Department of Structural Engineering
Irwin and Joan Jacobs School of Engineering

Undergraduate Handbook

Rev. 02/28/2014
UNDERGRADUATE STUDENT AFFAIRS
Department of Structural Engineering
SME Building, Room 340A

www.structures.ucsd.edu

CONTACT LIST

UNDERGRADUATE AFFAIRS COMMITTEE

Hyonny Kim, Chair 858-534-7442 hyonny@ucsd.edu
Michael Todd 858-534-5951 mdt@ucsd.edu
Chia-Ming Uang 858-534-9880 cuang@ucsd.edu
John Kosmatka 858-534-1779 jkosmatka@ucsd.edu
Petr Krysl 858-822-4787 pkrysl@ucsd.edu
Lelli Van Den Einde 858-822-2188 lellivde@ucsd.edu
Danielle Swenson 858-822-2273 dswenson@ucsd.edu

UNDERGRADUATE ACADEMIC ADVISOR

Danielle Swenson 858-822-2273 dswenson@ucsd.edu

DEPARTMENT CHAIR

Enrique Luco 858-822-5212 se-chair@ucsd.edu

DEPARTMENT VICE CHAIRS

Benson Shing 858-822-4567 pshing@ucsd.edu
Michael Todd 858-534-5951 mdt@ucsd.edu

MANAGEMENT SERVICE OFFICER (MSO)

Jacqueline Vo 858-534-8082 jtvo@ucsd.edu

LOCATION

Structural Engineering faculty, staff, and laboratories primarily reside in the SME (Structural and Materials Engineering) building. The Jacobs School of Engineering Dean’s office and administration is primarily located in Engineering Building Unit I. A detailed campus map may be found online at the following web link: http://maps.ucsd.edu/mapping/viewer/default.htm.
# FACULTY AND STAFF CONTACT LIST*

## FACULTY

<table>
<thead>
<tr>
<th>Name</th>
<th>Office</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asaro, Robert</td>
<td>SME 442K</td>
<td>858-534-6888</td>
<td><a href="mailto:rasaro@ucsd.edu">rasaro@ucsd.edu</a></td>
</tr>
<tr>
<td>Bazilves, Yuri</td>
<td>SME 445H</td>
<td>858-534-3663</td>
<td><a href="mailto:yuri@ucsd.edu">yuri@ucsd.edu</a></td>
</tr>
<tr>
<td>Benson, David</td>
<td>SME 445G</td>
<td>858-534-5928</td>
<td><a href="mailto:dbenson@ucsd.edu">dbenson@ucsd.edu</a></td>
</tr>
<tr>
<td>Bisagni, Chiara</td>
<td>SME 441H</td>
<td>858-534-4599</td>
<td><a href="mailto:cbisagni@eng.ucsd.edu">cbisagni@eng.ucsd.edu</a></td>
</tr>
<tr>
<td>Conte, Joel</td>
<td>SME 443K</td>
<td>858-822-4545</td>
<td><a href="mailto:jpconte@ucsd.edu">jpconte@ucsd.edu</a></td>
</tr>
<tr>
<td>Elgamal, Ahmed</td>
<td>SME 443H</td>
<td>858-822-1075</td>
<td><a href="mailto:aelgamal@ucsd.edu">aelgamal@ucsd.edu</a></td>
</tr>
<tr>
<td>Fox, Patrick J.</td>
<td>SME 444G</td>
<td>858-822-0431</td>
<td><a href="mailto:pfjfox@ucsd.edu">pfjfox@ucsd.edu</a></td>
</tr>
<tr>
<td>Hegemier, Gil</td>
<td>SME 442J</td>
<td>858-534-4280</td>
<td><a href="mailto:hegemier@ucsd.edu">hegemier@ucsd.edu</a></td>
</tr>
<tr>
<td>Hutchinson, Tara</td>
<td>SME 444K</td>
<td>858-534-7436</td>
<td><a href="mailto:tara@ucsd.edu">tara@ucsd.edu</a></td>
</tr>
<tr>
<td>Kim, Hyonny</td>
<td>SME 441J</td>
<td>858-534-7442</td>
<td><a href="mailto:Hyonny@ucsd.edu">Hyonny@ucsd.edu</a></td>
</tr>
<tr>
<td>Kosmatka, John</td>
<td>SME 441G</td>
<td>858-534-1779</td>
<td><a href="mailto:jkosmatka@ucsd.edu">jkosmatka@ucsd.edu</a></td>
</tr>
<tr>
<td>Krysl, Petr</td>
<td>SME 445F</td>
<td>858-822-4787</td>
<td><a href="mailto:pkryst@ucsd.edu">pkryst@ucsd.edu</a></td>
</tr>
<tr>
<td>Kuester, Falko</td>
<td>SME 342D</td>
<td>858-534-9953</td>
<td><a href="mailto:fkuester@ucsd.edu">fkuester@ucsd.edu</a></td>
</tr>
<tr>
<td>Lanza di Scalea, Francesco</td>
<td>SME 442H</td>
<td>858-822-1458</td>
<td><a href="mailto:flanza@ucsd.edu">flanza@ucsd.edu</a></td>
</tr>
<tr>
<td>Luco, Enrique</td>
<td>SME 445D</td>
<td>858-534-4338</td>
<td><a href="mailto:jelucu@ucsd.edu">jelucu@ucsd.edu</a></td>
</tr>
<tr>
<td>Mosqueda, Gilberto</td>
<td>SME 443G</td>
<td>858-534-4722</td>
<td><a href="mailto:gmosqueda@ucsd.edu">gmosqueda@ucsd.edu</a></td>
</tr>
<tr>
<td>Qiao, Yu</td>
<td>SME 442G</td>
<td>858-534-3388</td>
<td><a href="mailto:yqiao@ucsd.edu">yqiao@ucsd.edu</a></td>
</tr>
<tr>
<td>Restrepo, Jose</td>
<td>SME 444H</td>
<td>858-822-3392</td>
<td><a href="mailto:jrestrepo@ucsd.edu">jrestrepo@ucsd.edu</a></td>
</tr>
<tr>
<td>Shing, Benson</td>
<td>SME 443J</td>
<td>858-822-4567</td>
<td><a href="mailto:pshing@ucsd.edu">pshing@ucsd.edu</a></td>
</tr>
<tr>
<td>Todd, Michael</td>
<td>SME 445E</td>
<td>858-534-5951</td>
<td><a href="mailto:mtodd@ucsd.edu">mtodd@ucsd.edu</a></td>
</tr>
<tr>
<td>Uang, Chia-Ming</td>
<td>SME 444J</td>
<td>858-534-9880</td>
<td><a href="mailto:cuang@ucsd.edu">cuang@ucsd.edu</a></td>
</tr>
<tr>
<td>Van Den Einde, Lelli</td>
<td>SME 440E</td>
<td>858-822-2188</td>
<td><a href="mailto:llelli@ucsd.edu">llelli@ucsd.edu</a></td>
</tr>
<tr>
<td>Zhu, Qiang</td>
<td>SME 342E</td>
<td>858-822-2161</td>
<td><a href="mailto:qizhu@ucsd.edu">qizhu@ucsd.edu</a></td>
</tr>
</tbody>
</table>

## STAFF

<table>
<thead>
<tr>
<th>Name</th>
<th>Office</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graduate Advisor:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wilson, Yvonne</td>
<td>SME 340B</td>
<td>858-534-1421</td>
<td><a href="mailto:ywilson@eng.ucsd.edu">ywilson@eng.ucsd.edu</a></td>
</tr>
<tr>
<td>HR Coordinator:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hall, Raquel</td>
<td>SME 341A</td>
<td>858-534-3524</td>
<td><a href="mailto:rfhall@ucsd.edu">rfhall@ucsd.edu</a></td>
</tr>
<tr>
<td>Undergrad Advisor:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swenson, Danielle</td>
<td>SME 340A</td>
<td>858-822-2273</td>
<td><a href="mailto:dswenson@ucsd.edu">dswenson@ucsd.edu</a></td>
</tr>
<tr>
<td>Sr. Dev. Engineer:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Porter, Steve</td>
<td>SME 440A</td>
<td>858-822-2248</td>
<td><a href="mailto:sporter@ucsd.edu">sporter@ucsd.edu</a></td>
</tr>
</tbody>
</table>

*A complete listing including adjunct faculty, staff and researchers is at: [http://www.structures.ucsd.edu/se_directory](http://www.structures.ucsd.edu/se_directory)
# TABLE OF CONTENTS

INTRODUCTION TO THE DEPARTMENT .................................................................................................................. 5  
Department Mission and Objectives ................................................................................................................. 6  
Department Background ........................................................................................................................................ 7  
ETHICAL STANDARDS EXPECTED OF THE ENGINEERING STUDENT ......................................................... 8  
ADMISSION TO STRUCTURAL ENGINEERING ................................................................................................. 10  
REGULATIONS AND REQUIREMENTS ............................................................................................................... 11  
ACADEMIC ADVISING ...................................................................................................................................... 12  
STRUCTURAL ENGINEERING DEGREE PROGRAMS AND REQUIREMENTS ............................................. 13  
4-Year ABET Accredited Program in Structural Engineering ............................................................................. 14  
4-Year Non-Accredited Program in Engineering Sciences .................................................................................... 15  
SE Capstone Design Experience ...................................................................................................................... 16  
Focus Sequences .................................................................................................................................................. 19  
Technical Electives .............................................................................................................................................. 20  
SE 199 as a Technical Elective ............................................................................................................................ 21  
Course Pre-requisites .......................................................................................................................................... 21  
Transfer Students .................................................................................................................................................. 23  
GENERAL EDUCATION/COLLEGE REQUIREMENTS ...................................................................................... 24  
COURSE DESCRIPTIONS .................................................................................................................................. 25  
COURSE OFFERINGS 2013-2014 ....................................................................................................................... 29  
INTEGRATED BACHELOR’S/MASTER’S DEGREE PROGRAM ......................................................................... 30  
IDEA STUDENT CENTER ................................................................................................................................... 30  
COMPUTER RESOURCES FOR UNDERGRADUATES ..................................................................................... 31  
ACADEMIC ENRICHMENT ................................................................................................................................. 32  
ACADEMIC INTERNSHIPS ................................................................................................................................... 32  
UCSD Academic Internship Program (AIP) ......................................................................................................... 32  
Opportunities Abroad ......................................................................................................................................... 33  
Undergraduate Research Conference ................................................................................................................ 33  
Readers/Graders Positions .................................................................................................................................. 33  
Engineering Aide Positions ................................................................................................................................ 33  
STUDENT SOCIETIES AND ORGANIZATIONS ................................................................................................. 34  
OFFICE OF ACADEMIC SUPPORT AND INSTRUCTIONAL SERVICES (OASIS) ......................................... 36  
OTHER IMPORTANT RESOURCES ................................................................................................................... 37  
Counseling and Psychological Services (CAPS) ............................................................................................... 37  
STEPS TO A PROFESSIONAL ENGINEERING LICENSE ............................................................................... 38
Introduction to the Department

Department Mission and Goals

The programs and curricula of the Department of Structural Engineering have been specifically developed to educate and train engineers using a holistic approach to structural systems engineering by emphasizing and building on the commonality of engineering structures in materials, mechanics, analysis and design across the engineering disciplines of aerospace, civil, marine and mechanical engineering.

All Structural Engineering programs of study have strong components of laboratory experimentation, numerical computation, and engineering design. Design is emphasized throughout the curricula by open-ended homework problems, laboratory and computer courses which include student-initiated projects, through team assignments and exercises, and finally by senior design project courses which involve teams of students working to solve engineering design problems brought in from industry. The Structural Engineering programs are designed to prepare students receiving bachelor’s degrees for professional careers or for graduate education in their intended area of specialization. In addition, the program is structured to provide a solid foundation for students who intend to use their undergraduate engineering education as preparation for postgraduate professional training in non-technological fields such as business administration, law or medicine.

WHAT DO STRUCTURAL ENGINEERS DO?
Design, analyze & create:
Buildings
Bridges
Dams
Automobiles
Airplanes
Rockets
Satellites
Ships
Off-shore facilities
Mechanical
Structures
Sporting Goods
THE FUTURE !!


**Program mission and objectives**
The B.S. Structural Engineering program is accredited by the ABET Inc. Engineering Accreditation Commission (Accreditation Board for Engineering and Technology). Accreditation is an assurance that the program meets established quality standards.

