section, day, undergraduate, Fall 2005; Spring 2006; Spring 2009; Spring 2011; Fall 2011
  - CVEN 417 Bituminous Materials (2-3), 1 section, day, undergraduate, Fall 2007; Fall 2009
  - CVEN 653 Bituminous Materials (2-3), 1 section, day, graduate, Fall 2007; Fall 2008; Fall 2009; Fall 2010
  - CVEN 681 Graduate Seminar in Materials (0-2), 1 section, day, graduate, Spring 2006; Spring 2008; Spring 2009

Other Duties
- Transportation and Materials Division, Division Head, 2011-present
- Materials Group, Co-Area Advisor, 2004-2011
- Task Force on the Undergraduate Experience, Chair, 2005-2006
- Pre-Faculty Fellow Program Task Committee, Chair, 2009
- Undergraduate and Graduate Student Advisor
- Faculty Search, Peer Review of Teaching, Curriculum, and Promotion and Tenure Committees
Professional Service:

TRB, Committee on Full-Scale and Accelerated Pavement Testing (AFD40), 2001-2010
TRB, Committee on Characteristics of Bituminous-Aggregate Combinations to Meet Surface Requirements (AFK40), 2011-present
ASCE, Journal of Transportation Engineering, Associate Editor, 2008-2011
AAPT, Newer Member Committee, Co-Chair, 2009-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

Percent Time Available for Research or Scholarly Activities: 62.5%
Percent Time Committed to the Program: 100%
Name: **Jeffrey M. Falzarano**

**Academic Rank:** Professor, full time

**Degrees:**
- BS, Naval Architecture and Marine Engineering, Webb Institute, 1982
- MSE, Naval Architecture and Marine Engineering, University of Michigan 1985
- MSE, Applied Mechanics, University of Michigan, 1987
- MSE, Aerospace Engineering, University of Michigan 1989
- PhD, Naval Architecture and Marine Engineering, University of Michigan, 1990

**A&M Faculty:** 5 years service
- Professor 2007

**Related Experience:**
- Professor, (NAME), University of New Orleans, 2002-2007
- Associate Professor (NAME), University of New Orleans, 1995-2002
- Assistant Professor (NAME), University of New Orleans, 1990-1995
- Visiting Professor, US Navy NSWC-CD, Summer 2002
- Visiting Professor, Technical University of Lisbon, Summer 2000
- Visiting Professor US Navy NFESC, Summer 1998
- Visiting Scholar, Vienna Technical University, Summer 1989
- Research Engineering, American Bureau of Shipping, Summer 1986
- Naval Architect US Coast Guard Merchant Marine Technical, Summer 1985
- Naval Architect, US Coast Guard Naval Engineering, 1982-1984

**Consulting & Patents:**
- Technip Summer 2006
- Offshore Model Basin, Summer 1997

**Prof. Licenses:** None

**Recent Publications:**
- Jeffrey Falzarano, Srinivas Vishnubhotla and Sarah Juckett, “Combined Steady State and Transient Analysis of a Patrol Vessel as Affected by Varying Amounts of Damping and Periodic and Random Wave Excitation,” February 2010 issue
Falzarano, Jeffrey M

Conference, St. Petersburg Russia

Xiaochun Yu, JM Falzarano and Chandan Lakhotia "Development of a Multi-body Vessel Dynamics Simulation Tool" Proceedings of the 28th International Conference on Ocean, Offshore and Arctic Engineering, OMAE 2009, May 31 - June 5, 2009, Honolulu, Hawaii, USA


Societies:
Society of Naval Architects and Marine Engineers (1978-date)
American Society of Mechanical Engineers (1985-date)

Honors and Awards:
Fellow SNAME 2005
Fellow ASME 2005

Institutional Service:
Courses taught in last 5 years
OCEN 402 Principles of Naval Architecture (3-0), one section, day, undergraduate, Fall 2007, 2008 and 2009, 2010, 2011
OCEN 407 Design of Ocean Engineering Facilities (1-6), one section offshore, day, undergraduate, Spring 2008, 2010
OCEN 630 Dynamics of Ocean Vehicles, (3-0), one section, day, graduate, Spring 2009, 2011
OCEN 362 Hydromechanics, (3-0), one section day undergraduate, Spring 2010, 2011
ENGR 111 Introduction to Engineering (1-3), 3 sections, day, undergraduate, Fall 2008
Advisor to TAMU student section of Society of Naval Architects and Marine Engineers, Spring 2008-date
OCEN Curriculum Committee Spring 2008-2010
CE Promotion and Tenure Committee 2007-date

Professional Service:
Member SNAME Annual Meeting papers Committee
Member SNAME Annual Meeting Committee
Member SNAME Scholarship Committee
Member SNAME Seakeeping T&R Panel
Member SNAME Maneuvering T&R Panel
Member SNAME Dynamic Stability Working Group
Member SNAME Stability T&R Panel
Co-Chair SNAME Ad-hoc Committee on Parametric Rolling
Member ASME OMAE Offshore Technology Scientific Committee
Member ASME OMAE Ocean Engineering Scientific Committee
Member of International Towing tank Conference (ITTC) Stability in Waves Committee
Editorial Board International Shipbuilding Progress
Associate Editor ASME Journal of Offshore Mechanics and Arctic Engineering
Editorial Board Ocean Systems Engineering Journal
Percent Time Available for Research or Scholarly Activities: 25%
Percent Time Committed to the Program: 100%
Name: David N. Ford

Academic Rank: Associate Professor

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: 12 years service
Associate Professor, 2006 - present
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

Consulting & Patents: Engineering and Construction Risk Institute, Change Management Committee, 2007 – present; Survey of tools and methods used to manage secondary effects of changes in construction projects,
British Petroleum, Exploration & Production Technology Group. Houston, TX, 2003 – 2007, Development of project models with internal consulting group for use with development project teams to improve processes and management.

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

Recent Publications:
Ford, DN and Andersen, JM. "Risk-Aversion in Water Allocation Policies in Semi-Arid
Ford, David N


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:
Williams Brothers Construction Company Faculty Fellow. Texas A&M University. 2008 2009.
Chi Epsilon, National Civil Engineering Honor Society. member since 2007.

Institutional Service:
Courses Taught
CVEN 717 – Engineering Project Control, Graduate, Fall 2008-2011
CVEN 400 – Problems in Civil Engineering (capstone design), Undergraduate, Spring 2007
CVEN 349 – Civil Engineering Project Management, Undergraduate, Spring 2008, Fall 2007, Spring 2005
Professional Service:

- President, International System Dynamics Society, 2012
- Co-Chair. System Dynamics Winter Camp 2005 - present.
- Reviewer for Systems Research and Behavioral Science, System Dynamics Review,
  IEEE Transactions on Engineering Management, Risk Analysis
- Co-Program Chair, 2009 International System Dynamics Conference, Albuquerque, NM.
- Session Program Committee. Decision and Risk Analysis Conference. May 21-22, 2007. Dallas, Tx
- Conferences of the International System Dynamics Society, paper review committees, member, 2001 - present.

Percent Time Available for Research or Scholarly Activities: 45%

Percent Time Committed to the Program: 100%
Name: Nasir G. Gharaibeh

Academic Rank: Assistant Professor, full time

Degrees: Bachelor of Science, Civil Engineering, Jordan University of Science and Technology, 1990
Master of Science, Civil Engineering, Jordan University of Science and Technology, 1991
Doctor of Philosophy, Civil Engineering, University of Illinois (U-C), 1997

A&M Faculty: 3.5 years service
Appointed Assistant Professor, 2008

Related Experience: Assistant Professor, University of Texas at El Paso (UTEP), 2004-2008
Highway Construction Engineer, Nishikawa Gumi Corporation, Japan, 1992-1993

The Transtec Group, Austin, Texas, Development of Advanced Quality Systems for Highway Construction and Materials, 2008-2010

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

Recent Publications:


### Societies:
- American Society of Civil Engineers (ASCE)
- Transportation Research Board (TRB)

### Honors and Awards:
- Royal Scholarship, Jordan University of Science and Technology (1985-1990)
- TTI Research Diversity Bonus Award (2011)

### Institutional Service:
#### Courses Taught at Texas A&M University
- **CVEN 303** Civil Engineering Measurement (2-3), 3 sections, day, undergraduate, Fall 2008; 3 sections, day, undergraduate, Spring 2009; 3 sections, day, undergraduate, Fall 2009; 3 sections, day, undergraduate, Spring 2010; & 3 sections, day, undergraduate, Fall 2010.
- **CVEN 624** Infrastructure Engineering and Management (3-0), 1 section, day, graduate, Fall 2009; 1 section, day, graduate, Fall 2010; & 1 section, day, graduate, Fall 2011.
- **CVEN 418** Highway Materials and Pavement Design (3-0), 1 section, day, undergraduate, Spring 2011.
- **CVEN 689** Tools for Highway Materials and Pavement Design, (3-0), 1 section, day, graduate, Spring 2011.

#### Courses Taught at the University of Texas at El Paso
- **CE 303** Engineering Measurements, 1 section, day, undergraduate, Fall 2005; 1 section, day, undergraduate, Fall 2006; and 1 section, day, undergraduate, Fall 2007.
- **CE 6301** Infrastructure Management, 1 section, night, graduate, Fall 2004; 1 section, night, graduate, Fall 2005; 1 section, night, graduate, Fall 2006; & 1 section, night, graduate, Fall 2007.
- **CE 5324** Construction Management, 1 section, day, undergraduate, Spring 2004; 1 section, day, undergraduate, Spring 2005; 1 section, day, undergraduate, Spring 2006; & 1 section, day, undergraduate, Spring 2007.
- **BE 2326** Engineering Economy, 1 section, day, undergraduate, Spring 2008.
- **BE 3373** Engineering Probability and Statistical Models, 1 section, day, undergraduate, Spring 2005; 1 section, day, undergraduate, Spring 2006; & 1 section, day, undergraduate, Spring 2007.

### Professional Service:
- ASCE, Committee on Infrastructure Systems (2009-present) and Committee on Highway Pavement (2009-present).
- TRB, Committee on Management of Quality Assurance (2006-present) and Committee on Portland Cement Concrete Pavement Construction (2004-present)
- National Science Foundation (NSF), Served on five proposal review panels (2006-2011)

### Percent Time Available for Research or Scholarly Activities: 50%

### Percent Time Committed to the Program: 100%
Grasley, Zachary C.

Name: Zachary C. Grasley

Academic Rank:
Assistant Professor, full time

Degrees:
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

A&M Faculty:
6 years service
Assistant Professor, 2006

Related Experience:
Research Scientist, Texas Transportation Institute, 2006-present
Qualifying officer, G&W Residential Builders, 1997-present

Consulting & Patents:
City of Houston, 2008-2009

Prof. Licenses:
Engineer in Training, Michigan, 2001
Licensed Residential Builder, Michigan, No. 2102141214

Recent Publications:

Societies:
American Society of Civil Engineers
American Concrete Institute
American Ceramic Society
Transportation Research Board
American Society for Engineering Education
Chi Epsilon Honor Society
Phi Kappa Phi Honor Society

Honors and Awards:
CAREER Award, National Science Foundation, 2009
TEES Select Young Faculty Award, 2011
Zachry Award for Teaching Excellence, 2010

Institutional Service:
Courses Taught
CVEN 306 Materials Engineering for Civil Engineers, (2-2), 1 section, day, undergraduate, Spring 2008; 1 section, day, undergraduate, Fall 2008; 1 section, day, undergraduate, Spring 2009; 1 section, day, undergraduate, Fall 2009
CVEN 342 Materials of Construction, (2-2), 4 sections, day, undergraduate, Fall 2006; 4 sections, day, undergraduate, Spring 2007; 4 sections, day, undergraduate, Spring 2008
CVEN 343 Concrete Materials for Civil Engineering, (2-2), 1 section, day, undergraduate, Fall 2007; 1 section, day, undergraduate, Fall 2009
CVEN 622 Properties of Concrete, (2-2), 1 section, day, graduate, Fall 2007; 1 section, day, graduate, Fall 2009
CVEN 689 Advanced Constitutive Behavior of Cementitious Materials, (3-0), 1 section, day, graduate, Fall 2007; 1 section, day, graduate, Spring
2010

Other Duties
Zachry Department of Civil Engineering, Committee Member for Graduate Program Review, 10/2008-present.
Zachry Department of Civil Engineering, Manuscript reviewer for the Civil Engineering Student Research Symposia (CESRS), 9/2007.
Zachry Department of Civil Engineering, Organizer for the Materials Area Ph.D. Qualifying Examination, 10/2006-present.
Zachry Department of Civil Engineering, gave Materials presentation for CVEN 207, Fall 2007.
Zachry Department of Civil Engineering, gave Materials presentation for CVEN 207, Spring 2007.
Zachry Department of Civil Engineering, gave Materials presentation for CVEN 207, Fall 2008.
Zachry Department of Civil Engineering, gave Materials presentation for CVEN 207, Spring 2008.
Look College of Engineering, Member of Advisory Committee for the Materials Science and Engineering program, 2/2007-present.
Look College of Engineering, Organized and directed "Discover Engineering" session for High School students, 10/2006.
Texas A&M University, Organized and directed “Youth Adventure” session for High School students, 7/2008.
Texas A&M University, Organized and directed “Youth Adventure” session for High School students, 7/2007.

Professional Service:
Journal of Materials in Civil Engineering, Associate Editor, 2009-present.
American Ceramic Society, Chair for the Cements Division, 2010-2011.
American Ceramic Society, Secretary for the Cements Division, 2008-2009.

Percent Time Available for Research or Scholarly Activities: 25%
Percent Time Committed to the Program: 100%
Name: H. Gene Hawkins, Jr.

Academic Rank: Associate Professor, full time

Degrees: 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

A&M Faculty: 7 years service
              Appointed Associate Professor without tenure, 2004
              Associate Professor with tenure, 2007

Related Experience:
                    Research Engineer, Texas Transportation Institute, 2001-present
                    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.

Consulting & Patents:
                    Expert witness services on multiple cases in 2011.
                    Sightline Airfield Marking, subcontractor for developing the Airfield Marking
                    Urban Design Associates, subcontractor for developing a Model Sign Code for the
                    Scientific Applications International, Inc., subcontractor for developing and evaluating
                    symbols for traffic signs on a research project sponsored by the Federal Highway
                    Administration, 2005-2008.

Prof. Licenses:
                Professional Engineer, Texas, No. 61509

Recent Publications:
                Full Retroreflective Signposts on Rural Horizontal Curves. In Transportation Research
                Record 2149, The Journal of the Transportation Research Board, Transportation Research
                Hawkins, Jr., H.G. and M.A. Chacon. Improving Signing from the Installation
                Perspective: Creating a Sign Crew Field Book. In Transportation Research Record
                2122, The Journal of the Transportation Research Board, Transportation Research
                Hartmann, T.W. and H.G. Hawkins, Jr. Revised Process for Work Zone Decision-
                Making Based On Quantitative Performance Measures. In Transportation Research
                Record 2107, The Journal of the Transportation Research Board, Transportation Research
                Hawkins, Jr., H.G. and M. Gogula*. Assessment of Sag Curve Design Criteria
                Considering Modern Headlamp Performance. In Transportation Research Record
                2060, The Journal of the Transportation Research Board, Transportation Research
                Review and Development of Recommended Minimum Pavement Marking
                Retroreflectivity Levels, In Transportation Research Record 2055, The Journal of
                the Transportation Research Board, Transportation Research Board, Washington,
Hawkins, Jr. H. Gene


Societies:
Transportation Research Board
Institute of Transportation Engineers, Fellow
National Committee on Uniform Traffic Control Devices

Honors and Awards:
2010 Transportation Engineer of the Year, Texas District of the Institute of Transportation Engineers.
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, awarded August 2009.
2008 Outstanding Paper Award from the Transportation Research Board Geometric Design Committee for a paper entitled Assessment of Sag Curve Design Criteria Considering Modern Headlamp Performance.
2007-2008 Dick and Joyce Birdwell Endowed Teaching Award, Zachry Department of Civil Engineering, July 2008.
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.

Institutional Service:
Courses taught in last 5 years
CVEN 307 Transportation Engineering, (3-0), 1 section, day, undergraduate, fall 2004, spring, spring 2005, spring 2007, spring 2010, spring 2011.
CVEN 400, Design Problems in Civil Engineering, (3-0), 1 section, day, undergraduate, spring 2009
CVEN 451, Public Works Engineering, (3-0), 1 section, day, undergraduate, spring 2008
Stacked with CVEN 689/696 from fall 2006 to present
CVEN 689/696, Urban Traffic Facilities, (3-0), 1 section, day, graduate, fall 2006 (689), fall 2007 (689), fall 2009 (689), fall 2010 (696), and fall 2011 (696). Stacked with CVEN 457
CVEN 625, Traffic Engineering: Design, (3-0), 1 section, day, graduate, fall 2008: 1 section, day, graduate, spring 2006
CVEN 681, Seminar in Transportation (1-0), 1 section, day, graduate, fall 2006: 1 section, day, graduate, fall 2007

Other Duties
Division Head for Transportation and Materials, 2004-2011
Institute of Transportation Engineers Chapter Advisor, 2007-2010
Curriculum Committee, 2008-2011
Engineering and Public Policy Program Task Force, 2009-2010
Transportation Scholars Program Director, Southwest Region University Transportation Center, 2006-present
Civil Engineering Transportation Faculty Search Committee, 2005-2006.
Undergraduate and Graduate Student Advisor
Professional Service:

Professional activities in last 5 years, society/agency, dates
ITE, faculty advisor to student chapter, 2007-present

Percent Time Available for Research or Scholarly Activities: 25%

Percent Time Committed to the Program: 100%
<table>
<thead>
<tr>
<th>Name:</th>
<th>Mary Beth D. Hueste</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Rank:</td>
<td>Associate Professor (full-time)</td>
</tr>
</tbody>
</table>
| Degrees:      | Bachelor of Science, Civil Engineering, *North Dakota State University*, 1988  
|               | Master of Science, Civil Engineering, *University of Kansas*, 1993  
|               | Doctor of Philosophy, Civil Engineering, *University of Michigan*, 1997  |
| A&M Faculty:  | 14 years of service  
|               | Assistant Professor, 1998-2005  
|               | Associate Professor, 2005-present                         |
| Related Experience: | Assistant Research Engineer, Texas Transportation Institute, 1998-2005  
|               | Associate Research Engineer, Texas Transportation Institute, 2005-present  
|               | Structures Program Manager, Texas Transportation Institute, 2005-present  
|               | Assistant Division Head, Construction, Geotechnical and Structural Division, 2005-2009  
|               | Division Head, Construction, Geotechnical and Structural Division, 2010-present  
|               | Structural Engineer, Black & Veatch, Overland Park, Kansas, 1988-1993  
|               | Civil Engineering Technician, North Dakota Soil Conservation Service, June-August 1987  |
| Consulting & Patents: | None                                                   |
| Prof. Licenses: | Professional Engineer, Kansas, No. 12774  
|               | Professional Engineer, Texas, No. 89660                   |


Societies:

Professional Societies:
- American Concrete Institute (Fellow), American Society of Civil Engineers
- American Society of Engineering Education, Earthquake Engineering Research Institute, Precast/Prestressed Concrete Institute, Structural Engineers Association of Texas

Honor Societies:
- Blue Key National Honor Fraternity, Chi Epsilon National Civil Engineering Honor Society, Mortar Board National College Senior Honor Society, Phi Eta Sigma National Honor Society, Tau Beta Pi Engineering Honor Society

Honors and Awards:

ACI Fellow of the Institute, American Concrete Institute, 2011-present.
Holder, E.B. Snead '25 Development Professorship II, 2007-present
Williams Brothers Construction Company Faculty Fellow, 2011, TAMU Engineering 2004-2005 Ruth and William Neely '52/Dow Chemical Faculty Fellow, TAMU Engineering 2001-2002 Zachry Award for Excellence in Teaching, Dept. of Civil Engineering, TAMU

Institutional Service:

Courses Taught (last five years)
- CVEN 221 Engineering Mechanics: Statics, (2-2), 1 section, day, undergraduate, Spring 2009, Fall 2009, Fall 2010
- CVEN 400 Design Problems in Civil Engineering (2-3), 1 section, day, undergraduate, Summer 2009, Summer 2010
- CVEN 444 Structural Concrete Design, (3-0), 1 section, day, undergraduate, Spring 2007, Fall 2007, Spring 2010
- CVEN 483 Analysis and Design of Structures (2-3), 1 section, day, undergraduate, Fall 2008, Spring 2010
- CVEN 671 Behavior and Design of Prestressed Concrete Structures, (3-0), 1 section, day, graduate, Spring 2008, Spring 2011

Other Duties:
- Division Head, Construction, Geotechnical and Structural Engineering, 2010-present
- Asst. Division Head, Construction, Geotechnical and Structural Engineering, 2005-2009
- Structures Program Manager, TTI Constructed Facilities Division, 2005-present
- Advisor for Structural Engineering Graduate Program, 2003-2005
- Undergraduate and Graduate Student Advisor
Professional Service:

ACI-ASCE Committee 352 (Joints and Connections in Monolithic Concrete Structures), Voting Member, 2004-present, Committee Chair, March 2009-present
ACI Committee 374 (Performance-Based Seismic Design of Concrete Buildings), Voting Member, 1999-present
ACI Committee 375 (Performance-Based Design of Concrete Buildings for Wind Loads), Associate Member, 2000-present
EERI Ad Hoc Committee on Seismic Safety of Schools, 2010-present
Engineering Structures Journal, Member of Editorial Board, 2008-present
Mid-America Earthquake Center, Leadership Team, 2001-2008; Diversity Coordinator, 2004-2008
Technical Activities Panel for Texas Department of Transportation Research Management Committee 5, August 2003-present

Percent Time Available for Research or Scholarly Activities: 35%

Percent Time Committed to the Program: 100%
<table>
<thead>
<tr>
<th>Name:</th>
<th>Stefan Hurlebaus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Rank:</td>
<td>Associate Professor, full time</td>
</tr>
<tr>
<td>Degrees:</td>
<td></td>
</tr>
</tbody>
</table>
Vordiplom (B.S. equiv.), Mechanical Engineering, *University of Stuttgart*, 1993  
Master of Science, Mechanical Engineering, *University of Stuttgart*, 1996  
Doktor-Ingenieur, Mechanical Engineering, *University of Stuttgart*, 2002 |
| A&M Faculty: | 6 years experience  
Assistant Professor, 2005 to 2011  
Associate Professor, 2011 to present |
| Related Experience: | Assistant Research Engineer, Texas Transportation Institute, 2006-present  
Head Adaptive Structures Group, University of Stuttgart, 2002-2005 |
| Prof. Licenses: | N/A |
| Recent Publications: |  
Hurlebaus, S. and Gaul, L.: Smart Layer for Damage Diagnostics, Journal of |

Societies:
- American Society of Civil Engineers (ASCE)
- American Society of Nondestructive Testing (ASNT)
- American Society of Engineering Education (ASEE)
- Acoustical Society of America (ASA)
- Society of Experimental Mechanics (SEM)
- Structural Engineering Association of Texas
- International Society for Structural Health Monitoring and Intelligent Infrastructure
- Chi Epsilon

Honors and Awards:
- ASCE Excellence in Civil Engineering Education (ExCEEd) Faculty Award for Excellence in Teaching, 2007
- Birdwell Endowed Teaching Award in Civil Engineering, 2006 – 2007
- Caterpillar Teaching Excellence Award, 2008 - 2009

Institutional Service:
Courses Taught
- CVEN 207 Introduction to the Civil Engineering Profession (1-0), 2 sections, day, undergraduate, spring 2009: 2 sections, day, undergraduate, spring 2010:
- CVEN 345 Theory of Structures (3-0), 1 section, day, undergraduate, fall 2005: 1 section, day, undergraduate, fall 2006; 1 section, day, undergraduate, spring 2007; 1 section, day, undergraduate, spring 2008; 1 section, day, undergraduate, fall 2011:
- CVEN 363 Engineering Mechanics II: Dynamics and Vibrations (2-2), 1 section, day, undergraduate, spring 2008; 1 section, day, undergraduate, spring 2009; 1 section, day, undergraduate, spring 2010; 1 section, day, undergraduate, fall 2011;
- CVEN 662 Experimental Methods in Civil Engineering (3-0), 1 section, day, graduate, spring 2006, 1 section, day, graduate, fall 2007, 1 section, day, graduate, spring 2009; 1 section, day, graduate, fall 2010
- CVEN 689 Special Topics on Smart Structures (3-0), 1 section, day, graduate, fall 2006, 1 section, day, graduate, fall 2008; 1 section, day, graduate, spring 2011

Other Duties
- Structural Engineering Association of Texas, Faculty Advisor, 2008 - present

Professional Service:
- ASCE, EMI Structural Health Monitoring committee, SEI Technical Committee:
  Structural Identification of Constructed Systems
- SEM, Civil Structures Testing Technical Division
- Member Editorial Board: The Open Acoustics Journal

Percent Time Available for Research or Scholarly Activities: 50%
Percent Time Committed to the Program: 100%
Name: Ray W. James

Academic Rank: Associate Professor (full-time)

Degrees: Doctor of Philosophy, Engineering Mechanics, The University of Texas, 1976
Master of Science, Engineering Mechanics, The University of Texas, 1975
Bachelor of Science, Aerospace Engineering, The University of Texas, 1970

A&M Faculty: 30 years service
Assistant Professor, 1980-1988
Senior Lecturer, 1988-2003
Associate Professor, 2003-present

Related Experience:
Manager, Major Highway Structures Prog., Texas Transportation Inst., Sept. 1987-
Assoc. Research Engineer, Texas Transportation Institute, Sept. 1988-Present
Asst. Research Engineer, Texas Transportation Institute, Sept. 1980-Aug. 1988
Engineer IV, The Goldston Company, Corpus Christi, Summer 1979
Physicist, Lawrence Livermore Laboratory, Summer 1978
Research Scientist Assoc. IV, The Univ. of Texas Marine Science Inst., Summer 1977
Teaching Asst, Research Asst., Fellow, The University of Texas, Austin 1972-1976
Plant Engineer, Chatleff Controls, Summer 1972
Assoc. Engineer, Hutchison-Hayes Manufacturing, Inc., Summer 1969


Prof. Licenses: Professional Engineer, Texas, No. 42034


Societies: ASCE, Fellow; ASEE

Honors and Awards: Charles W. Crawford Service Award, College of Engineering, 2008-2009
Bovay Faculty Fellow, College of Engineering 2008-present
Arthur M. Wellington Prize, ASCE 1988
Tau Beta Pi
Sigma Gamma Tau

Institutional Service: Courses Taught:
ENGR 281 ESP Seminar I (1-0), day undergraduate honors, each spring 2005-2010
ENGR 381 ESP Seminar II (1-0), day, undergraduate honors, each fall 2005-2010
ENGR 482 Ethics and Engineering, (2-2), day, undergraduate, Spring 2012
ENGR 482 Ethics and Engineering, (2-2), day, undergraduate, Fall 2009
ENGR 111 Foundations of Engineering I, (1-3), day undergraduate Spring 2009
ENGR 482 Ethics and Engineering, (2-2), day, undergraduate, Fall 2008
ENGR 482 Ethics and Engineering, (2-2), day, undergraduate, Spring 2008
CVEN 305 Mechanics of Materials, (3,0), day, undergraduate, Fall 2007
CVEN 305 Mechanics of Materials, (3,0), day, undergraduate, Spring 2007
ENGR 482 Ethics and Engineering, (2-2), day, undergraduate, Fall 2006
CVEN 345 Structures, (3-0), day, undergraduate, Spring 2006

Other Duties:
Asst. Dean for Student Services,
   Dwight Look College of Engineering, 2009-present
Director, Engineering Student Advising and Development,
   Dwight Look College of Engineering 2004-2009
Director of Undergraduate Student Services,
   Civil Engineering Department 1992-2004
Coordinator of International Engineering Education Paris program, 2003-2005
Director, Engineering Scholars Program, 2004-2010
Faculty Advisor, TAMU Chapter of Tau Beta Pi

Various Committee Service:
   EIS/Howdy Portal Committee, 2008-present
   VPSA Advisory Committee, 2008-present
   President’s Task Force to Enhance Undergraduate Experience,
      Subcommittee on Honors Experiences, 2005-2007
   University Enrollment Management Committee, 2007-present
   University Committee Studying Class Meeting Times, 2008
Course Coordinator for ENGR 482 2003-present
Corps Academic Mentor, Squadron 21 2005-2010

Professional Service: Developed and taught several short courses on engineering ethics for various professional societies and commercially. Currently co-authoring 5th edition of textbook on engineering ethics.

