# Table of Contents

Introduction ............................................................................................................................................................... 1  
Mission Statement ..................................................................................................................................................... 1  
Program Educational Objectives .......................................................................................................................... 1  
Student Outcomes ...................................................................................................................................................... 2  
Accreditation and Assessment .................................................................................................................................. 2  
Employment Opportunities for Civil Engineering Graduates .................................................................................... 3  
Advising ..................................................................................................................................................................... 3  
Math Placement ........................................................................................................................................................ 4  
Transfer Procedures .................................................................................................................................................. 4  
Additional Advising Resources ............................................................................................................................... 5  
College of Engineering Advising Guides .................................................................................................................. 5  
Resources & Support ................................................................................................................................................ 5  
Graduation Requirements ......................................................................................................................................... 6  
Grades and Prerequisites/Co-requisites .................................................................................................................. 6  
CVEN Technical Elective Requirements .................................................................................................................. 7  
CVEN Free Elective Requirements .......................................................................................................................... 7  
CVEN Basic Engineering Elective Requirements ....................................................................................................... 7  
Engineering Science Track ...................................................................................................................................... 8  
Double Degrees in Civil Engineering and Applied Mathematics ............................................................................. 8  
Student Enrichment ................................................................................................................................................ 8  
Internships ................................................................................................................................................................ 9  
Learning Through Service ....................................................................................................................................... 9  
Study Abroad ............................................................................................................................................................ 9  
Undergraduate Research and Independent Study .................................................................................................... 10  
Additional Educational Opportunities .................................................................................................................... 11  
Concurrent BS/MS Program .................................................................................................................................... 11  
Engineering for Developing Communities Track .................................................................................................... 11  
Double Degrees ....................................................................................................................................................... 12  
Minors and Certificates .......................................................................................................................................... 12  
Semester at Sea ....................................................................................................................................................... 12  
Student Organizations ........................................................................................................................................... 13  
CEAE Policy on Academic Integrity ....................................................................................................................... 14  
CVEN Block Diagram .............................................................................................................................................. 15  
Modified Block Diagram with Precalculus ............................................................................................................... 15  
Graduation Planner .................................................................................................................................................. 15  
Appendix: Suggested Course Plans .......................................................................................................................... 15
Introduction

The purpose of this guide is to assist undergraduate students majoring in Civil Engineering (CVEN) to fulfill the CVEN curriculum requirements for the Bachelor of Science (BS) degree. These requirements are structured to comply with College rules and to maintain our accreditation, in compliance with the rules of the Engineering Accreditation Commission of ABET (www.abet.org).

To respond to the rapid changes in technology and needs of the profession, our curriculum is dynamic, and consequently undergoes both major and minor revisions annually. As an undergraduate student, you will generally be expected to follow the curriculum in effect when you entered as a freshman. You should keep a copy of the university catalog and all written information including the version of the Advising Guide that was in effect when you entered the Civil Engineering program. Copies of the curriculum, a course checklist, and a graphical flow chart are contained in this document. Alternatively, you may elect to follow a future revision to the curriculum in its entirety. If you decide to follow new curriculum guidelines, you must inform the Department.

The student is responsible for adherence to the CVEN curriculum rules and requirements and should be aware that deviation from the planned sequence of courses may result in delayed graduation.

Because of the diversity of the activities of civil engineers, the basic Civil Engineering Curriculum is intended to provide for a fundamental foundation of engineering science; and proficiency in three of the following five areas: construction, environmental, geotechnical, structural, and water resources engineering; culminating in an integrating multidisciplinary civil engineering major design experience. For talented students who seek the next-level preparation for R&D (Research and Development) careers or advanced degrees, they should consider the Engineering Science (ES) Track in Civil Engineering. In a special partnership with the Department of Applied Mathematics (APPM), a streamlined dual-degree program in Civil Engineering and Applied Mathematics via the Engineering Science track is now available. Catering to those who are interested in issues pertinent to the developing world, students can also elect the Engineering for Developing Communities (EDC) Track which focuses on sustainability and globally responsible engineering in developing communities and countries.

Mission Statement

The mission of the Department of Civil, Environmental and Architectural Engineering is the education of undergraduate students to become leaders in the professional practice of engineering, contributing to technological advances that benefit humankind while enhancing the earth's physical and biological resources.

Program Educational Objectives

The program objectives for the Bachelor of Science degree in Civil Engineering are that within five years:

Graduates will be successfully employed in engineering, science, or technology careers
Graduates will be assuming management or leadership roles
Graduates will engage in continual learning by pursuing advanced degrees or additional educational opportunities through coursework, professional conferences and training, and/or participation in professional societies
Graduates will pursue professional registration or other appropriate certifications
Graduates will be engaged in activities that provide benefit to communities

**Student Outcomes**

The outcomes that students are expected to have attained upon graduation with a bachelor of science degree in civil engineering are:

- the ability to apply knowledge of mathematics, science, and engineering
- the ability to design and conduct experiments
- the ability to analyze and interpret data
- the ability to design a system or component to meet desired needs
- the ability to function on multidisciplinary teams
- the ability to identify, formulate, and solve engineering problems
- an understanding of professional and ethical responsibilities
- the ability to communicate effectively through writing and/or drawing
- the ability to communicate effectively through oral presentations
- an understanding of the impact of engineering on society
- an understanding of the necessity to engage in life-long learning
- a knowledge of contemporary issues in civil, environmental, and architectural engineering
- the ability to use modern engineering techniques, skills, and tools
- the ability to explain basic concepts in management, business, public policy, and leadership

**Accreditation and Assessment**

The CVEN curriculum is accredited by the Engineering Accreditation Commission of ABET. Accreditation involves a process of continuous improvement using a series of assessment tools that measure how well the program is achieving its stated outcomes and objectives. As a student, you can expect to take part in the following evaluations during (and after) your academic career at CU:

**Faculty Course Questionnaire (FCQ)** – You will evaluate and provide feedback in every course you take at CU at the end of every semester.

