Undergraduate Guide for Architectural, Civil and Environmental Engineering Students

Fall 2015

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# CEES Faculty

**Director—Randall L. Kolar (CEC 334B)**

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<th>ENVIRONMENTAL ENGINEERING/SCIENCE</th>
<th>GEOTECHNICAL ENGINEERING</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
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</tr>
<tr>
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</tr>
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</tr>
<tr>
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</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td>Jeffery S. Volz <a href="mailto:volz@ou.edu">volz@ou.edu</a> CEC 423</td>
</tr>
<tr>
<td></td>
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</tr>
</tbody>
</table>

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**ASCE Student Chapter Advisor** – Christopher C. Ramseyer  
**Chi Epsilon Advisor** – Scott Harvey  
**ESSA Advisor** – Mark Nanny  
**SWB Advisor** – David Sabatini
The Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET) requires accredited engineering programs to publish the Mission Statement, Student Outcomes and Program Educational Objectives. The architectural engineering, civil engineering and environmental engineering programs are accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org.

MISSION STATEMENT

The mission of the School of Civil Engineering and Environmental Science (CEES) is to provide a high-quality educational experience for undergraduate and graduate students in the areas of architectural, environmental, geotechnical, structural, and transportation engineering and environmental science. The educational experience is accomplished through innovative classroom instruction aided by computer and multimedia-based instruction, laboratory experiences and student mentoring. The products of this experience are engineers and scientists capable of critical thinking, devoted to a lifetime of learning, and highly sought after by employers.

Student Outcomes

Student Outcomes describe what students are expected to know and be able to do by the time of graduation. The Student Outcomes for engineering students in CEES are:

(a) an ability to apply knowledge of mathematics, science, and engineering

(b) an ability to design and conduct experiments, as well as to analyze and interpret data

(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

(d) an ability to function on 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

(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, 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 the techniques, skills, and modern engineering tools necessary for engineering practice.
Program Educational Objectives  Program educational objectives (PEOs) are broad statements that describe what graduates are expected to attain within a few years of graduation. Program educational objectives are based on the needs of the program’s constituencies. The PEOs for CEES engineering graduates are:

Program Educational Objective 1: CEES alumni will have embarked on successful careers in areas associated with the development, implementation and management of architectural, civil or environmental engineering systems.

Program Educational Objective 2: CEES alumni will advance in their careers and continue their professional development through continuing education and lifelong learning.

1.0  ACADEMIC PROGRAM PLANNING

When you enroll in CEES we will appoint a faculty member to serve as your advisor. Your advisor will help you prepare an academic program plan, select courses, and offer advice on other matters. If you have a question regarding a specialty area within the School, you are encouraged to discuss the matter with a faculty member in that discipline. You should assume the primary responsibility for planning a coherent academic program that achieves your educational objectives and satisfies the requirements for graduation.

Students graduating from CEES must meet a number of criteria. The requirements for the Bachelor of Science in Architectural Engineering (129 hours), Bachelor of Science in Civil Engineering (126 hours) and Bachelor of Science in Environmental Engineering (125 hours) are located at the back of this booklet. In order to graduate, you must successfully complete semester hours noted with a minimum retention grade point average of 2.00 in all University of Oklahoma courses, all courses taken anywhere, all major (at OU & combined) courses and all courses required for the bachelor of science degree. In addition, you must have a minimum C grade in every course offered for your degree.

You must be admitted to the College of Engineering in order to enroll in all Engineering and CEES courses numbered 3XXX or greater, as well as in English 3153 (Technical Writing). For College of Engineering admission requirements, refer to “Policy on Admission of Undergraduate Students” in the current OU General Catalog.

It is your responsibility as a student to follow the course requirements for graduation, but your advisor will help you based on her/his knowledge at the time of each advising conference. Advisors can assist you in optimizing your learning experiences at OU. Failure to follow the advisor's recommendations can prolong the time required to earn a degree and result in probation and suspension. Your advisor has the
authority to withhold his approval if your selection of courses is inappropriate or unwise. Remember that both course and grade prerequisites are necessary for every course.

1.1 Accelerated B.S./M.S. Degree
The combined BS/MS program is offered to qualified undergraduate students in the School of Civil Engineering and Environmental Science, University of Oklahoma, who wish to pursue their graduate education while completing their undergraduate degree requirements. Students accepted into the combined BS/MS program can apply two professional elective courses (six credit hours) to simultaneously satisfy the requirements of both the BS and MS degrees. With proper planning in the final year, students can initiate thesis or non-thesis research in their senior undergraduate year and complete the MS in one additional year beyond their BS degree. Architectural Engineering majors will receive a BS in Architectural Engineering and MS in Civil Engineering through this program. Students interested in pursuing the combined BS/MS program are encouraged to inquire about their eligibility with their faculty advisor. It is suggested that the application process be completed by September 1st of the Junior Year.