Percent Time Available for Research or Scholarly Activities: less than 5%
Percent Time Committed to the Program: 100%
<table>
<thead>
<tr>
<th>Name:</th>
<th>Terry L. Kohutek</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Rank:</td>
<td>Senior Lecturer, full time</td>
</tr>
<tr>
<td></td>
<td>Doctor of Philosophy, Civil Engineering, <em>The University of Texas at Austin</em>, 1986.</td>
</tr>
</tbody>
</table>
| A&M Faculty:     | 28 years service.  
|                  | Senior Lecturer, 1993 to present.  
|                  | Assistant Professor, 1983 to 1993. |
| Related Experience: | Assistant Research Engineer, Texas Transportation Institute, 1983- present.  
|                  | Investigator, Texas Engineering Experiment Station, 1993-present.  
|                  | Principal Investigator, Texas Engineering Experiment Station, 1983-1993.  
|                  | Senior Research Engineer, Southwest Research Institute, San Antonio, Texas, 1977-1978.  
|                  | Lecturer and Engineering Research Associate, Civil Engineering Dept. and Texas Transportation Institute, Texas A&M University, 1975 - 1977.  
| Consulting & Patents: | None |
| Prof. Licenses:  | Professional Engineer, Texas, No. 54775 |
| Societies:       | American Institute of Steel Construction  
|                  | American Society for Engineering Education  
|                  | Tau Beta Pi  
|                  | Chi Epsilon |
| Honors and Awards: | Impact Award for Advising and Teaching, Zachry Department of Civil Engineering, Texas A&M University, 2011.  
|                  | Zachry Award for Excellence in Teaching, Zachry Department of Civil Engineering, Texas A&M University, 2008.  
|                  | Distinguished Teaching Award, College of Engineering, Association of Former Students, Texas A&M University, 1996.  
|                  | Professor of the Year (1 of 4 awarded University wide), Delta Delta Delta Sorority, Texas A&M University, 1994.  
|                  | Joyce and Dick Birdwell Endowed Teaching Award, Civil Engineering Department, Texas A&M University, 1991.  
|                  | Distinguished Teaching Award, College of Engineering, Association of Former Students, Texas A&M University, 1990.  
|                  | Zachry Award for Excellence in Teaching, Civil Engineering Department, Texas A&M University, 1989. |
Kohutek, Terry L.

Student Engineer's Council Outstanding Teaching Award, College of Engineering, Texas A&M University, 1989.
Exxon Professional Development Grant, 1983

Institutional Service:

Courses Taught
- CVEN 305 Mechanics of Materials (3-0), 1 section, day, undergraduate, Fall 2010.
- CVEN 345 Theory of Structures (3-0), 1 section, day, undergraduate, Summer 2004; 1 section, day, undergraduate, Spring 2005; 1 section, day, undergraduate, Summer 2005; 1 section, day, undergraduate, Summer 2006; 1 section, day, undergraduate, Summer 2007; 1 section, day, undergraduate, Summer 2008; 1 section, day, undergraduate, Summer 2009; 1 section, day, undergraduate, Summer 2010; 1 section, day, undergraduate, Summer 2011.
- CVEN 446 Structural Steel Design (3.0), 1 section, day, undergraduate, Fall 2005; 1 section, day, undergraduate, Spring 2006; 1 section, day, undergraduate, Fall 2006; 1 section, day, undergraduate, Spring 2007; 1 section, day, undergraduate, Fall 2007; 1 section, day, undergraduate, Spring 2008; 1 section, day, undergraduate, Fall 2008; 1 section, day, undergraduate, Spring 2009; 1 section, day, undergraduate, Fall 2009; 1 section, day, undergraduate, Spring 2010; 1 section, day, undergraduate, Spring 2011, 1 section, day, undergraduate, Fall 2011.
- ENGR 111 Foundations of Engineering I (1-3), 1 section, day, undergraduate, Spring 2004; 1 section, day, undergraduate, Fall 2004;
- ENGR 112 Foundations of Engineering II (1-3), 1 section, day, undergraduate, Spring 2004

Other Duties
- Assistant Department Head, 2010 – present.
- Director, Undergraduate Student Service Office, 2005 – present.
- Undergraduate Advisor, 2005 – present.
- Department of Civil Engineering ABET Core Committee, 2007 – present.
- Department of Civil Engineering Scholarship Committee, 2005 – present.
- Department of Civil Engineering Honors Task Force Committee, 2006 – 2007.
- Faculty Advisor, Aggie Ambassadors, Zachry Department of Civil Engineering, 2007 – present.
- Faculty Advisor, Theta Tau, 2002 - present
- ENGR 111/112 Revision Committee, Member, 1999, 2003

Professional Service:
- Prof. Development: 15 PDH required to renew Texas Professional Engineers License, 2005-2011

Percent Time Available for Research or Scholarly Activities: 0%
Percent Time Committed to the Program: 100%
Name: Dominique Lord

Academic Rank: Associate Professor, full time

Degrees: 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

A&M Faculty: 9 years service
              Associate Professor, 2010- present
              Assistant Professor, 2004-2010
              Visiting Assistant Professor, 2003-2004
              Visiting Assistant Professor, Department of Nuclear Engineering, Texas A&M
              University, 2002

Related Experience: Associate Research Scientist, Crash Analysis and Modeling Group, Texas
                    Transportation Institute, 2001 - 2004.
                    Consultant, Canada and International, 1995 - Present.
                    Lecturer, Ryerson University, 2001.
                    Teaching Assistant, University of Toronto, 1995 - 1999.
                    Research Assistant, Ecole Polytechnique(Center for Research on Transportation),
                    Teaching Assistant, University of Toronto, 1992 - 1994.
                    Traffic Engineer, City of Côte St. Luc, 1992.

Consulting & Patents: Dominique Lord Consulting, Traffic Safety and Transportation Engineering

Prof. Licenses: Professional Engineer, Quebec, CANADA, No. 109575
                Professional Engineer, Ontario, CANADA, No. 100052049

Recent Publications:
### Societies:
- 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

### Honors and Awards:
- 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.

### Institutional Service:
- **CVEN 456** Highway Design, (2-3), 1 section, day, undergraduate, Fall, 2005; 1 section, day, undergraduate, Fall, 2006; 1 section, day, undergraduate, Fall, 2007; 1 section, day, undergraduate, Fall, 2008; 1 section, day, undergraduate, Spring, 2010; 1 section, day, undergraduate, Spring, 2011.
- **CVEN 626** Roadside Safety Design, (3), 1 section, day, graduate, Spring, 2005; 1 section, day, graduate, Spring, 2006; 1 section, day, graduate, Spring, 2007; 1 section, day, graduate, Spring, 2008; 1 section, day, graduate, Spring, 2009.
- **CVEN 635** Street and Highway Design, (3), 1 section, day, graduate, Spring, 2006; 1 section, day, graduate, Spring, 2007; 1 section, day, graduate, Fall, 2010; 1 section, day, graduate, Fall 2011.
- **CVEN 681** Seminars in Transportation Engineering, (1), 1 section, day, graduate, Fall, 2008; 1 section, day, graduate, Fall, 2009.
Professional Service:  
Association québécoise du transport et des routes  
Member, Provincial  
Transportation Research Board (TRB)  
Statistical Methodology and Statistical Computer Software in Transportation (ABJ80)  
Friend, Pedestrian (ANF10)  
Friend, Safety Data, Analysis and Evaluation (ANB20)  
The Canadian Association of Road Safety Professionals  
Member, National  
Institute of Transportation Engineers  
Member, International  
Member, Brazos County  

Percent Time Available for Research or Scholarly Activities:  25%  
Percent Time Committed to the Program:  100%
Name: Lee L. Lowery, Jr.

Academic Rank: Professor (full-time)

Degrees:
- B.S., Civil Engineering, Texas A&M University, 1960
- M.E., Civil Engineering, Texas A&M University, 1961
- Ph. D., Civil Engineering, Texas A&M University, 1967

A&M Faculty:
- 47 years service
- Research Engineer, Texas A&M Research Foundation, 1975 - present
- Professor, Department of Civil Engineering, Texas A&M University, 1975 - present
- Professor, Aerospace Engineering, Texas A&M, 1975-1979
- Associate Professor, Department of Civil Engineering, Department of Architecture, and Department of Aerospace Engineering, Texas A&M University, 1968-1975
- Assistant Professor, Department of Architecture, Texas A&M University, 1966-1968
- Assistant Professor, Departments of Civil Engineering and Aerospace Engineering, Texas A&M University, 1963-1968

Related Experience:
- Research Engineer, Texas Transportation Institute, 1977- present
- Associate Research Engineer, Texas Transportation Institute, Texas A&M University, 1963-1975
- Research Assistant, Texas Transportation Institute, Texas A&M University, 1960-1963
- Teaching Assistant, 1958-1960

Consulting & Patents:
- Served as engineering consultant on structural failures and the design of offshore platforms for several hundred engineering firms.

Prof. Licenses:
- Professional Engineer, Texas, No. 27366

Societies:
- Phi Kappa Phi
- Tau Beta Pi
- Chi Epsilon
- Sigma Xi
- ASCE
- ASEE

Honors and Awards:
- Charles W. Crawford Service Award, 2010
- Distinguished Graduate of Zachry Department of Civil Engineering, 2010
- Eppright University Professor - Undergraduate Teaching Excellence, 2002-2007
- National Defense Fellowship, Texas A&M University 1960-1963
- Recipient - Texas A&M University Association of Former Students Distinguished Teacher Award – 1992 & 1998
- Recipient - Texas A&M University Gamma Sigma Delta Honor Society for Agriculture, 1991
- Award of Merit for Teaching.
- Recipient - Texas A&M University Outstanding Teacher Award, 1978

Institutional Service:
- Courses Taught in last 5 years:
  - ENGR 385 Civil Engineering Co-op, (1-0), day, undergraduate Spring, Summer and Fall semesters for past 5 years
  - CVEN 221 Engineering Mechanics: Statics, (3-0), day, undergraduate Spring 2007; Spring 2008; Spring 2010, Fall 2011
CVEN 305  Engineering Mechanics of Materials, (3-0), day, undergraduate  
Fall 2008; Fall 2009; Spring 2010  
CVEN 322  Civil Engineering Systems, (3-0), day, undergraduate  
Spring 2009; Summer 2008, Summer 2009; Fall 2010  
CVEN 345  Theory of Structures (3-0), day, undergraduate  
Fall 2008; Summer 2008, Spring 2009; Spring 2011  
CVEN 422  Civil Engineering Systems, (3-0), day, undergraduate  
Spring 2007, Summer 2007  
CVEN 446  Structural Steel Design (3-0), day, undergraduate  
Fall 2007, Spring 2008, Spring 2009, Fall 2009  

Other Duties:  
Serve as Advisor to over 100 students  
Senior Advisor in Undergraduate Student Services Office  
Manages FE Exam preparation for students  

Percent Time Available for Research or Scholarly Activities:  0%  
Percent Time Committed to the Program:  100%
<table>
<thead>
<tr>
<th>Name:</th>
<th>Eyad Masad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Rank:</td>
<td>Professor, full time</td>
</tr>
</tbody>
</table>
| Degrees:        | Bachelor of Science, Civil Engineering, *University of Jordan, 1993*
|                 | Master of Science, Civil Engineering, *Washington State University, 1995*
|                 | Doctor of Philosophy, Civil Engineering, *Washington State University, 1998*
| Degrees:        | Bachelor of Science, Civil Engineering, *University of Jordan, 1993*
|                 | Master of Science, Civil Engineering, *Washington State University, 1995*
|                 | Doctor of Philosophy, Civil Engineering, *Washington State University, 1998*
| A&M Faculty:    | 9 years service
|                 | Appointed Professor, 2009
|                 | Associate Professor, 2005-2009
|                 | Assistant Professor, 2003–2005
| Related Experience: | Professor, Texas A&M University at Qatar, Doha, Qatar, 2009-present
|                 | Research Engineer, Texas Transportation Institute, 2009-present.
|                 | Associate Professor, Texas A&M University at Qatar, Doha, Qatar, 2007-2009.
|                 | Associate Research Engineer, Texas Transportation Institute, 2005–2009.
|                 | Assistant Research Scientist, Texas Transportation Institute, 2003–2005
|                 | Assistant Professor, Department of Civil and Environmental Engineering, Washington State University, 1998–2002
| Consulting & Patents: | Civil Materials Solutions, Bryan, TX.
|                 | PBS&J Aviation Services, Houston, TX.
|                 | DMJM Aviation, Houston, TX.
|                 | Pine Instruments, Grove City, PA.
| Prof. Licenses:  | Professional Engineer, Texas, No. 96368
Societies:
American Society of Civil Engineers, Associate Member
Transportation Research Board
Association of Asphalt Paving Technologists
Chi Epsilon

Honors and Awards:
Halliburton Professorship Award for Scholarly Excellence and Continuing Contributions to the Field of Engineering, Dwight Look College of Engineering, Texas A&M University, March 2009.
The Texas Transportation Institute/Trinity New Researcher Award, January 2006.
ConocoPhillips Faculty Fellow for Outstanding Performance and Overall Contributions to the Texas A&M Engineering Program, 2005-2006.
Zachry Award for Excellence in Teaching, Department of Civil Engineering, Texas A&M University, June 2004.
Outstanding Young Faculty Award, College of Engineering and Architecture, Washington State University, March 2002.

Institutional Service:
Courses Taught
CVEN 342 Materials of Construction (2-3), 1 section, day, undergraduate, Spring 2004
CVEN 489 Special Topics: Materials Engineering for Civil Engineers (2-2), 1 section, day, undergraduate, Fall 2004; 1 section, day, undergraduate, Spring 2005; 1 section, day, undergraduate, Fall 2005; 1 section, day, undergraduate, Spring 2006
CVEN 653 Bituminous Materials (2-3), 1 section, day, graduate, fall 2004, 1 section, day, graduate, fall 2005, 1 section, day, graduate, fall 2006
CVEN 615 Structural Design of Pavements (3-0), 1 section, day, graduate, Spring 2007
ENGR 111 Foundation of Engineering I (1-3), 4 sections, day, undergraduate, Fall 2007
ENGR 112 Foundation of Engineering II (1-3), 2 sections, day, undergraduate, Spring 2008
ENGR 482 Ethics and Engineering (2-2), 2 sections, day/night, undergraduate, Fall 2008-present.
MEEN 221 Statics and Particle Dynamics (2-2), 1 section, day, undergraduate, Fall Spring 2009
CVEN 689 Special Topics: Constitutive Models for Bituminous Materials (3-0), 1 section, day, graduate, Spring 2009

Professional Service:
Associate Editor, Journal of Materials in Civil Engineering, ASCE (1/03-Present).
Associate Editor, International Journal of Pavement Engineering (12/07-present).
Member of the TRB Committee AFK40, (2/01 – present).
Member of the TRB Committee AFP70, (1/01 – present).
Member of the TRB Committee AFK50, (2/03 – present).

Percent Time Available for Research or Scholarly Activities: 35%
Administration 50%
Percent Time Committed to the Program: 15%
<table>
<thead>
<tr>
<th>Name:</th>
<th>Zenon, Medina-Cetina</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Rank:</td>
<td>Assistant Professor, full time</td>
</tr>
</tbody>
</table>
| Degrees: | Doctor of Philosophy, Civil Engineering, The Johns Hopkins University, 2006  
Master of Science, Civil Engineering, The Johns Hopkins University, 2004  
Master of Engineering, Civil Engineering, Universidad Nacional Autonoma de Mexico, 1996  
Bachelors of Science, Civil Engineering, Universidad Autonoma de Yucatan, 1994 |
| A&M Faculty: | 3.5 years of service  
Appointed Assistant Professor, fall 2008 - Present |
Researcher, Norwegian Geotechnical Institute / International Centre for Geohazards, 2006 – 2008  
Research Assistant, The Johns Hopkins University, 2001 - 2006  
Academic Coordinator (Engineering), Westhill University, 1999 – 2001  
Adjunct Professor, Universidad Nacional Autonoma de Mexico, 1996 – 2001  
Research Assistant, Universidad Nacional Autonoma de Mexico, 1994 – 1996 |
| Consulting & Patents: | Project Manager, Auvinet G. - Geodynamique, Geostatistical Site Characterization of the Rion – Antirion Bridge (Greece), 1996 – 2000  
| Prof. Licenses: | Ingeniero Civil, Mexico |
Yang S., Medina-Cetina Z. and Nadim F. (2010), "Uncertainty Analysis on


* Graduate Students or Postdocs

Societies:
- Society of Underwater Technology SUT
- Deep Foundations Institute DFI
- American Society of Civil Engineers ASCE: Geo-Institute GI; Engineering Mechanics Institute EMI; Coasts, Oceans, Ports and Rivers Institute COPRI
- Society for Industrial and Applied Mathematics SIAM
- American Statistical Society ASA
- Fulbright Association FA

Honors and Awards:
- Bachelor of Engineering, Highest Honors
- Duncan Fund for the Advancement of Research on Stochastic Processes, The Johns Hopkins University
- Fulbright Scholarship

Institutional Service:
- Courses taught:
  - CVEN 689 Stochastic Mechanics, 1 section, day, graduate, spring 2012
  - CVEN 305 Mechanics of Materials, 1 section, day, undergraduate, spring 2011, fall 2011
  - CVEN 365 Introduction to Geotechnical Engineering, 3 sections, day, undergraduate, fall-2008, spring-2009, fall-2009, spring-2010
  - CVEN 651 Geomechanics spring, 1 section, day, graduate, fall-2009
- Other:
  - College of Engineering, Texas A&M University, Strategic Alliance with the Mexican Petroleum Institute, 2008 – Present.
  - College of Engineering, Strategic Alliance with Mexican Schools of Engineering, Texas A&M University, 2008 - Present

Professional Service:
- Chair, Offshore Geotechnical Site Investigation and Geotechnics, SUT, 2012 - Present
- Technical Committee, Renewable Energy (Risk Assessment and Management subcommittee), ASCE-COPRI, 2011 – Present
- Technical Committee, Computational Mechanics, ASCE-GI, ASCE, 2010 – Present
- Technical Committee, Risk Assessment and Management, ASCE - GI, 2009 – Present
- Organizer Technical Sessions, 4 Conferences, 2010 – Present
- Reviewer, scientific journals and conference proceedings (30), 2004-Present
- Reviewer, government agencies (7), 2009-Present
Percent Time Available for Research or Scholarly Activities: 70%
Percent Time Committed to the Program: 100%
Name: Richard S. Mercier

Academic Rank: Professor (full time)

Degrees: Ph.D., Oceanographic Engineering, MIT/Woods Hole Oceanographic Institution, 1985
S.M., Civil Engineering, Massachusetts Institute of Technology, 1982
B.A.Sc., Civil Engineering, University of Waterloo, 1978

A&M Faculty: 10 years service
Professor, Ocean and Civil Engineering, 2001 - present

Related Experience:
Director, Offshore Technology Research Center, Texas A&M University, 2001 - present
Staff Research Engineer, Shell International Exploration & Production Inc., 1997 – 2001
Staff Research Engineer, Shell Exploration & Production Technology Co., 1993 – 97
Senior Research Engineer, Shell Development Co., 1989 – 93
Research Engineer, Shell Development Co., 1986 – 89
Associate Research Engineer, Shell Development Co., 1984 – 86

Consulting & Patents: Chamberlain, Hrdlicka, White, Williams and Martin, Attorneys at Law, 2006 – 08
BHP-Billiton Petroleum (Americas), 2006

Prof. Licenses: None

Recent Publications:


**Societies:** None

**Honors and Awards:** None

**Institutional Service:**

Courses taught:
- OCEN 676 Dynamics of Offshore Structures (3-0), graduate course, taught annually during spring semester from 2003 – present
- OCEN 481 Seminar (1-0), undergraduate course, fall semester 2005 & 2009
- OCEN 681 Seminar (0-2), graduate course, fall semester 2005 & 2009

Other Duties
- Advisor, OTRC Graduate Student Forum, 2001 – 2010
- Texas A&M University Council of Principal Investigators, Sept. 2008 – present
- Texas A&M University Task Force on Export Controls, 2009 – 11
- Texas A&M University Task Force on Creation, Management and Dissolution of Centers and Institutes, 2009 – 10
- Texas A&M University Search Advisory Committee for Senior Vice President for Administration, 2010
- Civil Engineering Dept. Tenure & Promotion Committee, 2003 – present
- Civil Eng. Dept. Search Committee for Coastal Engineering Faculty Position, 2008-09
- Civil Eng. Dept. Search Committee for Offshore Engineering Faculty Position, 2006 – 07
- Civil Eng. Dept. Search Committee for Coastal Engineering faculty Position, 2005 – 06
- Chair, Ocean Engineering Program Scholarships Committee, 2009 – present

**Professional Service:**

Member, US National Academies Marine Board, 2010 – present
- Third Maritime R&D Advisory Panel for Singapore Maritime and Port Authority, 2007 - 09
- American Petroleum Institute, RP2T Committee, 2001 – 2010
- Nanyang Technological University, Research Center Review Committee for Civil/Mechanical Engineering Group, June 2009
- National University of Singapore, Visiting Review Committee for Civil Engineering Dept., Feb. 2009
- Co-Chair, Marine Technology Society 7th International Rope Technology Workshop, Nov. 2007
- Instructor, University of Texas Short Course on Design of Floating Production Systems, 1993 - present

**Percent Time Available for Research or Scholarly Activities:** 72.5%

**Percent Time Committed to the Program:** 27.5%
Name: Gretchen R. Miller

Academic Rank: Assistant Professor, full time

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

A&M Faculty: 2.5 years of service
Assistant Professor, 2009 to present

Related Experience:
Graduate Student Instructor, Univ. of California - Berkeley, 2008
Project Engineer, Shaw Environmental, Summer 2003, January - August 2004
Graduate Research Assistant, University of Missouri – Rolla, 2003
Environmental Field Scientist, SAIC, Summer 2002
Summer Intern – Water Quality Division, Monsanto Corporation, Summer 2000 and 2001


Prof. Licenses: Engineer-In-Training, Missouri, No. 2003002985

Recent Publications:


**Societies:**
American Society of Civil Engineers, Associate Member
American Geophysical Union
National Ground Water Association
American Society for Engineering Education
Tau Beta Pi

**Honors and Awards:**
National Science Foundation Graduate Research Fellowship, 2005-2008
Fellow, Summer Institute for Preparing Future Faculty, UCB, 2008
AGU Outstanding Student Paper Award, Fall Meeting, 2007
Chancellor’s Fellowship, University of Missouri – Rolla, 2002-2003
Chancellor’s Scholarship, University of Missouri – Rolla, 1999-2002

**Institutional Service:**
Courses taught:
- CVEN 311 Fluid Dynamics, (3-0), 1 section, day, undergraduate, fall, 2009, 2010
- CVEN 339 Water Resources Engineering, (3-0), 1 section, day, undergraduate, spring, 2010
- CVEN 674 Groundwater Engineering (3-0), 1 section, day, graduate, spring, 2010, 2011

Other Duties
Faculty advisory committee for Civil Engineering Women’s Mentoring Group, 2009-present
Civil Engineering Curriculum Committee, May 2011 – present
Co-advisor for the American Water Resources Association Student Chapter, May 2011 – present

**Professional Service:**
Member, American Society of Civil Engineers Environment and Water Resources Institute
Research and Education Committee Member, 2009 – present
Sustainable Engineering Practices Committee Member, June 2010 – present
Secretary, July 2011 – June 2012 (rotates to Vice-Chair and Chair)
Founder and Chair of the Subcommittee on Teaching Sustainable Engineering Practices in Higher Education, September 2011 – present
Member, American Geophysical Union, Hydrology Section
Ecohydrology Technical Committee, appointed, national, July 2010 – 2012
Member, National Ground Water Association
Ground Water Protection and Management Subcommittee Member, 2009 – 2012
Member, AmeriFlux Cyberinfrastructure Working Group, Berkeley Water Center, 2006

**Percent Time Available for Research or Scholarly Activities:** 50%

**Percent Time Committed to the Program:** 100%
Name: John M. Niedzwecki

Academic Rank: Professor (full-time)

Holder of the Cain’13 Chair in Offshore Technology

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

A&M Faculty: Professor of Civil and Ocean Engineering, Texas A&M University, 1991-present
- Associate Professor of Civil and Ocean Engineering, Texas A&M University, 1983-1991
- Assistant Professor of Civil and Ocean Engineering, Texas A&M University, 1978-1982

Related Experience:
- Head, Zachry Department of Civil Engineering, 6/09 (Interim), 6/10-present
- Holder of the Wofford Cain’13 Chair in Offshore Technology, 6/11-present
- Visiting Research Scientist, Woods Hole Oceanographic Institute, 8/09-present
- Guest Professor, Shanghai Jiao Tong University, Shanghai, China, 8/07-present
- Regents Professor, TAMU System Board of Regents Appointment, 11/06-present
- Guest Professor, Harbin Engineering University, Harbin, China, 9/06-9/09
- Executive Associate Dean for Engineering & Associate TEES Director, 10/02-8/10
- Associate Vice Chancellor for Engineering, 10/02-6/07
- Acting Vice-Chancellor, Interim Dean of Engineering and TEES Director, 9/02-10/02
- Holder of the R.P. Gregory’32 Chair in Civil Engineering, 7/02-6/11
- Interim Director of the NSF Offshore Technology Research Center (OTRC), 2/00-8/01
- Head, Department of Civil Engineering, 8/97-6/9 (Interim), 6/98-10/02
- Associate Department Head of Civil Engineering, 9/95-8/97
- Departmental Graduate Advisor for Civil Engineering, 9/95-9/96
- Division Head, Constructed Facilities Division, 9/93-8/97
- Holder of the Wofford Cain ’13 Professorship in Offshore Technology, 4/93-7/02
- Academic Leader for Structural Engineering and Engineering Mechanics, 7/92-9/93
- Research Leader Fluid-Structure Interactions, OTRC, 10/89-2/00
- Visiting Associate Professor, MIT Department of Civil Engineering, 1986-1987
- Associate Professor of Civil and Ocean Engineering, Texas A&M University, 1983-1991
- Associate Professor of Ocean Engineering, University of Rhode Island, 1982-1983
- Assistant Professor of Civil and Ocean Engineering, Texas A&M University, 1978-1982
- David Taylor Naval Ship Research and Development Center, IKOR Corporation & HELIO Corporation, Research Engineer

Consulting & Patents:
- Virginia Offshore Wind Consortia, 2008-2009
- Mexican Petroleum Institute, 2009-2010

Prof. Licenses: Texas, No. 48561

Recent Publications:

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

Honors and Awards:
Diplomates Ocean Engineering (D.OE.), (2011). Academy of Coastal, Ocean, Port and Navigation Engineers (ACOPNE), an affiliate of the American Society of Civil Engineers.
Holder, Wofford Cain ‘13 Chair in Offshore Technology
Conoco Inc. (DuPont) Grant, 1987-1997
Mobil Grant, 1997-1998
Institutional Course Taught:
CVEN 695, Flow Induced Vibrations, (1-0), 2005

Other Duties:
Department Head, (32 hr/wk) 80 %
Research and Graduate Student Advising, (8 hr/wk) 20%

Professional Service:
NRC Panelist/Reviewer, Research Associateship Program, 2008 - present
Board of Trustees, Southwest Research Institute, San Antonio, Texas, 2005-present
Associate Editor; Journal of Offshore Mechanics and Arctic Engineering, 1/04 - present
Canada Foundation for Innovation, Expert review team, 2009