**B.S. Structural Engineering Mission**
To provide a comprehensive education and training to engineers using a holistic approach to structural systems engineering by emphasizing and building on the commonality of engineering structures at the levels of materials, mechanics, analysis and design.

**B.S. Structural Engineering Objectives**
Program Objectives represent graduates performance 3 to 5 years after completing the B.S. program:

1. *Take advantage* of a strong technical education at the undergraduate level to embark on successful professional careers in industry or to continue with a graduate education in their area of specialization.

2. Consistently and successfully *apply fundamental Structural Engineering principles* within chosen engineering application area (such as Aerospace, Civil, Marine, and Mechanical).

3. *Apply* broad multi-disciplinary skills necessary to accomplish professional objectives in a rapidly changing technological world.

4. *Understand the ethical issues* pertaining to engineering, *adopt* industry standards of ethical behavior, and *apply* appropriate communication and collaboration skills essential for professional practice.

**B.S. Structural Engineering Outcomes**
Program Outcomes are the expected knowledge, skills, attitudes, and behaviors of students at the time of completing the B.S. program:

a. An ability to apply knowledge of mathematics, science, and engineering

b. An ability to design and conduct experiments, as well as being able to analyze and interpret data

c. An ability to design a system, component, or process to meet desired needs

d. An ability to function in multidisciplinary teams

e. An ability to identify, formulate, and solve engineering problems

f. An understanding of professional and ethical responsibility

g. An ability to communicate effectively with written, oral, and visual means

h. The broad education necessary to understand the impact of engineering solutions in a global and societal context

i. A recognition of the need for and an ability to engage in life-long learning

j. A knowledge of contemporary issues

k. An ability to use modern engineering techniques, skills, and computing tools necessary for engineering practice
Department Background

The Department of Structural Engineering (SE) was formally established on July 1, 1999 with Professor Frieder Seible as its first Chairman. Structural Engineering had its beginning in the Department of Aerospace and Mechanical Engineering Sciences (DAMES), instituted in March of 1964. In January of 1972, DAMES was renamed to the Department of Applied Mechanics and Engineering Sciences (AMES) to reflect its growth into other instructional and research areas. AMES offered instruction in mechanical engineering, structural engineering, chemical engineering, bioengineering and systems science. In 1989, the systems science group moved to the Department of Electrical and Computer Engineering (ECE). The first departmental spin-off in AMES came in 1994 with the formation of the Bioengineering Department (BE). In 1995 three separate departmental divisions were formed, namely, a Division of Mechanical Engineering, a Division of Chemical Engineering, and a Division of Structural Engineering. In July of 1999, AMES was divided into two new departments: Department of Mechanical and Aerospace Engineering (MAE) and Department of Structural Engineering.

The undergraduate degree programs offered by the Jacobs School of Engineering are listed by department in Table 1.

<table>
<thead>
<tr>
<th>Departments</th>
<th>Degree Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural Engineering (SE)</td>
<td>B.S. Structural Engineering*</td>
</tr>
<tr>
<td></td>
<td>B.S. Engineering Sciences</td>
</tr>
<tr>
<td>Mechanical and Aerospace Engineering (MAE)</td>
<td>B.S. Mechanical Engineering*+</td>
</tr>
<tr>
<td></td>
<td>B.S. Aerospace Engineering*+</td>
</tr>
<tr>
<td></td>
<td>B.S. Environmental Engineering</td>
</tr>
<tr>
<td>Nano Engineering</td>
<td>B.S. Chemical Engineering*</td>
</tr>
<tr>
<td></td>
<td>B.S. Nano Engineering</td>
</tr>
<tr>
<td>Bioengineering (BE)</td>
<td>B.S. Bioengineering*+</td>
</tr>
<tr>
<td></td>
<td>B.S. Biotechnology*+</td>
</tr>
<tr>
<td></td>
<td>B.S. Bioinformatics</td>
</tr>
<tr>
<td></td>
<td>B.S. Biosystems</td>
</tr>
<tr>
<td>Computer Science and Engineering (CSE)</td>
<td>B.S. Computer Science+</td>
</tr>
<tr>
<td></td>
<td>B.S. Computer Engineering+</td>
</tr>
<tr>
<td></td>
<td>B.S. Computer Science: Bioinformatics</td>
</tr>
<tr>
<td></td>
<td>B.A. Computer Science</td>
</tr>
<tr>
<td></td>
<td>Minor in Computer Science</td>
</tr>
<tr>
<td>Electrical and Computer Engineering (ECE)</td>
<td>B.S. Electrical Engineering*</td>
</tr>
<tr>
<td></td>
<td>B.S. Computer Engineering+</td>
</tr>
<tr>
<td></td>
<td>B.S. Engineering Physics</td>
</tr>
<tr>
<td></td>
<td>B.A. Electrical Engineering &amp; Society</td>
</tr>
</tbody>
</table>

*ABET Accredited; for more information on ABET and the process of accrediting academic programs, go online at [http://www.abet.org/about.html](http://www.abet.org/about.html).
+Currently Impacted: All other engineering programs will have impacted status effective the following Fall quarters: 2014 for new incoming freshman; 2015 for new incoming transfer students; and 2015 for continuing students. For additional information about courses with impacted status, see: [http://students.ucsd.edu/academics/advising/majors-minors/impacted-majors.html](http://students.ucsd.edu/academics/advising/majors-minors/impacted-majors.html).
The Value of Integrity at UCSD in the Structural Engineering Department

The Structural Engineering department faculty, staff, and students together strive to uphold the value of integrity in all aspects of education and scholarship. This value is essential for the academic community to thrive and to protect the validity of intellectual work and discourse. In light of this goal, the Structural Engineering department refers to the UCSD Policy on Integrity of Scholarship: http://senate.ucsd.edu/manual/appendices/appendix2.pdf. The opening paragraph in this policy affirms the importance of integrity and clearly states the overall principles:

“Integrity of scholarship is essential for an academic community. The University expects that both faculty and students will honor this principle and in so doing protect the validity of University intellectual work. For students, this means that all academic work will be done by the individual to whom it is assigned, without unauthorized aid of any kind. Instructors, for their part, will exercise care in planning and supervising academic work, so that honest effort will be upheld.”

The Structural Engineering department will adhere to all of the tenets of this policy, which dictates the responsibilities and obligations of the members of the university community to uphold the value of integrity as well as the procedures and consequences for those who violate its tenets.

Responsibilities of the Students

The UCSD policy states “Students are expected to complete the course in compliance with the instructor’s standards. No student shall engage in any activity that involves attempting to receive a grade by means other than honest effort.” The Structural Engineering community maintains that violations of an honest effort include, but are not necessarily limited to, the following categories:

1. **Cheating**: Cheating involves the giving (or attempt thereof), receiving (or attempt thereof), or using (or attempt thereof) of any unauthorized aid or assistance to complete any assigned academic work, or the giving (or attempt thereof), receiving (or attempt thereof), or using (or attempt thereof) of an unfair advantage in any form.

2. **Plagiarism**: Plagiarism involves the copying (or attempt thereof) of the language, writing, ideas, concepts, structure, process, and/or thoughts of another and passing off such work as one’s own in any form without proper permission or credit. Plagiarism includes work involving computer codes or solutions manuals to textbooks not explicitly authorized by the instructor.

3. **Falsification**: Falsification involves the written or verbal statement of any untruth, with respect to any circumstances involving one’s own or another person’s academic work or record. Examples of falsification include, but are not limited to, forgery of official documents or assignments, fraudulent tampering with documents or assignments or any tampering with an assignment after a due date, or any other such fraudulent manipulation of any document or assignment.

The Structural Engineering department maintains that students should use extremely cautious judgment in proceeding to use (or attempt to use), offer (or attempt to offer), or receive (or attempt to receive) aids, resources, and/or collaborations of any kind not explicitly authorized by the instructor. **Students MUST assume that aids, resources, and/or collaborations not specifically allowed by the instructor are NOT permitted. Students who are unsure about the proper use of such aids, resources, and/or collaborations should consult the instructor before proceeding to use them.** In general, a student who has doubts about how the academic integrity policy applies to any assignment is responsible for obtaining specific guidance from the instructor before
submitting the assignment. Students must also understand that instructors may have policies, procedures, or regulations that vary from class to class: an acceptable action in one class may be deemed a violation in another class.

**Responsibilities of the Instructor**

Although all students, faculty, and staff are partners in maintaining the highest level of academic integrity in the Structural Engineering department, the primary responsibility for maintaining the standards of academic integrity rests with the university faculty and the university administration.

The instructor will clearly state the objectives, requirements, and regulations for each course at the beginning of the term, and he or she will attempt to inform students clearly what kinds of aids, resources, and/or collaborations, if any, on any assigned work are permitted. The instructor will respond promptly to any student enquiry regarding the use of such aids, resources, or collaborations. The instructor is **required** under policy to respond to suspected violations in one of two ways:

(I) Call the student to a meeting to discuss the suspected violation. If the instructor decides that there is evidence of academic dishonesty, he or she must report the suspected violation to the Office of the Academic Integrity Coordinator (AIC).

(II) Notify the AIC directly that there is a suspected violation of academic integrity.

The full procedure following instances of suspected violations may be found on the website previously given. When a student has admitted to or has been found guilty of a violation of the standards of academic honesty, two separate actions shall follow. (1) The instructor shall determine the student's grade on the assignment and in the course as a whole. Any breach of academic honesty may be considered grounds for failure in the course, although less serious consequences may be incurred in less serious circumstances. (2) The appropriate administrative authority shall impose a disciplinary penalty. The Structural Engineering department is committed to following the policy procedures in order to preserve the value of academic integrity.

**Determining an Honest Effort**

Academic integrity is often satisfactorily maintained simply by applying common sense principles to the situation at hand. A student, instructor, or staff member could ask a number of such 'common sense' questions to help assess whether a given action possibly violates the value of integrity. Examples of such questions are:

Are you unsure whether your action is allowed?
Do you feel a need to hide you actions?
Is it confidential information?
Might you feel guilty about the action later?
Is it dishonest or unfair to anyone?
Does it violate a license or agreement?
Is it detrimental to the interests of others?
Will the action be offensive to others?
Does it interfere with anyone's privacy?
Does your action waste time or resources?

(Permission © 2000 The University of Tennessee College of Engineering)

Further resources for students on issues of academic integrity can be found on the following UCSD website: http://students.ucsd.edu/academics/academic-integrity/index.html.
ADMISSION TO STRUCTURAL ENGINEERING

Admission to the Structural Engineering department (for both of the degree programs listed in Table 1) is currently based on both the student’s high school performance and enrollment goals set annually by the Office of Admissions and Relations with Schools. For more detailed information on UCSD’s application and admissions process, please visit http://admissions.ucsd.edu/freshmen/index.html. Prospective students who are admitted to UCSD and declare Structural Engineering or Engineering Sciences as their first major of choice will automatically be admitted into those majors. However, because of the large number of students interested in structural engineering undergraduate programs, and the limited resources available to accommodate this demand, the university has declared the majors in the Department of Structural Engineering (B.S. Structural Engineering, B.S. Engineering Sciences) as “impacted”, effective the following years:

Effective Fall 2014, new freshmen admission will be limited to both majors (B.S. Structural Engineering and B.S. Engineering Science). Students will be selected according to the UC San Diego Office of Undergraduate Admissions Holistic Review scores, taking into consideration the number of slots available in the Structural Engineering Department.

Effective Fall 2015, new transfer students will be selected by the UC San Diego Office of Undergraduate Admissions based on the students’ community college GPA, and taking into consideration the number of slots available in the Structural Engineering Department. Additionally, transfer students should have completed courses equivalent to UC San Diego’s Math 20A-D, 20F; Physics 2A–C, 2BL, 2CL; and Chemistry 6A.

Effective Fall 2015, the Structural Engineering Department will admit 10 continuing students into the impacted Structural Engineering or Engineering Science majors. Interested continuing students must not be past sophomore standing, as time to graduation would be delayed since the majority of departmental courses are offered only once per year. Continuing students who wish to be considered must meet the following minimum requirements:

- Completion of at least one year (3 quarters) of study at UCSD.
- Completion of all the following Lower Division Requirements for the requested major:
  - Math 20A – 20D, and 20F (Math 20A – 20C Freshman only)
  - Physics 2A - 2C, 2BL and 2CL (Physics 2A, 2B, and 2BL Freshman only)
  - Chem 6A

Upon completion of these courses, students can obtain an application from the Structural Engineering Student Affairs Office. Applications must be submitted to the Structural Engineering Student Affairs Office by Friday of the last week of instruction during Spring quarter. Continuing students’ applications will be approved, starting with the student having the highest GPA in the eleven required courses (seven for Freshman), until the target enrollment number of 10 is reached.