1.2 Williams Student Services Center (FH 112)
The Williams Student Services Center, located in 112 Felgar Hall, assists students with the following matters:

- retention
- transfer equivalencies (for lower division courses)
- repeat/forgiveness policy
- general education questions
- appropriate curriculum
- petitions to add/drop
- suspension petitions
- complete withdrawal
- Degree Navigator corrections/updates
- graduation verification
- general OU policy information
- general assistance if you don’t know where to go

1.3 Transfer Students
Students transferring into CEES may notice that the degree audit in Degree Navigator has placed courses into a category at the end called “excess coursework”. It is possible that some of this coursework can be applied towards your degree. Please contact an advisor in WSSC for the correct procedure to request a review.

1.4 Graduating Seniors
Graduating seniors should visit the Williams Student Services Center for TWO (2) graduation checks: one in the semester BEFORE you plan to graduate; and one EARLY in
the semester you plan to graduate. In addition, you must schedule and attend an exit interview with the Director of the School of CEES, towards the end of your last semester.

2.0 STUDENT ADVISING AND ADVANCE REGISTRATION
If you have been admitted to the College of Engineering, meet current retention standards, and have no unpaid fines, overdue books or parking tickets you can participate in advance registration. Advance registration for fall and summer is held during the preceding spring semester, and advance registration for the spring semester is held during the preceding fall semester. With a few exceptions, advance registration is conducted according to classification and in varying alphabetical order of students’ last names.

Prior to the advance registration period, CEES holds advising sessions for all CEES undergraduate students. Advising periods are scheduled each semester. Students should check their e-mail, the bulletin boards in the Carson Engineering Center or inquire in CEC 334 for the advising schedule. Students who do not attend one of the advising periods forfeit their opportunity to register during the advance registration period and will only be advised at the start of the subsequent semester.

**Students must sign up for a specific date and time slot using iAdvise.** Students who do not sign up for a specific date and time slot through iAdvise cannot be guaranteed advisement on a walk-in basis. Follow the steps below to schedule your advising appointment.

1. Log into [https://iadvice.ou.edu/](https://iadvice.ou.edu/).
2. Under *Departmental-level Advisement*, select your program of study.
3. Select *Make Group Appointment*.
4. Choose the desired Advising Group Session, and click the corresponding “Make Reservation” button.
5. Add your phone number, and finalize your advisement appointment by clicking the “Make Reservation” button.
6. The next window will verify that your reservation has been saved.
7. You will be sent an email confirmation of your scheduled advising appointment.

*Note: Failure to check-in during scheduled advisement time may result in loss of appointment time.*

Please follow these steps:

1. Attend an **advising session**. After attending an advising session, special problems or circumstances may necessitate your scheduling an appointment with your faculty advisor. **All CEES students are assigned an individual faculty advisor who can answer questions between**
**group advising sessions.** Please feel free to contact your faculty advisor for an appointment.

Please prepare the following prior to advisement:
1. Copy of your major flow chart
   a. mark through completed and current courses
   b. circle courses in which you want to enroll in the upcoming semester
   c. plan to enroll for the upcoming semester

If you need special permission for a CEES class, you must e-mail the instructor with cc: to Susan Williams at srwilliamsATou.edu with the following information:
1. your name
2. your OU ID number
3. course number
4. section number
5. course name
6. copy and paste the error message you receive when you enroll into the e-mail message

You must obtain special permission for English 3153 from the English Department.

Before enrolling in any course, you should determine that you satisfy the course prerequisites. The CEES curriculum flow charts are located at the back of this guide and the *General Catalog* is available on-line at oZONE.ou.edu. Prerequisites are enforced for all classes. You will be administratively removed from any course you enroll in without the required pre-requisites. Remember that a minimum “C” grade is needed in all courses and is a part of the prerequisite.

All students must take one of the following capstone courses prior to graduation: CEES 4993 (AE Senior Design), CEES 4903 (CE Senior Design) or CEES 4923 (EnvE Senior Design). All three courses are offered only in the spring semester and must be taken by students scheduled to graduate that spring semester or the subsequent summer or fall semesters. Students planning to graduate in the summer or fall semesters must have completed 90 credit hours of the Architectural, Civil, or Environmental Engineering curricula prior to enrolling in their capstone course. All engineering students enrolling in their capstone course are required to attempt the Fundamentals of Engineering (FE) examination during the semester in which they plan to graduate. CEES will pay the State Board fee for all CEES students who pass the FE examination.

All prerequisites must be met to enroll in capstone senior design courses. Following is a list of prerequisites by major.
Architectural Engineering
- CEES 4113 Building Lighting and Electrical Systems
- AME 4653 Air Conditioning System Design
- CEES 4803 Professional Practice
- CEES 3364 Soil Mechanics
- CEES 3663 Structural Design Steel 1

Civil Engineering
- CEES 3213 Water Resources Engineering
- CEES 4803 Professional Practice
- CEES 3364 Soil Mechanics

Environmental Engineering
- CEES 4114 Aquatic Chemistry
- CEES 4324 Environmental Biology & Ecology
- CEES 4813 Professional Practice Environmental
- CEES 3364 Soil Mechanics
- CEES 3213 Water Resources Engineering

3.0 PROFessional ELECTives
CEES has three engineering degree programs: architectural; civil and environmental. Within the civil and environmental engineering programs, there are different areas of emphasis. Students can use Professional Electives within the civil or environmental engineering curricula to focus on particular areas to obtain either a general or specialized background. Both paths have merits.