Percent Time Available for Research or Scholarly Activities: 20%
Percent Time Committed to the Program & college: 100%
Name: Philip Park

Academic Rank: Assistant Professor, full time

Degrees:
- Bachelor of Science, Civil Engineering, Yonsei University, South Korea, 1995
- Master of Science, Civil Engineering, Yonsei University, South Korea, 1997
- Master of Science, Mechanical Engineering, University of Michigan at Ann Arbor, 2011
- Doctor of Philosophy, Civil Engineering, University of Michigan at Ann Arbor, 2011

A&M Faculty: Assistant Professor, Texas A&M University, 2012-present

Related Experience:
- Assistant Professor, Texas A&M University, 2012-present
- Graduate Student Research Assistant, University of Michigan, 2007-2011
- Graduate Student Instructor, University of Michigan, 2008-2010
- Senior Research Scientist, Korea Research Institute of Standards and Science, 2001-2006
- Research Student, Korea Research Institute of Standards and Science, 1997-2001


Recent Publications:

Societies:
- American Society of Civil Engineers, Association of Asphalt Paving Technologists, Earthquake Engineering Research Institute, Korean Society of Civil Engineers, Korea institute for Structural Maintenance Inspection, Korean Society of Steel Construction, Korea Concrete Institute, and Phi Kappa Phi

Honors and Awards:
- Rackham Predoctoral Fellowship, University of Michigan, 2011
- Rackham International Student Fellowship, University of Michigan, 2008
- Civil Engineering Scholarship, University of Michigan, 2007
- NR-Eng Graduate Fellowship, University of Michigan, 2007

Institutional Service:
- Texas A&M University, Assistant Professor
- CVEN 306 Materials Engineering for Civil Engineers, Spring 2012
- University of Michigan, Graduate Student Instructor
CEE 312 Structural Engineering, Fall 2010
CEE 212 Solid and Structural Mechanics, Fall 2009
CEE 413 Design of Metal Structures, Fall 2008

Other:
- Multifunctional High Performance Fiber Reinforced Asphalt Concrete (M-HPFRAC)
- Nonlinear viscoelastic constitutive modeling
- Improvement of bridge asphalt plug joint performance
- Non-destructive test method and sensing techniques for structural health monitoring
- Fatigue and fracture of civil engineering materials

Professional Service:
- **ASPHALT PLUG JOINT**
  Improvement of bridge asphalt plug joint performance (2006-2008)

**NON-DESTRUCTIVE STRUCTURAL HEALTH MONITORING**
- Development of the passive/active new non-destructive testing techniques for damage monitoring and in-situ measurement of concrete structures (2005-2006)

**STRUCTURAL SAFETY EVALUATION**
- Development of In-Service Fitness Evaluation Technology for Industrial Infrastructure (2005-2006)
- Quantification of Structural Response Variations by Damage for Safety Evaluation of Steel Box Girder Bridges (2003-2006)
- Development of Crack Detection Technique and Failure Criterion for Fatigue Damaged Steel Bridges (2002-2004)
- Fatigue Damage Evaluation for Steel Structural Members (1999-2001)
- Safety evaluation of existing bridges including Dangsan Railway Bridge (steel truss, 1,200 m, reconstructed after the evaluation) and Wonhyo Bridge (pre-stressed concrete, 1,120 m, rehabilitated after the evaluation)

**LARGE SCALE STRUCTURAL TESTS**
- Fatigue Strength Evaluation Test for Steel-Concrete Composite Slab in Bridge (2002-2003)
- Damage Evaluation Test of Bolted Joints for Steel Structures (2002-2003)
- Friction Coefficient Test for Spherical Bearing of Bridge Shoe (2002)
- Design and construction of a large scale structural test laboratory (1999-2001)
Name: Luca, Quadrifoglio

Academic Rank: Assistant Professor, full time

Degrees:
- 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

A&M Faculty: 5 years service
Assistant Professor, 2006 - present

Related Experience:
- Lecturer, University of Southern California, 2005
- Postdoctoral Research Associate, CREATE - USC, 2005-2006
- Project Economist, Snamprogetti, 1996-2001

Consulting & Patents: None

Prof. Licenses: None

Recent Publications:
- Li X. and Quadrifoglio L. (2009), "Optimal Zone Design for Feeder Transit Services," Transportation Research Record, 2111, 2, 100-108.
- Li X. and Quadrifoglio L. (2009), "Feeder Transit Services: Choosing between Fixed or Demand Responsive Policy," Transportation Research, Part C: Emerging Technologies, Transportation Research, Part C: Emerging Technologies, 18, 770-780.
- Quadrifoglio L., Dessouky M. and Ordóñez F. (2008), "Mobility Allowance Shuttle
Quadrifoglio, Luca


Societies:
- Transportation Research Board
- Institute for Operations Research and the Management Sciences
- Institute of Transportation Engineers
- American Society of Civil Engineers
- OMEGA RHO
- ALPHA PI MU

Honors and Awards:
- 2006 Pritsker Doctoral Dissertation Award, 3rd Place: “A Hybrid Fixed and Flexible Transportation Service: Description, Viability, Formulation, Optimization and Heuristic”
- 2004 CUTC (Council of University Transportation Centers) National Student Award for best non thesis publication in Science and Technology: “An Insertion Heuristic for Scheduling Mobility Allowance Shuttle Transit (MAST) Services”

Institutional Service:
- Courses taught in last 5 years
  - CVEN 307 Introduction to Transportation Engineering, (3-0), 1 section, day, undergraduate, Spring, 2007; 1 section, day, undergraduate, Fall, 2007; 1 section, day, undergraduate, Spring, 2009; 1 section, day, undergraduate, Spring, 2010; 1 section, day, undergraduate, Spring, 2011
  - CVEN 322 Civil Engineering Systems, (3-0), 1 section, day, undergraduate, Spring, 2008; 1 section, day, undergraduate, Fall, 2008; 1 section, day, undergraduate, Spring, 2010; 1 section, day, undergraduate, Fall, 2011
  - CVEN 672 Engineering and Planning Urban Transportation Systems, (3-0), 1 section, day, graduate, Fall, 2007; 1 section, day, graduate, Fall, 2008
  - CVEN 689 Advanced Civil Engineering Systems, (3-0), 1 section, day, graduate, Fall, 2009; 1 section, day, graduate, Fall, 2010

Other Service
- Faculty Fellow: Center for Housing and Urban Development (CHUD) at TAMU, from Apr 08
- Faculty Search Committee Member: Zachry Department of Civil Engineering, in 07
- Scholarship Award Committee Member: 4 Committees since 06
- Undergrad Advisor: since 07
- Aggieland Saturday, in 08, 09 and 10
- Transportation Division PhD Qualifying Exam Coordinator, in 08 and 09
Professional Service:
- TRB Secretary of Paratransit Committee
- Member of Transit, Freight, and Logistics Modeling Subcommittee
- Friend of Transportation Network Modeling Committee
- INFORMS Member of Transportation Science and Logistics section

Percent Time Available for Research or Scholarly Activities: 50%
Percent Time Committed to the Program: 100%
Name: Robert E. Randall

Academic Rank: Professor, full time

Degrees: Bachelor of Science, Mechanical Engineering, Ohio State University, 1963
Master of Science, Ocean Engineering, University of Rhode Island, 1969
Doctor of Philosophy, Ocean Engineering, University of Rhode Island, 1972

A&M Faculty: 37 years service
Professor, 1997
Associate Professor, 1981
Assistance Professor, 1975

Related Experience: Director, Center for Dredging Studies, Civil Engr. Dept., Texas A&M University, Sept. 1993-Pres.
Director, Haynes Coastal Engr. Laboratory, Civil Engr. Dept., Texas A&M University, June 2009-Pres.
Visiting Professor, U.S. Army Engineer Waterways Experiment Station (WES), Sept. 1992-Aug. 1993.
Ocean Engr., Harbor Branch Foundation, Inc., 1973-75; Mechanical Engineer, Naval Underwater Systems Center, 1972-73

Construction.

Prof. Licenses: Professional Engineer, Texas, 39850

Recent Publications:
Henriksen, J. C. and Randall, R. E. Laboratory Near-field Turbidity Data for a Cutter Suction Dredging Operation, Proceedings of the Western Dredging Association Twenty-eighth Technical Conference and Thirty-ninth Annual Texas A&M Dredging Seminar, Editor, St. Louis, Missouri, Texas A&M University, Center for Dredging Studies, Ocean Engineering Program, Civil Engineering Department, College Station, TX, CDS Report No. 508, 468 pp., June 8-11, 2008.
Randall, R. E. Proceedings of the Western Dredging Association Twenty-eighth Technical Conference and Thirty-ninth Annual Texas A&M Dredging Seminar, Editor, St. Louis, Missouri, Texas A&M University, Center for Dredging Studies, Ocean Engineering Program, Civil Engineering Department, College Station, TX, CDS Report No. 508, 468 pp., June 8-11, 2008.
Randall, R. E. Proceedings of the World Dredging Congress (WODCON XVIII), Editor, Lake Buena Vista, Florida, USA, Texas A&M University, Center for


W.H. Bauer Professor of Dredging Engineering, Appointed, January, 2010


Ford Motor Company Endowed Professorship, Appointed, December 2007-2010

SNAME/ASME, International Offshore Student Design Competition, 1st, 2nd, 4th & 5th Place, Faculty Advisor, 2007.

Human Powered Submarine, Maroon Harpoon, 3rd Place Overall, 2nd Place, One Person-Propeller Division, Best Overall Performance, Honorable Mention, 9th International Submarine Races, 2007.

SNAME/ASME, International Offshore Student Design Competition, 2nd, 3rd, 4th & 5th Place, Faculty Advisor, 2006.

WEDA Dredger of the Year, Western Dredging Association, June, 2006.

Fellow, Society of Naval Architects and Marine Engineers, October, 2005.


Institutional Service: Courses taught


OCEN 401 Underwater Acoustics for Ocean Engineers (3-0), 1, day, undergraduate, Fall, 2007, 2008, 2009, 2010, 2011...


Other Duties

Civil Engineering Strategic Planning Committee, 2010-Present

Civil Engineering Promotion and Tenure Committee, 1992-Present

College of Engineering Awards Committee, 2010-Present

Advisor, Human Powered Submarine Student Team, 2005-Pres.

Faculty Advisor, Marine Technology Society & Society of Naval Architects and Marine Engineers, 2005-2008

Ocean Engineering Scholarship Committee, (2005-2009)

Undergraduate Advisor, Ocean Engineering Program, Texas A&M University, 1999-2008

Percent Time Available for Research or Scholarly Activities: 50%

Percent Time Committed to the Program: 100%
**Name:** Kenneth F. Reinschmidt  

**Academic Rank:** Professor, full time

**Degrees:**  
- Bachelor of Science in Civil Engineering, MIT, 1960  
- Master of Science in Civil Engineering, MIT, 1962  
- Doctor of Philosophy in Civil Engineering, MIT, 1965

**A&M Faculty:**  
- 11 years’ service  
- Professor of Civil Engineering, 2001 - present  
- Visiting Professor of Civil Engineering, 1999 - 2000  
- Adjunct Professor of Civil Engineering, 1998 - 1999

**Related Experience:**  
- Consultant, Littleton, Massachusetts, 1996 - 2001  
- Senior Vice President, Stone & Webster, Incorporated, New York, NY, 1992 - 1996  
- Vice President, Stone & Webster Engineering Corporation, Boston, MA, 1980 - 1992  
- Consultant, Stone & Webster Engineering Corporation, Boston, MA, 1975 - 1980  
- Senior Research Associate, Department of Civil Engineering, MIT, 1973 - 1975  
- Associate Professor of Civil Engineering, MIT, 1970 - 1973  
- Captain, U. S. Army Transportation Corps, 1966 - 1967  
- Assistant Professor of Civil Engineering, MIT, 1965 - 1970  
- NSF Graduate Fellow, Department of Civil Engineering, MIT, 1963 - 1965  
- Research Assistant, Department of Civil Engineering, MIT, 1961 - 1963  
- Research Assistant, Computation Center, MIT, 1960 - 1961

**Consulting & Patents:** None at present.

**Prof. Licenses:** None

**Recent Publications:**  
- Kim, B.-C., and Reinschmidt, K.F., “A Second Moment Approach to Probabilistic

**Societies:**
- American Association for the Advancement of Science, Fellow
- Society of the Sigma Xi
- Tau Beta Pi
- Chi Epsilon
- Institute for Operations Research and the Management Sciences (INFORMS)
- American Society of Civil Engineers, life member
- Society of Architectural Historians, life member
- Archaeological Institute of America, life member

**Honors and Awards:**
- Named to the Academy of Medicine, Engineering and Science of Texas, 2003
- Elected a Fellow of the American Association for the Advancement of Science, 1991.
- Designated a lifetime National Associate of the National Academies, 2001.
- "Cited by the Publisher and Editors of *Engineering News-Record* from among the many who serve the best interests of the Construction Industry," for work in computer-aided design, February 1983.
- Awarded the Legion of Merit, United States Army, 1967.
- National Science Foundation Graduate Fellowship, 1962.

**Institutional Service:**

Courses taught:
- CVEN 333 / ISEN 333 / MEEN 333 Project Management for Engineers, (3-0), day, undergraduate; spring 2002; spring 2004; fall 2005; fall 2006; spring 2007; fall 2007; spring 2008; fall 2008; spring 2009; spring 2010, fall 2010
- CVEN 639 Methods Improvement for Construction Engineers, (3-0), day, graduate spring 2002; spring 2005; spring 2006; spring 2007; spring 2008 (with Distance Learning); fall 2009, spring 2011
- CVEN 644 Project Risk Management, (3-0), day, graduate, fall 2002; fall 2003; fall 2004; fall 2005; fall 2006; fall 2007 (with Distance Learning); fall 2008 (with Distance Learning); fall 2009, fall 2010, fall 2011
- CVEN 689 Special Topics in New Project Development (3-0), day, graduate, spring 2004.

Other duties:
- College of Engineering Promotion and Tenure Committee, 2007 to present
- Dean’s Advisory Council on Project Management, 2004 to present
- College of Engineering Chaired Professors Group, 2004 to present
- Admissions, Construction Engineering and Management Group, 2007 to present

**Professional Service:**
Percent Time Available for Research or Scholarly Activities: 25%
Percent Time Committed to the Program: 100%
Name: Marcelo J. Sanchez

Academic Rank: Associate Professor, full time

Degrees:
- Bachelor of Science, Civil Engineering, Universidad Nacional de San Juan (UNSJ), Argentina. 1990
- Master in Numerical Methods in Engineering, Universidad Politecnica de Catalunya (UPC), Barcelona, Spain. 1996
- Doctor of Philosophy, Civil Engineering, Universidad Politecnica de Catalunya (UPC), Barcelona Spain. 2004

A&M Faculty: 2 years service
Associate Professor, 08/2009 to present

Related Experience:
- Senior Lecturer (equivalent to Associate Professor) in Civil Engineering, University of Strathclyde, Glasgow, UK. 2008-2009
- Lecturer (equivalent to Assistant Professor) in Civil Engineering, University of Strathclyde, Glasgow, UK. 2005-2008
- Researcher in Geomechanics. Universidad Politecnica de Catalunya (UPC), Barcelona. 1998-2004
- Assistant Professor (full time) Universidad Nacional de San Juan (UNSJ), Department of Geotechnical Engineering. San Juan, Argentina. 1993-1998.
- Assistant Professor (partial time) Universidad Nacional de San Juan (UNSJ), Department of Geotechnical Engineering. San Juan, Argentina. 1991-1993.

Consulting & Patents: None

Prof. Licenses: Professional Engineer, San Juan, Argentina. 1993-1996

Recent Publications:
- El Mountassir G., Sanchez M., Romero E. & Soemitro R. “Behavior of a compacted fill used to construct flood embankments”. Geotechnical Engineering, ICE. DOI: 10.1680/geng.10.00055. 2011


Sánchez M. “Behavior of expansive clays subjected to heating and hydration”. Invited lecture: IUTAM (Int. Union of Theoretical and Applied Mechanics). Brazil. 08/7.

Societies: American Society of Civil Engineers, Fellow


Institutional Service: Courses Taught

CVEN 365 Introduction to Geotechnical Engineering (2-3), 3 sections, day, undergraduate, fall 2009; 3 sections, day, undergraduate, spring 2010; 3 sections, day, undergraduate, fall 2010; 3 sections, day, undergraduate, spring 2011.

CVEN 305 Mechanics of Materials (3-0), 1 section, day, undergraduate, fall 2011.

CVEN 673 Transport Phenomena in Porous media (3-0), 1 section, day, graduate, fall 2010; 1 section, day, graduate, fall 2011

Professional Service: ASCE, Unsaturated Soils Committee, 2010 to present.

Member of Advisory Committee Conference: 1st Pan-American Conference on Unsaturated Soils (Colombia, Feb-13); 2nd European Conference on Unsaturated Soils (Italy, Jul-12); 5th International Conference on Unsaturated Soils (Spain, Sep-10); 5th Workshop New Frontiers on Computational Geotechnics (Australia, July-10); 4th Asian Pacific Conference on Unsaturated Soils (Australia, Nov-09); 2nd International Workshop on Geotechnics of Soft Soils (UK, Sep-08); 1st European Conference on Unsaturated Soils (UK, Jun-08); International Conference on Geotechnical and Highway Engineering, GEOTROPIKA 2008 (Malaysia, May-08).

Reviewer for Research Proposals: DOE (Department of Energy, US); Geosciences Research Program; DOE (US), Nuclear Energy University Programs (NEUP); NSF Graduate Research Fellowship Program; Dutch Technology Foundation (The Netherlands); The Leverhulme Trust (UK).

Percent Time Available for Research or Scholarly Activities: 60%
Percent Time Committed to the Program: 100%
<table>
<thead>
<tr>
<th>Name:</th>
<th>Roger E. Smith</th>
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</thead>
<tbody>
<tr>
<td>Academic Rank:</td>
<td>Professor, full time</td>
</tr>
</tbody>
</table>
| Degrees: | Bachelor of Arts, English Literature, *Wabash College*, 1967  
Bachelor of Science, Civil Engineering, *University of Illinois (U-C)*, 1978  
Master of Science, Civil Engineering, *University of Illinois (U-C)*, 1979  
Doctor of Philosophy, Civil Engineering, *University of Illinois (U-C)*, 1986 |
| A&M Faculty: | 25 years of service  
Professor, 2003 to present  
Associate Professor, 1986 to 2003 |
| Related Experience: | Research Engineer, Texas Transportation Institute, 2001-present  
Associate Research Engineer, Texas Transportation Institute, 1986-2001  
Manager, Pavement Management Program, TTI, 1997 to 2003  
Manager, Pavement Maintenance and Rehabilitation Program, TTI, 1986-1997  
Vice President and Technical Director, ERES Consultants, Inc., 1980 to 1986  
Geotechnical and Materials Engineer, Hurst-Rosche Engineers, Inc., 1979-1980  
Nichols Consulting Engineers, Chtd., Assistance with StreetSaver Pavement Management Program |
| Prof. Licenses: | Professional Engineer, Illinois, No. 062-040854, Texas, No. 62182 |
| Societies: | American Society of Civil Engineers, Fellow  
Chi Epsilon, Tau Beta Pi |
Honors and Awards:

- Lifetime Achievement Award, Metropolitan Transportation Commission, Oakland, CA, 2006.
- Profile published in TR News by the Transportation Research Board in 2006.
- Elected Member Emeritus of Committee on Pavement Monitoring, Evaluation and Data Storage of Transportation Research Board, February, 2005.
- Dick & Joyce Birdwell Endowed Teaching Award, Department of Civil Engineering, Texas A&M University, 2002-2003.
- Elevated to Fellow in ASCE, 1998.
- TTI/Zachry Senior Researcher Award, 1997.
- Chapter Honor Member, Chi Epsilon, Texas A&M University Chapter, 1997.

Institutional Service:

Courses Taught

- CVEN 403 Practical Applications of Civil Engineering Surveying (0-2), 1 section, day, undergraduate, summer 2006; 1 section, day, undergraduate, summer 2007; 1 section, day, undergraduate, summer 2008; 1 section, day, undergraduate, summer 2009; 1 section, day, undergraduate, summer 2010
- CVEN 418 Pavement Design (3-0), 1 section, day, undergraduate, Spring 2004; 1 section, day, undergraduate, Spring 2005; 1 section, day, undergraduate, spring 2006; 1 section, day, undergraduate, spring 2007; 1 section, day, undergraduate, spring 2008; & 1 section, day, undergraduate, spring 2009.
- CVEN 424 Civil Engineering Professional Practice (1-2), 1 section day, undergraduate, fall 2009; 1 section day, undergraduate spring 2010; 2 sections day, undergraduate fall 2010; 4 sections day, undergraduate spring 2011; 4 sections day, undergraduate fall 2011; 4 sections day, undergraduate spring 2012
- CVEN 624 Infrastructure Engineering and Management (3-0), 1 section, day, graduate, fall 2004, 1 section, day, graduate, fall 2005, 1 section, day, graduate, fall 2006, 1 section, day, graduate, fall 2007, & 1 section, day, graduate, fall 2009

Other Duties

- Associate Department Head, Undergraduate and Graduate Student Advisor, Peer Review of Teaching TAMU Institutional Representative, Assistance to Center for Teaching Excellence on Course Improvement Instruction, Texas A&M University Assessment Conference Committee.

Professional Service:

- ASCE, Committee on Local Roads and Streets, 1988 to present; Committee on Pavements, 1992 to 2007; Committee on Infrastructure Systems, 1994 to present; Transportation and Development Institute, Chair of Cross Cutting Council, 2002 to 2008; Editor of Pavement Related Papers for Journal of Transportation Engineering, 2002 to 2004; Member of Body of Knowledge Education Fulfillment Committee, 2007 to 2010; Member of Plus 30 Task Committee, 2009 to 2010.
- TRB, Committee on Pavement Maintenance, 1989 to present, Past Chairman, Emeritus member 2004; Committee on Pavement Management, 1993 to 2008 & 2010 to present, Past Co-Chairman of Subcommittee on Local Agency Pavement Management; Chair International Conferences Subcommittee 2010 to present, Committee on Pavement Monitoring, Evaluation and Data Storage, 1986 to present, Emeritus member 2005; Committee on Pavement Preservation, 2007 to present, Chair 2011 to present.
Smith, Roger E.

ASTM, Committee E-17, 1987 to present, Past Chairman of subcommittee on Pavement Management Technologies; Committee D-4, 1987 to present
ABET, Civil Engineering Program Evaluator, 2009-present

Percent Time Available for Research or Scholarly Activities: 15%

Percent Time Committed to the Program: 87.5%
Name: Scott A. Socolofsky

Academic Rank: Associate Professor, full time

Degrees:
- Bachelor of Science, Civil, Environmental & Architectural 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

A&M Faculty:
- 9 years service
- Associate Professor, 2009-present
- Assistant Professor, 2003-2009

Related Experience:
- Director, Environmental Fluid Mechanics Division, Institute for Hydromechanics, University of Karlsruhe, Germany, 2002
- Research Associate, Institute for Hydromechanics, University of Karlsruhe, Germany, 2001-2002
- Civil Engineer, Wright Water Engineers, Inc., 1994

Consulting & Patents:
- Supreme Council for the Environment and Natural Reserves, Doha, Qatar, 2005
- Plaintiffs' Liaison Counsel in RE: Deepwater Horizon, MDL No. 2179, 2011-present

Prof. Licenses: None

Recent Publications:


Societies:
- American Society of Civil Engineers (ASCE)
- International Association of Hydraulic Engineering and Research (IAHR)
- American Geophysical Union (AGU)
- American Physical Society (APS)

Honors and Awards:
- 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

Institutional Service:
Courses Taught
- CVEN 311 Fluid Dynamics (3-0), 1 section, day, undergraduate, fall 2008
- OCEN 489 Special Topics in Mixing and Transport in the Environment (3-0), 1 section, day, undergraduate, spring 2009; 1 section, day, undergraduate, spring 2008; 1 section, day, undergraduate, spring 2007
- CVEN 489 Special Topics in Mixing and Transport in the Environment (3-0), 1 section, day, undergraduate, spring 2005
- CVEN 489 Special Topics in Computer Applications in Engineering and Construction (3-2), 1 section, day, undergraduate, fall 2009.
- CVEN 302 Computer Applications in Engineering and Construction (3-0), 1 section, day, undergraduate, spring 2006; 1 section, day, undergraduate, fall 2005
- OCEN 678 Fluid Dynamics for Ocean and Environmental Engineering (3-0), 1 section, day, graduate, fall 2009; 1 section, day, graduate, fall 2008; 1 section, day, graduate, fall 2007; 1 section, day, graduate, fall 2006; 1 section, day, graduate, fall 2005
- OCEN 689 Special Topics in Environmental Fluid Mechanics (3-0), 1 section, day, graduate, spring 2009; 1 section, day, graduate, spring 2008; 1 section, day, graduate, spring 2007; 1 section, day, graduate, spring 2005

Other Duties
- Peer Review of Teaching Policy Review Committee Chair, 2009
- Course Coordinator for CVEN 302, 2006-present
- Dwight Look College of Engineering Honors and Awards Committee, 2006-2008

Professional Service:
- Engineering Mechanics Institute, ASCE, Fluids Committee, ASCE 2005-present
- Engineering Mechanics Institute, ASCE, Turbulence Committee, ASCE 2005-present
- European Graduate School Environment Water, Organizing Committee, IAHR, 2003-2006
Percent Time Available for Research or Scholarly Activities: 50%

Percent Time Committed to the Program: 100%
Name: John A. Walewski

Academic Rank: Assistant Professor, full time

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

A&M Faculty: 4 years service
Assistant Professor, 2008 to present

Related Experience:
- Research Associate, Center for Transportation Research, University of Texas, 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 & Patents:
- TBG Partners, Inc., sustainable infrastructure and roadside management, 2009 to present
- Winstead, PC, expert witness project management practices and training, 2010
- Bullivant Houser Bailey, PC, expert witness construction project practices, 2008
- Hyundai Engineering and Construction, international project risk management, 2007 to 2008
- U.S. State Department Embassy Construction, project risk management, 2005 to 2007
- U.S. Business Council for Sustainable Development, research design and metrics, 2005
- FMI Corporation, Research design and construction project management, 2004
- National Research Council, construction-related research and report editing, 2000 to 2001

Prof. Licenses: AP LEED July, 2012

Recent Publications:

Societies:
American Society of Civil Engineers
American Society of Engineering Education
Project Management Institute
Transportation Research Board

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, Dispute Resolution Fellowship

Institutional Service:
Infrastructure Research Center Review Committee, Department of Civil Engineering, 2011 to present
Engineering & Public Policy Review Committee, Department of Civil Engineering, 2009
Undergraduate Coordinator Construction Engineering and Management Focus Area, 2010 to present
Co-coordinator Construction Engineering and Management Ph.D. qualifying exams, 2009 to present
Undergraduate and Graduate Student Advisor, 2008 to present
Faculty Mentor, Texas A&M University Student Chapter (Corp of Cadets), American Society of Military Engineers, 2010 to present
Chapter Advisor, U.S. Green Building Council Student, Texas A&M University, 2009 to present

Professional Service:
Transportation Research Board (TRB) Airport Cooperative Research Program Project Panel 09-04, Re-commissioning and Re-tuning Airport Facilities, 2012
TRB Airport Cooperative Research Program Project Panel 11-03/Topic S03-06, Strategies for Re-use of Underutilized or Vacant Airport Facilities, 2010-2011
TRB, Transit Cooperative Research Program, Review Committee on Project Delivery Processes, 2009
TRB Airport Cooperative Research Program Project Panel 2-04, Primer for Airport Managers on Community Attitudes to Aircraft Noise, 2008
Academic Committee, Construction Industry Institute, 2010 to present
Reviewer, Journal of Public Works, 2007 to present
Reviewer, ASCE Journal Construction Engineering and Management, 2007 to present
Board of Directors, U.S. Green Building Council Texas, 2008 to present

Percent Time Available for Research or Scholarly Activities: 60%
Percent Time Committed to the Program: 100%
Name: Jun, Zhang

Academic Rank: Professor, full time

Degrees: Bachelor of Science, Naval Architecture, Shanghai Jiao Tong University, 1968
         Master of Science, Naval Architecture, Shanghai Jiao Tong University, 1981
         Master of Science, Ocean Engineering, MIT, 1984
         Doctor of Science, Ocean Engineering, MIT, 1987

A&M Faculty: 24 years service
              Appointed Assistant Professor, 1987
              Promoted to Associate Professor, 1993
              Promoted to Professor, 2000


Prof. Licenses: None

Recent Publications:

Societies: American Society of Civil Engineers, Associate Member

Honors and Awards: None

Institutional Service: Courses Taught
                     OCEN 201 Introduction to Ocean Engineering (3-0), 1 section, day, undergraduate, Spring 2007; 1 section, day, undergraduate, Spring 2008; 1 section, day, undergraduate, Spring 2009; 1 section, day, undergraduate, Spring 2010; 1 section, day, undergraduate, Spring 2011;
OCEN 402  Principle of Naval Architecture (3-0), 1 section, day, undergraduate, Fall 2005: 1 section, day, undergraduate, Fall 2006;
OCEN 481  Seminar (1-0), 1 section, day, undergraduate, Fall 2006;
OCEN 681  Seminar (0-2), 1 section, day, graduate, Fall 2006;
OCEN 671  Ocean Wave Mechanics (3-0), 1 section, day, graduate, Fall 2003; 1 section, day, graduate, Fall 2004; 1 section, day, graduate, Fall 2005; 1 section, day, graduate, Fall 2010; 1 section, day, graduate, Fall 2011;
OCEN 407  Design of Ocean Engineering Facilities, (1-6) 1 section, day, Fall 2011;
OCEN 678  Fluid Dynamics for Ocean Engineering (3-0), 1 section, day, graduate, Spring 2003; 1 section, day, graduate, Spring 2004; 1 section, day, graduate, Fall 2004;
OCEN 689  Nonlinear Wave-Wave Interaction In Ocean Waves & Its Implication to Ocean Engineering (3-0), 1 section, day, graduate, Spring 2003; 1 section, day, graduate, Spring 2005; 1 section, day, graduate, Spring 2007;
CVEN 302  Computer Application in Engineering and Construction (3-0), 1 section, day, undergraduate, Fall 2003; 1 section, day, undergraduate, Fall 2003; 1 section, day, undergraduate, Spring 2005; 1 section, day, undergraduate, Spring 2006; 1 section, day, undergraduate, Fall 2007; 1 section, day, undergraduate, Fall 2008;

Other Duties
Division Head, Coastal and Ocean Engineering, 2007-2011,
Chair, Tenure & Promotion Committee of Civil Engineering Dept, 2005-2007.
Member, Tenure & Promotion Committee of College of Engineering, 2011 - present

Professional Service:

Percent Time Available for Research or Scholarly Activities: 40%
Percent Time Committed to the Program: 100%
APPENDIX D Laboratory Descriptions
The Civil Engineering Structural and Materials Testing Laboratory primarily serves the Zachry Department of Civil Engineering, the Dwight Look College of Engineering, and the Texas Transportation Institute. The shop equipment, test equipment and instrumentation contained within the Civil Engineering High Bay Laboratory represent an investment of several million dollars and is one of the largest, most modern, and best-equipped facilities of its kind located in the South and Southwest. The laboratory contains machine/electronic shops and general purpose laboratories. The laboratory also contains a high-bay structural laboratory with a total floor area of 4000 sq.ft. (40 ft x 100 ft) and a ceiling height of 39 ft. The lab has a strong floor consisting of three 12 ft. deep box girders covered with a 2 ft thick heavily reinforced concrete slab for large scale testing. Tie-down holes throughout the floor are on 3 ft centers. Each tie-down hole can withstand a service load of 100 kips exerted either upward or downward. The area has temperature and humidity controls, and a 20 ton overhead crane.