Once a major is declared impacted, admission to UCSD will not automatically mean admission to the major. Additional information regarding impacted status can be found on the Structural Engineering website (http://www.structures.ucsd.edu) and in the 2014-2015 UCSD General Catalog.
Course requirements are the same for transfer students as they are for incoming freshmen and continuing students. Accordingly, when planning their program, transfer students should be mindful of lower-division prerequisite course requirements for their major, as well as for meeting college requirements. Students who have taken equivalent courses elsewhere may request to have transfer credits apply toward the department’s major requirements. This is accomplished by submitting a petition for transfer credits together with a transcript and catalog course description from the institution where the course(s) were taken. The Structural Engineering Undergraduate Affairs Committee reviews these documents for approval. No transfer credit will be given for SE 1, SE 2 and SE 9. Transfer petitions are available on TritonLink.

**Petition Process:** Students may petition UCSD courses not listed as Structural Engineering approved courses, or courses taken at other universities, to count towards fulfilling requirements for the major. However, before petitioning:

- Students must check with the UCSD Admissions Office about the transfer of credits from other institutions, including institutions in other countries.

- Students who wish to study abroad should obtain tentative pre-approval of courses before enrolling to be sure courses taken abroad may count towards requirements for the major.

When submitting a petition to have courses accepted towards Structural Engineering requirements, students must:

- Attach a catalog course description and, when available, a course outline from the proposed course.

- Attach a transcript (does not have to be official), showing the grade you received in the course.

- Submit the completed petition and required attachments to the Structural Engineering Undergraduate Advisor in SME 340A. The Undergraduate Affairs Committee will then review the petition.

Students wishing to petition for math, physics or chemistry taken outside of UCSD must submit their petitions directly to those departments. Students transferring in should check Student Link to see if the Admissions Office has already given them credit.

Students are reminded that pre-requisites for courses have been carefully chosen and evaluated; if a pre-requisite for a course is listed, this means that the course inherently requires the student know the material from the pre-requisite thoroughly. Consequently, students are advised that petitioning to waive a pre-requisite or take a pre-requisite concurrently is strongly discouraged, as it will likely result in a denial of the petition.

**REGULATIONS AND REQUIREMENTS**

*Grading Requirements:* All courses required for the major (lower-division and upper-division, including Math, Physics and Chemistry) must be taken for a letter grade. Pass/No Pass (P/NP) grades will only be accepted for independent study courses i.e. (SE 195-199).

*Grade Point Average (GPA) Requirement:* A minimum GPA of 2.0 is required to obtain the B.S. degree. **Students are required to have a grade of C- or better in all course work required for the major.** The grade D is not accepted for any major requirements, including Math, Physics and Chemistry.

*Double Majors:* Engineering students may not double major within any of the departments within the Jacobs School of Engineering.
**ACADEMIC ADVISING**

**Orientation:** Incoming freshman and transfer students are required to attend a scheduled orientation meeting with Structural Engineering faculty and members of the advising staff prior to the initiation of classes.

**Structural Engineering Advising Staff:** The Structural Engineering advising staff assists students with their program of study. The staff is most helpful in finding answers to questions of the type: “When will SE 131 be offered again? Can SE 160A be used as a technical elective? Can I petition courses taken at a community college?” etc. The undergraduate advisor is available in the SME Building, room 340A.

The Structural Engineering advising program runs parallel to the function of college advisors who assist students with the general-education requirements for each college. **The Structural Engineering advising staff assists students with Structural Engineering major requirements, and students should not rely upon their college advisors for Structural Engineering major requirements.** The advising staff also assists students in preparing petitions to the Undergraduate Affairs Committee for any deviations from the standard programs of study.

**Faculty Advisor:** Every incoming Structural Engineering student is assigned a faculty advisor who will continue in that role until the student graduates. The faculty advisors assist students in the planning of their professional career and academic opportunities, as well as serve as mentors through their academic career at UCSD. Assigned faculty advisors and their contact information may be found on the web at [http://www.structures.ucsd.edu/node/31](http://www.structures.ucsd.edu/node/31).

**Preparing to Meet with your Faculty Advisor:** Read this section carefully before meeting with your advisor. Take a moment to prepare some precise questions, perhaps even in writing. Take along a transcript if possible to demonstrate your academic standing and structural engineering courses taken, as well as relevant courses taken from other departments or institutions.

**When to see your Faculty Advisor**
1. Discuss problems which affect academic performance
2. Explore career options
3. Assess academic progress
4. Ask about research opportunities

**When to see the SE Undergraduate Advisor**
1. When filing a petition
2. Devising a course plan
3. Discuss any problems which affect academic progress
4. Finding out about fellowship /scholarship information

**How you and your advisor should prepare**

**You need to:**
Contact and keep in touch with your advisor.
Make and keep appointments . . . call if it is necessary to change or cancel an appointment.
Come with specific questions in mind and prepared (pen, class schedule, all necessary forms).
Ask about other sources of information.
Be open concerning school work, study habits, academic progress, etc.
Make decisions concerning careers, choice of major, and selection of courses.

**Your SE advisor will:**
Post office hours.
Keep appointments or contact you if it is necessary to cancel.
Provide accurate and specific information.
Have resource material on hand.
Suggest other sources of information.
Listen and help you solve problems.
Check your schedule for appropriate selection of courses.
STRUCTURAL ENGINEERING DEGREE
PROGRAMS AND REQUIREMENTS

As indicated in Table 1 on page 7, the Department of Structural Engineering offers students the choice of Bachelor’s degrees in Structural Engineering (ABET accredited), and Engineering Sciences (not ABET accredited). Specific course requirements for the two programs within the major are outlined in this section. In addition to the required technical courses specifically indicated, a suggested scheduling of humanities and social science courses are distributed in the plan for students to use to meet college general-education requirements. To graduate, students must maintain an overall GPA of at least a 2.0, and the department requires at least a C- grade in each course required for the major. The B.S. programs require a minimum of 148 units plus college requirements.

Students are strongly encouraged to follow the course plans appearing on pages 13-14 suggesting a program of study for each of the two degree programs. Deviations from either of the programs of study must be approved by the Undergraduate Affairs Committee prior to taking alternative courses. In addition to specific courses that are required, a number of Technical Elective (TE) and Focus Sequence (FS) courses are required. Further information regarding Technical Electives and Focus Sequences can be found starting on page 19.

Students with different academic preparation may vary the scheduling of lower-division courses such as math, physics and chemistry, but should consult the department prior to doing so. Deviations in scheduling lower-division Structural Engineering courses are discouraged due to scheduling constraints. A tentative schedule of course offerings is available from the SE Department each spring for the following academic year. This schedule is posted on the SE Department website at http://www.structures.ucsd.edu/node/34, and an example can be found on page 29 of this handbook.
4-Year ABET Accredited Program in Structural Engineering

*Structural Engineering* is concerned with the design and analysis of aerospace, civil, marine, mechanical, electromechanical, and offshore structures. Examples include bridges, dams, buildings, aircraft, spacecraft, ships, oil platforms, automobiles, other transportation vehicles, and even microchips and biological tissue. This field requires a thorough knowledge of the behavior of solids (metals, plastics, concrete, soils, and composite materials), fluid mechanics as it relates to structural loads, dynamics as it relates to structural response, mathematics for the generation of theoretical structural models and numerical analysis, and computer science for simulation purposes associated with computer-aided design, response analyses, and data acquisition. The basic understanding of materials behavior and structural performance is enhanced by laboratory courses involving static and dynamic testing of structural models, and the investigation of response of structural systems. Within this area, students can specialize in the Focus Sequences: (a) civil structures (b) aerospace structures, (c) renewal of structures, or (d) geotechnical engineering.

**Four-Year Course Schedule for Structural Engineering Degree Program**

### Freshman Year
- Math 20A
- GE¹
- Chem 6A
- GE
- Math 20B
- SE 1
- Phys 2A
- GE
- Math 20C
- SE 2/2L
- Phys 2B/2BL
- GE

### Sophomore Year
- Math 20D
- SE 101A
- Phys 2C/2CL
- GE
- Math 20F
- SE 101B
- SE 110A
- SE 9
- Math 20E
- SE 101C
- SE 110B
- SE 102

### Junior Year
- SE 121
- SE 103
- GE
- GE
- MAE 170
- SE 115
- SE 130A
- TE²
- GE
- SE 130B
- GE
- TE

### Senior Year
- SE 125
- TE
- FS³
- GE
- SE 131
- FS
- FS
- SE 140
- GE
- FS

¹GE is a general education/college requirement.
²TE is a technical elective course.
³FS is a focus sequence course.
4-Year Non-Accredited Program in Engineering Sciences

The *Engineering Sciences* program (not ABET accredited) follows the overall Structural Engineering program except that the number of required design courses is reduced. In addition to core courses in dynamics, vibrations, structures, fluid mechanics, thermodynamics, heat transfer, and laboratory experimentation, a large number of technical electives are scheduled. This aspect of the curriculum allows flexibility by permitting specialization and in-depth study in one area of the engineering sciences or through a sequence of courses on various emerging technologies. Students must consult their advisers to develop a course of study to fulfill the technical elective requirements of this program.

### Four-Year Course Schedule for Engineering Sciences Degree Program

#### Freshman Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Course</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 20A</td>
<td>Math 20B</td>
<td>Math 20C</td>
</tr>
<tr>
<td>GE1</td>
<td>SE 1</td>
<td>SE 2/2L</td>
</tr>
<tr>
<td>Chem 6A</td>
<td>Phys 2A</td>
<td>Phys 2B/2BL</td>
</tr>
<tr>
<td>GE</td>
<td>GE</td>
<td>GE</td>
</tr>
</tbody>
</table>

#### Sophomore Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Course</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 20D</td>
<td>Math 20F</td>
<td>Math 20E</td>
</tr>
<tr>
<td>SE 101A</td>
<td>SE 101B</td>
<td>SE 101C</td>
</tr>
<tr>
<td>Phys 2C/2CL</td>
<td>SE 110A</td>
<td>SE 110B</td>
</tr>
<tr>
<td>GE</td>
<td>SE 9</td>
<td>SE 102</td>
</tr>
</tbody>
</table>

#### Junior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Course</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE 121</td>
<td>SE 115</td>
<td>MAE 170</td>
</tr>
<tr>
<td>SE 103</td>
<td>SE 130A</td>
<td>SE 130B</td>
</tr>
<tr>
<td>GE</td>
<td>GE</td>
<td>TE2</td>
</tr>
<tr>
<td>GE</td>
<td>GE</td>
<td>GE</td>
</tr>
</tbody>
</table>

#### Senior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Course</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE 125</td>
<td>SE 131</td>
<td>SE 140</td>
</tr>
<tr>
<td>TE</td>
<td>SE 120</td>
<td>TE</td>
</tr>
<tr>
<td>TE</td>
<td>TE</td>
<td>TE</td>
</tr>
<tr>
<td>GE</td>
<td>GE</td>
<td>TE</td>
</tr>
</tbody>
</table>

1GE is a general education/college requirement.
2TE is a technical elective course.
SE Capstone Design Experience

Introduction

ABET accreditation requires students to undergo a capstone design experience that prepares them for engineering practice through team-based projects incorporating the knowledge and skills acquired in earlier coursework. The capstone design experience also incorporates appropriate engineering standards and multiple realistic constraints [1]. The capstone design experience is largely satisfied via three key design courses in the UCSD SE department. This document describes the UCSD SE Capstone Design Sequence, which consists of SE 103 (Conceptual Structural Design), SE 120 (Engineering Graphics & computer Aided Structural Design), and SE 140 (Structures & Materials Laboratory). Each of these courses invokes team-based projects, with varying size of teams, complexity of structural design experience, and drawing from skill-sets developed in prior courses of the curriculum.

The technical content and relationship to the capstone experience of each of these courses is described below.