Selecting electives from several areas will give you a chance to explore various fields before choosing a specialty. Few engineers follow a single track throughout their careers; changes to new areas are common and a broad education allows easy transition. For the person who desires a general civil engineering career, a broad background is usually required to satisfy the varied demands. Also, most civil engineering projects encompass many areas of design. A general background helps communicate across specialty lines.

Specialization may be the choice for those students who have clearly-defined career goals and want to focus on one area only. By selecting courses in a single area it is possible to be well qualified for a position within a particular field with only a baccalaureate degree. In addition, specialization can provide impressive qualifications and capabilities for graduate study.

We suggest that you carefully consider both the generalization and specialization options and consult with faculty, practicing engineers and your advisor before making a decision. Whatever path you choose, please recognize that focus in your selection of electives is desirable. There is no wisdom in a random selection of professional electives.
Professional electives are 4000-level senior and 5000-level graduate courses. These electives have, as prerequisites, required engineering or CEES core courses. Make certain that you have the appropriate course and grade prerequisites for each professional elective.

University of Oklahoma regulations and CEES policy impose certain restrictions when selecting professional electives. No 6000-level courses can be taken by undergraduate students, nor can 5000-level courses be taken by students with junior standing. Also, correspondence courses and the generic course, CEES 5020—Problems in CE, are unacceptable as professional electives.

3.1 Architectural Engineering
Architectural engineers design buildings and other structures, but the design of a building involves far more than its appearance. Buildings also must be functional, safe, and economical and must suit the needs of the people who use them. Architectural engineers consider all these factors when they design buildings and other structures. Architectural engineers design a wide variety of buildings, such as office and apartment buildings, schools, churches, factories, hospitals, houses, and airport terminals. They also design complexes such as urban centers, college campuses, industrial parks, and entire communities. In addition, they may advise on the selection of building sites, prepare cost analysis and land-use studies, and do long-range planning for land development.

Architectural engineers develop final construction plans that show the building’s appearance and details for its construction. Accompanying these plans are drawings of the structural system; air-conditioning, heating, and ventilating systems; electrical systems; communications systems; plumbing; and, possibly, site and landscape plans. Although they have traditionally used pencil and paper to produce design and construction drawings, architectural engineers are increasingly turning to computer-aided design and drafting (CADD) technology for these important tasks.

3.2 Civil Engineering Electives (Table 1)
Civil engineering is the oldest of the modern engineering disciplines with historical roots dating back to the 1700s. Responsibilities of the first civil engineers increased during the industrial revolution and included the construction of canals, roads and railroads.

Civil engineers are responsible for the design and construction of society’s infrastructure, such as buildings, highways, bridges, mass transit systems, dams and locks, and municipal water and sewage treatment systems. They often are responsible for planning, managing, operating and maintaining these facilities. Consequently, civil engineering is frequently referred to as “the people-serving profession.”

Spurred by general population growth and an expanding economy, more civil engineers will be needed to design and construct higher-capacity transportation, water supply and pollution control systems as well as large buildings and building complexes. They also
will be needed to repair or replace existing roads, bridges and other public structures.

3.2.1 Geotechnical Engineering Emphasis
Geotechnical engineering relates to the behavior of structures, foundations and geologic media such as soils and rocks. The geotechnical engineer designs earth and rock-filled dams, levees, tunnels, braced excavations and structural foundations. This field leads to careers in analysis, design, construction and maintenance of structural foundations, pavements, tunnels, dams and other facilities, and also in material testing and general civil engineering consultant works. Graduates typically work for consulting firms, state departments of transportation and government organizations.

3.2.2 Environmental/Water Resources Emphasis
Civil engineers are generally charged with developing the infrastructure needed to provide safe drinking water and wastewater collection and treatment systems. Water resources engineering can involve the design of dams, pipelines, water treatment plants, water distribution systems, and storm water control and flood prevention systems. Wastewater treatment engineers design sewage collection systems and wastewater treatment facilities. Graduates are frequently employed governmental agencies and private companies.

3.2.3 Structural Engineering Emphasis
Structural engineering involves the analysis, design and construction of buildings, bridges, offshore platforms and other facilities. Structural engineers select the appropriate materials and ensure that the structure will have sufficient strength and stiffness to fulfill its intended purpose. Careers are available in structural analysis and design, general civil engineering consulting work, and construction. Graduates are frequently employed by private companies, architectural firms and governmental agencies.