The facility accommodates a variety of structural specimens, and has several computer-controlled dynamic or static (tension or compression) actuators: two each with capacities of 200 kips, 100 kips, 50 kips, and 20 kips. Three 600 kip static loading jacks are also available. The laboratory has two permanently installed high force test systems rated at 1500 kips and 500 kips (tension or compression), dynamic or static. A central hydraulic pump facility with two 70 gpm pumps and one 40 gpm pump services all test equipment in the laboratory at 3000 psi.

Individual automated consoles control all test actuators or machines as closed-loop systems. PC-based data acquisition systems with signal filtering and conditioning capabilities are used to record experimental data from extensive measurement devices, including a wide array of LVDTs, accelerometers and load cells (1,000+ channels). Data acquisition capabilities include automated strain gage bridge completion circuitry as well as analog inputs.

The following capabilities are available in the High Bay Structural and Materials Testing Laboratory:

- **High-Axial Capacity Test System**
  Fatigue rated to 1,500,000 pounds, specimens up to 14 feet in length
- **High-Axial Capacity Test System**
  Fatigue rated to 500,000 pounds, specimens up to 7 feet in length
- **Axial-Torsional Test System**
  Fatigue rated to 20,000 pound axial, 10,000 in-pound torque capacity
- **Axial-Precision Test System**
  Precisely aligned crosshead and grips produce superior results in compression testing
- **High-Rate Material Test System**
  Up to 1,000 inches/second displacement rates, 12,000 pound capacity
- **Axial Test System**
  High-frequency fatigue rated to 20,000 pounds
- **Structural Actuators**
  20 kip, 50 kip, 100 kip, 200 kip capacities, capability to push or pull in any direction using any combination of actuators and the lab strong floor
- **Pneumatic Loading Cylinders**
  Compressive loads up to 600,000 pounds

**Sensors Laboratory**

Director: Dr. Stefan Hurlebaus  
Location: ETB – Room 0003

Room 0003 is designed as a sensors instruction laboratory. The lab contains eight workstations. The lab is used to collect and process experimental data relevant to seismic, environmental, transportation, structural and hydraulic monitoring. The lab is generally adequate in terms of space. The equipment is
adequate for teaching fundamentals in sensors and data acquisition in civil engineering. Currently available laboratory equipment includes:

- Shake table
- FFT analyzer
- Oscilloscopes
- Impact hammer
- Accelerometers
- Force cell
- Charge amplifiers
- Arbitrary function generator
- RF amplifier
- Pulser-receiver
- Ultrasonic transducers
- Data acquisition systems
- Optical table
- Laser Doppler vibrometer
- Digital controller
- Hydraulic cylinders
- Hydraulic pumps
- Video camera
- Webcam

The existing equipment is adequate for existing graduate laboratory instruction.
**Geotechnical Laboratories**

The geotechnical laboratories include six different laboratory facilities:

- National Geotechnical Experimentation Site
- General Geotechnical Laboratory
- Geotechnical Erosion Laboratory
- Advanced Geotechnical Laboratory
- Stochastic Geomechanics Laboratory
- Unsaturated Soils Laboratory

The geotechnical laboratories are equipped with standard as well as advanced soil testing equipment. The following is a sample of the tests that can be performed in the geotechnical and associated laboratories at Texas A&M University:

- Atterberg Limits
- Grain Size – Sieve Analysis
- Grain Size – Hydrometer Analysis
- Laboratory Vane Shear Strength
- Consolidation Tests (load step)
- Hydraulic Conductivity Test
- Triaxial Test
- Direct Shear Test
- Soil Suction Test
- Cation Exchange Capacity
- Sodium Adsorption Ratio
- pH
- Electrical Conductivity
- Pressure Plate Apparatus
- Special Triaxial Test for Unsaturated Soils
- Resonant Column Test
- Cyclic Triaxial Test
- Rod Shear Test

The following is a sample of the tests that can be performed in the field with the in situ testing equipment in the Geotechnical group at Texas A&M University.

- Drilling Rig (Geology Department)
- Standard Penetration Test
- Shelby Tube Sampling
- Cone Penetrometer Test
- Pressuremeter Test (TEXAM, OYO, PENCELL)
- Selfboring Pressuremeter Test (TEXAM)
- Borehole Shear Test
- Crosshole Test
- Load Cells (100 tons T/C, 400 tons C, 1000 tons C)
- Settlement Probe
- WAK Test
- LATWAK Test
- Instrumented Hammer Test
- Geophone Recording
- Inclinometer Probe

**National Geotechnical Experimentation Site**

Director: Dr. Jean-Louis Briaud  
Location: Riverside Campus

The National Geotechnical Experimentation Site, located on Texas A&M University Riverside Campus, is available for large-scale experiments. At these unique sites, full scale walls, shallow and deep
foundations, culverts, anchors, pipes, and other structures have been instrumented, calibrated, built, and monitored over a period of 20 years. Also, at the Texas A&M University Riverside Campus are a machine shop, an electronic shop, and a heavy equipment school with dozers, scrapers, and the like. Capabilities at the National Geotechnical Experimentation Site include full-scale testing of

- Shallow Foundations
- Deep Foundations
- Retaining Walls
- In Situ Testing
- Buried Objects Detection
- Soil Anchors
- Terrorists and Embassies
- Embankments
- Culverts

**General Geotechnical Laboratory**
Director: Dr. Giovanna Biscontin
Location: CVLB 116

The General Geotechnical Laboratory includes standard geotechnical equipment, such as
- Standard soil classification equipment
- Drop cone for liquid limit
- Laboratory compaction test
- Torvane
- Direct shear
- Permeameters
- Incremental consolidation
- Triaxial (3 conventional)
- Laboratory vane shear

**Geotechnical - Erosion Laboratory**
Director: Dr. Jean-Louis Briaud
Location: CE Basement

The Geotechnical – Erosion Laboratory provides the following capabilities:
- Erosion Function Apparatus (EFA)
- Pocket Erodometer Test (PET)

**Advanced Geotechnical Laboratory**
Director: Dr. Giovanna Biscontin
Location: CVLB 116

The Advanced Geotechnical Laboratory includes the following equipment:
- Multi-directional simple shear
- Bender elements for triaxial equipment
- Stress-path triaxial
- Constant rate of strain consolidation
- Electrical conductivity
- PH testing, chemical test

**Stochastic Geomechanics Laboratory**
Director: Dr. Zenon Medina-Cetina
Location: Reed McDonald Building

The Stochastic Geomechanics Laboratory includes the following computational equipment:
- Linux Cluster Computer (Red Hat) for scientific computing implementations (stochastic mechanics)
• MAC Multi-Operating System Server (OS Unix, Virtual W7 and WS-2003) to run:
  ✓ PLAXIS
  ✓ GIS
  ✓ Auto-Cad
  ✓ PFC-3D
  ✓ Matlab
  ✓ Python
  ✓ Image-J

• Proprietary Software for:
  ✓ Uncertainty Quantification
  ✓ Probabilistic Solution of Inverse Problems (Probabilistic Back Analysis)
  ✓ Probabilistic Neural Networks
  ✓ Probabilistic Model Selection
  ✓ Probabilistic Forecasting
  ✓ Probabilistic Inverse Reliability Analysis
  ✓ Spatio-Temporal 3D-T Stochastic Modeling
  ✓ Spatio-Temporal Causal Risk Assessment (in combination with GIS)
  ✓ Stochastic Early Warning Systems
  ✓ Spatio-Temporal Digital Image Analysis for the Identification and Characterization of Crack Propagation
  ✓ Internal and External Research Collaboration and Dissemination (MAC OS Wiki Server)

In addition, experimental equipment includes:
  • Triaxial Loading Frame and Data Acquisition System
  • 2D High Definition HD Video-Imaging and Lighting System for the identification and characterization of local kinematic effects on the boundary of granular specimens
  • Sample Preparation Device for granular homogeneous specimens with varying densities

**Unsaturated Soils Laboratory**
Director: Dr. Marcelo Sanchez
Location: Reed McDonald Building

The Unsaturated Soils Laboratory includes the following modeling capabilities:
• Coupled thermo-hydro-mechanical and chemical computational code for the interpretation and back-analysis of experiments

In addition, experimental equipment includes:
• Psychrometers and pressure plates for unsaturated soil testing
• Suction controlled oedometer apparatus
• Chamber to study chemically treated soils
• Plates and other devices to study cracked soil
Transportation and Materials Division Laboratories

The Transportation and Materials Division in the Zachry Department of Civil Engineering interacts and shares resources with the Texas Transportation Institute (TTI). This cooperative relationship provides faculty and graduate students access to many state-of-the-art research facilities including the Translink ® Research Center, the Center for Transportation Safety (CTS), the Highway Materials Laboratory, and the Concrete Laboratory. In addition, the Advanced Characterization of Infrastructure Materials (ACIM) laboratory was established by both the Zachry Department of Civil Engineering and TTI. More information can be found about TTI research facilities at: http://tti.tamu.edu/facilities/, and some additional detailed information is provided in this section.

TTI Transportation Research Facilities

TTI transportation research facilities identified by research area include:
- **Crash Testing**
  - Proving Grounds Research Facility
- **Environmental**
  - TTI/TxDOT Hydraulics, Sedimentation, and Erosion Control Lab (HSECL)
- **Safety & Human Factors**
  - Arrington Research ViewPoint Eye Tracking System
  - Driving Simulator
  - Instrumented Vehicle
- **Traffic Operations**
  - Hardware-in-the-Loop (HitL) Simulation Testbed
  - Highway 6 Low-Volume Detector Testbed and Roadside Equipment Laboratory
  - I-35 Austin High-Volume Detector Testbed
  - National Geotechnical Experimentation Site
  - Signal Control Laboratory
  - TransLink® Gilchrist Laboratory
  - Wellborn Road Arterial Traffic Management/Railroad Monitoring Testbed

Translink ® Research Center

TransLink® is a national, multi-modal, multi-agency public/private program of research, development and professional education designed to advance surface transportation system management. The laboratories of the TransLink® Center develop concepts and systems to integrate information into existing and future transportation management systems.

The Center for Transportation Safety

The Center for Transportation Safety is home to special resources for researchers including a fully interactive driving simulator and pedestrian simulator. In addition, TTI has an experimental research and testing facility located 10 miles northwest of the Texas A&M University main campus. Transportation faculty and students also use "real world" existing roadways in College Station and Austin as an important laboratory for education and research using conventional and state-of-the-art field data collection devices such as traffic classifiers, GPS units, and retroreflectometers.

TTI Materials Research Facilities

TTI materials and pavements research facilities include:
- Asphalt Binder Laboratory
- Center for Asphalt & Materials Chemistry
- Concrete Laboratory
- Environmental Test Chambers
- Falling Weight Deflectometer (FWD)
- Geotechnical Laboratory
Ground Penetrating Radar (GPR)
Highway Materials Laboratory
Model and Machining Center
Ride/Rut Facility
Spectrum Analysis Laboratory
Superpave Testing Equipment

Highway Materials Laboratory

TTI has the most extensive Superpave asphalt binder and asphalt concrete mixture laboratory in the U.S. The Highway Materials laboratory has American Association of State Highway and Transport Officials (AASHTO) Materials Reference Library (AMRL) accreditation and contains an asphalt binder laboratory, multiple loading systems capable of conducting dynamic modulus ($E^*$) testing, two types of creep testers, Gilmore electro-hydraulic closed-loop testing systems three types of automated data acquisition systems, two integrated electro-hydraulic closed-loop testing systems, and several environmentally controlled test facilities.

The asphalt binder laboratory contains standard Superpave PG binder equipment, including a Dynamic Shear Rheometer (DSR) and a Bending Beam Rheometer (BBR) for characterizing the binder’s contribution to resistance to rutting, fatigue cracking, and low temperature cracking. This laboratory also includes the equipment for the tube suction test (a percometer device) and thermocouple psychrometers for measuring matric and total suction, respectively.

TTI also owns specialized mixture testing equipment, such as overlay testers, flexural fatigue testing machines, and scaled accelerated pavement testing (APT) devices including the Asphalt Pavement Analyzer (APA), the Hamburg Wheel-Tracking Test (HWTT), and the Model Mobile Load Simulator (MMLS3). Other available equipment includes the Moisture Induced Stress Tester (MIST) and a polishing machine. Also, resilient modulus ($M_r$) testing consisting of a top loading, closed loop, pneumatic testing machine capable of applying a haversine-shaped load pulse over a range of load durations, load levels, and rest periods is available. In addition, the laboratory recently acquired an Asphalt Mixture Performance Tester (AMPT) useful in conducting $E^*$ and Flow Number (FN) testing.

The laboratory also contains the CoreLok device for measuring bulk specific gravity of asphalt concrete mixtures and a linear kneading compactor for fabricating beam specimens. Other available compaction devices include three gyratory molding machines and a slab compactor. This laboratory is capable of conducting repeated loading and strength tests in flexure, indirect tension (IDT), semi-circular bending (SCB), or uniaxial modes or with scaled APT devices.

Complete non-destructive pavement testing capabilities are also available through the partnership with TTI. These capabilities include ground penetrating radar (GPR), falling weight deflectometer (FWD) calibration facilities, and specialized pavement instrumentation including the Dynamic Friction Tester (DFT). TTI provides a mobile laboratory equipped with a Superpave Gyratory Compactor (SGC), an oven, and a scale to facilitate fabrication of plant-mixed, laboratory-compacted (PMLC) specimens. Recently, TTI has acquired a Wirtgen WLB 10 S laboratory-scale foamed bitumen plant for production of Warm Mix Asphalt (WMA). The Texas A&M division of the International Center for Aggregates Research (ICAR) also operates from TTI. The Center’s purpose is to conduct research and other activities to enhance effective and efficient use of aggregate resources.

Concrete Laboratory

The Concrete Laboratory tests and evaluates aggregates, cements, and fresh and hardened concrete. The High-Bay Structural and Materials Laboratory in the Zachry Department of Civil Engineering contains a large structural test laboratory, a materials testing laboratory that includes MTS and data acquisition systems, several machine/electronic shops and general purpose laboratories.
Advanced Characterization of Infrastructure Materials (ACIM) Laboratory

The Advanced Characterization of Infrastructure Materials (ACIM) laboratory is a state-of-the-art facility for advanced materials characterization, nondestructive evaluation, and computational modeling of infrastructure materials. This facility provides tools that match or even set the current trend in industrial and academic research in the field of infrastructure materials. In several cases, either the test equipment or test protocol for using the equipment has been developed in-house by the cooperative Materials research group. The ACIM laboratory includes equipment and analysis tools for three-dimensional nondestructive imaging of material microstructure, mineralogical analysis of aggregates, quantitative image analysis of aggregate shape characteristics, measuring surface free energy of asphalt binders and aggregates, characterization of adhesion between various materials, and computational modeling of various material and pavement systems using micro-structural analysis and continuum mechanics. The list of equipment at ACIM laboratory includes: X-ray Computed Tomography, Dynamic Mechanical Analyzer (DMA), Aggregate Imaging System (AIMS), Scanning Electron Microscope, Differential Scanning, Calorimeter/Thermogravimetric Analyzer, Microcalorimeter, Wilhelmy Plate Device, Sessile Drop Device, Universal Sorption Device, and X-ray Diffracti

CVLB 109 Fluid Dynamics Laboratory

The fluid dynamics laboratory in CVLB 109 houses experiments for both education and research. At the graduate level, this is the primary teaching laboratory for the CVEN 679 Theory of Fluid Mechanics Models course. The facilities for this course and for research consist of a 115 foot long wave flume with controllable recirculation capability, other smaller tanks for hydraulic testing, several lasers, wave gauges, pressure sensors, and cameras for both in situ and non-contact measurement of fluid velocity, visualization of fluid flow, and measurement of a suite of scalar properties. Funding for research is from a broad spectrum of sources, including industry, the National Science Foundation, the Texas Sea Grant program and Texas Department of Transportation, among others. Recent project studied wave impacts on offshore structures and generated green water, containment domes for subsea oil-well blowouts, and erosion studies of sediment samples in a recirculation loop.
**Hydromechanics Laboratory**

Facilities in the hydromechanics laboratory primarily support the teaching mission, housing graduate student offices, a graduate student computer lab, and experimental facilities for the undergraduate program. The laboratory is also home to the dredge loop, a major facility of the Center for Dredging Studies and a facility heavily utilized in their annual Dredging Engineering Short Course which hosts industry professionals and program students each January for a week-long intensive course.

**Offshore Technology Research Center**

The Offshore Technology Research Center is a premier deepwater wave basin that developed through a National Science Foundation Engineering Research Center grant. The basin primarily supports technology development in the offshore arena, particularly the oil and gas industry, but also more recently in renewable energy (offshore wind) and wave energy conversion. The primary facility is a wave basin 150 feet long, 100 feet wide and nominally 19 feet deep with a central deep pit of cross section 30 by 15 feet and extending to a total depth of 55 feet. The basin is driven by a fully programmable directional hinge-flap wave maker with 48 individual wave boards. A variable-depth cross-flow can also be generated through a multi-port jet manifold system of 9 manifolds at different depths, each containing 33 nozzles. The facility has fully-integrated data acquisition and specializes in measurements of vessel/object motion, loads, and wave interaction. Funding is also very diverse, with greater weighting from an industry consortium of sponsors balanced out by project from the new Bureau of Ocean Energy Management (formerly the Minerals Management Service) and other federal sponsors.

**Haynes Coastal Engineering Laboratory**

The Haynes Coastal Engineering Laboratory houses two major coastal engineering facilities: a shallow water three-dimensional wave basin and a two-dimensional tow-dredge tank. The three-dimensional basin is 120 feet long, 75 feet wide, and supports water depths to 4 feet deep. It is capable of recirculation flows up to 35,000 gallons per minute and is outfitted with a 48-paddle piston-type directional wave maker. The facility is well supported by industry and limited federal funding, including Texas Sea Grant. Recent projects investigated breakwater designs, design of bridge decks under hurricane wave loadings, wave transformation through segmented wetlands, and full site designs for artificial islands. The two-dimensional tow-dredge tank is 150 feet long, 12 feet wide and 10 feet deep and capable of the same flow capacity as the three-dimensional basin. A tow-dredge carriage mounted above the tank is fully wirelessly programmable with top speeds of 9 feet per second. The basin also has a central pit 25 feet long, 12 feet wide and 5 feet deep to support sediments used for dredging and erosion studies. The facility receives funding primarily from industry, the U.S. Army Corps of Engineers, Sea Grant, and the Texas Department of Transportation and has conducted innovative research on dredging technology, river meandering, and scour at bridge piers, among others.
Environmental Control Technology Lab – Chemical Processes
(WERC 120, 121, 141C)

These laboratories support research that develops improved methods for treating water, wastewater and hazardous wastes. The treatment technologies being studied depend primarily on chemical processes to bring about the desired treatment. Examples include advanced reduction processes to chemically degrade oxidized contaminants such as halogenated organics, perchlorate, bromate and chlorate to less toxic materials. Other treatment technologies that are being studied include nanoscale reactive adsorbents that remove contaminant from solution by adsorption and then stabilize the residues by surface reactions. Ferrous sulfide and pyrite are being investigated as reactive adsorbents for contaminants such as mercury, arsenic and selenium. Other technologies that have been investigated include precipitation processes for removal of scale forming compounds that limit efficiencies of desalination processes and recycled cooling systems; reductive dehalogenation processes using compounds containing ferrous iron; and removal of selenium compounds from refinery wastewaters. Equipment in these laboratories includes anaerobic hoods, gas chromatographs, UV-visible spectrophotometers, pH/selective electrode meters, balances, shakers, and ovens. Current and recent funding for research in these laboratories has been received from the Department of Energy, Qatar National Research Fund, and the Texas Hazardous Waste Research Center.

Environmental Risk Management Laboratories
(WERC 118, 119 & 120)

Environmental risk management involves reducing human and ecological exposures to known or potential environmental toxins through source characterization, source reduction and/or engineered solutions. Research occurring in the Environmental Risk Management laboratories currently involves contaminant source characterization, materials characterization, and developing treatment systems to remove contaminants (such as pharmaceuticals, endocrine disrupting chemicals, hydrocarbons, and heavy metals) from water, wastewater, soils, sediments, biomass and commercially available products. The laboratories contain instrumentation for basic water quality measurements (TOC, COD, IC, spectrophotometer, and water quality probes); sample preparation (microcentrifuges, extraction systems, filtration systems); field sampling equipment (2 geopumps, ISCO autosampler); laboratory apparatuses for advanced oxidation studies (batch, semi-batch, and continuous flow reactors, ozone generator, dosing pumps), and a gas chromatograph – mass spectrometer. Support for the laboratories has come from projects with EPA, FHWA, NASA, TTI and SAIC.

Environmental Biotechnology Laboratory
(CE131, 133)

Environmental Biotechnology Laboratory supports the application and development of biotechnologies to address various environmental challenges in water, soils, and energy. The research activities in this laboratory include: (i) biodegradation of emerging contaminants (like endocrine endocrine-disrupting chemicals, poly- and per-fluorinated compounds (PFCs), and explosives); (ii) bioremediation of persistent organics (like chlorinated solvents, PAHs, and petroleum hydrocarbons); (iii) stormwater runoff management, focusing on the treatment and monitoring of water quality; and (iv) bioenergy production. The instruments in the laboratory include gas chromatograph-mass spectrometers (GC-MS), pH meters, and specific ion meters. Culturing equipment includes a bioflow hood, fume hoods, BioRad iQ5 real-time PCR system, cryogenic freezer, bench top centrifuges, UV-Vis spectrophotometers, and incubators. This laboratory has received funding from the National Science Foundation, Department of Defense, Texas Department of Transportation, and the Texas Hazardous Waste Research Center.
**West Campus Watershed Outdoor Laboratory**

The West Campus Watershed is located on the rapidly developing portion of campus west of Wellborn Road and includes buildings such as the Bush Library, TTI Headquarters, and the Offshore Technology Research Center. The department currently has several monitoring stations in place; the data produced are used as a teaching tool in upper-level undergraduate classes. This outdoor laboratory is used as a teaching tool for upper-level and graduate classes in Water Resources Engineering, and as a research tool for studying the hydrological impacts of rapid urbanization. Existing equipment includes: six free-standing rain gauges; three hydrology stations, originally funded through IEF, each with datalogger and multiplexer, solar power system, rain gauge, relative humidity and temperature sensor, and transpiration sensors; and one “Flo-Tote” culvert-based flow sensor.

![Map of the watershed (left) and hydrology measurement station (right).](image)

**Ecohydrology Instrumentation Laboratory**

Using a variety of measurement and modeling tools, processes such as evapotranspiration and groundwater recharge in both natural and engineered ecosystems are studied. While most work is conducted at outdoor study sites, this laboratory facility is used to prepare for our field work and to centralize the research group’s computing and data storage. This laboratory is used for constructing and deploying field equipment to project sites, and conducting simulations on centralized computer workstations. Existing equipment includes: computer workstation with ArcInfo, ArcMap, Matlab, MS Office, Ubuntu VM software; field laptop with software for datalogger interface; Campbell Scientific CR1000X dataloggers and AM25-T multiplexers; weather sensing equipment: tipping bucket rain gauges,Temp/RH sensors; Decagon ECH2O-10HS in-situ soil moisture sensors; PMS plant water status console and Decagon SC-1 porometer; tools and materials to construct sap flow sensors; soil sampler and texture analysis equipment; and increment borers and diameter tapes for tree characterization.