**Fundamentals of Engineering (FE) Exam** – This national exam is the first step toward professional registration as an engineer and all CVEN students are required to take the exam prior to graduation. Most students take it in their last semester at CU.

**Senior Exit Survey** – In your last semester, you will be asked to fill out a survey administered by the College that asks how well the outcomes listed above were met, and your overall satisfaction with the program, department, faculty, etc.

**Alumni Survey** – We will send you a survey five years after graduation to evaluate if we met the program educational objectives.
Employment Opportunities for Civil Engineering Graduates

Civil engineers design and supervise the construction of roads, buildings, airports, tunnels, dams, bridges, and water supply and sewage systems. Civil engineering encompasses many specialties. The major specialties within civil engineering are structural, water resources, environmental, construction, transportation, and geotechnical engineering.

Many civil engineers hold supervisory or administrative positions, from supervisor of a construction site to city engineer. Others may work in design, construction, research, and teaching. More than 4 in 10 were employed by firms providing architectural, engineering, and related services, primarily developing designs for new construction projects. Almost one-third of the jobs are in federal, state, and local government agencies. The construction industry accounted for most of the remaining employment. About 15,000 civil engineers were self-employed, many as consultants.

Civil engineers usually work near major industrial and commercial centers, often at construction sites. Some projects are situated in remote areas or in foreign countries. In some jobs, civil engineers move from place to place to work on different projects.

With advanced degrees, civil engineers can pursue careers in academics, engineering consulting, research laboratories, and technology development in a wide range of engineering disciplines.

Advising

The faculty and staff are here because they have a true commitment to education and want to see students succeed. However, you, the student, are ultimately responsible for ensuring that all graduation requirements have been satisfied, and for seeking out the advice and help you need. To assist in this, students have access to both faculty and staff advisors. The department’s Undergraduate Coordinator can also assist you with many questions about the curriculum.

It is the individual student’s responsibility to secure the approval of her/his advisor for the course of study for each semester. First- and second-year students meet with the Undergraduate Coordinator, while third-year students and above meet with their faculty advisors. This activity occurs during the advising period, of which notification will be sent by email each semester. After the advising session, the advisor will sign the pink card in your file that will authorize the CEAE staff to remove the registration HOLD that prevents you from registering. IT IS NOT POSSIBLE TO REGISTER BEFORE THIS HOLD IS REMOVED.

There are a number of decisions to be made concerning choice of technical elective courses. These decisions should be made in close consultation with the academic advisors so that the electives contribute to overall educational objectives and become part of a cohesive, rational program. The development of such an academic program is the principal purpose for meeting with the academic advisors. A second, and equally important, purpose is for the student to be able to identify a friendly, experienced, and knowledgeable person with whom s/he can discuss her/his academic progress and solve any difficulties that may possibly arise.

A listing of CEAE faculty and staff with contact information can be found at http://ceae.colorado.edu/faculty-staff/.

Block diagrams and graduation planners for each program are included in this guide. Each student is responsible for keeping his or her graduation planner up-to-date.

Not all courses are offered every semester. Those that are only offered once per year are marked on the block diagrams.

The minimum course load for full time enrollment is 12 credit hours. The maximum course load is 19 credit hours. Variation must be requested by petition to the college. After 18 credit hours, a tuition surcharge is applied.

If problems arise, the following steps are suggested:

See CEAE Undergraduate Coordinator.

See the Associate Chair for Undergraduate Education.

Contact the Assistant Dean for Students (ECAD 100) for questions concerning College or University rules or policies.
Math Placement

Incoming freshmen are placed in their first math course based on their math assessment. Students who do not start in Calculus 1 their first semester will not be able to follow the standard CVEN block diagram, as they will not have the prerequisites to take all courses in the semesters shown. These students are encouraged to complete APPM 1360 Calculus 2 for Engineers during the summer session after their freshman year in order to get back on the standard block diagram.

Students who cannot take APPM 1360 during the summer session should see the Undergraduate Coordinator for a CVEN Modified Block Diagram. While students following the modified plan may still be able to graduate in four years, please note that the four-year guarantee does not apply. The department will make every effort to avoid course conflicts for students following the modified block diagram, but cannot guarantee that students will never encounter conflicts.

Transfer Procedures

The University and College have established procedures for admission of transfer students and evaluation of transfer credits. These policies are described on the undergraduate admissions website: http://www.colorado.edu/admissions/transfer. However, once a student is admitted and transfer credits have been evaluated by the University, the CEAE Department is responsible for the final evaluation of the application of transfer credits to degree requirements. A student is required to obtain the approval of the CEAE Transfer Credit Evaluator for all transfer credits. Prof. Dobroslav Znidarcic (dobroslav.znidarcic@colorado.edu) is the current (Fall 2016) CEAE Transfer Credit Evaluator. The following recommendations are offered:

It is the student’s responsibility to ensure that transfer credits have been evaluated and approved by the Department.