3.3 Environmental Engineering Electives (Table 2)
Environmental engineering began with the demand for better water and wastewater treatment technologies. Later, the field expanded to include hydro-mechanics processes, hydrology and water resources engineering. Today, environmental impact assessment and pollution control are also included. In CEES, we also work in hazardous and solid waste management and disposal. Careers are available in water resources (groundwater and reservoir development), water treatment, sewage treatment, industrial waste management and solid and hazardous waste management. Graduates typically work for federal, state and local governments, consulting firms and industry.
Table 1. Approved Professional Electives and Areas of Emphasis for Bachelor of Science in Civil Engineering Degree

<table>
<thead>
<tr>
<th>Geotechnical Engineering</th>
<th>Environmental Engineering</th>
<th>Structural Design</th>
<th>Structural Analysis</th>
<th>Structural Systems</th>
</tr>
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<tbody>
<tr>
<td>CEES 5020 (a)</td>
<td>CEES 4114</td>
<td>CEES 5693</td>
<td>CEES 4663</td>
<td>CEES 5020 (d)</td>
</tr>
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<td>CEES 5333</td>
<td>CEES 4123</td>
<td>CEES 5753</td>
<td>CEES 4673</td>
<td>CEES 5020.005</td>
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<tr>
<td>CEES 5343</td>
<td>CEES 4234</td>
<td>CEES 5773</td>
<td>CEES 5020 (b)</td>
<td>CEES 5073</td>
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<tr>
<td>CEES 5353</td>
<td>CEES 4263</td>
<td>CEES 5783</td>
<td>CEES 5020 (c)</td>
<td>CEES 5653</td>
</tr>
<tr>
<td>CEES 5404</td>
<td>CEES 5423</td>
<td></td>
<td>CEES 5723</td>
<td>CEES 5673</td>
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<tr>
<td>CEES 5413</td>
<td>CEES 5843</td>
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<td>CEES 5763</td>
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<td>CEES 5423</td>
<td>CEES 5853</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEES 5693</td>
<td>CEES 5873</td>
<td></td>
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</tr>
</tbody>
</table>

Course No. | Title                                   | Course No. | Title                                   |
------------|------------------------------------------|------------|------------------------------------------|
CEES 4114   | Aquatic Chemistry                        | CEES 5404  | Soil Stabilization                       |
CEES 4123   | Open Channel Flow                        | CEES 5413  | Soil-Structure Interaction               |
CEES 4234   | Applied Environmental Microbiology        | CEES 5653  | Advanced Mechanics of Materials          |
CEES 4333   | Foundation Engineering                   | CEES 5673  | Dynamics of Structures                   |
CEES 4663   | Matrix Methods in Structural Analysis     | CEES 5693  | Structural Design of Pavements           |
CEES 4673   | Structural Analysis II                    | CEES 5723  | Experimental Analysis of Structures      |
CEES 4753G  | Structural Design - Wood                 | CEES 5763  | Introduction to Finite Element Method    |
CEES 5020 (a) | Computer Methods in Geotechnical Eng | CEES 5773  | Structural Design – Steel II             |
CEES 5020 (b) | Plastic Analysis of Structures         | CEES 5783  | Structural Design – Concrete II          |
CEES 5020 (c) | Structural Stability                    | CEES 5843  | Hydrology                                |
CEES 5020 (d) | Pre-stressed Concrete                   | CEES 5853  | Groundwater and Seepage                  |
CEES 5020 (e) | Bridge Engineering Fundamentals          | CEES 5873  | Water Quality Management                 |
CEES 5021   | Technical Communications                 |            |                                          |
CEES 5343   | Advanced Soil Mechanics                  |            |                                          |
CEES 5353   | Introduction to Soil Dynamics             |            |                                          |
CEES 5423   | Environmental Geotechnology              |            |                                          |
### Table 2. Approved Professional Electives and Areas of Emphasis for Bachelor of Science in Environmental Engineering Degree

<table>
<thead>
<tr>
<th>Water Supply &amp; Resources</th>
<th>Environmental Systems Modeling</th>
<th>Environmental Chemistry and Biology</th>
<th>Wastewater Management</th>
<th>Solid &amp; Hazardous Waste Management</th>
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<tbody>
<tr>
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<td>CEES 4243</td>
<td>CEES 4473</td>
<td>CEES 4123</td>
<td>CEES 5423</td>
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<tr>
<td>CEES 5833</td>
<td>CEES 5883</td>
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<td>MATH 4753</td>
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<tr>
<td>CEES 5873</td>
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</tr>
</tbody>
</table>

1. One elective can be chosen from list of approved science electives.

**Course No.**
- CEES 4123
- CEES 4243
- CEES 4324
- CEES 4473
- CEES 5020
- CEES 5244
- CEES 5283
- CEES 5423
- CEES 5343
- CEES 5624
- CEES 5673

**Title**
- Open Channel Flow
- Water Technologies for Emerging Regions
- Environmental Biology and Ecology
- Soil Science
- Ecological Engineering Science (EES)
- Water and Waste Treatment Processes
- Environmental Organic Chemistry
- Environmental Geotechnology
- Advanced Soil Mechanics
- Biological Waste Treatment
- Colloid and Surface Science

**Course No.**
- CEES 5833
- CEES 5843
- CEES 5853
- CEES 5873
- CEES 5883
- ENGR 4510
- MATH 4753

**Title**
- Ground Water Quality Protection
- Hydrology
- Ground Water and Seepage
- Water Quality Management
- Environmental Modeling
- Sustainable Engineering
- Applied Math Statistics
3.4 Professional Electives Outside of CEES
Under special circumstances, senior and graduate courses from other departments are acceptable professional electives if they are part of a coherent elective program. Such courses must be approved by your advisor.