![Testing a sap-flow sensor (left) and measurement of transpiration from a bioretention cell at the Urban Solutions Center in Dallas (right).](image)
Soltis Center, Costa Rica

The Soltis Center is located in Costa Rica (http://costaricareu.tamu.edu/). It hosts the NSF sponsored summer program Research Experience for Undergraduates: Ecohydrology of a Tropical Montane Cloud Forest. The well-developed field facility includes housing, labs, and classrooms at the edge of 250 acres of primary and second growth tropical forests. This facility is expected to be used as a research facility to study the hydrological effects of anthropogenic changes in wet, tropical systems.
APPENDIX E Personnel and Students
### Table E-1. Personnel and Students Year: Fall 2011
Zachry Department of Civil Engineering

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>FT</th>
<th>PT</th>
<th>FTE</th>
<th>RATIO TO FACULTY¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative²</td>
<td>13</td>
<td></td>
<td>5.85</td>
<td></td>
</tr>
<tr>
<td>Faculty (tenure-track)</td>
<td>47</td>
<td></td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>Other Faculty (excluding student Assistants)</td>
<td>1</td>
<td>6</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Student Teaching Assistants</td>
<td>33</td>
<td></td>
<td>33</td>
<td>0.6</td>
</tr>
<tr>
<td>Student Research Assistants</td>
<td>72</td>
<td></td>
<td>72</td>
<td>1.3</td>
</tr>
<tr>
<td>Student Research Assistants (TTI) (71 GRA’s, 9 Grad Student Workers)</td>
<td>80</td>
<td></td>
<td>80</td>
<td>1.4</td>
</tr>
<tr>
<td>Technicians/Specialists</td>
<td>8</td>
<td></td>
<td>8</td>
<td>0.1</td>
</tr>
<tr>
<td>Office/Clerical Employees</td>
<td>16</td>
<td></td>
<td>16</td>
<td>0.3</td>
</tr>
<tr>
<td>Others (Graders) &amp; Student Workers (TTI)</td>
<td>27</td>
<td></td>
<td>6.75</td>
<td>0.1</td>
</tr>
<tr>
<td>Undergraduate Student enrollment</td>
<td>1,033</td>
<td></td>
<td>1,033</td>
<td>18.2</td>
</tr>
<tr>
<td>Graduate Student enrollment</td>
<td>407</td>
<td></td>
<td>407</td>
<td>7.2</td>
</tr>
<tr>
<td>Total Student Enrollment</td>
<td>1,439</td>
<td></td>
<td>1,439</td>
<td>25.3</td>
</tr>
</tbody>
</table>

¹ Divide FTE in each category by total FTE Faculty. Do not include administrative FTE.
² Persons holding joint administrative/faculty positions or other combined assignments should be allocated to each category according to the fraction of the appointment assigned to that category. – MKB (100-0), RA (80-20), RJ (80-20), EM (100-0), JMN (80-20), RES (50-50), MBH (25-75), FO (25-75), AEM (25-75), SS (25-75), MB (25-75), TK(50-50), LL (50-50), Left (Gardoni, Head, Irish, Lynett, & Zechman)
Retired (Maxwell, Roesset, Roeschke)
Gains (Park, Banks)
Table E-2. Personnel and Students Year: Fall 2010
Zachry Department of Civil Engineering

<table>
<thead>
<tr>
<th>HEAD COUNT**</th>
<th>FTE</th>
<th>RATIO TO FACULTY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FT</strong></td>
<td><strong>PT</strong></td>
<td></td>
</tr>
<tr>
<td>Administrative¹</td>
<td>16</td>
<td>8.75</td>
</tr>
<tr>
<td>Faculty (tenure-track)</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Other Faculty (excluding student Assistants)</td>
<td>1  4  3</td>
<td></td>
</tr>
<tr>
<td>Undergraduate Student enrollment</td>
<td>1110</td>
<td>1110 18.0</td>
</tr>
<tr>
<td>Graduate Student enrollment</td>
<td>419</td>
<td>419  6.8</td>
</tr>
<tr>
<td>Total Student Enrollment</td>
<td>1529</td>
<td>1529 24.8</td>
</tr>
</tbody>
</table>

¹ Persons holding joint administrative/faculty positions or other combined assignments should be allocated to each category according to the fraction of the appointment assigned to that category. – RA (50-50), RJ (75-25), EM (100-0), DM (50-50), JMN (75-25), RES (50-50), JB (50-50), JR (20-75), SS (25-75), JM (25-75), FO (25-75), GH (25-75), JZ (25-75), MB (25-75), TK(50-50), LL (50-50 (Left Rosowsky, Trejo)
Retired (Edge, Hann, Murf)
Gains (Arson)
Table E-3. Personnel and Students Year: Fall 2009
Zachry Department of Civil Engineering

<table>
<thead>
<tr>
<th>Head Count**</th>
<th>FTE</th>
<th>Ratio to Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Administrative(^1)</strong></td>
<td>16</td>
<td>8.2</td>
</tr>
<tr>
<td>Faculty (tenure-track)</td>
<td>52</td>
<td>0</td>
</tr>
<tr>
<td>Other Faculty (excluding student Assistants)</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Undergraduate Student enrollment</td>
<td>1126</td>
<td>1126</td>
</tr>
<tr>
<td>Graduate Student enrollment</td>
<td>432</td>
<td>432</td>
</tr>
<tr>
<td>Total Student Enrollment</td>
<td>1558</td>
<td>1558</td>
</tr>
</tbody>
</table>

\(^1\) Persons holding joint administrative/faculty positions or other combined assignments should be allocated to each category according to the fraction of the appointment assigned to that category. – JMN

Left (none)
Retired (none)
Gained (none)
### Table E-4. Personnel and Students Year: Fall 2008
Zachry Department of Civil Engineering

<table>
<thead>
<tr>
<th></th>
<th>FT</th>
<th>PT</th>
<th>FTE</th>
<th>RATIO TO FACULTY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Administrative</strong>¹</td>
<td>14</td>
<td>14</td>
<td>6.95</td>
<td></td>
</tr>
<tr>
<td><strong>Faculty (tenure-track)</strong></td>
<td>52</td>
<td>52</td>
<td>52</td>
<td></td>
</tr>
<tr>
<td><strong>Other Faculty (excluding student Assistants)</strong></td>
<td>2</td>
<td>7</td>
<td>5.5</td>
<td></td>
</tr>
<tr>
<td><strong>Undergraduate Student enrollment</strong></td>
<td>1128</td>
<td>1128</td>
<td>17.5</td>
<td></td>
</tr>
<tr>
<td><strong>Graduate Student enrollment</strong></td>
<td>398</td>
<td>398</td>
<td>6.2</td>
<td></td>
</tr>
<tr>
<td><strong>Total Student Enrollment</strong></td>
<td>1526</td>
<td>1526</td>
<td>23.7</td>
<td></td>
</tr>
</tbody>
</table>

¹ Persons holding joint administrative/faculty positions or other combined assignments should be allocated to each category according to the fraction of the appointment assigned to that category. – JMN (80-20), RJ (50-50), EM (100-0), DM (50-50), DR (100-0), RES (50-50), JR (50-50), RA (25-75), JB (25-75), GH (25-75), BE (25-75), MBH (25-75), TK (50-50), LL (50-50)
Left (Guikema)
Retired (Bruner)
Gained (Gharaibeh, Medina-Cetina, Walesky)
Table E-5. Personnel and Students Year: Fall 2007
Zachry Department of Civil Engineering

<table>
<thead>
<tr>
<th>HEAD COUNT**</th>
<th>FTE</th>
<th>RATIO TO FACULTY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FT</td>
<td>PT</td>
</tr>
<tr>
<td>Administrative(^1)</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Faculty (tenure-track)</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>Other Faculty (excluding student Assistants)</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Undergraduate Student enrollment</td>
<td>1109</td>
<td></td>
</tr>
<tr>
<td>Graduate Student enrollment</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td>Total Student Enrollment</td>
<td>1459</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) Persons holding joint administrative/faculty positions or other combined assignments should be allocated to each category according to the fraction of the appointment assigned to that category. – JMN (80-20), RJ (50-50), EM (50-50), DM (50-50), DR (100-0), RES (50-50), RA (50-50), JB (25-75), JR (50-50), JM (25-75), FO (25-75), GH (25-75), JZ (25-75), TC (25-75), TK (50-50), LL (50-50), Left (Bonner) Retired (Corapciaglu) Gained (Abu Al-Rub, Boulanger, Falzarano, Hite, Mander Ying, Zechman)
APPENDIX F  Exit Survey Form
Zachry Department of Civil Engineering

Name: ____________________________________

Directory Information:
Degree received: ME MS PhD DEng

Term of graduation: ________________________

Specialty:
- Coastal and Ocean
- Construction Management
- Environmental
- Geotech
- Materials
- Public Works and Infrastructure Management
- Structural
- Transportation
- Water Resources

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”

Survey of Graduating Graduate Students

Today’s Date: ____________________________

Confidential Information

Now that you have graduated, you will:

☐ Continue on for another degree.
  o Which University? ________________________________
  o What Degree? ________________________________

☐ Take a faculty position.
  o Which University? ________________________________

☐ Research at a national lab or research center.
  o Which one? ________________________________

☐ Take a post-doc position.
  o Which University? ________________________________

☐ Working somewhere other than one of the above.

☐ Undecided.

Starting annual salary $ __________

Number of job offers received: _______

Did you take the ELPE? ☐ Yes ☐ No
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 to:
Dr. Mark Burris, Director of Graduate Programs
CE Building Room 106
Zachry Department of Civil Engineering
Texas A & M University
College Station, TX 77843-3136

Continued on reverse side →
Please tell us how well you think the graduate program at Texas A&M has prepared you in the following areas.

How do you feel the program prepared you for your goals?  
1 2 3 4 5

Did you get a good breadth of education? 1 2 3 4 5

How would you rate the work environment? 1 2 3 4 5

How would you rate the social environment? 1 2 3 4 5

How would you rate the interaction with the faculty? 1 2 3 4 5

How would you rate the interaction with the other students? 1 2 3 4 5

How would you rate the advising? 1 2 3 4 5

How would you rate the difficulty/fairness of the degree requirements/exams? 1 2 3 4 5

Are you primarily interested in a professional or an academic career? (circle your choice)

If you had to make the decision of going to graduate school again would you decide to go? Yes or No  
Would you come again to TAMU? Yes or No (circle your choices)

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 who you believe did an exceptional job in preparing you for your civil engineering career?

_____________________________________________________________________________________________

_____________________________________________________________________________________________
APPENDIX G 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
Title – 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
Engineering design
General education (Matlab instruction, written communication)

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

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.


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
CVEN 613
Title – Micromechanics of Civil Engineering Materials

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: The course introduces students to:
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 and 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: Outline of course by listing of 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

**Graduate 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.

Prerequisites: 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:
Outline of course by listing of 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

**Graduate Level:** Masters & PhD

**Schedule:** Once every three regular semester
### 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

**Textbook:**

**Course Learning Outcomes:**
This class presents the fundamental knowledge and theories of uninterrupted 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; Queuing 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
Title – 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 understand 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 cover 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
CVEN 628
Title – Advanced Hydraulic Engineering

Description: 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.

Prerequisites: CVEN 339 or approval of instructor


Course Learning Outcomes: Proficiency in hydraulic design and analysis of natural streams, constructed channels, and hydraulic structures.

Topics Covered:
• Fundamentals of Fluid Dynamics
• Uniform Flow Principles
• Energy and Momentum Principles
• Gradually-Varied Flow
• Unsteady Open-Channel Flow
• Design of Channels
• Bridge and Culvert Hydraulics
• Hydraulics of Dams and Outlet Structures

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 632
Title – Transportation Engineering: Economics

Description: 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

Prerequisites: CVEN 672 or approval of instructor

Textbook: None – professor will supply reading materials.

Course Learning Outcomes:
- Students should be able to consider multiple (hopefully all) solutions to a transportation engineering problem and the potential impacts (costs and benefits) of each solution.
- Students should be able to use engineering economics to calculate the benefits (derived from the utility of the good or service at a demand level estimated by the student), the costs of providing the good or service, and the appropriate pricing policy.
- Finally, students should be able to write solid case for proceeding with the preferred alternative.

Topics Covered:
- Engineering economics
- Utility of public works
- Financing and funding of public works
- Benefit cost analysis, equity analysis
- Demand estimation
- Cost functions/allocation
- Value of time
- Pricing
- Financial analysis of public companies

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

Professional Contribution: Engineering science

Graduate Level: Masters & PhD

Schedule: One semester (generally spring) per calendar year
CVEN 633
Title – Advanced Mechanics of Materials

Description: 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.

Prerequisites: MATH 308 or approval of instructor


Course Learning Outcomes: The main objectives of this course are:
(1) to provide the student with a mathematical foundation for modeling the thermo-mechanical response of solid bodies to forces,
(2) develop the equations governing the behavior of linearly elastic solids and structural components,
(3) develop and apply common “mechanics of materials” solutions encountered in practice.

Topics Covered:
1. Concept of stress
2. Stress equilibrium equations
3. Stress transformation
4. Principle stresses
5. Displacements and strain-displacement relations
6. Stress and strain relations
7. Equations of elasticity, plane stress, plane strain, Airy stress functions
8. Equations of elasticity in other coordinate systems
9. Stress concentrations
10. Failure analysis and plasticity theories
11. Plastic behavior of materials
12. Torsion of non-circular bars
13. Bending of beams
14. Shear Center
15. Curved beams
16. Thick-walled cylinders
17. Beams on elastic foundations
18. Analysis of plates
19. Numerical methods

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

Professional Contribution: Engineering science

Graduate Level: Masters

Schedule: One semester per calendar year
CVEN 635
Title – Street and Highway Design

Description: 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.

Prerequisites: CVEN 456 or equivalent


Course Learning Outcomes: Students should be able to apply advanced engineering bases for designing rural and urban highways and understand the safety and operational effects of various highway design elements.

Topics Covered:
1. Introduction/recent development in highway design research (1 week)
2. Review: Design control and basic design elements (1 week)
3. Flexibility in highway design (1 week)
4. Interchange design (3 weeks)
5. Designing for older drivers (1 week)
6. Designing for pedestrians and cyclists (1 week)
7. 3-D Application in geometric design (1 week)
8. Design and operational speeds (1 week)
9. Safety audits in highway design (1 week)
10. Software tools in highway design (1 week)
11. Transportation planning and design (1 week)
12. Research seminar by graduate students (1 week)

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

Professional Contribution:
Mathematics and basic sciences
Engineering science
Engineering design
General education (Civil 3D)
Major Design experience (Term Project)

Graduate Level: Masters & PhD

Schedule: One semester per calendar year
CVEN 637
Title- Rigid Pavement Analysis and Design

Description: 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.

Prerequisites: CVEN 418, CVEN 342


Course Learning Outcomes: The primary learning objectives for this course is an in depth understanding of concrete pavement behavior and design in addition to advanced concepts and approaches to the design of a concrete pavement system. The course guides the student through a number of key topics building a sound foundation upon which to apply the fundamentals of concrete slab-on-grade behavior to design methodology and performance characterization. Key aspects of concrete pavement design are discussed in terms of both load and climatic related performance effects.

Topics Covered:
1. Concrete pavement types
2. Concrete pavement performance
3. Concrete pavement construction
4. History of concrete pavement design
5. Medium thick plate theory
6. Subgrade theory
7. Load equivalencies
8. Chemical admixtures
9. Composite slab behavior
10. Environmental stresses
11. Load transfer mechanisms
12. Slab jointing
13. Joint behavior
14. Performance modeling
15. Design reliability
16. CRC pavement design concepts
17. Pavement rehabilitation

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

Professional Contribution: Engineering design

Graduate Level: Masters & PhD

Schedule: Once every three regular semesters
CVEN 638
Title – Computer Integrated Construction Engineering Systems

Description: 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.

Prerequisites: CVEN 349


Course Learning Outcomes:
• Identify and understand the distinguishing elements of computer integrated construction, the value produced, and the business models that support it.
• Understand why and how traditional design/construction processes can be transformed to integrated processes.
• Know the methods and processes of computer modeling as applied to civil engineering and building systems.
• Learn building information modeling (BIM) from a technology and design and building practice perspective.
• Understand the theory and practice aspects of the adoption of advanced technologies in the building industry, with special focus on IT.
• Become familiar with current and new computer and information technologies, applications, and techniques for the construction industry.
• Understand the various entities involved in promoting advancements in the capabilities of the building industry related to information, communication, sensing and automation technologies and improved work processes.
• Understand industry accepted project management procedures and techniques as applied to collaborative project management systems.
• Become familiar with construction industry product and project data standards.
• Obtain first-hand experience with computer integrated construction using software packages and interaction with construction industry professionals.

Topics Covered:
• Computer integrated construction defined
• Modeling and simulation/ Convergence and standards
• Integration of engineering, design, and construction
• Whole building design/Intelligent buildings
• Virtual design and construction
• Visualization and video imaging technologies
• Collaborative project management systems
• Building Information Modeling (BIM) construction industry applications
• Hand held and wearable computers, RFID
• Digital city/Google Earth/SketchUp & 3D
• Decision support systems
• Product and project data standards
• Equipment applications
• Research questions and methods
• Next generation construction IT and computers
Meeting Time: Two lecture sessions each week, 75 minutes each

Professional Contribution:
- Engineering science
- Engineering design
- General education (Autodesk, other construction-related software instruction)
- Design experience

Graduate Level: Masters & PhD

Schedule: One semester per calendar year
CVEN 639
Title - Methods Improvement for Construction Engineers

Description: 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 473 or approval of instructor. Cross-listed with ISEN 639.

Textbook: No Textbook required; lecture notes prepared and handed out by instructor

Course Learning Outcomes: This course is intended to provide students with the ability to:

- Model elementary construction project operations.
- Develop linear multivariate regression models from project data.
- Develop stochastic (Monte Carlo) models for project simulation.
- Use models to compare alternate methods.
- Develop conclusions and decisions based on these models.
- Distinguish trends from variability in the presence of uncertain and inadequate data.
- Forecast activity, job, and project completion times and costs based on job progress to date.
- Engage in project controls for on-going projects
- Understand construction project dynamics and the effects of feedback, recycling, and rework.

Topics Covered: Statistical Process Control and Six-Sigma
- Linear multivariate regression analysis
- Monte Carlo simulation methods
- Bayesian inference
- Project learning curves

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

Professional Contribution: Mathematical statistics
Construction engineering and management
Engineering design and statistical Quality Control

Graduate Level: Masters & PhD

Schedule: One semester per calendar year
CVEN 641
Title – Construction Engineering Systems

Description: 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.

Prerequisites: CVEN 473 or approval of instructor


Course Learning Outcomes: Course learning outcomes are outlined below:
1. Student can describe the importance of the project management process in terms of managing money and time.
2. Student can describe the project management functions required to manage money and time.
3. Student can identify when to use the appropriate techniques and tools when managing money and time.
4. Student is capable of using spreadsheets, @Risk, and Primavera to support project management.
5. Student can perform as an effective team member in preparing project management deliverables for a project.
6. Student can write technical reports and present results in terms of typical project deliverables required when managing money and time for a project.
7. Student can perform as a Project Controls Engineering in practice.

Topics Covered: Lecture topics covered:
1. Relationship between Engineering, Procurement and Construction and the Project Management Process
2. Project versus Company Organization Structures
3. Project Initiation and Planning – Conceptual Estimating/Data Utilization and Master Level Scheduling
6. Advanced Project Scheduling/Cost Control – Scheduling techniques, resource constraints, logic analysis, and cost trending and change order analysis
7. Cost/Scheduling Control Issues – Productivity/Wage Rate Analysis, Manpower/Progress Planning, Short Interval Scheduling
8. Cost/Scheduling Control Issues – Progress/Performance Analysis, Forecasting, Integration Concepts

Laboratory topics: Two hour laboratory where students work in teams on the project cast study to apply topics covered in the lecture, and to use various software for project estimating, cost control, scheduling, scheduling control, and risk analysis.

Meeting Time: Three lecture sessions each week, 50 minutes each, and one laboratory session each week, 110 minutes
<table>
<thead>
<tr>
<th>Professional Contribution:</th>
<th>Major Design Experience and Engineering Design</th>
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<tbody>
<tr>
<td>Graduate Level:</td>
<td>Master of Science or Master of Engineering (PhD students can take this course.)</td>
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<tr>
<td>Schedule:</td>
<td>One semester per calendar year</td>
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# CVEN 643

**Title – Advanced Construction Methods**

**Description:** An overview of materials used in the construction industry; methods used to construct facilities with these materials; practices that affect production during construction and serviceability, as well as the lifecycle of these facilities.

**Prerequisites:** Graduate Classification and CVEN 349, 405, 473 or equivalents or approval by the instructor

**Textbook:**

**Course Learning Outcomes:**

1. Develop an understanding of advanced construction methods and quality needs for facilities constructed with concrete (emphasis), steel, and composite materials.

2. Develop the skill set to quantify value by constructing with higher quality materials.

3. Develop an advanced understanding of materials and processes used to make concrete (emphasis), steel, and composites.

4. Understand engineering and management practices that affect the serviceability of construction materials.

5. Understand the methods and procedures for analyzing the life-cycle cost and service-life prediction of construction facilities.

**Topics Covered:**

9. Construction methods and materials
10. The need for quality in construction
11. Fundamentals of concrete
12. Fresh and hardened concrete characteristics
13. Advanced construction methods and quality for steel, and composite materials
14. Batching, mixing, transporting, placing, finishing, and curing concrete
15. Concrete construction methods for hot and cold weather
16. Construction methods for steel and composite materials
17. Formwork design
18. Quality issues, changes, and repairs
19. Service-life predicting
20. Life-cycle costing

**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:** Less often than every two calendar years
CVEN 644
Title – Project Risk Management

Description: 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; STAT 211, 601 or equivalent

Textbook: No Textbook required; lecture notes are prepared and distributed by instructor

Course Learning Outcomes: This course is intended to provide students with the ability to:

• Appreciate the impact of uncertainty on projects and project management.
• Identify sources of uncertainty and risks related to projects.
• Infer probability distributions and assess risks quantitatively.
• Evaluate the effects of perceptions of risk on engineering decisions.
• Understand project dynamics and the effects of recycling and rework.
• Prepare qualitative and quantitative risk assessments.
• Prepare project risk management plans and execute these plans as required.
• Apply risk management principles to future project activities.

Topics Covered:

• Principles of risk management
• Project and engineering economics
• Probability theory and applications in engineering and construction
• Bayesian inference
• Monte Carlo simulation

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

Professional Contribution: Mathematics
Probability theory
Engineering design
Project management

Graduate Level: Masters & PhD

Schedule: One semester per calendar year
CVEN 645
Title – Geotechnical Site Investigation

Description: 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

Textbook: There is no textbook for this course. Notes from instructor and handouts.

Course Learning Outcomes: At the end of this course the students, if they receive a good grade in this course, will be able to
1. know what a geotechnical site investigation is and how to organize it
2. know about common drilling and sampling techniques available and how to choose the proper one for a given soil
3. know about common in situ testing techniques available and how to chose the most appropriate one for a given geotechnical problem.

Topics Covered:
- Overview
- Planning a Site Investigation
- Drilling Rigs
- Drilling Boreholes
- Sampling
- Standard Penetration Test
- Cone Penetrometer Test
- Pressuremeter Test
- Dilatometer Test, Step Blade Test
- Vane Test, Mini vane, Pocket Penetrometer
- Bore Hole Shear Test
- Offshore Investigations
- Permeability Tests
- Crosshole, SASW
- Resistivity Test
- Falling Weight Test, Deflectometer test
- NDT Tests of Foundations
- Instrumentation Equipment
- Writing the report

Meeting Time: Two lecture sessions each week, 50 minutes each plus three field trips

Professional Contribution: Engineering design

Graduate Level: Masters & PhD

Schedule: Once every two calendar years
CVEN 646
Title – Foundations on Expansive Soils

Description: 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


Course Learning Outcomes: Upon completion of this course the student will know the fundamentals of the science and mechanics of unsaturated soil mechanics and apply this knowledge in the engineering design of several foundation elements. The student will be able to apply the scientific knowledge to the prediction of the flow of water in unsaturated soils, and the consequent heave and shrinkage of these soils. In class work exercises, the students will write their own Excel spreadsheets to perform these calculations. In addition, the student will complete exercises to design slabs and pavements on expansive soils and to design slopes, drilled piers and retaining walls in these soils.

Topics Covered: Outline of course by listing of topics covered:

- Scope of expansive soils problems and their engineering solutions
- Crack fabric diagrams of expansive soils in the field
- Continuum theory of mixtures
- Stress states in unsaturated soils
- Definition of Soil Suction and Gibbs Free Energy
- Measurement of soil suction
- Unsaturated permeability
- Shear strength of unsaturated soils
- Plasticity yield criteria in unsaturated soils
- Unsaturated hydraulic conductivity; effect of dissolved salts
- Application to landfill liner design
- Volume change in unsaturated soils
- Horizontal and vertical steady state flow in expansive soils
- Mitchell’s formulation of unsaturated transient flow
- Solution of the partial differential equations of transient flow using Laplace Transforms
- Use of transient solutions in laboratory and field
- Steady state envelopes of suction with depth
- Depth of the moisture active zone
- Depth of the movement active zone
- Design of stiffened slabs on expansive soils
- Principles of structural design using post-tensioning
- Risk formulation of slab design
- Design of pavements on expansive soils
- Design of slopes in expansive soils
- Horizontal earth pressure in expansive soils
- Design of drilled piers in expansive soils
• Design of retaining walls in expansive soils

Meeting Time: This is a 3-0 course
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 647
Title – Numerical Methods in Geotechnical Engineering

Description: 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.

Prerequisites: Degree in engineering or approval of instructor

Textbook: Course handouts by instructor.

Course Learning Outcomes: Students should achieve proficiency in developing and implementing numerical solutions for problems in geotechnical engineering, including analysis pile-soil interaction, stresses and strains in a soil mass, consolidation processes, steady seepage, and soil stress-strain-strength behavior.

Topics Covered:
- Review of mathematics and engineering mechanics
- Review of MATLAB programming
- Finite difference analysis
- Analysis of laterally loaded piles
- Finite difference analysis of nonlinear systems
- Weighted residuals and virtual work finite element formulations
- Finite element analysis of elasticity problems
- Two dimensional consolidation theory
- Numerical analysis of diffusion problems
- Explicit and implicit time marching schemes
- Stability and accuracy
- Finite element analysis of steady seepage
- Introduction to plasticity theory
- Elasto-plastic constitutive models

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
Matlab instruction

Graduate Level: Masters & PhD

Schedule: Once every two calendar years
CVEN 648
Title – Advanced Numerical Methods in Geotechnical Engineering

Description: 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

Textbook: Instructor handouts

Course Learning Outcomes: Students should gain proficiency in formulating advanced numerical models of soil behavior including advanced constitutive models of stress-strain-strength behavior, finite element analyses of nonlinear systems, and coupled hydro-mechanical models of geotechnical systems.

Topics Covered:
- Review of plasticity theory
- The Prandtl-Ruess model
- The Camclay model
- Advanced generalized constitutive models
- Implementation of elasto-plastics models into a finite element formulation
- Solution strategies for non-linear finite element problems
- Formulation for analysis of coupled consolidation problems
- Finite element formulation for coupled hydro-mechanical systems

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

Professional Contribution:
- Mathematics and basic sciences
- Engineering science
- Use of program ABAQUS

Graduate Level: Masters & PhD

Schedule: Once every two calendar years
# CVEN 649
## Title – Physical and Engineering Properties of Soil

### Description:
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 435 or approval of instructor

### Textbook:

### Course Learning Outcomes:
- Evaluate soil response based on laboratory testing for classification, consolidation and strength; evaluate settlements and rate of settlement of clays, mitigate excessive settlements; assess stress-strain-strength response of clays and sands in drained and undrained conditions, interpret soil response within the framework of critical state soil mechanics; communicate results of testing program to clients.

### Topics Covered:
- Soil characterization: chemical composition of clay minerals, micro- and macro-structure of soils, soil classification, characteristics of compacted soils.
- Compression response of clays, consolidation testing and evaluation of results, consolidation parameters from test results, effects of disturbance, cementation, and aging, settlement and rate of settlement calculation, secondary deformations, design alternatives for settlement mitigation, pre-loading and vertical drains.
- Shear response: stress paths, strength and deformation properties of soils, common tests for assessment of stress-strain and strength response of soils, selection of appropriate test to determine design parameters, influence of disturbance, testing apparatus, rate of shearing on measured response, critical state soil mechanics.

Laboratory: Gradation curve and visual classification, consistency limits and clay mineralogy, compaction and suction, instrumentation and calibration, triaxial panel and software operation, constant rate of strain consolidation, triaxial testing: unconfined compression, unconsolidated undrained compression, isotropically consolidated undrained compression, direct shear.