Newly admitted transfer students should make an appointment with the CEAE Transfer Credit Evaluator as soon as possible to obtain final approval of transfer credits. A transfer credit approval form, signed by the Transfer Credit Evaluator, will be placed in the student’s file and will be required for graduation. The form will also be used by advisors to inform academic guidance.

If there are questions or concerns about a transfer course, the Evaluator may request catalog pages or course descriptions, or may seek the advice of other faculty members. In some cases, it may be recommended that the student prepare a petition for transfer credit, with multiple levels of approval, to ensure that there will be no future questions. While the petition process may seem onerous, it is only used to protect the student’s interest.

Transfer credit issues can also arise for current students who take one or more courses at other institutions during their academic career, e.g., study abroad programs or summer school at a local college. Current students who are planning to take courses at another institution should seek preliminary approval of the transfer credits before taking the courses.

Additional Advising Resources

There are many advising resources available at CU-Boulder, but students frequently do not know they exist or hesitate to take advantage of them:

College of Engineering Advising Guides

The College publishes a comprehensive set of advising guides to provide students with timely and accurate information. These guides are not intended as a substitute for personal interaction between student and advisor, but can be a great way to get answers to many common questions and concerns. Brief summaries of the curricula and
requirements for individual majors in the College can be found at [www.colorado.edu/engineering/academics](http://www.colorado.edu/engineering/academics) along with the following advising guides:

Guide to Degree Programs, Minors & Certificates  
Enriching Your Experience  
Online Learning  
Summer Session  
Graduation Ceremonies

The following College and University policies can also be found on the College website at [www.colorado.edu/engineering/academics/policies](http://www.colorado.edu/engineering/academics/policies):

- Academic Honesty  
- Academic Policies  
- Academic Probation and Suspension  
- Confirming Your Major  
- Four-Year Graduation Guarantee and Flexible First Year  
- Grading Policies  
- Graduation Requirements  
- Humanities, Social Sciences and Writing

**Resources & Support**

**Academic Support & Tutoring, Campus Resources, Engineering Ambassadors, Meet with Faculty, Tips for Success**

Utilizing resources to support your academic and personal success is an important part of your student experience. You are encouraged to take advantage of college resources such as the Engineering Ambassador peer advisors, Engineering Career Services, Student Success Center tutoring in the BOLD Center, along with campus resources such as workshops on time management, exam preparation, and managing stress offered through the Student Academic Success Center (SASC) and Counseling and Psychiatric Services (CAPS). Reach out and make the most of your student journey!

**Graduation Requirements**

Failure to complete the requirements listed below will postpone graduation. Any exceptions will require authorization from the CEAE Operations Committee and the Dean’s Office. Students should meet with the CEAE Undergraduate Coordinator at least one semester prior to their planned graduation to review their records. It is the student’s responsibility to be certain that all degree requirements have been met, to apply for graduation online, and to keep the CEAE Undergraduate Coordinator and the Dean’s Office informed of any change in graduation plans.

To be eligible for the CVEN BS degree, students must meet the following minimum requirements:

The satisfactory completion of the prescribed and elective work in the CVEN BS curriculum. A student must complete a minimum number of 128 semester hours, of which the last 45 shall be earned after admission to the College of Engineering and Applied Science as a degree student.

A minimum cumulative grade point average of 2.250 for all courses attempted and for all courses that count toward graduation requirements, excluding P grades for courses taken Pass/Fail. (Pass/Fail courses do not count for graduation credit.)

A minimum cumulative grade point average of 2.250 for all CEAE course work. This “major” grade point average is computed separately from the student’s cumulative grade point average and includes only course work from CVEN and AREN.

Successful completion of all Minimum Academic Preparation Standards (MAPS) requirements of the College.
Successful completion of WRTG 3030, Writing on Science and Society or an approved alternate writing course (HUEN 1010, HUEN 3100, WRTG 3035, or PHYS 3050). Any other exceptions to the WRTG 3030 requirement must be approved via petition by the Assistant Dean for Students.

Completion of the Fundamentals of Engineering (FE) Examination during the student’s senior year. Graduation is not contingent upon passing. However, it is beneficial for your career to do so because this exam is the first step toward professional registration.

Submission of a completed Application for Diploma, online.

Obtain the recommendation of the CEAE faculty.

Obtain the recommendation of the faculty of the College of Engineering and Applied Science.

Note: Double degree students must obtain approval of both designated departments and colleges. The University normally requires that a minimum of an additional 30 semester credit hours be earned for the second degree outside of engineering or 15 credits for a second degree within engineering. However, BOTH degree requirements must be completed. Minor students must provide the Undergraduate Coordinator with a Minor Completion form to verify minor requirements have been completed.

BECAUSE THE BURDEN OF PROOF IS ON THE STUDENT, CONSULT THE ASSOCIATE CHAIR FOR UNDERGRADUATE PROGRAMS, YOUR FACULTY ADVISOR, OR THE UNDERGRADUATE COORDINATOR, AND PETITION FOR APPROVAL OF ANY PROGRAM DEVIATIONS.

Grades and Prerequisites/Co-requisites

The minimum passing grade for prerequisite and co-requisite courses is C-. The minimum passing grade for all other courses is D-.