SE 103: Conceptual Structural Design

The objective of SE 103 is to introduce students to the “creative” part of the structural design process, specifically the conception of an idea that in the end leads to and meets the functionality, safety, and constructability requirements of a structure. The course incorporates a large laboratory component consisting of four individual self-paced computer lab modules focused on modeling 2D and 3D systems using geometric and numerical analysis software, and several team-based competitions where students design, analyze, construct, and test 3D structures with the objective of maximizing a pre-defined performance index. Projects include the creative design of bridges, water towers, gazebos, and stadium structures under specified geometrical constraints and loading parameters (see Figure 1a). Teams are required to create their conceptual designs, conduct structural analyses, and write reports describing their structure and expected performance. Additionally, short oral presentations are given in teams at the end of the quarter. Each team must build scaled physical models of their structures that are physically tested and rated based on a defined performance index. The laboratory and project component of the class encompasses 70% of the graded material for the course. Students spend on average about 10-15 hours per week on the laboratory assignments and group projects. The group sizes are limited to 4-5 students per team.

SE 120: Engineering Graphics & computer Aided Structural Design

While SE 103 introduces the conceptual design process including basic visualization techniques, SE 120 focuses on 2D and 3D computer aided geometric modeling and rendering in structural engineering. SE 120 builds on the skills and outcomes from SE 103 such as the ability to conduct experiments and interpret data, design structural components and systems, function on multi-disciplinary teams, indentify and solve engineering problems, communicate effectively through written and verbal means, and use modern engineering tools.

In SE 120, fundamental theory is combined with engineering graphics techniques and hands-on methods (SolidWorks, Matlab, AutoCAD) to examine a variety of problems in engineering that are best understood through 3D modeling, simulation, graphical rendering and viewing of the results. Aspects of professional responsibility and ethics are emphasized through discussions, exercises, and case studies. Students learn about the relationship between real world applications and the implications of the use of computer models to convey technical content.

Similar to SE 103, SE 120 is composed of an extensive laboratory component consisting of individual and team-based projects that require students to identify key structural components and to construct CAD models of them. The team projects emphasize functioning in teams as encountered in the engineering workplace and consist of competitions between groups to encourage innovative and economical solutions to real structural engineering problems. Example projects include scaled concrete columns made from hydrostone and plaster with wire reinforcement, and a model drawbridge that requires creative mechanisms to open the bridge and allow a ship to pass (see Figure 1b). The projects require the development of a realistic computer model, and the analysis and translation of it into a scaled physical structure that is tested to failure. Team oral presentations that describe the overall project, selected approach, modeling, model analysis, test results, and predicted performance characteristics are also conducted. The laboratory and project component of the class encompass 100% of the graded material for the course. Students spend on average about 10 hours per week on the assignments and projects. The group sizes are limited to 4-6 students per team.

**SE 140: Structures & Materials Laboratory**

SE 140 is the final course of the capstone design sequence and continues the progression from SE 103 and SE 120 through a comprehensive term project whereby they design, analyze, build and test a complex structural system. In prior years students have focused on the task of constructing and testing a robotic crane (see Figure 1c). Each team must learn to use new concepts and tools to formulate problems, generate and analyze alternatives, analyze structural behavior, design structural details, construct the designed structures, test and improve structures through iterations, and document, report, and present their work. Students are required to consider structural behavior and design related to control, fixture, motion, protection, storage, retirement, maintenance, etc. They undergo a number of decision-making processes to design the shape, configuration, size, materials, construction procedures and schedules for various engineering components and structures. Through this experience, students build on the skills learned in SE 103 and SE 120 related to principles of teamwork and project management, such as team coordination, scheduling, evaluation and self-evaluation, professional ethics, etc.

Because the end-to-end project encompasses multi-disciplinary tasks that are typical of a project in industry, students work in teams of 7-8 students and are responsible for a variety of milestones consisting of a conceptual design, structural analysis and design, bill of materials, fabrication, programming, testing, and final report and presentation. Each project is evaluated on aesthetics, stiffness, accuracy of deflection prediction, structural performance, and structural economy. Typically, each team has a lead or coordinator, and all the team members share the above responsibilities. An average level of effort of 12-13 hours per student per week is needed to meet the demands of the course. The laboratory and project component of the class encompass 100% of the graded material for the course.
Outcome for Students Completing the SE Capstone Design Experience

Successful completion of these three courses provides for a well-rounded capstone design experience. Students are introduced to the full design cycle consisting of the conceptual design phase, the quantification phase, and the production or execution phase. From a defined structural objective, students must conceptualize an idea that leads to and meets functionality, safety, and constructability requirements of a structure. Students are also introduced to cost issues, aesthetics, working in teams, conflict resolution, and project management issues such as budget and schedule.

The challenges and activities that students are exposed to throughout this design sequence resemble the roles they will face as Structural Engineers in practice. Students are tasked to design structures that will withstand forces they will be subjected to, develop initial designs, use math to calculate stresses that could arise in the structure, simulate and model possible situations, such as high winds and earth movements, inspect work, advise fellow peers during construction of a project, work in partnership with other engineers and architects, and examine structures to discover whether or not they are structurally sound.

Because each of these three courses has a significant laboratory component and due to the nature of the projects, which are physically intensive, a laboratory fee is required for each course to support the costs of disposable materials, and the maintenance and upgrade of testing apparatus.
Focus Sequences
Students enrolled in the Structural Engineering degree program (ABET accredited) should note that four course slots must be filled by focus sequence (FS) courses. The department currently offers four focus sequences, as listed in Table 2, and students must complete one of the focus sequences of their choice. Students should note that not all focus sequence courses will be offered every year. Students should consult the department Undergraduate Affairs Office in the spring quarter of the year before they begin taking focus sequence classes to ensure that the appropriate courses will be offered. If a course is not going to be offered, it may be possible to petition another course to take its place.

Table 2. Focus Sequences.

<table>
<thead>
<tr>
<th>Sequence Name</th>
<th>Courses in Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Structures (CS)</td>
<td>SE 150 Design of Steel Structures</td>
</tr>
<tr>
<td></td>
<td>SE 151A Design of Reinforced Concrete</td>
</tr>
<tr>
<td></td>
<td>SE 151B Design of Pre-stressed Concrete</td>
</tr>
<tr>
<td></td>
<td>SE 152 Seismic Design of Structures</td>
</tr>
<tr>
<td>Aerospace Structures (AS)</td>
<td>SE 160A Aerospace Structural Design</td>
</tr>
<tr>
<td></td>
<td>SE 160B Aerospace Structural Design</td>
</tr>
<tr>
<td></td>
<td>SE 142 Design of Composite Structures</td>
</tr>
<tr>
<td></td>
<td>SE 171 Aerospace Structures Renewal</td>
</tr>
<tr>
<td>Geotechnical Engineering*</td>
<td>SE 180 Earthquake Engineering</td>
</tr>
<tr>
<td></td>
<td>SE 181 Geotechnical Engineering</td>
</tr>
<tr>
<td></td>
<td>SE 182 Foundation Engineering</td>
</tr>
<tr>
<td></td>
<td>SE 184 Ground Improvement</td>
</tr>
<tr>
<td></td>
<td>*SE 180 not offered in 13-14</td>
</tr>
<tr>
<td>Renewal of Structures</td>
<td>SE 171 Aerospace Structures Renewal</td>
</tr>
<tr>
<td></td>
<td>SE 142 Design of Composite Structures</td>
</tr>
<tr>
<td></td>
<td>SE 163 Nondestructive Evaluation</td>
</tr>
<tr>
<td></td>
<td>*4th course must be petitioned</td>
</tr>
</tbody>
</table>

Technical Electives
Students are required to pick three technical electives from courses outside their focus area. These courses can be selected from other focus sequences or from a list of pre-approved upper division or graduate courses. This pre-approved list is shown below. The rationale behind technical electives is to enable students to learn more about specific topics or to gain specialized knowledge in subject areas outside the focus sequence. A course cannot be taken both as part of a focus sequence and as a TE. In the accredited program, TE courses are restricted to meet ABET standards (50% Engineering Science, 50% Engineering Design). Courses such as SE 195, SE 197 and SE 198 are not allowed as technical electives in meeting the upper-division major requirements. SE 199 can be used as a technical elective only under restrictive conditions. Policies regarding these conditions are listed in the Academic Enrichment section of this handbook. Students are discouraged from deviating from the pre-approved list in Table 3, but students who wish to do so are required to submit a petition to the Undergraduate Affairs Committee before taking the course. Students taking courses other than those in the list or petitioning for changes after taking an unapproved course cannot be guaranteed that the course is acceptable. Students wishing to take graduate courses (200 level, marked with an asterisk * in Table 3) must have a minimum 3.0 overall GPA, instructor approval and department stamp to enroll.
Table 3. Pre-approved Technical Elective (TE) Courses.

ENG 100/100L* TIES program (6 units)
ESYS 150  Environmental Perils
SE 111A/B  Steel Bridge Design Competition (4 units total, SE 112 A/B cannot also be used as TE)
SE 112A/B  Concrete Canoe Design Competition (4 units total, SE 111 A/B cannot also be used as TE)
SE 142  Design of Composites Structures
SE 150  Design of Steel Structures
SE 151A-B  Design of Structural Concrete
SE 152  Seismic Design of Structures
SE 154  Design of Timber
SE 160A-B  Aerospace Structural Design
SE 163  Nondestructive Evaluation and Design
SE 168  Structural System Testing and Model Correlation
SE 171  Aerospace Structures Repair
SE 180  Earthquake Engineering
SE 181  Geotechnical Engineering
SE 182  Foundation Engineering
SE 184  Ground Improvement
SE 201**  Advanced Structural Analysis
SE 202**  Structural Stability
SE 203**  Structural Dynamics
SE 211**  Advanced Reinforced & Prestressed Concrete
SE 212**  Advanced Structural Steel Design
SE 221**  Earthquake Engineering
SE 222**  Geotechnical Earthquake Engineering
SE 223**  Advanced Seismic Design of Structures
SE 252**  Experimental Mechanics and NDE
MAE 101C  Heat Transfer
MAE 104  Aerodynamics
MAE 105  Introduction of Mathematical Physics
MAE 110A-B  Thermodynamics
MAE 124  Intro to Environmental Engineering
MAE 125A  Flow and Transport in the Environment
MAE 131C  Solid Mechanics III: Small Deflection Theory of Plates
MAE 140  Linear Circuits
MAE 143A  Signals and Systems
MAE 143B  Linear Control
MAE 143C  Digital Control Systems
MAE 149  Sensor Networks
MAE 150  Computer-Aided Design
MAE 160  Mechanical Behavior of Materials
MAE 165  Fatigue and Failure Analysis of Engineering Components
MAE 166  Nanomaterials
MAE 167  Wave Dynamics of Materials
MAE 180A  Spacecraft Guidance I
MAE 181  Space Science and Engineering
USP 171  Sustainable Development
USP 177  Urban Design Practicum
USP 179  Urban Design, Theory, and Practice
USP 180  Urban Transportation
USP 191***  GIS for Urban and Community Planning

* ENG 100 and two ENG 100L courses must be taken together for a total of 6 units to count as one TE. At least one ENG 100L must be a pre-approved SE project as determined by the department. TIES can only be used for a total of one TE. ** Students wishing to take graduate courses must have a minimum 3.0 overall GPA and obtain instructor approval prior to enrolling. ***Course enrollment is restricted to USP majors.; after all USP majors have been accommodated, SE students will be allowed to enroll.
SE 199 as a Technical Elective
SE students may take SE 199, Independent Study for Undergraduates, under the guidance of an SE faculty member. Taking SE 199s may not replace ABET approved courses. This course is taken as an elective on a P/NP basis. Under the following restrictive conditions, however, it may be petitioned to satisfy upper-division technical course requirements for the major. Minimum qualifications are the student must be in the SE major and the course must be taken for at least 4 units (can also be over 2 quarters for 2 units each).

Students interested in taking an SE 199 course must identify a faculty member with whom they wish to work and propose a research or study topic. After obtaining the faculty member’s concurrence on the topic and scope of the study, the student must submit a Special Studies Course form to the Structural Engineering Undergraduate Affairs Committee. To seek technical elective credit students must also submit an undergraduate student petition form. The forms must be completed, approved, and processed prior to the beginning of the quarter in which the course is to be taken. Please keep in mind that registration into a 199 does not take place until the Special Studies form is received by the Registrars Office.