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

### Professional Contribution:
Engineering science

### Graduate Level:
Masters & PhD

### Schedule:
One semester per calendar year (Fall)
CVEN 651
Title – Geomechanics

Description: Fundamentals of mechanics of deformable bodies; theory and application of elasticity, plasticity, viscoelasticity and approximate rheological models to soil mechanics problems.

Prerequisites: Approval of instructor

Textbook: Instructor’s Notes.

Course Learning Outcomes: Synthesize concepts, summarize key findings and develop knowledge derived from reading and analytical assignments related to geomechanical applications. Apply theoretical and analytical principles of geomechanics for the solution of real problems by the use of analytical formulations.

Topics Covered:
1. Mathematical Preliminaries.
2. Kinematics
3. Strain
4. Stress
5. Balance Principles
6. Principles of Elasticity and Applications
7. Principles of Plasticity and Applications

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

Professional Contribution: Mathematics and basic sciences

Graduate Level: Masters, PhD, or Masters & PhD

Schedule: One semester per calendar year
CVEN 652
Title – Soil Dynamics

Description: 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.

Prerequisites: MATH 308

Textbook: None

Course Learning Outcomes: Interact confidently and knowledgeably with other experts in the field of earthquake engineering, such as seismologists, geologists, and structural engineers; develop a probabilistically based site specific seismic response analysis; evaluate dynamic soil properties in the laboratory and in the field; evaluate liquefaction potential and devise mitigation strategies; evaluate seismic stability and performance of dams, retaining walls, and landfills.

Topics Covered:
- Introduction
- Plate tectonics, faults
- Earthquake characterization
- Strong ground motion
- Fourier representation of functions
- Fundamentals of vibration, response spectra
- Probabilistic seismic hazard analysis
- Recurrence relationships
- Attenuation relationships
- Probabilistic characterization of magnitude and distance
- Code provisions
- Dynamic soil response
- Measuring dynamic soil properties
- One-dimensional wave propagation analysis
- Seismic site response analysis
- Liquefaction: pore pressure generation during cyclic loading
- Procedures for evaluating soil liquefaction potential
- Ground deformations from liquefaction
- Seismic performance of slopes: pseudo-static analysis
- Seismic performance of dams: dynamic analysis methods
- Seismic lateral earth pressures for retaining walls
- Analytical procedures and design codes for lateral earth pressures during earthquakes

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

Professional Contribution: Engineering science, Engineering design

Graduate Level: Masters & PhD

Schedule: Once every two calendar years
CVEN 653
Title – Bituminous Materials

Description: 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.

Prerequisites: Approval of instructor

Superpave Mix Design SP-2, Asphalt Institute, 3rd Edition (2001)

Course Learning Outcomes:
To provide a working knowledge of the properties, behavior, and civil engineering applications of bituminous materials
To develop an understanding of traditional and state-of-the-practice specifications and mix design procedures for asphalt paving materials
To instill the importance of construction practices and quality control on the performance of asphalt paving materials
To provide practical and direct exposure to laboratory testing of asphalt paving materials and reporting of results

Topics Covered:
- Introduction to Bituminous Materials
- Binders: Chemistry
- Binders: Behavior
- Binders: Tests & Specifications (Traditional, Superpave, Liquid Asphalts)
- Binders: Modified Binders
- Aggregates: Introduction
- Aggregates: Gradation
- Aggregates: Tests & Specifications (Fine, Coarse)
- Aggregates: Superpave Aggregate Requirements
- Asphalt Concrete: Introduction
- Asphalt Concrete: Volumetrics
- Asphalt Concrete: Mix Design (Traditional, Superpave)
- Asphalt Concrete: Properties (Stiffness, Stability, Fatigue Resistance, Thermal Cracking Resistance, Durability, Etc.)
- Construction: QC/QA
- Other Binder/Aggregate Combinations

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

Professional Contribution: Engineering science

Graduate Level: Masters & PhD

Schedule: One semester per calendar year
# CVEN 654

**Title – Strategic Construction and Engineering Management**

**Description:** 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.

**Prerequisites:** Graduate classification or approval of instructor. Cross-listed with ISEN 643


Copies of some of the slides used in some lectures will be attached to the course web page for use by students. They will not be provided for all class periods or for all lectures. They are provided as aids to note-taking, not as a replacement for note-taking. They are provided as-is, meaning that they will often not exactly match what is covered in class. This is partially due to the need to remove slides that make the files very large (e.g. photos) and that lectures evolve over time. Students remain responsible for taking notes and for all material covered in class and in lecture notes.

**Course Learning Outcomes:**
- Exposure to and exploration of issues in the strategic management of engineering enterprises
- Develop skills in building models of engineering enterprises and the use for strategic process and policy design and analysis for improvement
- Experience in the combined use of research literature and computer simulation modelling to investigate a specific engineering management issue
- Experience in team modelling and teamwork

**Topics Covered:**
- Strategic engineering management issues
- Experiencing the management of project dynamics
- Conceptual modelling of dynamic engineering management systems
- Formal modelling of engineering enterprises
- Model validation, analysis, and use for strategic management

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

**Professional Contribution:**
- Engineering science
- Preparation for engineering practice
- Engineering design, incorporating realistic constraints; pick from list: economic; environmental; sustainability; manufacturability; ethical; health and safety; social; and political

**Graduate Level:** Masters & PhD

**Schedule:** One semester per calendar year
CVEN 655
Title – Structural Reliability

Description: 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 421


Course Learning Outcomes: Students should be able to:

• Understand and explain modern methods for reliability assessment, analysis of the propagation of uncertainties, probabilistic design codes, and the probabilistic basis for performance-based design.
• Use computer codes to apply the concepts learned to example problems.
• Read and understand the literature in the field of structural reliability and risk analysis
• Make use of existing reliability analysis codes, such as CalREL, FERUM, OpenSees, NESSUS, PROBAN and STRUREL.

Topics Covered:
1. Motivation: The need to take uncertainties into account, the use of reliability methods in engineering practice
2. Types of uncertainty: A review of various types of uncertainties, classified as either “aleatory” or “epistemic” in nature
3. Elementary set theory: Random events, Venn diagrams, union and intersection of events
4. Elementary rules of probability: The three basic axioms of probability, total probability theorem, Bayes’ rule, and the inclusion-exclusion rule
5. Partial descriptors of random variables: The concept of random variable, probability distributions, mean, standard deviation, measures of skewness, and the concept of moments
6. Univariate probability distribution models: Normal, lognormal, uniform, exponential, gamma, etc.
7. Data analysis: Mean and standard deviation of observations, assessment of probability distribution based on observations, goodness of fit, Bayesian statistics
8. Multiple random variables: Correlation, multivariate distribution functions, multivariate probability models
9. Functions of random variables: How to obtain the probability distribution for the function, exact cases, first- and second-order approximations
10. Formulation of the reliability problem: Limit-state functions, capacity and demand safety format, component vs. system reliability problems
11. The first-order second-moment method (FOSM): Geometrical reliability index, early developments of reliability methods, the invariance problem
12. The first-order reliability method (FORM): Solution of the invariance problem, the generalized reliability index, determination of the most likely failure point, linearization of the limit-state surface
13. Parameter importance measures: Ranking of the random variables according to relative importance, identification of “resistance” and “load” variables
14. The second-order reliability method (SORM): Approximation of the limit-state surface by a paraboloid, determination of curvature
15. **Sampling methods**: Mean-centered Monte Carlo sampling, importance sampling, other sampling techniques
16. **Response surface methods**
17. **System reliability problems**: The case of multiple limit-state functions, formulation and solution of system reliability problems, series and parallel system bounds
18. **Reliability analysis under parameter uncertainties**
19. **Fragility analysis**
20. **Response sensitivity analysis**: The need for sensitivities, review of the direct differential method
21. **Random fields**
22. **Random processes**: Environmental loads, elementary concepts of random vibrations
23. **Time and space-variant reliability problems**
24. **Reliability-based optimization**: Formulation of objective function and constraints, solution techniques
25. **Probability-based design**: Introduction to codes and RBD, uncertainty modeling, target reliabilities, code calibration

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

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

**Graduate Level:** Masters & PhD

**Schedule:** Once every two calendar years
CVEN 656
Title – Bridge Engineering

Description: An 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.

Prerequisites: CVEN 345


Course Learning Outcomes: The primary objective of the course is to introduce the student to the design of bridges and review all major aspects of typical highway bridge design. Successful completion of the course will allow the student to enter either a state or private bridge design practice. The students are evaluation by examination and a semester project that requires the analysis and complete design of either a steel or concrete highway bridge.

Topics Covered: • Introduction to bridge engineering, AASHTO LRFD specifications, Aesthetics of Bridges
• General Design Considerations
• Constructional material – Steel and Concrete
• Loads and Load Combinations, Limit States (Service, Fatigue, Strength, and Extreme Event)
• AASHTO Truck and Lane Loading
• Methods of Analysis – Girder Line Analysis, Influence Lines
• Load Distribution Factors
• Bridge Slab and Slab Overhang Design
• Reinforced Concrete Bridge Design
• Prestressed Concrete Beam Design, Losses, Creep, Debonding
• Steel Girder Design – Flexural, Shear, Stiffeners, Fatigue
• Composite Design
• Railroad Bridge Overview
• Bridge rating
• Bridge Maintenance Issues

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

Professional Contribution: Engineering science
Engineering design
Major Design experience (semester project)

Graduate Level: Masters & PhD

Schedule: Once every two calendar years
CVEN 657
Title – Dynamic Loads and Structural Behavior

Description: 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

Textbook: A. K. Chopra, Dynamics of Structures, Prentice Hall

Course Learning Outcomes:

- Student will develop appropriate physical and mathematical models for structural dynamics
- Student will determine dynamic response using time and frequency domain models
- Student will analyze dynamic response using exact and numerical solutions
- Student will interpret analysis results within the context of modeling and analysis assumptions
- Student will articulate her/his own engineering opinion and basis for judgment in both written and oral formats

Topics Covered:

1. Formulation of dynamic equations of motion – particle and rigid body systems
2. Free vibration of damped and undamped single-degree-of-freedom systems
3. Response to harmonic, periodic and impulsive loadings
4. Frequency domain analysis of single-degree-of-freedom systems: Continuous Fourier transforms, Discrete Fourier Transforms (DFT)
5. Time domain methods, utilizing numerical methods, for response of single-degree-of-freedom systems
7. Matrix formulation of equations of motion for multi-degree-of-freedom systems (MDOF)
8. Eigen-analysis and undamped vibration of MDOF systems
9. Damping matrices for MDOF systems
10. Modal superposition analysis for response of linear MDOF systems
11. Time domain methods, utilizing numerical methods, for response of MDOF systems
12. Developing models for approximating dynamic response

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

Professional Contribution:
- Mathematics and basic sciences
- Engineering science
- General education (such as Matlab instruction)

Graduate Level: Masters
Schedule: Fall Semesters

Prepared By: L.R. Barroso

Date Prepared: 2/21/12
CVEN 658
Title – Civil Engineering Applications of GIS

Description: 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.

Prerequisites: Graduate classification

Textbook: No textbook is required. All materials are available online.

Course Learning Outcomes:
- Approach civil engineering problems from a different perspective by including the variable “location” in their analysis;
- Use publicly available GIS data; and
- Use commercially available GIS software.

Topics Covered:
- Class 1 - 3: Introduction to GIS and ArcGIS
- Class 4 - 5: ArcMap and data visualization
- Class 6 - 7: ArcCatalog and geodatabases
- Class 8 - 9: Map projections
- Class 10: Getting data
- Class 11 - 13: Map analysis with vector data
- Class 14: Creating and editing feature data
- Class 15: Creating and editing tabular data
- Class 16 – 19: Map analysis with raster data
- Class 20 – 21: Interaction with GoogleEarth.
- Class 22 – 28: Student presentations.
- Class 28: Evaluation

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

Graduate Level:
- General education (ArcGIS instruction)
- Engineering analysis

Schedule: One semester per calendar year
CVEN 659
Title – Behavior and Design of Steel Structures

Description: 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.

Prerequisites: 3 credit hours of structural steel design or approval of instructor

Textbook: Steel Construction Manual- Fourteenth Edition; American Institute of Steel Construction (AISC); 2011

Course Learning Outcomes: The primary objective of the course is to extend the student’s knowledge of steel design and behavior beyond the undergraduate level. The course looks at steel structures from both a macro (member/frame/system) and micro (material properties) approach. Successful completion of the course will allow the student to practice steel design at a high level of knowledge and understanding. The students are evaluation by examination and a semester project that analyzes a recent structure steel failure.

Topics Covered:
- Introduction, AISC-LRFD Review
- Connections – simple, moment
- Eccentric loading of bolt groups, prying action, eccentric loading of weld groups
- Torsion – theory and torsion of wide flange beams
- Frames subject to sidesway, second order effects, Direct Analysis Method
- Column buckling modes, leaner columns
- Bracing forces
- Design of non-compact and slender beams
- Plate girder design, shear stiffeners
- Material properties of steel
- Welding and weld processes
- Weld flaws and AWS Code requirements and tolerances
- Nondestructive test methods for welds
- Linear elastic fracture mechanics
- Stress intensity factor, fracture toughness, Chary V-notch testing
- Fatigue crack propagation
- Fatigue of welded structures

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

Professional Contribution: Engineering science
Engineering design

Graduate Level: Masters & PhD

Schedule: One semester per calendar year
CVEN 660
Title – Probabilistic Structural Dynamics

Description: Dynamic response of structural systems to excitations characterized as stochastic processes; approximate methods for single degree-of-freedom nonlinear structures; methods for single and multiple degrees-of-freedom linear structures; probabilities of failure for first passage and for fatigue.

Prerequisites: CVEN 657; AERO 310 or OCEN 301; MEEN 459 and 617


Course Learning Outcomes:
- Classify random excitations as stationary or non-stationary
- Discuss important properties of random processes
- Define and compute power spectral density functions
- Compute auto-and cross-correlation functions, and relate them to power spectral density functions
- Describe the dynamic response of a multi-degree-of-freedom system to a stochastic excitation
- Quantify the distributions of peak loads and peak responses from a system subject to stochastic excitation
- Apply tools from probabilistic modeling to analyze dynamic systems while accounting for variability and uncertainties

Topics Covered:
- Fundamentals of Probability and Random Variables;
- Expected Values of Random Variables
- Characterization of stochastic processes: stationarity, properties of autocorrelation and autocovariance, limits of stochastic processes, ergodicity, Gaussian processes
- Stochastic calculus: derivative and integral
- Stochastic dynamics and response to stationary excitation
- Frequency domain analysis of stochastic process
- Direct stochastic analysis of linear systems
- Introduction to nonlinear stochastic vibration
- Frequency, bandwidth and amplitude: general concepts and estimates
- Failure analysis and Estimating Power Spectral Density (PSD) from data

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

Professional Contribution: Mathematics and basic sciences

Graduate Level: PhD

Schedule: Less often than every two calendar years

Prepared By: L.R. Barroso Date Prepared: 2/21/12
CVEN 662
Title – Experimental Methods in Civil Engineering

Description: 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.

Prerequisites: Graduate classification in engineering

Textbook: Instructor's handout and computer manuals

Course Learning Outcomes:
• Ability to apply knowledge of basic mathematics, science, and engineering to solving civil engineering problems
• An ability to design and conduct experiments, as well as to analyze and interpret data.
• Ability to function on multi-disciplinary teams
• Ability to formulate and solve civil engineering problems
• Ability to communicate effectively in oral and written forms
• Ability to use modern tools, techniques, and computation methods necessary for civil engineering practice

Topics Covered:
• Introduction
• Laboratory safety
• Fundamentals (error analysis, statistical analysis, averaging, smoothing, windowing, aliasing, leakage)
• Strain gages
• Fiber optic sensors
• Vibration measurement (measuring force and acceleration based upon strain gages, fiber optic sensors, piezoelectric material)
• Experimental modal analysis
• Laser measurement (holography, electronic speckle pattern interferometry, Laser vibrometry)
• Ultrasonics (wave propagation in elastic solids, Laser generation and detection, piezotransducer)
• Signal conditioning (filters, amplifiers, etc.)
• Wireless sensors
• Data acquisition
• Signal processing (FFT, 2DFFT, STFT, Wavelet, Chirplet, …)

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: Once every three regular semester

Prepared By: Stefan Hurlebaus     Date Prepared: 2/17/2012
Description: 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, Treffetz method, review of current literature.

Prerequisites: MATH 308; approval of instructor


Course Learning Outcomes: The primary objective of the course is for the students to understand the phenomenon of structural buckling and the factors that influence a member’s stiffness or resistance. The students will understand how buckling design criteria are implemented in various codes and specifications. The students are evaluated by examination and a semester project that analyzes a current stability failure.

Topics Covered: • Introduction - idealized column behavior
• Euler Column Buckling
• Boundary conditions
• Imperfect columns
• Inelastic Buckling - Effect of non-linearity, residual stresses, Tangent Modulus, Shanley Theory
• Approximate Methods of Analysis - Rayleigh-Ritz, Variation principles, Galerkin Method
• Beam-Columns
• AISC Direct Analysis Method
• Buckling of Frames - matrix methods/computer solutions
• Bracing
• Torsional Buckling
• Buckling of Plates and Shells

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: Once every two calendar years
CVEN 664
Title – Water Resources Engineering Planning and Management

Description: 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.

Prerequisites: Graduate classification in engineering or approval of instructor


Course Learning Outcomes: After completing this course students should...

1. Be able to articulate systems concepts in general and as applied to water resources;
2. Understand the nature of the following water resources systems objectives, be able to describe the practical analytical techniques applicable to each objective, and be able to identify relationships among objectives when applied to an unfamiliar water resources system:
   a. M&I water supply,
   b. Irrigation,
   c. Hydropower,
   d. Waste assimilation,
   e. Recreation,
   f. Navigation, and
   g. Ecological needs;
3. Be able to describe the rational planning model and determine objective tradeoff relationships given example data;
4. Be able to articulate the various legal doctrines governing water resources systems and describe the institutions responsible for policy and regulation of these systems at state, national, and international levels;
5. Understand the importance of climate variability and climate change for water resources systems, be able to diagnose these effects for a specific system, and be able to suggest preliminary planning and management accommodations to these effects;
6. Know basic ideas about the process of modeling water resources systems, understand basic simulation and optimization techniques, and know the names and basic capabilities of several common models used in water resources practice;
7. Be able to name basic components of emergency and security planning and response for water resources systems;
8. Have completed a review paper discussing an emergent issue in water resources planning and management;
9. Know several journals important in the water resources field and how to readily access them; and
10. Have reviewed multiple case studies of important water resources systems and be able to describe the important issues, stakeholders, and planning and management processes for those systems.

Topics Covered: Systems theory; Water resources objectives; Rational planning model; Water law; Climate variability and change; Multi-objective analysis; Socio-economic objectives

Meeting Time: Three lecture sessions each week, 50 minutes each
<table>
<thead>
<tr>
<th>Professional Contribution:</th>
<th>General education</th>
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<tbody>
<tr>
<td>Graduate Level:</td>
<td>Masters &amp; PhD</td>
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<tr>
<td>Schedule:</td>
<td>One semester per calendar year</td>
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</table>
CVEN 665
Title – Water Resources Systems Engineering

Description: 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

Textbook: No single textbook. Reading and problems assignments involving selected reference materials.

Course Learning Outcomes: Proficiency in the application of optimization, simulation, and related systems analysis techniques in water resources planning and management.

Topics Covered:
- Water Resources Planning and Management and Systems Engineering
- Water Resources Management Applications of Linear Programming
- Model Formulation
- Solution Algorithms
- Network Flow Programming
- Integer Programming
- Multiple Objective Analyses
- Dealing with Nonlinearities
- Nonlinear Optimization Techniques
- Gradient Search Methods
- Genetic Algorithms
- Dynamic Programming
- Simulation of River/Reservoir Systems
- Economic Benefit-Cost Analysis
- Analysis of Flood Damage Reduction Systems

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

Professional Contribution: Engineering science and engineering design

Graduate Level: Masters & PhD

Schedule: One semester per calendar year
CVEN 667
Title – Slope Stability and Retaining Walls

Description: 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

Textbook: Handouts from instructor

Course Learning Outcomes: Students should be capable of analyzing and designing sheetpile, gravity, cantilever, and mechanically stabilized earthfill wall systems; braced excavations; stabilization measures for natural slopes; and earthen embankments including earth dams and levees.

Topics Covered:
- Rankine earth pressure theory
- Coulomb earth pressure theory
- Design of sheetpile walls
- Application of bearing capacity theory to retaining wall design
- Gravity wall systems
- Cantilever wall systems
- Mechanically stabilized earthfill wall systems
- Effect of seepage on wall behavior
- Braced excavations
- Analysis of shallow slides
- Slope stability analysis: method of slices
- Fellenius, Bishop, and Spencer methods
- Parameter selection for slope stability analysis
- Seepage through slopes and embankments
- Cracking and erosion of slopes and embankments
- Remediation measures for slope stabilization

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

Professional Contribution: Engineering science

Graduate Level: Masters & PhD

Schedule: One semester per calendar year
CVEN 668
Title – Advanced EPC Project Development

Description: 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.

Prerequisites: Graduate classification in engineering or approval of instructor


Course Learning Outcomes: Course learning outcomes are:
1. Student can describe the phases and their steps of the Front-End Planning (FEP) process (previously known as business and pre-project planning)
2. Student can discuss the importance of FEP in relation to the EPC process.
3. Student can identify current and emerging tools and techniques used in Front-End Planning
4. Student can apply tools and techniques used in Front-End Planning
5. Student can perform as an effective team member in preparing FEP deliverables for a project.
6. Student can write technical reports and present results for typical project deliverables required for FEP.

Topics Covered: Outline of course topics listed below:
21. Overview of the EPC Process and Front End Planning Process Relationship
22. Front End Planning Overview
   Process Modeling
23. Feasibility Phase of FEP – Initiate, Generate Options, Process Model Development, Filter Options, Project Definition Rating Index Tool
24. Concept Phase of FEP – Initiate, Analyze Alternatives, Conceptual Scope and Estimates, Evaluate and Select Best Alternative(s), Project Definition Rating Index Tool
25. Detailed Scope Phase of FEP – Initiate, Preliminary Design and Engineering, Finalize Scope Definition, Cost and Scheduling Control Estimate, Project Definition Rating Index Tool
27. Case Studies (throughout the course)

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

Professional Contribution: Major Design Experience and Engineering Design

Graduate Level: Master of Science and Master of Engineering (PhD students can take this course.)

Schedule: One semester per calendar year
CVEN 669
Title – Design of Structures for Hazardous Environmental Loads

Description: 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.

Prerequisites: Approval of instructor


Course Learning Outcomes: Students should be able to:
- Explain and apply fundamental concepts of seismology
- Characterize a ground motion using elastic and inelastic spectra
- Develop appropriate structural and load models for seismic analysis
- Analyze a structural system under seismic loads using all methods presented in the course
- Demonstrate an ability to apply principles covered in the course to the design of a structural system

Topics Covered:
- Code approach to seismic design. Typical code requirements. Design philosophies.
- Effects of local soil conditions. Soil amplification. Site specific spectra.
- Structural systems for seismic resistance
- Code approved methods for seismic analyses: Equivalent static loads, Modal Analysis, Response Spectrum Analysis (SRSS), Linear dynamic analysis, Nonlinear static analysis, Nonlinear dynamic analysis, Pushover analysis
- Impacts of Irregularities and P-Delta effects.
- Introduction to Performance-Based Design

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

Professional Contribution: Engineering science

Graduate Level: Masters & PhD

Schedule: Once every two calendar years

Prepared By: L.R. Barroso

Date Prepared: 2/21/12
CVEN 670
Title – Behavior and Design of Composite Structures

Description: 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


Course Learning Outcomes: Students will develop a fundamental understanding of the behavior of composite structural components and systems that comprise rolled steel shapes and reinforced concrete. Design procedures and code provisions will be exposed within the context that a design should aim at achieving a preferred behavior of a composite system: i.e. preferred responses of the system to its anticipated loading environment.

Topics Covered:
- Concrete Review
- Steel Review
- Composite Beams
- Composite Columns
- Lateral Resisting Systems
- Retrofitting Applications

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 671
Title – Behavior and Design of Prestressed Concrete Structures

Description: 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

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:
- Understand and explain the behavior of prestressed concrete structural members, including pretensioned and post-tensioned elements.
- Design prestressed concrete structural members for flexure, including working stress and ultimate strength analysis and design.
- Design non-composite and composite prestressed concrete structural members.
- Evaluate short-term and time-dependent prestress losses in prestressed concrete structural members.
- Evaluate short-term and long-term deflection behavior of prestressed concrete members.
- Analyze and design determinate and indeterminate prestressed concrete structural systems.

Topics Covered:
1. Production of Precast, Pretensioned Girders
2. Materials and Systems for Prestressing
4. Flexure: Ultimate Strength Analysis and Design (Nominal Strength, Factored Loads)
5. Composite Beams (Flexure and Interface Shear Design)
6. Prestress Losses
7. Shear in Prestressed Members
8. Serviceability
9. Indeterminate Prestressed Concrete Structures

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 672**

**Title – Engineering and Urban Transportation Systems**

**Description:** 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.

**Prerequisites:** Graduate classification in engineering or urban and regional planning or approval of instructor


**Course Learning Outcomes:** Understanding urban transportation systems planning; the relationship between demand, network and system performance; and related project management concepts; understanding the connection to urban planning and transportation economics.

Students are expected to have the basic skills and techniques to conduct tasks keen to planning a contemporary urban transportation system in the topic areas listed below.

**Topics Covered:**
- Characteristics of urban travel
- Data needs for transportation planning and basic sampling techniques
- The four-step travel demand model (trip generation, distribution, mode choice and traffic assignment)
- Demand and supply analysis
- Project alternatives evaluation
- Characteristics of urban freight system

**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 673
Title – Transport Phenomena in Porous Media

Description: Transport phenomena in porous media with special emphasis on fundamentals and applications to various geo-environmental problems.

Prerequisites: CVEN 311 and MATH 308 or approval of instructor

Textbook: Handouts and course notes.
Journal papers

Course Learning Outcomes: After this course it is expected that the students can be able to:

a) Understand the fundamentals associated with the multiphase flow and transport of heat and mass in deformable porous media.

b) Recognize the main Thermo-Hydraulic-Mechanical and Geochemical (THMG) phenomena, and their mutual interactions, when coupled multiphysics actions take place in porous media.

c) Understand the mathematical framework typically used to deal with flow and transport phenomena in deformable porous media.

d) Be familiar with the numerical solutions of coupled THMG in porous media.

e) Apply their knowledge in THMG behavior of porous media to create solutions to practical geo-engineering problems.

Topics Covered:

1. Introduction and basic concepts
   1.1 Notation. Approximation of the porous medium as a continuum. Representative elementary volume. Porosity and effective porosity. Particle-size/pore-size distribution. Other statistical descriptions.
   1.2 Properties of the liquid water. Density, compressibility, viscosity and surface tension.
   1.3 Properties of the water vapor and gaseous phase (wet air). Density, compressibility and viscosity. Dissolved air and Henry law.
   1.4 Influence of temperature, pressure and solutes on water and gas properties. Influence of capillary tension and suction on vapor concentration.

2. Single-phase flow in non deformable porous media
   2.3 Laboratory and in-situ tests. Applications.

3. Multi-phase flow in non deformable porous media
   3.2 Darcy’s law for unsaturated (multiphase) media. Relative permeability. Piezometric level. Flow equations for unsaturated porous media. Richards’s equation.
3.4 Laboratory and in-situ tests.
3.5 Physicochemical law. Effect of solutes. Matric, osmotic and total suctions.
3.6 Vapor pressure. Internal energy. Water phase diagram.

6.4. Multiphase flow in deformable porous media
4.1 Stresses and strains.
4.2 Momentum balance equation.
4.3 Material Derivative. Porosity changes.
4.4 Balances equation in material coordinates.
4.5 Effective stress. Terzaghi’s Theory of Consolidation.