Pass/fail courses do not count toward graduation. Students must petition to take a course pass/fail or for no credit.

All prerequisite/co-requisite waivers, including those for required courses taken in other departments, must be petitioned and approved by the course instructor, the CEAE Department, and the Assistant Dean for Students.

CVEN Technical Elective Requirements

A technical elective is generally a course in engineering or science with technical content, selected in consultation with a faculty advisor at the upper (3000+) level.

Up to 3 credit hours of Independent Study, Undergraduate Research, or the following ROTC courses are acceptable as technical elective credit: AIRR 3010 or NAVR 4010.

A maximum of 6 credit hours of technical electives other than CVEN or AREN courses may be selected with the consent of the student’s faculty advisor.

A list of potential technical electives for CEAE students can be found at http://www.colorado.edu/ceae/sites/default/files/attached-files/CEAE-tech-elective-list.pdf.

CVEN Free Elective Requirements

A free elective is generally any college-level course. Free electives cannot be remedial courses needed to fulfill deficiencies (algebra, trigonometry, precalculus, introductory chemistry/physics, etc. may not be used), and cannot be similar to courses used toward graduation requirements (non-calculus-based physics, etc. may not be used).

CVEN Basic Engineering Elective Requirements

Students who could not fit GEEN 1400-Engineering Projects in their First Year, may substitute any 3-credit technical course given in the engineering college with a designator ASEN, AREN, APPM, CHEN, COEN, CVEN, CSCI, ECEN, EVEN, GEEN, or MCEN; or any other course approved by the CEAE Curriculum Committee. Remedial courses or courses approved as HSS electives may not be used.
Engineering Science Track

For those students who have advanced placement credits, seek additional career opportunities in research and development (R&D) in engineering and technology or better preparation for advanced degrees in engineering, they should consider the Engineering Science Track which aims to provide a higher-level preparation in analytical and computer modeling essential in modern engineering and technology. Interested students should contact Prof. Ronald Pak, ES Track Advisor: pak@colorado.edu.

Double Degree in Civil Engineering and Applied Mathematics

For students who are interested in civil engineering science, applied mathematics, and their close relationship, a special dual BS degree program is now available by which one can earn a baccalaureate degree in both civil engineering and applied mathematics with a minimum of only 143 credits instead of 158. Contact the dual CE-APPM degree program advisor, Professor Ronald Pak (pak@colorado.edu), in civil engineering or Professor Anne Dougherty (anne.dougherty@colorado.edu) in Applied Mathematics for more details and consultation.

The minimum passing grade for prerequisite and co-requisite courses is C-. The minimum passing grade for all other courses is D-.

Pass/fail courses do not count toward graduation. Students must petition to take a course pass/fail or for no credit.

All prerequisite/co-requisite waivers, including those for required courses taken in other departments, must be petitioned and approved by the course instructor, the CEAE Department, and the Assistant Dean for Students.

A technical elective is generally a course in engineering or science with technical content, selected in consultation with a faculty advisor at the upper (3000+) level. Courses listed as Concentrations in this guide are examples of technical electives. Up to 3 credit hours of Independent Study, Undergraduate Research, or the following ROTC courses are acceptable as technical elective credit: AIRR 3010 or NAVR 4010. A maximum of 6 credit hours of technical electives other than CVEN or AREN courses may be selected with the consent of the student’s faculty advisor.

A free elective is generally any college-level course. Free electives cannot be remedial courses needed to fulfill deficiencies (algebra, trigonometry, precalculus, introductory chemistry/physics, etc.), and cannot be similar to courses used toward graduation requirements (non-calculus-based physics, etc.).

Student Enrichment

The Department of Civil, Environmental and Architectural Engineering strives to develop holistic engineers – it’s what sets us apart from our more than 140 peer departments across the U.S. The purpose of the Student Enrichment and Internship Program is to give EVERY student the chance to participate in activities that give them a complete educational experience. By 2018, our goal is to have 95% of our undergraduates take part in at least one enrichment opportunity:

Internship with an owner, engineering firm or contractor.

Research opportunity with one of our more than 35 faculty members across 13 disciplines.

Service-learning experience, such as Bridges to Prosperity or Engineers Without Borders.

Studying abroad through the Office of International Education.

For more information about student enrichment, visit http://www.colorado.edu/ceae/enrichment.
Internships

Corporate internships give students the opportunity to practice their professional engineering skills and contribute to their community. Plus, it helps them make connections that will be invaluable as they enter the workforce.

We believe a successful internship allows a student to:

- Perform the job responsibilities of the position
- Develop professional competencies
- Build a meaningful work experience
- Positively contribute to the employer’s business objectives

Information about the CEAE Internship Program and CEAE career fairs is available at http://www.colorado.edu/ceae/internships.

Learning Through Service

*Engineers Without Borders has been an incredible opportunity for me to become integrally involved in something that I hope my future career will resemble. From the development work to the hands-on engineering experience, leadership opportunities to interactions with professionals in the field, I have loved being apart of EWB and everything we do!* - Nikki van den Heever, civil engineering major, minor in leadership

We don’t just provide service learning opportunities for students – we pioneer them. Professor Bernard Amadei is the founder of Engineers without Borders - USA, and alumna Avery Bang (MCivEng’09) is CEO of Bridges to Prosperity.