Structural Engineering Course Prerequisites:

<table>
<thead>
<tr>
<th>Course</th>
<th>Prerequisite(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Required courses</strong></td>
<td></td>
</tr>
<tr>
<td>Chem 6A</td>
<td></td>
</tr>
<tr>
<td>Math 20A</td>
<td></td>
</tr>
<tr>
<td>Math 20B</td>
<td></td>
</tr>
<tr>
<td>Math 20C</td>
<td></td>
</tr>
<tr>
<td>Math 20D</td>
<td>Math 20C</td>
</tr>
<tr>
<td>Math 20E</td>
<td>Math 20C</td>
</tr>
<tr>
<td>Math 20F</td>
<td>Math 20C</td>
</tr>
<tr>
<td>Phys 2A</td>
<td>Math 20A concurrent with Math 20B</td>
</tr>
<tr>
<td>Phys 2B</td>
<td>Phys 2A, Math 20B, concurrent with Math 20C</td>
</tr>
<tr>
<td>Phys 2BL</td>
<td>Phys 2A</td>
</tr>
<tr>
<td>Phys 2C</td>
<td>Phys 2B, Math 20C, concurrent with Math 20D</td>
</tr>
<tr>
<td>Phys 2CL</td>
<td>Phys 2A and Phys 2B</td>
</tr>
<tr>
<td>MAE 170</td>
<td>Phys 2CL</td>
</tr>
<tr>
<td>SE 1 Introduction to Structures and Design</td>
<td>Engineering Major</td>
</tr>
<tr>
<td>SE 2 Structural Materials</td>
<td>Chem 6A, Phys 2A</td>
</tr>
<tr>
<td>SE 2 Structural Materials Lab</td>
<td>Chem 6A, Phys 2A, and SE 2</td>
</tr>
<tr>
<td>Required courses cont.....</td>
<td>Math 20D and Math 20F (co-requisite)</td>
</tr>
<tr>
<td>-----------------------------------------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>SE 9 Algorithms and Programming</td>
<td>Math 20C, Phys 2A</td>
</tr>
<tr>
<td>SE 101A Mechanics I: Statics</td>
<td>SE 101A</td>
</tr>
<tr>
<td>SE 101B Mechanics II: Dynamics</td>
<td>SE 101C</td>
</tr>
<tr>
<td>SE 101C Mechanics III: Structural Dynamics</td>
<td>Math 20F and SE 101B</td>
</tr>
<tr>
<td>SE 102 Numerical, Computational &amp; Graph. Tools</td>
<td>SE 1, SE 9, SE 101A</td>
</tr>
<tr>
<td>SE 103 Conceptual Structural Design</td>
<td>SE 2, SE 9, SE 101A</td>
</tr>
<tr>
<td>SE 110A Solid Mechanics I</td>
<td>SE 110A</td>
</tr>
<tr>
<td>SE 110B Solid Mechanics II</td>
<td>SE 110A</td>
</tr>
<tr>
<td>SE 115 Fluid Mechanics</td>
<td>Phys 2A, Math 20D</td>
</tr>
<tr>
<td>SE 120 Eng. Graph. &amp; Comp. Aided Structural Des.</td>
<td>SE 102, SE 103</td>
</tr>
<tr>
<td>SE 121 Numerical Methods in Engineering</td>
<td>SE 102, SE 101C</td>
</tr>
<tr>
<td>SE 125 Statistics, Probability and Reliability</td>
<td>Engineering Major</td>
</tr>
<tr>
<td>SE 130A Structural Analysis</td>
<td>SE 110A</td>
</tr>
<tr>
<td>SE 130B Structural Analysis</td>
<td>SE 130A</td>
</tr>
<tr>
<td>SE 131 Finite Element Analysis</td>
<td>SE 121, SE 130B, SE 101C</td>
</tr>
<tr>
<td>SE 140 Structures and Materials Lab</td>
<td>SE 103, SE 130B, MAE 170</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Focus Sequence and Technical Elective course</th>
<th>Math 20D and Math 20F (co-requisite)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE 111A/B Steel Bridge Competition</td>
<td>SE 103, SE 110A</td>
</tr>
<tr>
<td>SE 112A/B Concrete Canoe Competition</td>
<td>SE 110A</td>
</tr>
<tr>
<td>SE 142 Design of Composite Structures</td>
<td>SE 110A, SE 110B</td>
</tr>
<tr>
<td>SE150 Design of Steel Structures</td>
<td>SE 130A</td>
</tr>
<tr>
<td>SE 151A Design of Structural Concrete</td>
<td>SE 103, SE 130A</td>
</tr>
<tr>
<td>SE 151B Design of Structural Concrete</td>
<td>SE 151A</td>
</tr>
<tr>
<td>SE 152 Seismic Design of Structures</td>
<td>SE 130A, SE 150, SE 151A, SE 151B (co-req.)</td>
</tr>
<tr>
<td>SE 154 Timber Design</td>
<td>SE 103, SE 130A</td>
</tr>
<tr>
<td>SE 160A Aerospace Structural Design</td>
<td>SE 2, SE 101B, SE 110A</td>
</tr>
<tr>
<td>SE 160B Aerospace Structural Design</td>
<td>SE 160A</td>
</tr>
<tr>
<td>SE 163 Nondestructive Evaluation and Design</td>
<td>SE 110A, SE 110B</td>
</tr>
<tr>
<td>SE 168 Struct. System Testing and Model Correlation</td>
<td>SE 101C, SE 131</td>
</tr>
<tr>
<td>SE 171 Aerospace Structures Repair</td>
<td>SE 130B, SE 160B</td>
</tr>
<tr>
<td>SE 180 Earthquake Engineering</td>
<td>SE 110A, SE 130A</td>
</tr>
<tr>
<td>SE 181 Geotechnical Engineering</td>
<td>SE 110A</td>
</tr>
<tr>
<td>SE 182 Foundation Engineering</td>
<td>SE 181</td>
</tr>
<tr>
<td>SE 184 Ground Improvement</td>
<td>SE 181</td>
</tr>
</tbody>
</table>

*all prerequisite courses require a minimum grade of C-
**Transfer Students**

Students transferring into Structural Engineering from outside UCSD have unique circumstances that do not always fit neatly into the course plans provided above. Nonetheless, all of the same course requirements apply equally to all transfer students. Even though students may enter UCSD with junior-level standing, most transfer students should expect to take up to three years to complete all department requirements. Students transferring from California community colleges have typically planned for their transfer by using the ASSIST program ([http://www.assist.org](http://www.assist.org)) that shows how various community college courses translate into UCSD courses. **Transfer students are strongly encouraged, as soon as possible upon their arrival on campus, to make an appointment with the Undergraduate Affairs Staff Advisor to plan out their academic careers to facilitate their successful completion of the major.**

Some common transfer student frequently-asked questions are:

**Do I have to take SE 1 and 2 since I am a transfer student?**

Yes, SE 1 and 2 serve as an introduction to the program of study at UCSD.

**Is there an equivalent course to SE 1, SE 2, or SE 9 at the community colleges?**

No, these courses are designed to be unique to the UCSD Structural Engineering major.

**Do I have to take SE 1 my first year at UCSD?**

It is critical to follow the course curriculum listed on pages 14-15. Courses in the curriculum are designed to support the knowledge from the previous course. In situations where deviation has occurred, the undergraduate advisor will provide assistance.

**Can I take my lower division courses for Pass/No Pass?**

No, all courses for the major must be taken for letter grade.

**If I receive a D grade, is that considered passing?**

No, you must receive a C- or better for the major.

**Can I receive credit for Statics and Dynamics if I took it at a community college?**

You must submit a petition to have the course reviewed for credit, and the Undergraduate Affairs Committee will review the petition.

**Will my grades transfer from my community college?**

No, only the units.

**I got AP credit for Physics 2A and 2B. Do I have to take the 2BL lab?**

Yes, lab experience is critical to experiential learning.
GENERAL EDUCATION/COLLEGE REQUIREMENTS

UCSD undergraduate students enroll in one of six colleges: Revelle, John Muir, Thurgood Marshall, Earl Warren, Eleanor Roosevelt, and Sixth. The colleges are distinguished by their particular educational philosophy and environment. The choice of college is independent of the choice of major; all colleges are open to all majors.

Each student must satisfy general-education course requirements determined by the college, as well as the major requirements determined by the department. The six colleges have widely different general-education course requirements. The number of general education courses required by each college beyond the mathematics, physics, chemistry and engineering courses included in the Structural Engineering major program are listed in Table 4. Table 4 summarizes the course requirements of each UCSD college. Both of the four-year degree programs allow for a maximum of 12 general education courses if a full schedule is taken. Depending on the number of Advanced Placement credits, students from certain colleges may not be able to graduate in the four-year schedule presented in the Structural Engineering curriculum table. Please consult your college advisor to confirm your general-education requirements.

In the ABET accredited programs, students must take a total of at least twenty-four units in the arts, humanities, and social sciences, not including subjects such as accounting, industrial management, finance, or personnel administration. This requirement is typically satisfied by the general education requirements of all colleges.

Table 4. Number of General Education Courses IN ADDITION to Structural Engineering Degree Requirements.

<table>
<thead>
<tr>
<th>College</th>
<th>Additional Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thurgood Marshall</td>
<td>12-15</td>
</tr>
<tr>
<td>John Muir</td>
<td>11-14</td>
</tr>
<tr>
<td>Revelle</td>
<td>13-24</td>
</tr>
<tr>
<td>Eleanor Roosevelt</td>
<td>10-18</td>
</tr>
<tr>
<td>Sixth College</td>
<td>12-17</td>
</tr>
<tr>
<td>Earl Warren</td>
<td>10-12</td>
</tr>
</tbody>
</table>
Chemistry

CHEM 6A: General Chemistry: First quarter of a three-quarter sequence intended for science and engineering majors. Topics include: atomic theory, bonding, molecular geometry, stoichiometry, types of reactions, and thermochemistry. May not be taken for credit after Chem 6AH. Recommended: proficiency in high school chemistry and/or physics; Concurrent or prior enrollment in Math 10A or 20A.

Mathematics

MATH 20A: Calculus for Science and Engineering: Foundations of differential and integral calculus of one variable. Functions, graphs, continuity, limits, derivative, tangent line. Applications with algebraic, exponential, logarithmic, and trigonometric functions. Introduction to the integral. Prerequisites: Math Placement Exam qualifying score, or AP Calculus AB score of 2 or 3 (or equivalent AB subscore on BC exam), or SAT II Math 2C score of 650 or higher, or Math 4C with a grade of C− or better, or Math 10A with a grade of C− or better.

MATH 20B: Calculus for Science and Engineering: Integral calculus of one variable and its applications, with exponential, logarithmic, hyperbolic, and trigonometric functions. Methods of integration. Polar coordinates in the plane. Prerequisites: AP Calculus AB score of 4 or 5, or AP Calculus BC score of 3, or Math 20A with a grade of C− or better, or Math 10B with a grade of C− or better, or Math 10C with a grade of C− or better.

MATH 20C: Calculus for Science and Engineering III: Vector geometry, vector functions and their derivatives. Partial differentiation. Maxima and minima. Double integration. Prerequisites: AP Calculus BC score of 4 or 5, or Math 20B with a grade of C− or better.


MATH 20F: Linear Algebra: Matrix algebra, Gaussian elimination, determinants, Linear and affine subspaces, bases of Euclidean spaces. Eigenvalues and eigenvectors, quadratic forms, orthogonal matrices, diagonalization of symmetric matrices. Applications. Computing symbolic and graphical solutions using Matlab. Prerequisites: Math 20C (or Math 21C) with a grade of C− or better.

Physics

PHYS 2A: Physics-Mechanics: A calculus-based science-engineering general physics course covering vectors, motion in one and two dimensions, Newton’s first and second laws, work and energy, conservation of energy, linear momentum, collision, rotational kinematics, rotational dynamics, equilibrium of rigid bodies, oscillations, gravitation. Prerequisites: Mathematics 20A. Corequisites: Mathematics 20B.

PHYS 2B: Physics-Electricity and Magnetism: Continuation of Physics 2A covering charge and matter, the electric field, Gauss’ law, electric potential, capacitors and dielectrics, current and resistance, electromotive force and circuits, the magnetic field, Ampere’s law, Faraday’s law, inductance, electromagnetic oscillations, alternating currents and Maxwell’s equations. Prerequisites: Physics 2A or 4A and Mathematics 20B. Corequisites: Mathematics 20C.

PHYS 2C: Physics-Fluid, Waves, Thermodynamics and Optics: Continuation of Physics 2B covering fluid mechanics, waves in elastic media, sound waves, temperature, heat and the first law of thermodynamics, kinetic theory of gases, entropy and the second law of thermodynamics, Maxwell’s equations, electromagnetic waves, geometric optics, interference and diffraction. Prerequisites: Physics 2A, 2B, and Mathematics 20C. Corequisites: Mathematics 20D.