6.5. Mechanical Behaviour of Porous Media
5.1 Stress and strain Invariants
5.2 Elastic (linear non-linear) and Elastoplastic models (e.g. Mohr-Coulomb, Cap, Cam Clay) for saturated soils and rocks. Damage models.
5.3 Deformations and strength in two phases (e.g. unsaturated) porous media.
5.4 Thermal effects on mechanical behavior of soils & rocks.
5.5. Mechanical behavior of fractures.
5.5 Notion of laboratory and in-situ tests.

4.6. Mass transport in non deformable porous media
6.1 Solute (conservative) transport in single phase flow. Advection. Fick’s law.
   Dispersion: hydro-mechanical dispersion; molecular diffusion. Tortuosity
6.2 Adsorption. Transport of radioactive nuclides (radioactive decay).
6.3 Solute transport in multiphase flow. Introduction to reactive transport.
6.4 Laboratory and in-situ tests.

5.7. Energy transport in non deformable porous media
7.2 Issues related to advective-dispersive terms in transport equations.
   Characteristic times. Peclet and Rayleigh numbers.
5.4 Laboratory and in-situ tests.

7.8. Coupled processes and phenomena in deformable porous media
8.1 Consolidation. Biot’s theory for 3-D consolidation.
8.2. Main Thermo-Hydro-Mechanical and Geo-chemical (THMG) couplings in porous media.
8.3 General mathematical formulation to analyze THMG coupled problems in deformable multiphase porous media.
8.4 Onsager’s phenomena: direct flow phenomena, and coupled processes.
8.5 Numerical approximation.

8.9. Applications related to coupled problems in porous media

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: Once every two calendar years (Fall Semesters)
CVEN 674
Title – Groundwater Engineering

Description: Groundwater hydrology, theory of groundwater movement, steady-state flow, potential flow, mechanics of well flow, multiple-phase flow, salt water intrusion, artificial recharge, groundwater contamination and models.

Prerequisites: CVEN 311 or approval of instructor

Available for free as an electronic, pdf text from the TAMU Library.

Software: We will be using the educational modeling software Interactive Groundwater for this course. You may download Version 3 for free at [http://www.egr.msu.edu/igw/](http://www.egr.msu.edu/igw/).

Website: Course materials will be posted on the TAMU eLearning website at [http://elearning.tamu.edu](http://elearning.tamu.edu).

Course Learning Outcomes: After successfully completing this course, students should be able to accomplish the following types of engineering tasks:

- Create a conceptual model of an area’s hydrogeology that can be used to guide a site investigation or engineering design project.
- Compare methods for solving groundwater flow equations under a variety of situations, selecting the most appropriate modeling techniques based on an engineering project’s goals and evaluating how their weaknesses may impact the final conclusions.
- Develop a preliminary consulting report for a groundwater development or remediation project.

Topics Covered:

<table>
<thead>
<tr>
<th>Topic Outline</th>
<th>Unit Learning Outcomes</th>
</tr>
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<tbody>
<tr>
<td>I) Understanding Hydrogeology</td>
<td>• Explain significance of groundwater to hydrologic cycle and engineering projects</td>
</tr>
<tr>
<td>a. Introduction</td>
<td>• Define properties of porous media</td>
</tr>
<tr>
<td>b. Describing aquifers and their geology</td>
<td>• Solve Darcy’s law for simple flow geometries</td>
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<tr>
<td>c. Fundamentals of fluids in porous media</td>
<td>• Relate properties to geologic formations</td>
</tr>
<tr>
<td>d. Groundwater flow concepts</td>
<td></td>
</tr>
<tr>
<td>II) Mathematics of Groundwater Flow</td>
<td>• Describe origin, function, utility, and assumptions behind equations of flow in porous media</td>
</tr>
<tr>
<td>e. Mathematical formulations of flow</td>
<td>• Apply the appropriate equations and their analytical solutions to a variety of flow situations</td>
</tr>
<tr>
<td>f. Equations for well hydraulics</td>
<td>• Perform and analyze data from common aquifer tests</td>
</tr>
<tr>
<td>g. Equations for aquifer testing</td>
<td></td>
</tr>
</tbody>
</table>
### III) Applied Groundwater Concepts

- h. Numerical modeling of complex flows
- i. Contaminant transport
- j. Remediation
- k. Topic to be selected from:
  - Salt water intrusion
  - Artificial recharge
  - Hydraulic fracturing
  - Sustainable groundwater development (selection depends on class interests)

- • Derive and use forward and backward finite difference equations for saturated flow
- • Simulate common groundwater flows using numerical modeling software
- • Predict contaminant migration and concentration in simple flow geometries
- • Suggest and compare methods of remediation for common situations

<table>
<thead>
<tr>
<th>Meeting Time:</th>
<th>Three lecture sessions each week, 50 minutes each</th>
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</thead>
<tbody>
<tr>
<td>Professional Contribution:</td>
<td>Mathematics and basic sciences (geology, hydrology)</td>
</tr>
<tr>
<td></td>
<td>Engineering science (analytical and numerical modeling)</td>
</tr>
<tr>
<td></td>
<td>General education (writing)</td>
</tr>
<tr>
<td>Graduate Level:</td>
<td>Masters &amp; PhD</td>
</tr>
<tr>
<td>Schedule:</td>
<td>One semester per calendar year</td>
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</tbody>
</table>
CVEN 675
Title – Stochastic Hydrology

Description: Analysis, simulation and forecasting of hydro-climatic variables

Prerequisites: CVEN 421 and 463 or approval of instructor

Textbook: None.

Course Learning Outcomes: After completing this course, the student should be able to
1. Discuss stochastic models and methods currently used in hydrology, and determine what model should be used for different hydrologic processes
2. Develop and use methods of parameter fitting for these models
3. Use these models to simulate synthetic hydrologic data sets for use in further hydrologic analysis and modeling.

Topics Covered:
- Quick review of probability and statistics
  - Time-based measurements
    - Markov time series models for rainfall
    - Point process models for rainfall
    - Frequency analysis and extreme value distributions for floods and rainfall
    - ARMA Time series modeling for stream flow and other environmental variables
  - Spatial-based measurements
    - Kriging – optimal interpolation between measurements in space
    - Spatial scaling – information across scales

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

Professional Contribution: Mathematics and basic sciences; General education

Graduate Level: PhD

Schedule: Once every two calendar years
CVEN 677
Title – Advanced Surface Transportation Systems

Description: Design and operational issues and systems related to advanced traffic systems; advanced studies on traffic management systems, travelers information systems, public transportation systems and commercial vehicle operation.

Prerequisites: Graduate classification in engineering or approval of instructor

This course has not been taught for several years, and it will be significantly revised prior to being taught again in the near future.
CVEN 679
Title – Experimental Fluid Mechanics Modeling

Description: 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.

Prerequisites: Approval of instructor

Textbook: There is no required textbook for this course. The following books are recommended:

- Physical Models and Laboratory Techniques in Coastal Engineering, by Steven A. Hughes, World Scientific, 1993
- An Album of Fluid Motion, by Milton Van Dyke, Parabolic Press, 1982
- LabVIEW Tutorial

Course Learning Outcomes: The objective of the course is to introduce students to the principle of physical modeling and methods and techniques of experimental data collection and analysis, in particular as they pertain to fluid flows. Students are expected to learn basic information and experience they will need to be able to design a good experiment, accurately acquire and analyze experimental data, and understand the strengths and limits of the data set they have acquired and analyzed.

Topics Covered:
- Dimensional analysis and similitude
- Computer interfacing for experimental control and data acquisition
- Experimental methods
- Sampling theory and digital signal processing

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

Professional Contribution: Engineering science

Graduate Level: Masters & PhD

Schedule: Once every two calendar years
CVEN 680
Title – Advanced Computation Methods for Fluid Flow

Description: Unsteady three-dimensional Navier-Stokes equations in general non-orthogonal curvilinear coordinates; algebraic and elliptic grid generation; turbulence modeling for complex flows; Advanced numerical methods for unsteady incompressible flows; large-eddy simulations; Reynolds-averaged Navier-Stokes simulation; chimera domain decomposition and interactive zonal approach.

Prerequisites: CVEN 688 or approval of instructor

Textbook: Lecture notes from the instructor

Course Learning Outcomes: Develop understanding of tensor and general curvilinear coordinates. Derive Navier-Stokes and energy equations in curvilinear coordinates. Develop ability to generate numerical grids for computational fluid dynamics applications. Develop concepts of turbulence modeling for complex fluid flow and heat transfer problems.

Topics Covered: Introduction, General curvilinear coordinates, General tensor transformations, Differentiation of tensors, Continuity equation, Navier-Stokes equations, Energy equation, Algebraic grid generation, Elliptic grid generation, Grid control functions, Direct numerical simulations, Reynolds-Averaged Navier-Stokes equations, Reynolds stress equations, Turbulent kinetic energy transport equation, Rate of turbulent energy dissipation equation, Universal law-of-the-wall, Near-wall turbulence model, eddy-viscosity models, Second-order Reynolds stress closure models, Large eddy simulations, Subgrid-scale models, Dynamic SGS models

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

Professional Contribution: Mathematics and basic sciences
Engineering science

Graduate Level: Masters & PhD

Schedule: Once every two calendar years
CVEN 682
Title – Environmental Remediation of Contaminated Sites

Description: 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, 619, 620


Course Learning Outcomes:
1) Develop understanding of integrated approaches to remediating contaminated sites.
2) Develop the ability to screen, choose and design appropriate technologies for remediation by applying fundamental knowledge of biological, chemical and physical processes.
3) Improve skills in communication, teamwork and analysis.

Topics Covered:
I. Introduction (1 lecture hour)
II. Laws, Regulations and Remediation (5 hours)
III. Risk Assessment (3 hours)
IV. Remedial Options
   A. Introduction (0.25 hr)
   B. Administrative Options (0.25 hr)
   C. Groundwater
      1. Plume Containment (1 hr)
      2. Pump and Treat (2 hr)
      3. Source Control (.5 hr)
      4. Permeable Reactive Barriers (3 hr)
      5. Monitored Natural Attenuation (5 hr)
   D. Soils/Sludges
      1. Excavation (0.25 hr)
      2. Landfill (0.25 hr)
      3. Containment (0.25 hr)
      4. Solidification/Stabilization (5 hr)
      5. Chemical treatment (1 hr)
      6. Surfactant extraction (1 hr)
      7. Soil vapor extraction (2.25 hr)
      8. Bioremediation (4 hr)
      9. Phytoremediation (1 hr)
     10. Thermal Processes (1 hr)
     11. Soil Washing (1 hr)
   VI. Project Presentations (2 hours)

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

Professional Contribution:
Engineering science
Engineering design
General education (written and oral communication, teamwork)

Graduate Level: Masters & PhD

Schedule: Once every two calendar years
CVEN 683
Title – Dynamic Soil Structure Interaction

Description: 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.

Prerequisites: Graduate classification


Course Learning Outcomes:
- Conduct a seismic site response analysis; assess potential for soil amplification at a site; design foundations subjected to seismic or other vibration loads; evaluate the effects of seismic soil-structure interaction; determine soil properties from field testing.

Topics Covered:
- Dynamics of single degree of freedom systems
- Seismic excitation
- Multi-degree of freedom systems
- Steady-state response to harmonic loads
- Continuous systems with distributed mass
- Response to applied loads and base motion
- Fundamentals of wave propagation
- Soil amplification of earthquake motion
- Dynamic stiffness of foundations
- Design of machine foundations
- Seismic soil-structure interaction
- Determination of soil properties in situ using dynamic testing
- Moving loads

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

Professional Contribution: Engineering science, engineering design

Graduate Level: Masters & PhD

Schedule: Once every two calendar years
CVEN 687
Title – Foundation Engineering

Description: 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

Textbook: There is no textbook for this course which will make use of handouts.

Course Learning Outcomes: At the end of this course the students, if they receive a good grade in this course, will be able to
4. know what a shallow foundation and a deep foundation are
5. know how to design a shallow foundation for common cases
6. know how to design a deep foundation subjected to vertical and horizontal loads for common cases

Topics Covered:
1. Fundamental Elements of Foundation Engineering (2 Lec)
   • The soil, the structure, the interaction, the approach, drainage, frost
   • Failure (soil, structure), movement (settlement, shrink-swell, collapse)
   • Working stress design, Load and Resistance Factor Design (LRFD)
2. Shallow Foundations (6 Lec)
   • Design approach
   • Bearing pressure (distribution, capacity)
   • Settlement (footings, mats, embankments)
3. Mat Foundations (4 Lec)
   • Design approach
   • Subgrade reaction
   • Deflections
   • Bending moment distribution
4. Deep Foundations under vertical loads (8 Lec)
   • Design approach
   • Installation (drilled shaft, wave equation)
   • Single pile capacity under vertical load (driven, bored)
   • Special loading (cyclic, rapid, long term)
   • Pile group capacity under vertical load
   • Settlement of deep foundations
   • Downdrag
5. Deep Foundations under horizontal loads (8 Lec)
   • Design approach
   • Single pile under horizontal load
   • Special loading (cyclic, rapid, long term)
   • Pile group capacity under horizontal load
6. Foundations on Shrink-Swell Soils (4 Lec)
   • Design approach
   • Movement calculations
   • Slab-on-grade design
   • Pile design

Meeting Time: Two lecture sessions each week, 75 minutes each.
<table>
<thead>
<tr>
<th><strong>Professional Contribution:</strong></th>
<th>Engineering design</th>
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<tbody>
<tr>
<td><strong>Graduate Level:</strong></td>
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CVEN 688
Title – Computational Fluid Dynamics

Description: 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


Course Learning Outcomes: Develop understanding of numerical accuracy and numerical stability. Develop numerical concepts for dispersion, propagation, and equilibrium problems. Develop ability to solve fluid flow and heat transfer problems using the finite-difference, finite-volume, and finite-element methods.


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

Professional Contribution: Mathematics and basic sciences, Engineering science

Graduate Level: Masters & PhD

Schedule: Fall Semesters
CVEN 696
Title – Urban Traffic Facilities

Description: 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.

Prerequisites: Graduate classification


Course Learning Outcomes: This course is designed to give new graduate students in the transportation engineering program an introduction to the basic principles and practice of traffic engineering as applied to the design and operation of urban traffic facilities. Learning objectives include:

a. Ability to apply knowledge of basic mathematics, science, and engineering to solving civil engineering problems
b. Ability to design a civil engineering system to meet desired needs while incorporating engineering standards and realistic constraints.
c. Ability to formulate and solve civil engineering problems.
d. Understanding of professional and ethical responsibility.
e. Ability to user modern tools, techniques, and computation methods necessary for civil engineering practice.
f. Proficiency in at least four of civil engineering areas

Topics Covered: Traffic Engineering, Driver Characteristics; Visibility Issues; Vehicle Characteristics; Traffic Flow Models; Traffic Studies; Statistical Analysis; Safety and Crash Analysis; Tort Liability; Highway Safety Manual; Traffic Engineering, Traffic Control Devices, and the MUTCD; Introduction to Traffic Signals; Warrant Analysis, Change Intervals, And Pedestrian Timing; Signal Phasing and Saturation Flow; Signal Green Timing and Initial Project Planning; Signal Delay and Level-of-Service (HCM); Computer Programs for Signal Operation; Signal Design and Safety; Actuated Control and Signal Coordination; Pedestrians at Signalized Intersections; MUTCD Sign and Marking Criteria; Sign Design and Performance; Pavement Marking Design and Performance; Work Zone Traffic Control; Traffic Engineering Standards and Specifications; Roundabout Design; Roundabout Capacity and Analysis; Stop Controlled Intersection Analysis; Freeway Operations and Design; Freeway Capacity and Level-of-Service Introduction; Managed Lanes, Incident Management, and ITS; Freeway Level-of-Service for Basic Sections; Weaving Sections

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

Professional Contribution: Engineering science
Engineering design
Major Design experience

Graduate Level: Masters & PhD

Schedule: One semester per calendar year

Prepared By: Gene Hawkins Date Prepared: February 28, 2012
CVEN 699  
Title – Engineering Risk Analysis

Description: Introduces students 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.

Prerequisites: STAT 211 or approval of instructor


Course Learning Outcomes: Students should be able to:
- Understand and explain applications of probability theory, statistics, and decision analysis to civil engineering problems.
- Apply the concepts learned to example problems, including probabilistic modeling and analysis of civil engineering problems, Bayesian statistics, risk analysis, and decision under uncertainty.

Topics Covered:
1. Elements of set theory
2. Basic elements of probability theory
   - Axioms of probability
   - Elementary rules of probability
   - Conditional probability and statistical independence
   - Bayes’ rule
   - Theorem of total probability
   - Probability rules for conditional events
   - Elements of fragility analysis
3. Random variables
   - Discrete, continuous, and mixed random variables
   - Probability distributions
   - Partial descriptors of a random variable
   - Common distribution models
   - Distribution conditioned on events
4. Multiple Random Variables
   - Conditional moments
   - Multivariate distribution models
5. Function of random variables
   - First and second moments of functions
   - Distribution of functions
6. Probabilistic models
   - Bernoulli trial
   - Bernoulli sequence and related distributions
   - Poisson and related distributions
   - Asymptotic models
7. Statistical inference
   - Method of moments
   - Method of maximum likelihood
   - Bayesian statistics and conjugate distributions
8. Formulation of the reliability problem
   - Limit-state functions
   - Capacity and demand safety format
   - Component vs. system reliability problems
9. **Elements of decision theory**

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

**Professional Contribution:** Mathematics and basic sciences

**Engineering science**

**Graduate Level:** Masters & PhD

**Schedule:** Once every two calendar years

**Prepared By:** Mary Beth Hueste  
**Date Prepared:** February 28, 2012
CVEN 717
Title – Engineering Project Control

Description: 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.

Prerequisites: Graduate classification in civil engineering or industrial and systems engineering or approval of instructor. Cross-listed with ISEN 642.


Course Learning Outcomes: Students successfully completing this course will have developed their:

a. Ability to apply knowledge of basic mathematics, science, and engineering to solving engineering problems
b. Ability to design and conduct experiments, as well as to analyze critically and interpret data in at least one recognized major engineering area
c. Ability to design a engineering system to meet desired needs while incorporating engineering standards and realistic constraints such as those based on economic, environmental, sustainability, constructability, ethical, health and safety, social, and political issues
d. Ability to function on multi-disciplinary teams
e. Ability to formulate and solve engineering problems
f. Ability to communicate effectively in oral and written forms
g. Appreciation and knowledge of current engineering issues including professional practice issues
h. Ability to use modern tools, techniques, and computation methods necessary for engineering practice
i. Proficiency in engineering project control and management

Topics Covered:

Foundations of Project Control
- Control theory basis for project control
- Contract types and risk allocation
- Project control policy evaluation

Project Status & Analysis
- Change control
- Forecasting project performance
- Finding the causes of performance gaps

Changing Project Performance
- Controlling costs
- Controlling schedule
- Controlling capital
- Design realization

Project Control under Uncertainty
- Using contingency
- Managerial real options

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

Professional Contribution: Engineering science
Graduate Level: Masters & PhD

Schedule: One semester per calendar year

Prepared By: David N. Ford, Instructor

Date Prepared: February 17, 2012
CVEN 750
Title – Finite Element Applications in Structural Engineering

Description: 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.

Prerequisites: CVEN 445 or approval of instructor

Textbook: No Textbook -- (several reference books are available electronically)

Course Learning Outcomes:
To be able to outline and describe the use of the Finite Element Method to effectively analyze a structure.
To be able to use a commercial finite element package for analysis of a variety of structures.
To be aware of the limitations of finite element analysis (and include the importance of mesh size, element selection, etc. to appropriately model a structure)

Topics Covered:
• Introduction to the role of Finite Elements in Structural Engineering
  • Overview of Matrix Structural Analysis –
    o "direct stiffness" for Frames & Trusses
    o Computation of displacements & linear elastic member forces
    o Shape functions; potential energy & stiffness matrix
    o Introduce SAP2000 and RISA 3D programs & project #1
    o Mesh size and other modeling issues
    o Modeling of structures including:
      ▪ Buildings
      ▪ Bridges
      ▪ Truss Elements
      ▪ Frames Elements
      ▪ Solid Elements
      ▪ Plates Elements
      ▪ Shell Elements
      ▪ Discrete Springs
      ▪ Gap & Link Elements
    o Analysis including material & geometric non-linearity & project #2
    o Modal Dynamic Analysis
    o Time-history analysis
    o Non-linear dynamic analysis
    o Stability analysis

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

Prepared By: J. R. Morgan Date Prepared: 2/24/2012
CVEN 751
Title – Advanced Dynamics and Control of Civil Engineering Structures

Description: 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.

Prerequisites: CVEN 657, MEMA 647 or equivalent, or approval of instructor


Course Learning Outcomes: Students should be able to:

• Understand fundamental concepts of classical and state-space control of structures
• Formulate an analysis and generate code for block-oriented control systems with filters and observers
• Explain and apply the basic principles involved in introduction of supplemental passive and active damping of large civil engineering structures.
• Interpret the contributions of researchers throughout the world to intelligent structural design as described in archival journals and recent textbooks.
• Demonstrate an ability to apply principles covered in the course to a structural project of special interest within civil engineering.

Topics Covered:
1. LaPlace Transforms
2. Block diagrams for system modeling
3. Effect of Poles and Zeros on dynamic response
4. Development of State-Space formulation of dynamic equations of motion
5. Overview of nonlinear dynamic principles and analysis for discrete systems
6. Base isolation for civil structures
7. Viscous and Visco-elastic supplemental damping in civil structures
8. Basic properties of classic control

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

Prepared By: L.R. Barroso Date Prepared: 2/21/12
CVEN 752
Title – Smart Structures

Description: 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.

Prerequisites: CVEN 363 or equivalent or graduate classification in CVEN or approval of instructor

Textbook: Hurlebaus, S.: *Smart Structures - Fundamentals and Applications*: Lecture Notes, 256 pages, Zachry Department of Civil Engineering, Texas A&M University, 2005

Course Learning Outcomes:

- Ability to apply knowledge of basic mathematics, science, and engineering to solving civil engineering problems
- An ability to design and conduct smart structures, as well as to analyze and interpret data.
- Ability to function on multi-disciplinary teams
- Ability to formulate and solve civil engineering problems
- Ability to communicate effectively in oral and written forms
- Ability to use modern tools, techniques, and computation methods necessary for civil engineering practice

Topics Covered:

- Structural Dynamics
- Damping
- Smart Materials
- Sensor Technology
- Modeling of Smart Structures
- Signal Processing Methods:
  - Control Concept
  - Semi-Passive Damping
  - Semi-Active Damping
  - Active Vibration Control
  - Active Vibration Isolation
  - Structural Health Monitoring
- Shape Adaptation

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: Once every two calendar years

Prepared By: Stefan Hurlebaus

Date Prepared: 2/17/2012
MEMA 633
Theory of Plates and Shells

Description: Theoretical formulations of thin and thick plates (classical and shear deformation theories); analytical solutions of plates and various shapes and support conditions, bending, vibration and stability of plates; numerical solutions using the energy methods and the finite element method; theory and analysis of cylindrical shells.

Prerequisites: MEMA 601, 602 or 605

Class notes

Course Learning Outcomes: The main goal is to provide a solid understanding of the behavior of plates and of simple shell structures.

Topics Covered:
5. Cylindrical plate bending.
8. Effect of transverse shear deformation.
9. Basic concepts of differential geometry of curves and surfaces.
10. General shell equations.
11. Membrane theory of shells.

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

Professional Contribution: Engineering science

Graduate Level: Masters & PhD

Schedule: Once every two calendar years
MEMA 647
Theory of Finite Element Analysis

Description: Finite elements models of a continuum; virtual work principle; plane stress and plane strain finite element models; bending of plates; axisymmetric problems; three-dimensional stress analysis; isoparametric formulations; finite element computer programs to solve typical structural problems.

Prerequisites: Graduate classification or approval of instructor


Course Learning Outcomes:
- Understand the components of a mathematical model: governing equations, initial conditions, essential and natural boundary conditions, primary and secondary variables...
- find a mathematical approximate solution using a weighted-residual formulation of a problem
- use variational methods to find approximate solutions
- build a 1D Finite Element Model (weak form, interpolation functions, element governing equation, global stiffness matrix…): beam elements, 1D elements for eigenvalue and time-dependent problems
- determine the interpolation functions of basic 2D master elements (triangular elements, linear and quadratic rectangular elements)
- define the best modeling strategy in 2D: serendipity elements, transition elements, optimal load representation
- use 2D Finite Element models to solve plane elasticity problems

Topics Covered:
1. Introduction
   a. What is an engineering problem and what is a mathematical model?
   b. Review: Integral Theorems, Elements of Calculus of Variations
2. Building an Approximation Problem
   a. Integral formulation of differential equations
   b. Variational methods to solve boundary value problems
3. FEM for 1 degree of freedom in one dimension
   a. Modeling: element equations (bars, heat transfer…), Lagrange and Hermite interpolation functions, connectivity, application of nodal conditions, resolution (condensation technique)
   b. Applications: discrete systems, heat transfer, fluid flow in a pipe, bars and plane trusses
4. Special Applications of 1D-FEM:
   a. 1D-FEM for Beams: Euler-Bernouilli beam elements, Timoshenko beam elements
   b. 1D- FEM for eigenvalue problems
   c. 1D- FEM for time-dependent problems: parabolic equations (ex: transient heat transfer), hyperbolic equations (ex: vibration of beams)
5. FEM in 2D:
   a. Elementary Modeling: Linear Triangular and Rectangular Elements, Higher-Order triangular and rectangular elements, serendipity elements,
   b. Building the whole model: assembly, boundary integrals for flux boundary conditions
   c. Mathematical issues: numerical integration, coordinate transformation, 2D master elements
d. Application of the FEM to 2D single-variable problems: heat transfer, fluid flow

e. Application of the FEM to 2D multi-variable problems: plane elasticity

Meeting Time: 3 lecture sessions per week: Mo-We-Fr 12.40pm – 1.30pm

Professional Contribution: Engineering science

Graduate Level: Masters & PhD

Schedule: One semester per calendar year

Prepared By: Dr. Chloé Arson (coordinator)  Date Prepared: 02/20/2012
OCEN 630
Title – Dynamics of Ocean Vehicles

Description: Dynamics and stability of motion of immersed and floating structures and ocean vehicles; maneuverability and control; behavior of ocean vehicles and stationary platforms in waves. Design considerations leading to motion reduction; applications to surface vessels, submersibles and drilling rigs.

Prerequisites: CVEN 311, CVEN363 or equivalent, or approval of instructor

Textbook: Notes and
1) Lewandowski, Dynamics of Marine Craft,
2) Abkowitz, Stability and Motion Control of Marine Vehicles

Course Learning Outcomes: Ship Dynamics consists of two areas maneuvering and ship motion in waves. These two areas have traditionally been treated separately but in certain circumstances they must be treated simultaneously. This course will describe each area in some detail and prepare the student to simultaneously analyze these types of motion simultaneously. Moreover, reference to floating platform and submerged body dynamics will be made where appropriate.

Topics Covered: I. INTRODUCTION
1.1 Ship maneuvering and control
1.2 Ship motion simulation
II. STATIC STABILITY
III. EQUATIONS OF MOTION
3.1 Moving coordinates
3.2 Motion of a rigid body in space
IV. HYDRODYNAMIC FORCES
4.1 Nature and origin of the forces
4.2 Hydrodynamic derivatives and their physical interpretations
4.3 Evaluation of the hydrodynamic derivatives
V. MANEUVERING AND CONTROL
5.1 Path keeping - straight-line, directional and positional stability
5.2 Criteria for dynamic stability
5.3 Maneuvering and control
5.4 The turning path
5.5 Nonlinear effects on ship maneuverability
VI. SIMPLIFIED EQUATIONS OF MOTION
6.1 Simplified equations of motion
6.2 Maneuvering criteria
VII. MANEUVERING IN RESTRICTED WATERWAYS
VIII. DEFINITIVE MANEUVERS
IX. BEHAVIOR OF FLOATING PLATFORMS IN WAVES

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

Professional Contribution: Engineering science

Graduate Level: Masters & PhD
Schedule: Once every two calendar years

Prepared By: Jeffrey Falzarano Date Prepared: Feb 17, 2012
OCEN 671
Title – Ocean Wave Mechanics

Description: Wave theory and applications to engineering problems; linear and non-linear theories of regular gravity waves; wave properties and transformation in shoaling water; spectral analysis of irregular waves; forecasting, hindcasting and theoretical spectra.