Appropriate professional electives can be found in Aerospace Engineering, Architecture, Biological Engineering, Biology, Chemical Engineering, Chemistry, Computer Science, Electrical Engineering, Industrial Engineering, Mathematics, Mechanical Engineering, Microbiology, Petroleum Engineering, Physics, Statistics, Meteorology, and Geology.

4.0 PREMEDICAL OPTION
Students who wish to fulfill medical school admission requirements must consult with the OU Premedical Professions Advising Office (http://www.ou.edu/cas/zooology/premed/) at the beginning of their degree programs. This office can provide students with current information about medical school admission requirements and assist in identifying the appropriate program of study. Careful consultation with the Premedical Professions Advising Office early in the curriculum is required so that the student can choose appropriate general education, elective, and other courses that will allow the student to complete both the premedical and CEES degree requirements as efficiently as possible. Students who wish to complete a B.S. degree in Architectural, Civil, or Environmental Engineering and also fulfill medical school admission requirements may, with their CEES advisor’s approval, choose one professional elective from among the upper division life science and related courses that will fulfill medical college admission requirements. Students seeking to complete medical school admissions will require coursework beyond the credit hours normally required for the B.S. degree in CEES.

5.0 REQUIRED SOCIAL SCIENCE AND HUMANITIES COURSES
Engineers must understand their social responsibilities and be able to consider related factors in making professional decisions. Therefore, studies in the humanities and social sciences should meet both the objectives of a broad education and those of the engineering profession. The humanities consists of those areas concerned with man and his culture (e.g., history, literature, philosophy and religion); whereas, the social sciences are the studies of individual relationships in and to society (e.g., anthropology, economics, psychology, geography, political science and sociology).

ABET requires that courses taken in humanities and social sciences provide the student both breadth and depth and should not be a selection of unrelated introductory courses. The College of Engineering requires that a minimum of one of these must be upper division and at least two should be in the same or closely-related areas.

In addition to ABET criteria, the University of Oklahoma General Education Requirements (Table 3) mandate that students take two courses (6 credits) in social science and four courses (12 credits) in humanities. The humanities requirement consists of: one course (3 credits) in understanding artistic forms; two courses (6
credits) in western civilization and culture; and one course (3 credits) in non-western culture. Furthermore, according to State Regents' ruling, one of the social science courses must be Political Science 1113 (Government of the United States) and the western civilization and culture courses must include either History 1483 (United States, 1492-1865) or History 1493 (United States, 1865-present). At least one of the courses (minimum of 3 hours) used to satisfy the general education requirements must be at the upper division level.

Students may wish to explore other courses in the humanities (Table 4) and social sciences (Table 5), but it is imperative that they consult with their advisor or the Williams Student Services Center to make certain that they are satisfying both ABET and OU General Education Requirements. Only one humanities and one social science course can be used in your curriculum.

5.1 Foreign Language Requirements
To satisfy the OU General Requirements, non-international students must successfully complete two years of the same foreign language in high school or a two-semester sequence of a single language such as: Chinese, French, German, Greek, Hebrew, Italian, Japanese, Latin, Russian, Spanish, Arabic and American Indian languages in college.

An international student who graduates from a secondary school in which the language of instruction was not English has satisfied the language requirement through passing the TOEFL exam for admission to OU. An international student who graduates from a secondary school in which the language of instruction was English must meet the foreign language requirement of non-international students. Transcripts documenting foreign language study or an advanced standing exam must be presented for completion of the general education foreign language requirement.
Table 3. Examples of Courses to Meet the OU General Education Requirements

<table>
<thead>
<tr>
<th>WESTERN CIVILIZATION AND CULTURE</th>
<th>HIST 1483</th>
<th>United States, 1492-1865, or</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HIST 1493</td>
<td>United States, 1865-present, and</td>
</tr>
<tr>
<td></td>
<td>HIST 3483</td>
<td>The Life of the Mind in America Since 1877</td>
</tr>
<tr>
<td>NON-WESTERN CULTURE</td>
<td>HIST 2683</td>
<td>History of Islam, or</td>
</tr>
<tr>
<td></td>
<td>HIST 3853</td>
<td>Japanese Civilization to 1800, or</td>
</tr>
<tr>
<td></td>
<td>HIST 3863</td>
<td>Modern Japan Since 1800</td>
</tr>
<tr>
<td>SOCIAL SCIENCE</td>
<td>PSC 1113</td>
<td>Government of the United States, and</td>
</tr>
<tr>
<td></td>
<td>GEOG 4533</td>
<td>Geography of Europe</td>
</tr>
<tr>
<td>ARTISTIC FORMS</td>
<td>AHI 1113</td>
<td>Understanding Art, or</td>
</tr>
<tr>
<td></td>
<td>AHI 2214</td>
<td>General Art History Survey I, or</td>
</tr>
<tr>
<td></td>
<td>ENGL 2413</td>
<td>Introduction to Literature</td>
</tr>
</tbody>
</table>
### Table 4. Examples of Western Civilization Courses for Engineers