PHYS 2BL: Physics Laboratory-Mechanics and Electrostatics: One hour lecture and three hours laboratory. Experiments include gravitational force, linear and rotational motion, conservation of energy and momentum, collisions, oscillations and springs, gyroscopes. Experiments on electrostatics involve charge, electric field, potential, and capacitance. Data reduction and error analysis are required for written laboratory reports. Prerequisites: Physics 2A or 4A.

PHYS 2CL: Physics Laboratory-Electricity and Magnetism, Wave and Optics: One hour lecture and three hours laboratory. Experiments on refraction, interference/diffraction using lasers and microwaves; lenses and the eye; acoustics; oscilloscope and L-R circuits; oscillations, resonance and damping, measurement of magnetic fields; and the mechanical equivalence of heat. Prerequisites: Physics 2A or 4A and Physics 2B or 4C.
General Engineering

SE 87: Freshman Seminar Program: Each term, freshman seminars (sometimes opened up to upperclassmen) in a variety of topics are offered by engineering faculty. When a freshman seminar is offered by a Structural Engineering instructor, it will be designated SE 87. Topics are chosen to reflect a level appropriate for first-year students and are conducted in an informal seminar setting limited to 10-20 students. These courses meet once per week and carry one unit credit. More information on the freshman seminar program, as well as current topics being offered, may be found online at http://ugseminars.ucsd.edu/FSP_studentPortal.htm.

MAE 170: Experimental Techniques: Principles and practice of measurement and control and the design and conduct of experiments. Technical report writing. Lectures relate to dimensional analysis, error analysis, signal-to-noise problems, filtering, data acquisition and data reduction, as well as background of experiments and statistical analysis. Experiments relate to the use of electronic devices and sensors.

Prerequisites: C- or better in Phys 2CL.

Structural Engineering Core Courses


Prerequisites: Priority given to SE majors.

SE 2: Structural Materials: Properties and structures of engineering materials, including metals and alloys, ceramics, cements and concretes, polymers, and composites. Elastic deformation, plastic deformation, fracture, fatigue, wearing, and corrosion. Selection of engineering materials based on performance and cost requirements.

Prerequisites: C- or better in Chem. 6A, Phys. 2A.

SE2L: Structures and Materials Lab: Materials testing and/or processing for metals and alloys, polymers and composites, cements, and wood. Materials selection and structural design to meet functional and cost requirements. Structural construction and testing.

Prerequisites: C- or better in Chem 6A, Phys 2A, and SE 2.


Prerequisites: C- or better in Math 20 D and Math 20F. Math 20F may be taken concurrently.

SE 101A: Mechanics I: Statics: Statics of particles and rigid bodies in two and three dimensions using vector representation; free body diagrams; analysis of trusses, frames, and machines; internal forces; shear force and bending moment diagrams; equilibrium problems with friction; introduction to moment of inertia.

Prerequisites: C- or better in Math. 20C and Phys. 2A.

SE 101B: Mechanics II - Dynamics: Kinematics and kinetics of particles and rigid bodies in 2-D and 3-D motion using vector representation; Newton’s second law; work, energy, and power; conservative forces, conservation principles; linear and angular impulse and momentum, and impact; Coriolis acceleration; rotating reference frames.

Prerequisites: C- or better in SE 101A, or MAE 130A.

SE 101C: Mechanics III - Vibrations: Free and forced vibrations of undamped and damped one-degree of freedom systems; Fourier analysis; vibration isolation; analysis of discrete multiple degree-of-freedom systems using normal mode matrix formulation; Lagrange’s equations; introduction to continuous vibrating systems and numerical analysis.

Prerequisite: C- or better in Math 20F and SE 101B (or MAE 130B).


Prerequisites: C- or better in SE 1, SE 9, and SE 101A or MAE 130A.

SE 103: Conceptual Structural Design: Introduction to structural design concepts, structural performance, materials, load cases, factors of safety, and aesthetics through team-based projects; development of design theories and approaches; application examples from aerospace, civil, and marine systems; introduction to basic visualization and modeling applications.

Prerequisites: C- or better in SE 2, SE 9 and SE 101A (or MAE 130A).


Prerequisites: C- or better in Math 20D and SE 101A (or MAE 130A).


Prerequisite: C- or better in SE 110A (or MAE 131A).
SE 111A/B: Steel Bridge Design Competition: Student teams design, analyze, build, and test a steel bridge for regional and national ASCE design competition.
Prerequisite: C- or better in SE 103 and SE 110A (or MAE 131A).

SE 112A/B: Concrete Canoe Design Competition: Student teams design, analyze, build and test a concrete canoe for the regional and national ASCE design competitions.
Prerequisite: C- or better in SE 110A (or MAE 131A).

SE 115: Fluid Mechanics for Structural Engineering: Fluid statics, hydrostatic forces; integral and differential forms of conservation equations for mass, momentum and energy; Bernoulli equation; dimensional analysis; viscous pipe flow; external flow, boundary layers; open channel flow.
Prerequisites: C- or better in Phys 2A and Math 20D.

Prerequisite: C- or better in SE 102 and SE 103.

Prerequisite: C- or better in SE 102 and SE 101C (or MAE 130C).

Prerequisite: Priority given to SE majors.

Prerequisites: C- or better in SE 110A (or MAE 131A).

SE 130B: Structural Analysis: Matrix methods of analysis for structures comprised of a large number of truss and beam-column structural elements. Development of the underlying mathematical formulations based on matrix structural analysis, and implementation of computer codes for the analysis of civil, mechanical, and aerospace structures.
Prerequisites: C- or better in SE 130A.

Prerequisites: C- or better in SE 101C (or MAE 130C), SE 121, and SE 130B.

SE 140: Structures and Materials Laboratory: Introduction to concepts, procedures, and key issues of engineering design. Problem formulation, concept design, configuration design, parametric design, and documentation. Project management, team working, ethics, and human factors. Term project in model structure design. Program and or materials fee may apply.
Prerequisites: grade of C– or better in SE 103, SE 130B, MAE 170, and senior standing in the major.

Design, Focus Sequences, and Technical Electives

SE 142: Design of Composite Structures: Introduction to advanced composite materials and their applications. Fiber and matrix properties, micromechanics, stiffness, ply-by-ply stress, hygrothermal behavior, and failure prediction. Lab activity will involve design, analysis, fabrication, and testing of composite structure.
Prerequisites: C-or better in SE 110A (or MAE 131A), and SE 110B.

Prerequisites: C- or better in SE 130A.

Prerequisites: C- or better in SE 103, and SE 130A.

SE 151B: Design of Prestressed Concrete: Mechanical properties of concrete and reinforcing material including creep, shrinkage, and stress relaxation. Concept and application of prestressed concrete. Analysis and design of prestressed concrete structures and components including continuous beams and composite construction. Calculation of deflection and prestress losses.
Prerequisites: C- or better in SE 151A.

Prerequisites: C- or better in SE 130A, SE 150 and SE 151A. Concurrent enrollment in SE 151B.
SE 154: Design of Timber Structures: Properties of wood as a building material. Analysis and design of wood beams and columns. Lateral analysis for wind/seismic loading using the IBC. Distribution of lateral forces through a wood structure. Shear wall and diaphragm design. Wood connections introduction. **Prerequisites:** C- or better in SE 103 and SE 130A.

SE 160A: Aerospace Structural Mechanics I: Aircraft and spacecraft flight loads and operational envelopes, three-dimensional stress/strain relations, metallic and composite materials, failure theories, three-dimensional space trusses and stiffened shear panels, combined extension-bend-twist behavior of thin-walled multi-cell aircraft and space vehicle structures, modulus-weighted section properties, shear center. **Prerequisites:** C- or better in SE 2, SE 101B (or MAE 130B) and SE 110A (or MAE 131A). *Priority given to engineering majors.*

SE 160B: Aerospace Structural Mechanics II: Analysis of aerospace structures via work-energy principles and finite element analysis. Bending of metallic and laminated composite plates and shells. Static, vibration, and buckling analysis of simple and built-up aircraft structures. Introduction to wing divergence and flutter. Fastener analysis. **Prerequisites:** C- or better in SE 160A.

SE 163: Nondestructive Evaluation and Design: Fourier signal processing, liquid penetrant, elastic wave propagation, ultrasonic testing, impact-echo, acoustic emission testing, infrared thermography. **Prerequisites:** C- or better in SE 110A and SE 110B or consent of instructor.


SE 171: Aerospace Structures Repair: Review methods used to repair aerospace structures. Emphasis on primary load-bearing airframe structures and analysis/design of substantiate repairs. Identification of structural/corrosion distress, fatigue cracking, damage tolerance, integrity and durability of built-up members, patching, health monitoring. **Prerequisites:** C- or better in SE 130 B or SE 160A.


SE 181: Geotechnical Engineering: General introduction to the mechanics of soils, including: composition and classification, compaction, compressibility and consolidation, permeability and seepage, stress distribution, settlement and shear strength, as well as soil exploration, sampling, and in-situ testing techniques. Physical laboratory taken concurrently. **Prerequisites:** C- or better in SE 110A or MAE 131A.

SE 182: Foundation Engineering: Review of soil mechanics, site investigations, foundations design, bearing capacities of shallow and deep foundations, settlement of structures, and earth pressures on retaining walls. **Prerequisite:** C- or better in SE 181.

SE 184: Ground Improvement: Concepts underpinning mechanical, hydraulic, chemical and inclusion-based methods of ground improvement will be discussed. Students will be able to understand the advantages, disadvantages and limitations of the various methods; and develop a conceptual design for the most appropriate improvement strategy. **Prerequisite:** C- or better in SE 181.
### Typical Academic Year Course Schedule (Subject to Change Each Year)

<table>
<thead>
<tr>
<th>COURSE</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
<th>Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core Required Courses</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE 1</td>
<td>Intro. to Structures and Design</td>
<td>X</td>
<td></td>
<td>X*</td>
</tr>
<tr>
<td>SE 2</td>
<td>Structural Materials</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>SE 2L</td>
<td>Structural Materials Lab</td>
<td>X</td>
<td></td>
<td>X*</td>
</tr>
<tr>
<td>SE 101A</td>
<td>Mechanics I: Statics</td>
<td>X</td>
<td></td>
<td>X*</td>
</tr>
<tr>
<td>SE 101B</td>
<td>Mechanics II: Dynamics</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SE 101C</td>
<td>Mechanics III: Vibrations</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SE 102</td>
<td>Numerical, Computational, and Graphical Tools</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>SE 103</td>
<td>Conceptual Structural Design</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SE 110A</td>
<td>Solid Mechanics I</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SE 110B</td>
<td>Solid Mechanics II</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>SE 115</td>
<td>Fluid Mechanics for Structural Engineering</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>SE 120</td>
<td>Eng. Graphics and CAD</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>SE 121</td>
<td>Numerical Methods in Engineering</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SE 125</td>
<td>Statistics, Probability, and Reliability</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SE 130A</td>
<td>Structural Analysis I</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>SE 130B</td>
<td>Structural Analysis II</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SE 131</td>
<td>Finite Element Analysis</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SE 140</td>
<td>Structures and Materials Laboratory</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Civil Focus Sequence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE 150</td>
<td>Design of Steel Structures</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SE 151A</td>
<td>Design of Structural Concrete (RC)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>SE 151B</td>
<td>Design of Structural Concrete (PC)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>SE 152</td>
<td>Seismic Design of Structures</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Aerospace Focus Sequence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE 160A</td>
<td>Aerospace Structural Design I</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SE 160B</td>
<td>Aerospace Structural Design II</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SE 142</td>
<td>Design of Composite Structures</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SE 171</td>
<td>Aerospace Structures Renewal</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Geotechnical Focus Sequence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE 180</td>
<td>Earthquake Engineering</td>
<td></td>
<td>X*</td>
<td></td>
</tr>
<tr>
<td>SE 181</td>
<td>Geotechnical Engineering</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>SE 182</td>
<td>Foundation Engineering</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>SE 184</td>
<td>Ground Improvement</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Renewal Focus Sequence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE 142</td>
<td>Design of Composite Structures</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SE 163</td>
<td>Nondestructive Evaluation</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>SE 171</td>
<td>Aerospace Structures Renewal</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Technical Electives</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE 154</td>
<td>Timber Design</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE 168</td>
<td>Structural System Testing &amp; Model Correlation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE 111A,B</td>
<td>Design Competition: Steel Bridge</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SE 112A,B</td>
<td>Design Competition: Concrete Canoe</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>Freshman Seminars</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE 87</td>
<td>Freshman Seminar</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Courses might be offered every other year or at some time other than the quarter indicated.
INTEGRATED BACHELOR’S/MASTER’S DEGREE PROGRAM

An integrated program leading to a Bachelor of Science and a Master of Science Degree in Structural Engineering is offered to UCSD undergraduate students seeking to obtain the Master’s degree within one year of completion of the baccalaureate degree.