Prerequisites: OCEN 362 or equivalent


Course Learning Outcomes:
1. Apply basic ocean wave theory to compute the pressure and kinematics of ocean waves.
2. Predict wave properties when they entering into shallow water.
3. Use wave statistics and spectra to simulate and analyze ocean waves.
4. Understand wave-maker theory to simulate ocean waves in a wave tank.
5. Understand basic nonlinear wave theories and their application.

Topics Covered:
1. Review of Basic Fluid Mechanics
2. Linear wave theory
3. Waves entering shallow water, wave shoaling and refraction
4. Wave breaking and diffraction
5. Long wave approximation, wave reflection, transmission and bottom friction
6. Wave-maker theory
7. Wave statistics, wave spectrum and simulation of random waves
8. Nonlinear wave theory, Stokes expansion
10. Radiation Stress and wave set-down and set-up

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

Professional Contribution: Mathematics and basic sciences

Engineering science

Graduate Level: Masters & PhD

Schedule: Fall semester of each year

Prepared By: Jun Zhang 

Date Prepared: Feb. 20, 2012
OCEN 672
Title – Coastal Engineering

Description: Effects of waves on coastal structures; design of seawalls, breakwaters, jetties, harbors, ship channels and pipelines; intentional and accidental discharge of pollutants; diffusion and spreading; oil spill containment and collection.

Prerequisites: OCEN 671

Textbook: U.S. Army Corps of Engineers Coastal Engineering Manual (available online) Other references as needed.

Course Learning Outcomes: By the end of the course, students will be able to: Apply wave theory to solve coastal engineering problems; relate breaking wave properties to longshore current velocities; use probability theory and spectral analysis to describe random waves; apply extreme value statistics in design; determine tidal amplitudes in inlets and bays; determine storm surge characteristics; use wave forecasting methods to determine generated wave characteristics; determine sediment transport quantities; design elements of beach fills, coastal structures and other coastal defense elements. Measurement of student progress toward these goal is done by evaluation of performance on exams, homework assignments and a project.

Topics Covered:
- Review of water wave theory
- Wave-averaged wave properties
- Nearshore hydrodynamics
- Wave statistics and wave spectra
- Extreme value analysis
- Astronomical tides and tidal hydrodynamics
- Coastal meteorology and storm surge
- Wave generation by wind
- Littoral processes
- Soft coastal engineering solutions
- Hard coastal engineering solutions; coastal structures

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

Prepared By: James M. Kaihatu

Date Prepared: 2/21/2012
OCEN 673
Title – Nonlinear Hydrodynamic Problems in Ocean Engineering

Description: Nonlinear hydrodynamic problems involved with the complex offshore structures in high sea environment; nonlinear waves application of Volterra model to weakly nonlinear systems; generation of nonlinear model waves; nonlinear hydrodynamic interaction between waves and structure; dynamic analysis of nonlinear response of integrated offshore structures.

Prerequisites: OCEN 671 and 678

Textbook: Sea Loads on Ships and Offshore Structures (O.M. Faltinsen; Cambridge Press)

References:
3. Developments in Offshore Engineering (Editor J.B. Herbich) CH.8

Course Learning Outcomes: This course provide various advanced topics that are considered in the wave-structure interaction theory, nonlinear wave loading, boundary element method for diffraction and radiation, nonlinear stochastic approach, and nonlinear dynamic analysis of offshore structures.

Topics Covered:
- Various offshore structures and related topics
- CH1. Introduction
- CH2. Sea environment
- CH3. Linear-wave induced motions and loads on floating structures
- CH4. Numerical methods for linear-wave induced motions and loads
- Hydrodynamic theory for WEC (wave energy converter)
- Mid-term Exam
- CH5. Second-order non-linear problems
- Fully nonlinear wave-floating-body interactions
- CH6. Current and wind loads
- CH7. Viscous wave loads and damping
- CH8. Station keeping
- Recent advances in harvesting ocean renewable energy
- Final

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

Professional Contribution: Engineering science

Graduate Level: Masters & PhD

Schedule: Once every two calendar years

Prepared By: Joseph M.H. Kim, Professor

Date Prepared: 2/17/2012
OCEN 674
Title – Ports and Harbors

Description: Basic port planning including site selection, environmental factors and economic conditions; design of wharves, quays, jetties, breakwaters, terminals, navigational channels and fenders; harbor sedimentation and maintenance dredging; design of fishing, small craft and recreation boat harbors.

Prerequisites: Approval of instructor

Textbook: None; course developed from instructor’s notes. Materials from relevant references available online, in particular material from the U.S. Army Corps of Engineers.

Course Learning Outcomes: By the end of the course, the student will be able to: determine the characteristics of vessels relevant for design; distinguish between types of vessels; determine natural environmental factors affecting port and harbor placement and layout; design entrance channel layouts and cross-sections; design turning basins; design port and harbor structures based on loading from winds, waves and currents; design mooring structures and fenders; design foundation depths and geometric considerations for mooring and dock structures. Measurement of student progress toward these goals is performed by evaluation of performance on assigned homework, midterm exam and final exam.

Topics Covered:

- Vessel characteristics
- Site selection and general layout
- Environmental factors
- Planning factors
- Inlets, jetties and entrances
- Small craft harbors
- Channels and turning basins
- Operational and environmental loads on port structures
- Berthing loads and fender design
- Mooring loads and design principles
- Design of fixed structures
- Geotechnical considerations
- Maintenance

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: Once every two calendar years

Prepared By: James M. Kaihatu

Date Prepared: 2/21/2012
OCEN 675
Title – Nonlinear Wave Dynamics

Description: Nonlinear wave-wave interactions in steep ocean waves significantly affect wave properties and long-term wave evolution. Strong and weak wave interactions and their respective effects on waves are studied, using various perturbation methods. Applications are shown through using Hybrid Wave Models to analyze wave measurements and predict wave loads on structures.

Prerequisites: OCEN 671

Textbook: None. Instructor's notes supplied online.

Course Learning Outcomes: By the end of the course the student will be able to: separate a problem into relevant scales using perturbations and multiple scales; scale the water wave problem for deep and shallow water asymptotes; develop the theory for second order Stokes waves; be familiar with the concept of resonant interaction; develop shallow water Boussinesq equations, Korteweg-deVries equations and Kadomtsev-Petviashvili equations; develop time-harmonic evolution equations for waves in shallow water; understand the concept of carrier waves and develop modulate Stokes wave theory. Measurement of student progress toward these goals will be performed by evaluation of performance on assigned homeworks, midterm exam and class project.

Topics Covered:
- Introduction to perturbation methods: multiple scales analysis, strained parameters.
- Scaling the water wave problem
- Second order Stokes wave theory
- Gravity/capillary waves
- Weakly dispersive shallow water waves
- Boussinesq equations; Korteweg-deVries equations; Kadomtsev-Petviashvili equations
- Time-harmonic evolution equations; triad interactions
- Modulated Stokes waves
- Quartet interactions

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

Prepared By: James M. Kaihatu
Date Prepared: 2/21/2012
OCEN 676
Title – Dynamics of Offshore Structures

Description: Review of concepts of linear structural dynamic analysis for time and frequency domain simulations, functional design of off-shore platforms, pipelines, floating structures and moorings; environmental loading problems; hydrodynamic phenomena including wind and current interaction, vortex shedding and wave forces; structure-fluid interaction models.

Prerequisites: OCEN 671 or approval of the instructor

Textbook: None – lecture notes provided by the instructor

Course Learning Outcomes: This course provides a basic treatment of the broad range of topics that are considered in the dynamic analysis of offshore structures.

Topics Covered:

Part A: Fundamentals of Vibration Analysis
1. Introductory Considerations
2. Inertia Forces
3. Single Degree of Freedom Systems
4. Input/Output Relationships for Linear Systems
5. Random Processes

Part B: Application to Dynamic Analysis of Offshore Structures
6. Statistical Description of Waves
7. Wave Mechanics
8. Wave Interactions with Large Displacement Structures
9. Linearized Equations of Motion for a Constrained, Floating Body
10. Nonlinear Wave Diffraction
11. Forces on Bodies Exposed to a Steady Flow
12. Drag Forces on Bodies in Oscillatory Flow
13. Wave Interactions with Slender Structures

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

Professional Contribution:
Mathematics and basic sciences
Engineering science

Graduate Level: Masters & PhD

Schedule: Spring Semester

Prepared By: R. S. Mercier

Date Prepared: Feb. 22, 2012
OCEN 683
Title – Estuary Hydrodynamics

Description: Introduction to fluid and mass transport in naturally occurring flows; topics include molecular and turbulent diffusion; dispersion; river, estuary, and ocean mixing; dissolution boundary layers; tidal mixing; offshore wastewater outfalls; introduction to environmental quality numerical modeling.

Prerequisites: CVEN 311 or equivalent


Course Learning Outcomes: The objective of this course is to introduce the physics and chemistry of transport and mixing of substances in the hydrosphere through which students learning to understand the effects of diffusion, advection, dispersion, and chemical reactions on concentrations in the environment, apply the governing transport equation to solve problems with diverse boundary and initial conditions, evaluate the important processes affecting fate and transport in a range of problem situations, and synthesize the analysis tools developed in the course to solve real-world transport problems.

Topics Covered:
- Concentration and concentration measures
- Fick’s law of diffusion
- Diffusion equation
- Integral solutions to the diffusion equation
- Advection-diffusion equation
- Instantaneous point source solution
- Initial spatial distributions
- Fixed concentration solutions
- Properties of turbulence
- Reynolds decomposition and the turbulent transport equation
- Taylor dispersion
- Dispersion coefficients in rivers
- Reaction kinetics
- Reacting transport equation
- Atmospheric mixing
- Boundary exchange: air/water and sediment/water interfaces
- Jet and plumes
- Outfall design
- Far-field ocean transport

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

Prepared By: Scott A. Socolofsky Date Prepared: February, 2012
OCEN 678
Title – Fluid Dynamics for Ocean and Environmental Engineering

Description: General conservation laws; Navier-Stokes equations; steady and unsteady Bernoulli’s equation; potential flow theory and basics of panel methods; laminar and turbulent boundary layer; dispersion and diffusion processes in laminar and turbulent flow; flow past a body of any shape.

Prerequisites: CVEN 311 or equivalent


Course Learning Outcomes: By the end of this course, students will be able to construct solutions to fluid dynamics problems applicable to their research using methods from the fluids literature. To achieve this goal, students will learn to categorize solutions to fluids problems by their fundamental assumptions, list and explain the assumptions behind the classical equations of fluid dynamics, and identify and formulate the physical interpretation of the mathematical terms used in solutions to fluid dynamics problems.

Topics Covered:
- Tensors
- Reynolds transport theorem
- Navier-Stokes equations
- Dynamic pressure
- Transport equations
- Viscous flow: analytical and approximate solutions
- Boundary layer theory
- Turbulence
- Turbulent boundary layers
- Bernoulli equations
- Kelvin’s theorem
- Two-dimensional potential flow
- Blasius integral laws
- Conformal mapping
- Three-dimensional potential flow
- Forces on objects in three-dimensional potential flow
- Added mass
- Panel methods

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

Professional Contribution: Mathematics and basic sciences
Engineering science

Graduate Level: Masters & PhD

Schedule: One semester per calendar year

Prepared By: Scott A. Socolofsky
Date Prepared: February, 2012
OCEN 682
Title – Coastal Sediment Processes

Description: Sediment properties and size distribution, fluvial sediment transport equations, movement of material by the sea, review of pertinent wave theories, littoral drift, inlet stability, coastal protection structures, similarity in sediment transport, movable bed models, sediment tracing, Aeolian sand transport, case studies.

Prerequisites: OCEN 671 or approval of instructor

Textbook: None. Instructor's notes supplied online.

Course Learning Outcomes: By the end of this course the student should be able to: determine the characteristics of long-period motion in the nearshore; determine the relevant cross-shore motions responsible for beach profile evolution; determine the relationships between longshore currents and sediment transport; calculate bed load and suspended load quantities; determine likely beach morphology evolution given forcing conditions; determine likely bed form characteristics. Measurement of student progress toward these goals are performed by evaluation of performance on homework assignments, exams and a project.

Topics Covered: • Introduction to sediment properties • Wave-averaged motion in the nearshore • Cross-shore transport • Longshore transport • Wave and current boundary layers; steady streaming • Basic sediment transport mechanics • Bed load • Suspended load • Beach morphology and bed forms • Introduction to cohesive sediment

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

Professional Contribution: Mathematics and basic sciences Engineering science

Graduate Level: Masters & PhD

Schedule: Once every two calendar years

Prepared By: James M. Kaihatu Date Prepared: 2/21/2012
OCEN 683
Title – Estuary Hydrodynamics

Description: Development of applicable equations for tidal dynamics applied to real estuaries; technology for determination of mean velocities, circulation patterns, water depths, turbulent dispersion patterns, etc. for solution of environmental problems in estuaries; physical and mathematical models.

Prerequisites: OCEN 678 or approval of instructor


Course Learning Outcomes: By the end of this course, students will be able to measure, predict, and analyze flow patterns in real estuaries and to critique papers on estuary hydrodynamics in the research literature.

Topics Covered:
• Flow and transport fundamentals
• Astronomical tides
• Estuary tidal dynamics
• Estuary mixing and transport
• Hydrodynamic models
• Vegetated hydrodynamics
• Tidal inlet hydrodynamics

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

Professional Contribution: Engineering science

Graduate Level: Masters & PhD

Schedule: Once every two calendar years

Prepared By: Scott A. Socolofsky  Date Prepared: February, 2012
OCEN 688
Title – Marine Dredging

Description: Dredge pump selection; pump and system characteristics; cavitation; types of dredges; continental shelf and deep-ocean dredging; head loss in horizontal and vertical pipes for two and three-phase flow; design of disposal methods for dredged material; environmental effects of dredging.

Prerequisites: Approval of instructor

Textbook: Dredging and Dredged Material Placement, Purchased Course Notes
Additional references:
Randall, R. E., Dredging, Chap. 10, Port Engineering, Tsinker, Editor, 2002.

Course Learning Outcomes:
1. Ability to apply knowledge of engineering science and design to marine dredging
2. Developed ability to function on teams
3. Developed the ability to communicate more effectively
4. Ability to use available dredging software
5. Ability to analyze the pumping and pipeline systems that transport of two phase slurry flow
6. Ability to apply environmental laws
7. Capable of analyzing alternatives for placing dredged material
8. Gained knowledge of dredging and placing contaminated sediment

Topics Covered:
1. Introduction, History, Dredging Equipment
2. Dredge Pumps, Pump Affinity Laws, Pump Characteristic Curves, Dredge Modeling
3. Slurry Effects on Dredge Pumps, Dredge Pump System Curves, Cavitation and Gas Effects
4. Sediment Characteristics & Classification, Settling Velocity, Pipeline Transport of Dredged Material
5. Pipeline Transport of Dredged Material, Slurry Composition, Critical Velocity
6. Dredge Production Evaluation, Velocity, Pressure, and Cutter Limitations, Dredging Costs
9. Confined Disposal Facilities, SETTLE Numerical Model
11. Beneficial Uses of Dredged Material, Contaminated Sediment
13. Dredging Windows, Silt Curtains, Resuspension, Instrumentation, Monitoring

Meeting Time: Three lecture sessions each week, 50 minutes each
| Professional Contribution: | Engineering science  
|                           | Engineering design  
|                           | General education (use of dredging software, Settle, STFATE)  
|                           | Team design report and presentation  
| Graduate Level:           | Masters & PhD  
| Schedule:                | Once every two calendar years  

**Prepared By:** Robert E. Randall  
**Date Prepared:** February 29, 2012
Table H-1. Graduate Course Offerings – 2007-2012

<table>
<thead>
<tr>
<th>Course Number</th>
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<td>Systems Design of Pavements</td>
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<td>Traffic Engineering Characteristics</td>
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APPENDIX I  Civil Engineering Advisory Council Bylaws
ARTICLE I 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.

Section 2

The mission of the Civil Engineering Advisory Council 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 Civil Engineering Advisory Council 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 Civil Engineering Advisory Council membership shall be expected to provide advice to the Department Head as representatives of all department graduates as well as firms employing its graduates both in Texas and the nation.

In addition to providing timely guidance on critical issues and challenges facing the profession, the Civil Engineering Advisory Council 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.

ARTICLE II MEMBERSHIP

Section 1

The Civil Engineering Advisory Council shall typically have a membership of twenty to twenty-five active registered professional engineers. 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 and the diversity of our graduates in the broadest sense. The program areas of specialization within the Department’s educational program currently include: Coastal, Construction, Environmental, Geotechnical, Materials, Ocean, Water Resources, Structures, Transportation, and General Civil Engineering. This has become increasingly important with regards to professional accreditation by ABET of its undergraduate degree programs in Civil and Ocean Engineering. The Advisory Council should be open to include one or two graduates from other well-respected engineering programs who will enhance the national and international perspective of the department on the practice of Civil Engineering.

Typically, nominations for the Civil Engineering Advisory Council membership can come from students, former students, faculty, retired faculty, the Department Head or active or emeriti council members. Nominees must be in professional practice for a period of time consistent with professional licensure and have a demonstrated record of leadership in the profession. The council chairperson in consultation with the Department Head will appoint a membership committee of four to five members with representation from Houston, Corpus-Christi, San Antonio, Dallas/Fort Worth and Austin. They 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 Emeriti members. After taking into account the recommendations of the membership committee, the Department Head will make a selection from the list of nominees. 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.

Section 2

The term of appointment for a member of the Civil Engineering Advisory Council shall be four years. Ideally approximately one-fourth of the members’ terms will be expiring each year. Terms of 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, shall be four years in duration with a maximum of a one-term reappointment. The Department Head may terminate an appointment on the advisory council upon request of a council member, or upon the recommendation of the membership committee. Upon the completion of their two consecutive terms, members may be named Emeriti Members 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.

In order to begin the process of adjusting the council membership rotation in the least disruptive manner, the membership committee and the Department Head will review the current council membership and develop a workable rotation plan.

Section 3

At the request of the Department Head, the Civil Engineering Advisory Council will form committees to address membership 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 matters may be presented by the Department Head or discussed by the Advisory Council or committees that because of the subject are confidential in nature. 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.

ARTICLE III OFFICERS

Section 1

A Chair and Co-chair will provide the leadership of the Civil Engineering Advisory Council 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 Civil Engineering Advisory Council 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 be expected to help as needed and to lead meeting in the absence of the Chair. Both of these individual 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 Civil Engineering Advisory Council shall preside at all meetings of the Zachry Department of Civil Engineering Advisory Council 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 meetings of the Zachry Department of Civil Engineering Advisory Council on campus may be held twice a year. The Fall Meeting will normally be held in September or October and the spring meeting will normally be held in March or April. Additional regional meetings in late fall and during the spring and summer semesters. These regional meetings are intended to engage more of our former students and most likely will replace the on-campus spring meeting.

Section 2

Special event 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 these local events with various current or Emeriti council members depending on their availability. The Department Head may also arrange for the Advisory Council Chair and members of the Council to meet with our students, college or university officials, as appropriate.

Section 3

Regional meetings may be scheduled during the fall and spring academic semesters. The meetings 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 meetings 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 for 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 Civil Engineering Advisory Council, 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 Civil Engineering Advisory Council, together with the Department Head and departmental staff shall be responsible for preparing a written summary including minutes 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 members of the Council and for the Department Head.

ARTICLE VII EVALUATION

The Civil Engineering Advisory Council will conduct a self-evaluation of past activities for the purpose of improving the function of the Council. These evaluations, short reports, will be scheduled as part of the fall meeting of the Civil Engineering Advisory Council every year for discussion and future planning.
APPENDIX J Civil Engineering Advisory Council Members

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Dean Word Company  
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Mr. H. B. Zachry, Jr. '54  
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APPENDIX K Guidelines - Teaching Fellowships for Doctoral Candidates
Guidelines Teaching Fellowships for Doctoral Candidates
Zachry Department of Civil Engineering

The purpose of the departmental Teaching Fellowship program is to provide a supervised teaching experience to our very best doctoral students who have passed their doctoral preliminary examinations and are within a year of graduation. This competitive program will give the selected students an important experience that will help them compete for faculty positions at the rank of Assistant Professor at top tier universities around the country. This program is open to all doctoral students in both the Civil and Ocean Engineering degree programs. The nominees must have expressed and demonstrated a serious interest and have the potential to pursue an academic career.

The dissertation chair, who must be a member of the Zachry Department of Civil Engineering, will nominate students for the Teaching Fellowship. This is essential, as the dissertation chair must actively mentor the student during the period of the fellowship. The mentor's role is to provide support and guidance during the semester/s while the Teaching Fellow is learning about pedagogy and the strengthening their current state of knowledge on course content and improving their teaching skills.

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. Thus, Teaching Fellows are expected to continue their doctoral research and professional activities during this appointment. At the successful conclusion of this appointment the student will receive a letter from the Department Head and the dissertation chair attesting to the selectivity of the process and the Teaching Fellow's performance.

Eligibility requirements
In order to be eligible, applicants must have:
1. attained degree candidacy by successfully completing their preliminary examinations
2. be within a year of graduation, and
3. have a strong desire to pursue an academic career

Additionally, candidates will be expected to complete or have completed the Graduate Teaching Academy program (http://gta.tamu.edu/) offered by the Texas A&M University Center for Teaching Excellence.

Application Process
The following documents are required for application:
1. Application form (see next page)
2. Statement of teaching and research philosophy
3. Transcript of all graduate courses taken at A&M
4. Written class proposal (student should discuss this with the committee chair)
5. A recommendation letter which addresses the nominees potential and suggest undergraduate course/s that the nominee could teach.

Due date
Ideally, applications will be due by the end of the 4th week of classes in the semester before the assignment is to begin. The evaluation and selection will be conducted in the next 4 weeks of the semester noting the following deadlines:

Fall due date: Sept. 30 for teaching in spring.
Fall selection date: Candidates notified by October 31 for teaching in spring.

Spring due date: February 15 for teaching in summer or fall.
Spring selection date: Candidates notified by March 15 for teaching in summer or fall.
The objective is to complete the teaching assignments before students start pre-registration. This is important because room and teaching assignments may depend on whether or not a Teaching Fellow will be allowed to teach in a given semester.

**Selection process**
An evaluation committee will be appointed by the Department Head, and may consist of the Associate and Assistant Department Heads, the appropriate Division Head and additional faculty members with relevant teaching experience. The committee will initially evaluate applications and the potential for the applicant to be successful. The candidates selected by the committee will be given time to prepare a lecture on an assigned topic relevant to the applicant’s teaching and research interests. The committee will recommend the appointment of Teaching Fellows based upon the effectiveness of the lecture by the candidate and the application materials. The Department Head will work with the Associate Department Head, the Division Heads and the Teaching Fellow/s to determine appropriate faculty to aid in the mentoring process, class selected and schedule.

**Other**
The Department Head will work with the faculty and Teaching Fellows to ensure the best teaching and research experience possible and to provide the appropriate financial incentives. The appointment as a Teaching Fellow will typically be limited to the one or two semesters prior to graduation. The student will receive support for tuition, fees, benefits, and a fellowship stipend as appropriate. Please note that upon selection the dissertation chair will be expected to sign a mentoring agreement outlined as part of this document.

**Faculty Mentor Contract**

Name:

As a faculty mentor for Teaching Fellow ____________________________ for the course ___________
I will:

− Provide guidance/plan for developing knowledge of teaching pedagogy and current state of knowledge in the area of the course
− Meet with the teaching fellow weekly to discuss the lecture notes before the lectures. It will be my responsibility to help the faculty fellow in preparing organized and effective lecture plans, suggest methods and activities that will be more suitable for the faculty fellow in this course
− Attend the lectures by the teaching fellow weekly
− Meet with the teaching fellow weekly to discuss my observations of the lectures, including: strong performance and ways to improve
− Help the teaching fellow develop an effective assessment plan
− Oversee the quality of instruction and experience for the students enrolled in the course
Faculty Committees

Curriculum Committee (Ongoing)

Morgan, James   CGS
(Chair)  Kaihatu, James  C&O
Zhang, Yunlong T&M
Miller, Gretchen EWRE
Kohutek, Terry   ex-officio
Socolofsky, Scott ex-officio
Smith, Roger

Infrastructure Center (Technical/Research Areas/Needs)

Smith, Roger  T&M (Chair)
Bracci, Joe  CGS
(development leave)
Damnjanovic, Ivan  CGS
Epps Martin, Amy  T&M
Olivera, Francisco EWRE
Kaihatu, James  C&O
Quadrifoglio, Luca  T&M
Auben, Charles  CGS

(Sensors)

Walewski, John  CGS

Niedzwecki, John  CGS
Mander, John  CGS
Briaud, Jean-Louis  CGS
Batchelor, Bill  EWRE
Lytton, Bob  T&M
Little, Dallas  T&M
Reinschmidt, Ken  CGS
Randall, Robert  C&O
Smith, Roger  T&M
Anderson, Stuart  CGS
Autenrieth, Robin EWRE
Wurbs, Ralph  EWRE
Bracci, Joe  CGS

Research Opportunities and Strategic Planning (Ongoing)

Niedzwecki, John  CGS
Mander, John  CGS
Briaud, Jean-Louis  CGS
Batchelor, Bill  EWRE
Lytton, Bob  T&M
Little, Dallas  T&M
Reinschmidt, Ken  CGS
Randall, Robert  C&O
Smith, Roger  T&M
Anderson, Stuart  CGS
Autenrieth, Robin EWRE
Wurbs, Ralph  EWRE
Bracci, Joe  CGS

Computation

Lynett, Patrick  C&O
Grasley, Zachary  T&M
Sanchez, Marcelo  CGS
Brumbelow, Kelly EWRE (Chair)
Al-Rub, Rashid  CGS
Arson, Chloe  CGS
Chu, Bella  EWRE
Wang, Bruce  T&M
Ying, Qi  EWRE

Lynett, Patrick  C&O
Grasley, Zachary  T&M
Sanchez, Marcelo  CGS
Brumbelow, Kelly EWRE (Chair)
Al-Rub, Rashid  CGS
Arson, Chloe  CGS
Chu, Bella  EWRE
Wang, Bruce  T&M
Ying, Qi  EWRE
STUDENT ORGANIZATION PRESIDENTS
Spring 2012

ACE Doc – Bryan Tyson
   Advisor: Abu Al-Rub

AEES – (Association of Environmental Engineering Students)
   Advisor: Batchelor

ASCE Chapter
   Advisor: Cahill

ASCE Concrete Canoe –
   co-captain: Molly Giltner - & Jen Menard
   Advisor: Zollinger

ASCE COPRI (Coasts, Oceans, Ports and Rivers Institute)
   Advisor: Chang

ASCE Steel Bridge
   Advisor: Keating

AWRA - Jenna Kromann
   Advisor: Brumbelow

Chi Epsilon – Damona Woodley
   Advisor: Brumbelow

Engineers Without Borders (EWB) – Kate Emery
   Advisor: Autenrieth

Geo-Institute – Michelle Bernhardt
   Advisor: Biscontin

Human Power Submarine – Duncan Brotzman
   Advisor: Randall

Institute of Transportation Engineers (ITE) –
   Lisa Larsen
   Advisor: Lord

MAES (Mexican American Engineers & Scientists) – Nallely Davila

MTS & SNAME – Gary Liles
   Advisor: Kaihatu

Omega Epsilon – Adam Scheidler –
   Advisor: Zhang

SEAoT – Josh White
   Advisor: Hurlebaus