To get involved with one of our service-learning groups, please visit the following:

- Engineers without Borders - http://www.colorado.edu/engineering/ewb
- Bridges to Prosperity Student Chapter - https://www.facebook.com/CUB2P

Study Abroad

Study abroad, usually taken in the junior year, can be an enriching experience. The largest engineering firms earn 50-75 percent of their income from international projects, and it’s not unusual for projects to involve teams from around the globe. Studying abroad gives you a worldview that will open up new career opportunities and make you a true citizen of the world.

Information about this unique opportunity can be obtained from the Office of International Education, Center for Community (C4C) Suite S355, (303) 492-7741, http://studyabroad.colorado.edu/.

A Civil Engineering Study Abroad Guide is also available at http://www.colorado.edu/ceae/enrichment/study-abroad

Students interested in studying abroad for a semester (or longer) should start the planning process as soon as possible – the study abroad guide is intended to assist in this process. However, students should also consult with their academic advisor and the Study Abroad Office early and often during the planning process. Courses must be pre-approved by the CEAE Study Abroad Advisor to guarantee that they will count toward the AREN degree.
Many summer study abroad opportunities are also available for students not able to spend an entire semester overseas.

**Undergraduate Research and Independent Study**

The Department of Civil, Environmental, and Architectural Engineering of the University of Colorado Boulder is a major research center in the U.S. Most of the CEAE faculty members are active researchers in their field, leading interesting and challenging research projects supported by the government and industry. Students are encouraged to take advantage of such an inquisitive setting to enhance their educational experience by engaging in guided or independent research. These opportunities promote individual contact with faculty and graduate students, and they provide an educational experience that cannot be obtained in the normal classroom setting. Those in the Engineering Science Track are particularly encouraged to participate in such undergraduate research activities. Visit [http://www.colorado.edu/ceae/enrichment/undergraduate-research](http://www.colorado.edu/ceae/enrichment/undergraduate-research)

At CU-Boulder, research opportunities are not limited to graduate students. We encourage undergraduate students to engage with faculty members in their research projects through two programs:

**Discovery Learning Apprenticeship Program**

Pairs undergrad students with faculty for a paid, year-long research experience.

Student applications (with resume and cover letter for min GPA of 3.0) accepted through end of April for following academic year.

For a list of current projects in CEAE, visit [engineering.colorado.edu/surveys/dla/dlafaclisting.aspx](http://engineering.colorado.edu/surveys/dla/dlafaclisting.aspx).

**Independent Study**

Earn academic credit outside the normal class structure under the individual direction of a faculty member

**Undergraduate Research Opportunities Program**

Campus-wide program funds undergraduate research and scholarly work with several types of grants.

Projects are partnerships between faculty and undergraduates.

Additional opportunities available at NIST and through other outside programs.

**YOU’RE@CU Research**

BOLD Center program links undergraduates with graduate students in their majors for research opportunities.

Work with a graduate mentor for 3-5 hours per week and participate in a weekly seminar class for pass/fail credit.

**Additional Educational Opportunities**

**Concurrent BS/MS Program**

The BS/MS program is an opportunity for undergraduate students to start working on their MS degree while they are fulfilling the requirements of their BS degree. Specifically, undergraduate students admitted into this program will be allowed to use up to a maximum of 6 graduate units for both the BS and the MS degrees
if the student can maintain a 3.5 GPA or above in their immediate next 24 credit hours (2 semesters, cumulatively) after entering the joint degree program.

The minimum GPA for admission is 3.25. Students are expected to submit applications during the sixth or seventh semester of their undergraduate program. As a guideline, applications will be considered from students who have completed at least 75 credit hours, but not more than 110 credit hours, of the necessary coursework to satisfy the requirements of the Department BS degree.

Applications will be evaluated by the individual graduate programs in the department and administered through the Graduate Committee. Additional restrictions may be placed in these rules by the individual programs. The BS/MS program is an opportunity for undergraduate students to start working on their MS degree while they are fulfilling the requirements of their BS degree. Specifically, undergraduate students admitted into this program will be allowed to use up to a maximum of 6 graduate units for both the BS and the MS degrees if the student can maintain a 3.5 GPA or above in their immediate next 24 credit hours (2 semesters, cumulatively) after entering the joint degree program.

The minimum GPA for admission is 3.25. Students are expected to submit applications during the sixth or seventh semester of their undergraduate program. As a guideline, applications will be considered from students who have completed at least 75 credit hours, but not more than 110 credit hours, of the necessary coursework to satisfy the requirements of the Department BS degree.

Applications will be evaluated by the individual graduate programs in the department and administered through the Graduate Committee. Additional restrictions may be placed in these rules by the individual programs. For more information visit [http://www.colorado.edu/ceae/current-students/undergraduate-studies/bsms-program](http://www.colorado.edu/ceae/current-students/undergraduate-studies/bsms-program)

**Engineering For Developing Communities Track**

The Engineering for Developing Communities (EDC) track educates globally-responsible engineering students and professionals who can offer sustainable and appropriate solutions to the endemic problems faced by developing communities worldwide. Interested students should contact Robyn Sandekian, EDC Track coordinator, (sandekian@colorado.edu) or Prof. Paul Chinowsky (paul.chinowsky@colorado.edu) or visit the department website.