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 1013</td>
<td>Introduction to Philosophy</td>
</tr>
<tr>
<td>PHIL 3313</td>
<td>Ancient Philosophy</td>
</tr>
<tr>
<td>PHIL 3333</td>
<td>Survey of Modern Philosophy</td>
</tr>
<tr>
<td>PHIL 3353</td>
<td>American Philosophy</td>
</tr>
<tr>
<td>PHIL 1213</td>
<td>Introduction to Ethics</td>
</tr>
<tr>
<td>PHIL 3253</td>
<td>History of Ethics</td>
</tr>
<tr>
<td>SOC 1523</td>
<td>Social Problems</td>
</tr>
</tbody>
</table>

### Table 5. Examples of Social Science Courses for Engineers

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 2513</td>
<td>Human Evolution</td>
</tr>
<tr>
<td>ECON 1113</td>
<td>Principles of Economics—Macro</td>
</tr>
<tr>
<td>ECON 1123</td>
<td>Principles of Economics—Micro</td>
</tr>
<tr>
<td>PSY 1113</td>
<td>Introduction to Psychology</td>
</tr>
</tbody>
</table>
6.0 SCHOLARSHIPS AND FINANCIAL AID
Several scholarship opportunities are available to CEES undergraduate students including entering freshmen. Scholarships typically are awarded both for potential academic ability and financial need. Scholarships are awarded by the school, alumni, consulting firms and private industry. Awards range from $500-$1500. Scholarship recipients should be aware of the School of Civil Engineering and Environmental Science Policy on Scholarship Recipient Obligations (dated 2012). This policy requires written acknowledgement to the sponsor and participation in the annual scholarship luncheon as well as professional activities. Scholarship students must obtain and familiarize themselves with the policy.

The deadline to apply to be considered for general freshman scholarships is December 15 and the deadline to apply for transfer scholarships is March 1. Scholarship applications for incoming freshmen and transfer students can be found at http://www.ou.edu/content/admissions/affordability/scholarships.html

Applications for current students are due February 1 and can be found at http://www.scholarships.ou.edu

In addition to the scholarships offered by the School of CEES and the Gallogly College of Engineering, students may qualify for other scholarships or forms of financial assistance, including tuition waivers, direct student loans, work-study, and coop programs with Oklahoma firms and government agencies. The Office of Financial Aid, 731 Elm Avenue, Norman, OK 73019-0230, can provide information on the national Direct Student Loan Program, the Guaranteed Loan Program, the University Work-Study Program, and additional programs and opportunities. Whether or not they are eligible for the Work-Study Program, students can obtain assistance in finding part-time jobs on the campus by applying to the Personnel Service Office, 905 Asp Avenue, Norman, OK 73019-0420.

7.0 FUNDAMENTALS OF ENGINEERING EXAMINATION
To obtain legal status as a professional engineer you must graduate from an accredited engineering program, obtain appropriate engineering work experience, and pass two standard examinations. These examinations are administered by the National Council of Examiners for Engineering and Surveying (NCEES). The Fundamentals of Engineering (FE) and the Principles and Practice of Engineering (PE) examinations are the primary licensure examinations for engineers. The eight-hour FE examination is open book and tests you in basic science, mathematics, engineering science and engineering economics. You are eligible to take the exam if you have completed 90 hours toward your engineering degree; however, it is recommended that you take the exam during the semester you plan to graduate. All CEES students must attempt the FE examination before receiving their baccalaureate degree.

8.0 STUDENT ACTIVITIES
Student groups provide an excellent opportunity to supplement classroom education through contact with faculty, practicing engineers and fellow students.
8.1 **Architectural Engineering Institute (AEI)**
The Architectural Engineering Institute is a nationally affiliated technical organization new to CEES here at the University of Oklahoma. The AEI student chapter was founded in 2006 by interested architectural and civil engineering students.

The purpose of AEI is to promote and disseminate knowledge regarding the profession of architectural engineering through study, research, and discussion. AEI also provides the opportunity for interaction between students and professionals in the field through sponsored site tours, seminars and social events.

All students interested in architectural engineering are welcome to attend all gatherings and are encouraged to become a member. For additional information, contact a student officer or the Student Chapter Faculty Advisor.

8.2 **American Society of Civil Engineers (ASCE)**
ASCE has established over 125 chapters in U.S. engineering colleges. The parent society keeps in touch with students and engineering education through these student chapters. Membership in the student chapter is open to all undergraduate and graduate CEES students.

ASCE meets each month, usually in the evening, and hosts speakers from the practice of engineering. In addition, they sponsor field trips, attend national, regional and local meetings of the parent organization, and coordinate the College of Engineering Open House. For additional information, contact a student officer in the ASCE office or the Student Chapter Faculty Advisor.