The Structural Engineering Department accepts applications during the spring quarter (exact deadline is May 15th) of the student’s junior year. The applicant must have completed at least 148 quarter units with a cumulative 3.5 GPA. Applicant must also be in the major.

Students accepted into the program by the department must follow the department and college requirements for the remainder of their undergraduate work in addition to the requirements of the integrated program.

Formal application to graduate study is made during the student’s senior year of undergraduate study. At that time, a graduate application fee (non-refundable), and original transcripts are submitted to the Graduate Student Advisor of the SE Department. The department forwards these materials with the admit recommendation to the Office of Graduate Studies and Research. For more information, students can contact the SE Department Graduate Student Advisor listed on page 3 of this handbook.

For students interested in pursuing graduate study in engineering after graduating from UCSD, information may be found at the Career Services Center special web page: http://career.ucsd.edu/undergraduates/consider-grad-school/field-of-study/science-tech-eng-and-Math.html.

IDEA STUDENT CENTER
(ENGINEERING STUDENT SERVICES)

The Jacobs School of Engineering supports several programs and services that promote academic and professional development for undergraduate students across all engineering departments. Students are encouraged to contact the IDEA (Inclusion, Diversity, Excellence and Advancement) Student Center about these programs by electronic mail (idea@soe.ucsd.edu), by phone (858) 534-6105, or by person in Room 1400, Jacobs Hall (formerly Engineering Building Unit I). Some of these programs and services are discussed briefly below. Students may access the web at http://www.jacobsschool.ucsd.edu/student for a complete listing of opportunities and services provided by the IDEA Student Center.

Triton Engineering Student Council (TESC). The Jacobs School of Engineering currently recognizes and supports twenty-four student chapters of various professional and honorary engineering societies. These organizations and other interested undergraduate engineering students form TESC, which helps to identify and address engineering student needs and concerns. TESC is a critical component of the School and it is supported through the Dean’s Office. TESC coordinates school-wide student events such as E-Week, DECaF, and the Ring Ceremony for graduating seniors. TESC also hosts engineering K-12 outreach events and supports other undergraduate student organizations. TESC may be found on the web at http://tesc.ucsd.edu or they can be contacted by electronic mail at tesc@ucsd.edu.

Engineering Student Employment Opportunities. In a coordinated effort, Engineering Student Services assists Career Services, the Academic Internship Program, interested companies, faculty and staff in disseminating information about job opportunities for engineering students. These opportunities include permanent employment, part-time employment during the academic year, summer employment and contract work. This information can be found on the web at http://www.jacobsschool.ucsd.edu/student/student_prof/prof_career. If you have additional questions about this service, you may contact the coordinator through electronic mail (idea@soe.ucsd.edu), or by phone (858) 534-6105.

Team Internship Program (TIP). Summer Team Internships are part of the Jacobs School’s effort to enhance students’ education through real-world engineering experiences in a team setting. Students work on-site with industry partners as a multi-disciplinary team focused on a clearly defined and significant project. This is a paid internship program
which will last 10-12 weeks over the summer and requires 40 hours per week. Additional information can be found on the web at http://www.jacobsschool.ucsd.edu/student/student_prof/prof_team/team_intern. Students who are interested in participating in TIP can contact the program coordinator via email at JacobsStudentTeams@soe.ucsd.edu or by phone (858) 534-6105.

**Teams In Engineering Service (TIES):** TIES is an innovative service-learning academic program putting UCSD undergraduates and their technical and creative skills to work for San Diego non-profit organizations. Multi-disciplinary teams of UCSD students design, build and deploy projects that solve technology-based problems for community partners. TIES projects can range from working with orthopedists and physical therapists to develop and build mechanical tools or prosthetics for the developmentally disabled, to working with agriculture to develop new irrigation solutions for local farming communities. Information on current TIES projects, how to apply, and the course structure, can be found on the web at http://globalties.ucsd.edu/prospectivestudents.html.

**Orientation to Engineering (formerly Access to Careers in Engineering ACE):** The Orientation to Engineering course series focuses on the successful transition and orientation of both new freshmen and transfer students to engineering studies at UCSD, with particular emphasis on those students coming from economically or educationally disadvantaged backgrounds. Each course is worth 1 unit. Course descriptions and additional information can be found on the web at http://www.jacobsschool.ucsd.edu/student/student_success/ace.shtml.

All engineering students are encouraged to work with his or her college advisor, and engineering program representative in developing a plan of study and selecting the appropriate courses.

**IDEA Study Lab.** Tau Beta Pi and Eta Kappa Nu, Engineering Honor Societies, offer FREE tutoring sessions at the IDEA Study Lab for undergraduate engineering students. The IDEA Study Lab is located at Jacobs Hall 4600. To view the weekly tutoring schedule or to request an individual session for a specific class, visit the following website: http://www.jacobsschool.ucsd.edu/student/student_success/tutoring.shtml

**COMPUTER RESOURCES FOR UNDERGRADUATES**

**ACMS Accounts Available to Students**
Academic Computing and Media Services (ACMS) provides computer and media resources for UCSD faculty, staff, and students. If you are enrolled (not just accepted) as a regular UCSD student you may register yourself with ACMS for basic computing service. Registering someone else or registering if you are not a qualified UCSD student is prohibited. New students have accounts created automatically when they accept admission. Go to the following page on the ACMS website to see how to activate and access your account: http://acms.ucsd.edu/info/newadmits.shtml.

**Open Computing Environment Account:** OCE accounts are designed to provide students with on-going access to computers labs and servers that are dedicated to supporting their major or division. OCE accounts support both personal computing and course work. They receive additional resource allocations depending on the student’s enrollment in corresponding courses. It is important to be aware that disk space allocations are reduced again when courses end.

Structural Engineering students automatically qualify to upgrade to an OCE account. This will allow you access to the PFBH 161 Linux Lab as well as all ACMS general purpose computer labs.

*For instructions on how to upgrade to an OCE account, please see the ACMS student webpage at: http://acms.ucsd.edu/students/oce-upgrade.shtml. For instructions on how to use an OCE account for classwork, please see the ACMS student webpage at: http://acms.ucsd.edu/students/oce-intro.shtml.*
ACADEMIC ENRICHMENT

A number of additional educational opportunities, not formally required in the curriculum, are available to undergraduates interested in exploring facets of engineering in more detail. These opportunities include participation in research, industrial internships, student societies, course instruction, and seminars. More on academic enrichment may be found online at http://aep.ucsd.edu/.

Undergraduate Research and Independent Study

Undergraduates may participate in engineering research at UCSD through a number of informal and formal mechanisms. Many students first become familiar with research by participating 5-10 hours per week during the academic year or 10-20 hours per week in the summer on a volunteer basis. Other students are involved in research through the more formal programs described below.

Independent Study for Undergraduates:
SE199 courses offer qualified and motivated students the opportunity to work closely with faculty and graduate students and gain first hand experience in conducting research. Structural Engineering students may take SE 199, Independent Study for Undergraduates under the guidance of a Structural Engineering faculty member. This course can only be taken as an elective on a P/NP basis, under restricted conditions (see page 21).

The Faculty Mentor Program:
The Faculty Mentor Program (FMP) offers research experience to any junior or senior with at least a 2.7 GPA who wants to prepare for graduate school. Participants work as research assistants to UCSD faculty members for at least 10 hours per week for two quarters. Students receive 4 units of SE 199 (Independent Study) credit for each quarter, learn how to write a research proposal and paper, receive graduate school and fellowship information, and present their research at the annual Faculty Mentor Program Research Symposium at the end of the academic year. For further information please call 534-5791 or visit the FMP website at http://students.ucsd.edu/academics/research/fmp/index.html.

Pacific Rim Undergraduate Experiences:
The Pacific Rim Undergraduate Experiences (PRIME) program provides undergraduates with hands-on, full-time research experience in internationally collaborative settings. Against the backdrop of living abroad in another culture, students work as full-time researchers in scientific institutions located in countries such as Australia, China, India, Japan, Malaysia, New Zealand, or Taiwan. The students will collaborate with mentors at both their host institution and back at UC San Diego. Further information is available at http://prime.ucsd.edu.

ACADEMIC INTERNSHIPS

UCSD Academic Internship Program (AIP)
The Academic Internship Program is an academic course that offers students of all majors the opportunity to intern and conduct research in diverse corporate and community settings while earning 4, 8 or 12 units of P/NP academic credit over the course of the quarter. Through the academic internship experience students enhance their research, critical thinking, problem-solving, and writing skills by bringing an academic lens to a question or issue related to the internship experience. Students are required to intern a minimum number of hours based on the number of elected AIP 197 units. Students receive guidance from AIP counselors in identifying appropriate internships; résumé, cover letter and interview preparation; securing an internship; and identifying a faculty advisor for the research paper/project.

In order to participate in AIP 197, students must have completed 90 units and have a minimum GPA of 2.5 at the time of application. Transfer students must have completed one quarter of course work prior to the time of application. Further information is available at http://aip.ucsd.edu.
Opportunities Abroad
Engineering is already a global field offering jobs throughout the world. You can prepare yourself for these opportunities with an exciting study or internship experience abroad. Through the Programs Abroad Office, students may receive credit for international study through a variety of programs. Two categories of programs, both of which offer transferable credit pending approval by UCSD are offered: Education Abroad Program - EAP (UC sponsored exchanges with over 100 universities abroad) and Opportunities Abroad Program - OAP (all other study, internship, and work abroad programs sponsored by other universities, of which thousands exist). Financial Aid can be used with EAP and OAP academic programs, and scholarships are also available for study abroad.

For information on EAP and OAP programs, first contact the Programs Abroad Office (858-534-1123, abroad@ucsd.edu, or http://icenter.ucsd.edu/pao/index.html; or visit the International Center on Library Walk).

After meeting with an advisor at the Programs Abroad Office, you will be sent with an Academic Planning Form to the SE Dept., where the Undergraduate Coordinator and the Undergraduate Faculty Chair will advise you on major-credit courses. Upon receiving approval from the Undergraduate Faculty Chair, you must file a general petition. Final approval of petitions will be considered only after the courses have been completed and posted on your UCSD transcript. Students are advised to keep all of their coursework and a copy of the course syllabi for review. Students interested in studying abroad are strongly encouraged to plan their academic careers well in advance to ensure that coursework abroad is approved and to understand how credits will transfer in order to keep themselves on track for graduation in Structural Engineering.

UCSD’s Undergraduate Research Conference
Undergraduates who have written outstanding papers have the opportunity to present their findings in a formal setting at the annual UCSD Undergraduate Research Conference. Such students are invited to participate in the conference after being nominated by a faculty member. The conference is typically held in May.

Readers/Graders Positions
Undergraduate students may work as graders or readers for courses that they have completed and in which they have received a grade of B or better. Other qualifications include being a full time student (12 units or more), having at least junior standing, and a minimum GPA of 3.0. Readers generally work 10 hrs/week and receive $12.82/hr. Students interested in applying for a reader position should visit the employment page on the Structural Engineering website: http://www.structures.ucsd.edu/node/7.

Engineering Aide Positions
Throughout the year, Structural Engineering employs undergraduate students as Engineering Aides who assist faculty members with their research. These positions give students a hands-on opportunity to apply the concepts and methods taught in class. Many of our Engineering Aides assist with the construction and testing of large-scale structures in the Powell Labs while others provide computer analysis. Engineering Aide positions are available during the academic year as well as during summer. Available positions are posted on tritonlink at the following link: http://career.ucsd.edu/PT_Login.shtml.
STUDENT SOCIETIES AND ORGANIZATIONS

The Student Organization and Leadership Opportunities (SOLO) office coordinates the formation of student clubs that are run by and for students. All of these groups are represented at the Fall Festival on the Green (FFOG), usually held in mid-October.