**Minors and Certificates**

Numerous minor and certificate opportunities exist that would satisfy humanities/social science electives, technical electives, and/or free electives. Many require little additional course work beyond the minimum BS requirements. For more information on minor opportunities and requirements, visit:

- Arts & Sciences minors: [http://www.colorado.edu/advising/programs-requirements](http://www.colorado.edu/advising/programs-requirements)
- Engineering Degree, Certificates & Minors: [http://www.colorado.edu/engineering/academics/guide-degrees-certificates](http://www.colorado.edu/engineering/academics/guide-degrees-certificates)
- Environmental Design (Architecture) Minor: [http://www.colorado.edu/envd/program-information/curriculum/certificates-minors/environmental-design-minor](http://www.colorado.edu/envd/program-information/curriculum/certificates-minors/environmental-design-minor)
- Business Minor: [http://www.colorado.edu/leeds/minor-business#overview](http://www.colorado.edu/leeds/minor-business#overview)

**Double Degrees**

It is possible to obtain double degrees in two engineering disciplines or one degree in engineering and a second degree from a department in another college or school of the University. Students must satisfy curricula for both programs and normally complete a minimum of 30 additional semester credit hours above and beyond the degree with the larger minimum credit hour requirement. If the student can satisfy both degree requirements with fewer than 30 additional hours, the difference can be made up with free electives. If both bachelor’s degrees are in the
College of Engineering and Applied Science, a minimum of 143 credits are required (128 + 15). Another exception is the pioneering dual CVEN-APPM degree program described earlier, which is a special opportunity for research- and analytically-inclined students or those who seek a broader career horizon.

Of the 30 additional semester credit hours, regular double degree students must complete 24 semester credit hours in courses offered by the secondary academic department or in courses approved in advance by the department as substitutes. Transfer students pursuing double degrees must complete a minimum of 75 semester credit hours as a degree student in the College of Engineering and Applied Science and must satisfy all other stipulations regarding total hours required and approval of all coursework by both departments concerned.

Students may coordinate their double degree schedule by closely interacting with academic advisors in each of the departments involved. It is in the student’s best interest to select courses that satisfy degree requirements in both departments as frequently as possible. In some cases, it may be preferable to pursue an MS degree rather than two undergraduate degrees.

Semester at Sea

Administered through the Office of International Education, and managed by the University of Pittsburgh’s Institute for Shipboard Education, students explore and learn valuable insights into the various societies visited, allowing students to analyze and discuss their observations in formal classes on the shipboard campus. Set sail aboard the SS Universe Explorer each semester and summers. Contact the Office of International Education for more information, Center for Community (C4C) Suite S355, (303) 492-6016.

Student Organizations

Students have excellent opportunities to become involved in discipline-related activities outside of the classroom. The department has active chapters in a number of major student societies including American Society of Civil Engineers (ASCE), Association of General Contractors (AGC), Illumination Engineering Society (IES), and Engineers without Borders (EWB-CU).

CEAE students can also participate in engineering-related organizations. There is always something to do on campus, so get out there and get involved! View link http://www.colorado.edu/ceae/student-enrichment/student-organizations.
CEAE Policy on Academic Integrity

The Department of Civil, Environmental, and Architectural Engineering (CEAE) requires all students to adhere to a strict policy of academic integrity. These expectations are in accordance with the University of Colorado Boulder Honor Code (http://www.colorado.edu/honorcode/), but this policy is intended to provide more specific guidelines for all undergraduate and graduate students in CEAE. Ethical behavior in college sets the stage for a lifetime of professional and ethical behavior that is expected of all engineering professionals. This policy describes the academic sanctions that will be imposed by CEAE faculty members. Faculty retain the right to set academic sanctions, and if they choose individual courses can deviate from the expectations stated below; these changes will be noted in the course syllabus. All incidents of academic misconduct will be reported to the Honor Code Council. Non-academic sanctions are the purview of the Honor Code Council.

Any activity that could give you an unfair advantage over other students may be cheating. Specific examples of actions that are considered to be cheating and therefore violations of academic integrity:

Plagiarizing a homework, lab report, or problem set. On assignments that require you to use supplemental materials, you must properly document the sources of information that you used. If you are uncertain about allowable reference materials or how to document your sources, ask your instructor in advance. Specific examples of plagiarism include:
- copying from a solution manual
- copying from Internet sites
- copying from previous semester’s homework set or lab report
- copying directly from classmates
- copying lab data that you yourself did not participate in collecting

Plagiarizing content in a paper, report, thesis, or dissertation, by copying material from a published sources or the internet, without appropriate citation format and attribution

Using unapproved information during a closed-book test or quiz (such as a reference sheet, information stored in a calculator, iPhone, information written on your skin)

Copying from another student during a quiz, exam, or test

Working in groups on web based quizzes, exams, or tests

Working in groups on take-home quizzes, exams, or tests

Asking another student about questions on an exam that you have not yet taken

Changing the answer on your test/homework after it was graded and then telling the instructor that there was a grading mistake

Allowing another student to copy your homework, lab report, or allowing another student to look at your answers during a quiz or exam

The list above is not exhaustive; other violations are possible

Any violation will be reported to the Honor Code Council.