8.3 **Chi Epsilon**
Chi Epsilon is the Civil Engineering Honor Society. It recognizes outstanding student achievements and promotes development of characteristics for a successful engineering career. The University of Oklahoma Chapter is part of a network of more than 60 chapters formed since the organization was founded at the University of Illinois in 1922. Membership in Chi Epsilon conveys both an honor and an obligation. To be eligible for membership, an undergraduate that has completed at least one-half of their coursework, must rank scholastically in the upper one-third of his or her class in a curriculum leading to a baccalaureate degree in Civil Engineering or a closely related curriculum. For more information, contact the Chapter Faculty Advisor.

8.4 **Environmental Science Student Association (ESSA)**
ESSA, which was established in 1992, is an independent organization of undergraduate environmental science students. Its major purpose is to invite speakers from academia, government, and industry to provide both technical perspectives on environmental problems, and career guidance. In addition, it provides networking opportunities for environmental science students, who usually do not take ES classes until their junior year, and consequently often don’t meet their peers until the third year of the program. Other activities include placement of newspaper recycling bins in Carson Engineering Center, organization of the first Environmental Fair at a local mall to bring current environmental
issues to area residents, and field trips to the Oklahoma Department of Environmental Quality laboratories. For more information, contact the Chapter Faculty Advisor.

8.5 Engineers' Club
The Engineers' Club fosters the high ideals of the engineering profession, stimulates interest in school and college activities and develops professional awareness and leadership qualities. Activities of the Engineers' Club include organization of OU Engineers' Week activities and Engineering Open House.

8.6 Society of Black Engineers (SBE)
SBE shares many of the same goals and objectives as the Engineers' Club, while directing attention to the challenges and needs of black students.

8.7 Society of Women Engineers (SWE)
SWE is a technical society with the objective of encouraging women who have chosen to study engineering. Through speakers, discussions and field trips, members are able to examine professional issues and challenges particular to women. Membership is open to both men and women.

8.8 Sooners Without Borders (SWB)
The mission of Sooners Without Borders (SWB) is to promote sustainable solutions for health, education, development and peace by engaging OU students, faculty and staff in multi-disciplinary service projects in both local and global communities. The purpose of SWB is to aid in the organization, publicity, and coordination of both domestic and international service projects undertaken by students, faculty and staff at the University of Oklahoma.

9.0 CURRICULA
The following flow charts are provided to help you in planning your coursework, and are not intended to be exhaustive. This information presupposes that you are enrolled in a current curriculum.

The University of Oklahoma in compliance with all applicable federal and state laws and regulations does not discriminate on the basis of race, color, national origin, sexual orientation, genetic information, sex, age, religion, disability, political beliefs, or status as a veteran in any of its policies, practices or procedures. This includes but is not limited to admissions, employment, financial aid and educational services. For questions regarding discrimination, sexual assault, sexual misconduct, or sexual harassment, please contact the Office(s) of Institutional Equity as may be applicable -- Norman campus at (405) 325-3546/3549, the Health Sciences Center at (405) 271-2110 or the OU-Tulsa Title IX Office at (918) 660-3107. Please see www.ou.edu/eoo

Accommodations on the basis of disability are available by contacting (405) 325-5913.
The University of Oklahoma
School of Civil Engineering and Environmental Science

Architectural Engineering Curriculum - Flowchart based on 2015-2016 degree check sheet
Modified 09-18-15 130 credit hrs

FALL
ENGR 1410 Freshman Engineering Orientation
ENGL 1213 Engl. Comp. or EXPO 1213 Expos. Writing
CEES 1100 Seminar
ENGR 2431 Electrical Grouts
ENGR 3401 Engineering Economics
CEES 1113 Intro. to CEES
MATH 2502 Differential and Integral Calc. II
MATH 2524 Differential & Integral Calc. I
MATH 2534 Differential & Integral Calc. III
CHEM 1315 General Chem.
PHYS 2514 Physics I
PHYS 2524 Physics II
MATH 3113 Intro. to ODE
CEES 2223 Fluid Mechanics
ENGL 2103 English Composition
CEES 2213 Statics
CEES 2223 Fluid Mechanics
CEES 2224 Structural Design Wood 1
CEES 2113 Seminar
CEES 2153 Mechanics of Materials

SPRING
ENGR 1410 Freshman Engineering Orientation
ENGL 1213 Engl. Comp. or EXPO 1213 Expos. Writing
CEES 1100 Seminar
ENGR 2431 Electrical Grouts
ENGR 3401 Engineering Economics
CEES 1113 Intro. to CEES
MATH 2502 Differential and Integral Calc. II
MATH 2534 Differential & Integral Calc. III
CHEM 1315 General Chem.
PHYS 2514 Physics I
PHYS 2524 Physics II
MATH 3113 Intro. to ODE
CEES 2223 Fluid Mechanics
ENGL 2103 English Composition
CEES 2213 Statics
CEES 2223 Fluid Mechanics
CEES 2224 Structural Design Wood 1
CEES 2113 Seminar
CEES 2153 Mechanics of Materials

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MATH 2534 Differential & Integral Calc. III
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CEES 2213 Statics
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CEES 2113 Seminar
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CEES 1113 Intro. to CEES
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MATH 2534 Differential & Integral Calc. III
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PHYS 2524 Physics II
MATH 3113 Intro. to ODE
CEES 2223 Fluid Mechanics
ENGL 2103 English Composition
CEES 2213 Statics
CEES 2223 Fluid Mechanics
CEES 2224 Structural Design Wood 1
CEES 2113 Seminar
CEES 2153 Mechanics of Materials

NOTE: This flowchart is NOT an official note of degree requirements and/or prerequisites. Please use as a supplemental advising guide to be used with the OFFICIAL OU check sheet.