The Department of Structural Engineering students participate in student chapters of the American Institute of Aeronautics and Astronautics (AIAA), the Society of Civil and Structural Engineers (SCSE) a student chapter of the American Society of Civil Engineers (ASCE) and Earthquake Engineering Research Institute (EERI). These student chapters invite external speakers, organize trips to local companies, visit local projects and participate in regional and national design competitions. A number of other engineering societies are active at UCSD. The Society of Women Engineers (SWE) encourages and supports women in engineering and the Society for Hispanic Engineers (SHPE), a national organization of professional engineers that serve as role models in the Hispanic community. They sponsor talks, provide workshops, and distribute information about opportunities in engineering.

Tau Beta Pi (TBP) at UCSD is a member of the National TBP engineering honor society. Engineering students who rank in the top 1/8 of juniors and the top 1/5 of seniors are contacted by TBP for possible membership. These students are eligible for membership in TBP if they complete an interview process as well as pass the exemplary character criteria. Throughout the year, TBP invites speakers to club meetings, organizes tours of companies, and provides a tutoring service. See: http://tbp.ucsd.edu.

**American Institute of Aeronautics and Astronautics (AIAA):** For over 70 years, the American Institute of Aeronautics and Astronautics has served as the principal society of the aerospace engineer and scientist. Formed in 1963 through a merger of the American Rocket Society (ARS) and the Institute of Aerospace Sciences (IAS), the purpose was, and still is, "to address the professional needs and interests of the past, current, and future aerospace workforce and to advance the state of aerospace science, engineering, technology, operations, and policy to benefit our global society.” Both ARS and IAS brought to the relationship a long and eventful history -- stretching back to 1930 and 1932, respectively -- and each left its mark on the Institute. The merger combined the imagination, opportunistic, and risk-taking desire of those rocket, missile, and space professionals with the more established, well-recognized achievers from the aviation community.

Today, AIAA has more than 35,000 professional members and more than 5,000 student members in over 190 branches. (including 12 foreign student branches ). The Institute's membership roster is also enhanced by its nearly 100 domestic and international corporate members. In short, AIAA offers a broad and diversified menu of programs to meet the ever-changing needs of the aerospace professional. See: http://aiaa.ucsd.edu/.

**Society of Civil and Structural Engineers (SCSE):** Society of Civil and Structural Engineers, formerly American Society of Civil Engineers, formed in 1852, is the oldest engineering society in the United States. Boasting a national membership of over 140,000 professional members, SCSE seeks to enhance the quality of living throughout the world by advancing professional knowledge and improving the civil engineering (CE) practice. These aspirations are best expressed in the Engineering Code of Ethics. The student chapter of SCSE provides students studying civil engineering with activities to further their practical knowledge of the field through activities such as field trips, guest speakers, and annual conferences. Through these activities, future CE professionals are given the opportunity to experience the practical application of their studies and meet practicing professional engineers. See: http://scse.ucsd.edu.
The Earthquake Engineering Research Institute (EERI): The Earthquake Engineering Research Institute, founded in 1949, is the principal U.S. society for engineers, geoscientists, architects, planners, public officials, and social scientists concerned about earthquakes and their effects. The objective of the Earthquake Engineering Research Institute is to reduce earthquake risk by advancing the science and practice of earthquake engineering by improving understanding of the impact of earthquakes on the physical, social, economic, political and cultural environment, and by advocating comprehensive and realistic measures for reducing the harmful effects of earthquakes.

The Institute is best known for its field investigation and reconnaissance reports detailing the effects of destructive earthquakes. Often EERI serves as coordinator for the investigative efforts of several organizations. EERI members include the leading earthquake professionals throughout the world. Information on the effects of destructive events is published in the Newsletter and in the Earthquake Spectra, EERI's quarterly professional journal. The newsletter and the journal are provided to all members.

EERI sponsors and co-sponsors major conferences in the USA and abroad, and organizes technical seminars and workshops, all of which provide forums for the exchange of information between researchers and practitioners in all the earthquake-related disciplines. EERI membership is open to all individuals interested in earthquake hazard reduction. See: https://www.eeri.org/.

Society of Women Engineers (SWE): The Society of Women Engineers is a not-for-profit educational and service organization that empowers women to succeed and advance in the field of engineering, and to be recognized for their life-changing contributions as engineers and leaders. Founded in 1950, SWE is the driving force that establishes engineering as a highly desirable career for women through an exciting array of training and development programs, networking opportunities, scholarships, outreach and advocacy activities, and much more. See: http://swe.ucsd.edu/.

Society of Hispanic Professional Engineers (SHPE): The Society of Hispanic Professional Engineers (SHPE) was founded in Los Angeles, California, in 1974 by a group of engineers employed by the city of Los Angeles. Their objective was to form a national organization of professional engineers to serve as role models in the Hispanic community.

The concept of Networking was the key basis for the organization. SHPE quickly established two student chapters to begin the network that would grow to encompass the nation as well as reach countries outside the United States. Today, SHPE enjoys a strong but independent network of professional and student chapters throughout the nation. See: http://shpe.ucsd.edu.
OFFICE OF ACADEMIC SUPPORT AND INSTRUCTIONAL SERVICES (OASIS)

OASIS provides a variety of services to maximize student performance and retention at the University of California, San Diego. OASIS provides activities that support and contribute to the improvement of teaching and learning. Programs range from services to help students overcome past academic deficiencies to program to help them excel in a subject matter or skill.

**Tutorial Programs:** All UCSD students are eligible for free, course-specific tutoring programs in math and science through OASIS. OASIS offers two types of math and science tutoring each quarter: Via appointment and via workshops.

**Workshops** are structured group study sessions led by a tutor. Most are course-specific and relate to a particular instructor. You must register in advance for these workshops. Workshops are offered for all of the lower division Math, Chemistry and Physics courses that are required for the Structural Engineering major.

For more information on the OASIS Tutorial Program, including schedules and information on how to enroll, please call (858) 822-2077 or visit [http://students.ucsd.edu/academics/_organizations/oasis/math-science/index.html](http://students.ucsd.edu/academics/_organizations/oasis/math-science/index.html).

**Language and Writing Program (LWP):** Through individual tutoring sessions and workshops, LWP enhance ESL students' English writing and composition strategies, knowledge and usage of grammar, and verbal skills. The program also helps students taking beginning or advanced classes in Spanish and French. ESL undergraduate students can request LWP services if they are taking SDCC 4 or SDCC 1 classes, college writing courses, or any class that requires term papers, essays, or laboratory reports. There are no eligibility requirements for students taking Spanish or French. For information on how to apply, visit [http://oasis.ucsd.edu/lang/lang.asp](http://oasis.ucsd.edu/lang/lang.asp).

**OASIS Transition Programs:** OASIS offers opportunities for academic enrichment and growth for selected freshmen and first-year transfer students. Students are selected by the University to participate in one of the following 3 OASIS programs:

- **Summer Bridge & Academic Transition Program:** This intensive 4-week summer program offers academic enrichment and credit for freshman students as well as academic support throughout the first school year.

- **STEP and TRiO Student Support Service Program:** This program provides freshman students with mentoring, tutoring, extracurricular activities, and other support during the first school year.

- **TRiO Student Support Service Program (SSSP):** Designed for freshman and transfer students, this program offers tutoring, workshops, mentoring, and other academic support throughout your career at UCSD.

Any incoming undergraduate UC San Diego freshman or transfer can apply to the OASIS Transition Programs. For more information, including how and when to apply, visit [http://students.ucsd.edu/academics/_organizations/oasis/transition-programs/index.html](http://students.ucsd.edu/academics/_organizations/oasis/transition-programs/index.html).
OTHER IMPORTANT RESOURCES FOR STUDENTS

Counseling and Psychological Services (CAPS)
CAPS is committed to promoting student mental health and well-being at an individual and organizational level, as well as the preservation and sustainability of an environment conducive to growth and lifelong learning.

CAPS provides individual, group, couples, and family psychotherapy to registered undergraduate and graduate students. Services are free of charge to currently enrolled students who have paid their registration fees. During the summer, students who were enrolled the previous Spring quarter and are intending to return in the Fall quarter are eligible for services.

In keeping with ethical standards of the mental health profession and the law, all services provided by the staff of CAPS are kept confidential. They do, however, consult as needed within the staff of CAPS (and Student Health Service if they are collaborating in your care) about the best way to provide the assistance based on client need. No information is released to outside parties without the client's prior, written consent. Neither the fact that you seek counseling nor any information about the counseling sessions will appear in your student academic record unless you direct CAPS to communicate with other staff and faculty at the university.

If you notice that you have certain patterns of thinking and behavior that interfere with your success with and the enjoyment of certain endeavors then you should consider making an appointment. Students also consult with CAPS about a variety of more specific personal, academic and relationship problems such as:

- Poor academic performance and study skills
- Roommate conflicts
- Homesickness and difficulty adjusting to the university
- Disappointing social relationships
- Alcohol and other substance use and abuse
- Difficulty in love relationships
- Loneliness and isolation
- Eating and body image problems
- Depression and suicidal thoughts
- Anxiety
- Sexuality and sexual identity
- Family conflict
- Grief and loss

For more information about CAPS and the services they provide, please see the CAPS webpage:
http://caps.ucsd.edu/#students

For appointments and after-hours assistance: (858) 534-3755
**STEPS TO A PROFESSIONAL ENGINEERING LICENSE**

Whether you design power plants, consumer goods, buildings, or aerospace vehicles, whether you work in private industry, for the U.S. government, or for the public and whether your efforts are theoretical or practical, you (as an engineer) have a significant responsibility.

Engineers of all types perform exciting and rewarding work, often stretching new technologies to their limits. But those limits are often incomprehensible to non-engineers. As the ambient level of technological sophistication increases, the public depends increasingly and unhesitatingly on engineers. That is where professional licensing and the National Society of Professional Engineers (NSPE) become important.

NSPE, the leading organization for licensed engineering professionals, is dedicated to serving the engineering profession by supporting such activities as continuing educational programs for its members, lobbying and legislative efforts on local and national levels and promoting guidelines for ethical service. From local, community-based projects that encourage top-scoring high school students to choose engineering as a career, to hard-hitting lobbying efforts in the nation’s capital to satisfy the needs of all engineers, NSPE is committed to you and your profession.

Engineering licensing is a two-way street: it benefits you personally while it also benefits the public and the profession. For you licensing offers a variety of advantages, ranging from peer recognition to greater advancement and career opportunities. If you wish to become an independent engineering consultant, it is required by law that you are registered. Some states require registration as a Professional Engineer if you wish to use the title engineer. A court of law generally will not recognize an individual as an engineer unless one is registered. For the profession, licensing establishes a common credential by which engineers can be compared. For the public, a professional engineering license is an assurance of a recognizable standard of competence.

The requirements for professional engineering registration prevailing in most of the states are as follows:

1) Graduation from an ABET accredited school, plus passage of the 8-hour EIT exam, plus two years of engineering experience acceptable to the board, plus passage of the 8-hour PE exam, or

2) Passage of the 8-hour EIT exam, plus four years of engineering experience acceptable to the board, plus passage of the 8-hour PE exam.

The first exam is generally known as the “Fundamental Examination” (sometimes referred to as the “Engineering-in-Training” exam or the EIT) and the second exam, as the “Professional Examination,” (sometimes referred to as the PE exam or the “Principles and Practices” exam). Persons who successfully pass these examinations are entitled to use the title “Professional Engineer” and to place the initials “P.E.” after their names. It is illegal for unregistered persons to use the title. Nearly all states have made provisions for an EIT status and will allow persons to take the first eight-hour (EIT or “Fundamentals”) portion of the written examination immediately before or immediately after graduation from an ABET accredited school. EIT status conveys no legal privileges and is offered primarily as a convenience to new graduates so that they can take the examination in fundamentals at a time when the material is still fresh in their minds. Almost all of the states use a uniform national EIT examination, administered through the National Council Engineering Examination (NCEE) and a great majority uses a uniform national examination for the “Professional” portion.

The 8-hour EIT exam is generally offered twice a year, in April and October. *The Structural Engineering department is not affiliated with administering the exam.*

For application and further information regarding the California EIT and PE examination visit the California Board for Professional Engineers and Land Surveyors website at [http://www.pels.ca.gov](http://www.pels.ca.gov). Students may also go online to the National Society of Professional Engineers at [http://www.nspe.org/Licensure/HowtoGetLicensed/index.html](http://www.nspe.org/Licensure/HowtoGetLicensed/index.html) to discover the complete process for becoming licensed as a professional engineer.