Any first violation of academic integrity on graded course activities (i.e. homework, lab reports, and exams) will result in a minimum sanction of a zero score and an entry in your department file. Instructors can increase these penalties to assigning a failing grade (F) for the entire course. The department will retain a list of all instances of academic integrity violations. Additional sanctions will be imposed for subsequent violations.
<table>
<thead>
<tr>
<th>SEM</th>
<th>CR</th>
<th>CVEN BLOCK DIAGRAM 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>8TH SEM (SPR)</td>
<td>16</td>
<td>CVEN 4899-4 Senior Design Project (Senior standing) #</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Technical Elective-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Technical Elective-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proficiency III CVEN XXXX-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S-H Elective-3 (upper-level)</td>
</tr>
<tr>
<td>7TH SEM (FALL)</td>
<td>17</td>
<td>CVEN 4897-2 Professional Issues #</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CEAE Technical Elective-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CEAE Technical Elective-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proficiency II CVEN XXXX-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FREE ELECTIVE-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S-H Elective-3 (upper-level)</td>
</tr>
<tr>
<td>6TH SEM (SPR)</td>
<td>15</td>
<td>CVEN 3227-3 Probability Statistic &amp; Decision for Civil Engrs. (JRs/PRs) #</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 3111-3 Analytical Mechanics II (CVEN 2121, co-req APPM 2360) #</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proficiency I CVEN XXXX-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S-H Elective-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WRTG 3030-3 Writing on Science &amp; Society (JR standing)</td>
</tr>
<tr>
<td>5TH SEM (FALL)</td>
<td>15</td>
<td>CVEN 3246-3 Intro. To Construction (JR or instructor consent)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 3323-3 Hydraulic Engineering (CVEN 3313) #</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 3525-3 Structural Analysis (CVEN 3161) #</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 3414-3 Fund. of Env. Engr. (CHEN 1211, APPM 1360)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 3708-3 Geotechnical Engineering I (CVEN 3161)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 3698-3 Engineering Geology or other Basic Science elective # ***</td>
</tr>
<tr>
<td>4TH SEM (SPR)</td>
<td>16</td>
<td>APPM 2360-4 Introduction to Linear Algebra &amp; Diff. Eq. (APPM 1360)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 3313-3 Theoretical Fluid Mechanics (CVEN 2121) #</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 3161-3 Mechanics of Materials I (CVEN 2121, co-req APPM 2360) #</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AREN 2110-3 Thermodynamics (PHYS 1110, co-req APPM 1360)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 2012-3** Introduction to Geomatics (APPM 1350 or equiv.) #</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S-H Elective-3</td>
</tr>
<tr>
<td>3RD SEM (FALL)</td>
<td>18</td>
<td>APPM 2350-4 Calculus III for Engineers (APPM 1360)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PHYS 1120-4 Gen.Phys/Lab (PHYS 1110, co-req APPM 1360)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 2121-3 Analytical Mechanics I (PHYS 1110, co-req APPM 2350) #</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 1027-3 OR AREN 1027-3 Engineering Drawing #</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S-H Elective-3</td>
</tr>
<tr>
<td>2ND SEM (SPR)</td>
<td>15</td>
<td>APPM 1360-4 Calculus II for Engineers (APPM 1350)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PHYS 1110-4 Gen. Physics I (co-req APPM 1350) #</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CSCI 1320-4 Intro Engr. Computing (co-req APPM 1350)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 1027-3 OR AREN 1027-3 Engineering Drawing #</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S-H Elective-3</td>
</tr>
<tr>
<td>1ST SEM (FALL)</td>
<td>16</td>
<td>APPM 1350-4 Calculus I for Engineers (2yr HS Alg, 1yr Geom., 1/2yr Trig or approval by faculty advisor)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CHEN 1211-4 Gen Chem for Engineers $ (1yr HS CHEM or Sats. in CHEM 1001 or CHEM 1021 &amp; HS Alg)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CHEM 1221-1 General Chemistry Lab for Engineers $</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GEEN 1400-3 Engineering Projects OR Basic Engineering Elective **</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 1317-1 Introduction to Civil &amp; Environmental Engineering # *</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S-H Elective-3</td>
</tr>
</tbody>
</table>

# Course is offered only in SEMESTER shown (fall or spring)
$ CHEN 1211 & CHEM 1221 may be taken concurrently or separately.
* COEN 1500 is an equivalent course for CVEN 1317
** GEEN 1400 may be replaced with a Basic Engineering Elective in the engineering college with a designator
*** CVEN 3698 may be replaced with one of the following Basic Science Electives (EBIO 1030, EBIO 1210, ATOC 1050, ATOC 1060, OR GEOL 1010)

Final 2/3/2017

CVEN- Advising Guide August 2017
Civil Engineering

Students select **three of five proficiencies** [to ensure students can “design in more than one context”]

**Technical electives:** 12 credits must be 3000-level or above; with at least up to 6 credits from CEAE courses.

The list below shows proficiency courses and CEAE electives for the sub-discipline areas in civil engineering. For recommended courses sequence, consult the Suggested Course Plan in the advising guide and your faculty advisor.