1. Transfer students are required to take ENGR 3410 instead of ENGR 1410
2. CEES 1000 must take 4 of 6 offered
3. CEES 2213 prerequisite = Sophomore level standing in CEES
4. ENGL 3153 prerequisite ENGL 1213 or EXPO 1213. ENGL 3153 must be taken with CEES 3363 or CEES 3403
5. CEES 4453 prerequisites = CEES 1213 with CEES 1213 or 2213 and MATH 2433 or 2934
6. CEES 4803 prerequisite = Senior standing in Architectural or Civil Engineering
7. CEES 4993 prerequisites = CEES 3663, 3673, 4803, and 4113 (or concurrent), 4333 (or concurrent) & AME 4653

□ At least one of these GenEd courses must be 3000-4000 level
□ Foreign Language: 2 semesters college level or 2 years of high school

NOTE: All CEES courses offered once a year except CEES 1000
Environmental Engineering Curriculum - Flowchart based on 2015-2016 degree check sheet modified 09-18-15 125 credit hrs

FALL
Freshman
ENGR 1410 1
Freshman Engineering Orientation
ENGL 1113
Engl. Comp.
CEES 1112
Intro to CEES
MATH 1914
Differential & Integral Calc. I
CHEM 1315
Gen. Chem. I
HIST 1483
US 1492-1865 or Hist. 1493 US 1865-Present
PHYS 2514
Physics I

FALL
Sophomore
CEES 1000 2
Seminar
ENGR 2461 4
Thermo-dynamics
CEES 2313
Water Quality Fundamentals
MATH 2504
Differential & Integral Calc. III
CHEM 1415
Gen. Chem. II
CEES 2213
CADD Fundamentals
PHYS 2524
Physics II

FALL
Junior
CEES 1000 2
Seminar
Professional Elective
ENGR 2431
Electrical Circuits
CEES 3213
Water Res. Engr.
MATH 3113
Intro. to ODE
CEES 4213
Statistical methods
CEES 4263 10
Hazardous & Solid Waste Management

FALL
Senior
CEES 4253
Statistics & Probability
CEES 4943
Air Quality Management
CEES 4813
Water and Waste Treat Design
CEES 4923
Prof. Practice Environmental
Core III – Soc. Sci. Elective

SPRING
Freshman
ENGL 1213
Engl. Comp.
EXPO 1213
Expos. Writ.

SPRING
Sophomore
CEES 1000 2
Seminar
ENGL 3153 7
Technical Writing
CEES 3243
Water and Waste Treat Design
ENGR 4243 5
Electrical Circuits
CHEM 3053
Gen. Chem. II

SPRING
Junior
CEES 1000 2
Seminar
CEES 4114 10
Aquatic Chemistry
CEES 4813 11
Prof. Practice Environmental
PSC 1113
Amer. Fed. Govt.

SPRING
Senior
CEES 1000 2
Seminar
CEES 4114 10
Aquatic Chemistry
CEES 4923 13
Env. Engr. Capstone

Pre-requisite must be taken first.
Co-requisite must be taken as a pre-requisite or in the same semester.

NOTE: This flowchart is NOT an official notice of degree requirements and/or prerequisites. Please use as a supplemental advising guide to be used with the OFFICIAL OU check sheet.

1. Transfer students are required to take ENGR 3410 instead of ENGR 1410
2. CEES 1000 – must take 4 of 6 offered
3. CEES 2213 pre-requisite – Sophomore standing in CEES
4. ENGR 2461 pre-requisite = MATH 2423 or 2924
5. ENGR 2431 pre-requisite = MATH 1823 or 1914
6. ENGR 3401 pre-requisite = MATH 1823 or 1914
7. ENGL 3153 co-requisite = CEES 3304 or 3403 or 3363 or any upper division CEES course with lab
8. CEES 4253 pre-requisite = MATH 2524 and PHYS 2524
9. CEES 4263 pre-requisite = MATH 2524 and CHEM 1315
10. CEES 4114 pre-requisite = Senior standing and one year of General Chemistry
11. CEES 4813 pre-requisite = Senior standing in ES or EnvE
12. CEES 4263G pre-requisite = Junior standing in CEES or permission of instructor
13. CEES 4823 pre-requisite = CEES 3213, 4114, 4324, 4813 and CEES 4263 pre-concurrent enrollment

* At least one of these GenEd courses must be 3000-4000 level

At least one of these GenEd courses must be 3000-4000 level

Foreign Language: 2 semesters college level or 2 years of high school

NOTE: All CEES courses offered once a year except CEES 1000

□ At least one of these GenEd courses must be 3000-4000 level

□ Foreign Language: 2 semesters college level or 2 years of high school

□ At least one of these GenEd courses must be 3000-4000 level