**GEOTECHNICAL ENGINEERING**

**Proficiency:** CVEN 3718 Geotech Engr II (Fall & Spring), prereq: CVEN 3708

**Technical Electives:**
- CVEN 4728 Foundation Engineering (Fall), prereq: CVEN 3718 or consent
- CVEN 5748 Design of Earth Structures (Spring), prereq: CVEN 5708 or consent OR any 4XXX level or above, Geotech Engineering course

**WATER RESOURCES ENGINEERING**

**Proficiency:** CVEN 4333 Engineering Hydrology (Spring), coreqs CVEN 3227 & 3323

**Technical Electives:**
- CVEN 4353 Ground Water Engineering (Fall), prereq: CVEN 3313
- CVEN 5363 Modeling of Hydrologic Systems (Spring), prereq: CVEN 3323 or coreq CVEN 4333
- CVEN 4383 Groundwater Modeling (Spring), recommended prereq: CVEN 4353
- CVEN 4323 Water Resource Engineering Design (Junior or Senior)

**CONSTRUCTION ENGINEERING AND MANAGEMENT**

**Proficiency:** CVEN 3256 Construction Engineering (Fall & Spring) prereq: CVEN 3246

**Technical Electives:**
- AREN 4506—Project Management I: Construction Project Planning (Fall & Spring), prereq: CVEN 3246 [starts Spring 2014 & repeats every semester thereafter].
- AREN 4606—Project Management II: Construction Project Execution and Control (Spring) prereq: AREN 4506 [Starts Spring 2015 and repeats every Spring].

**STRUCTURAL ENGINEERING/STRUCTURAL MECHANICS**

**Proficiency:** CVEN 4545 Steel Design (Spring) or CVEN 4555 Reinforced Concrete (Fall), prereq: CVEN 3525

**Technical Electives:**
- CVEN 4161 Mechanics of Materials II (Fall), prereq CVEN 3161
- CVEN 4545 or CVEN 4555 (whichever not selected as proficiency)
- CVEN 4525 Analysis of Framed Structures, (Spring), prereq: CVEN 3525

**ENVIRONMENTAL ENGINEERING**

**Proficiency:** CVEN 3424 Water & Wastewater (Spring), prereq: CVEN 3414

**Technical Electives:**
- CVEN 4404 Water Chemistry (Lab CVEN 4414) (Fall), prereqs: CHEN 1211 & CVEN 3414
- CVEN 3434 Introduction to Applied Ecology (Spring), prereqs: CHEN 1211 & CHEM 1221
- CVEN 4474 Hazardous & Industrial Waste Management (Fall), prereq: CVEN 3414
- CVEN 4484 Intro to Environmental Microbiology, (Spring), prereqs: CHEN 1211, CHEM 1221, APPM 1350, 1360, 2360

**CIVIL SYSTEMS**

**Technical Electives:**
- CVEN 4147- Civil Engineering Systems (Fall) (restricted to Senior, Fifth Year Senior)
- CVEN 5565 Life-Cycle Engineering of Civil Infrastructure Systems (Spring), recommended prereq: CVEN 3227 or equivalent

---

**FREE ELECTIVE:** any college-level course; AP or IB credit; cannot be similar to courses used toward graduation requirements or deficiencies; may be an S-H course, technical elective, etc.

**Transportation Systems, Timber Design, and Design of Masonry** available as a technical elective (spring), every other year. Potential Technical Electives (outside of CEAE) can be found at [http://www.colorado.edu/ceae/current-students/undergraduate-studies/civil-advising-curriculum](http://www.colorado.edu/ceae/current-students/undergraduate-studies/civil-advising-curriculum)
<table>
<thead>
<tr>
<th>SEM</th>
<th>CR</th>
<th>Modified CVEN BLOCK DIAGRAM 2017 with Pre-Calculus</th>
</tr>
</thead>
<tbody>
<tr>
<td>8TH</td>
<td>19</td>
<td>CVEN 4899-4 Senior Design Project (Senior standing)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>#</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CEA Technical Elective-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Technical Elective-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Technical Elective-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proficiency III CVEN XXXX-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S-H Elective-3 (upper-level)</td>
</tr>
<tr>
<td>7TH</td>
<td>17</td>
<td>CVEN 4897-2 Professional Issues #</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 3323-3 Hydraulic Engineering (CVEN 3313)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CEA Technical Elective-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proficiency II CVEN XXXX-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 3708-3 Geotechnical Engineering I (CVEN 3161)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S-H Elective-3 (upper-level)</td>
</tr>
<tr>
<td>6TH</td>
<td>18</td>
<td>CVEN 3227-3 Probability Statistic &amp; Decision for Civil Engrs. (JRs/RSs) #</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 3313-3 Theoretical Fluid Mechanics (CVEN 2121)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 3525-3 Structural Analysis (CVEN 3161)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 3111-3 Analytical Mechanics II (CVEN 2121, co-req APPM 2360) #</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proficiency I CVEN XXXX-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WRTG 3030-3 Writing on Science &amp; Society (JR standing)</td>
</tr>
<tr>
<td>5TH</td>
<td>16</td>
<td>APPM 2360-4 Introduction to Linear Algebra &amp; Diff. Eq. (APPM 1360) #</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 3246-3 Intro. To Construction (JR or instructor consent)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 3161-3 Mechanics of Materials I (CVEN 2121, co-req APPM 2360) #</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FREE ELECTIVE-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S-H Elective-3</td>
</tr>
<tr>
<td>4TH</td>
<td>16</td>
<td>APPM 2350-4 Calculus III for Engineers (APPM 1360).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PHY 1120-4 Gen. Phys/Lab (PHY 1110, co-req APPM 2350)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 2121-3 Analytical Mechanics I (PHYS 1110, co-req APPM 2350) #</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 3414-3 Fund. of Env. Engr. (CHEN 121, APPM 1360)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 3698-3 Engineering Geology or other Basic Science elective # ***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AREN 2110-3 Thermodynamics (PHYS 1110, co-req APPM 1360)</td>
</tr>
<tr>
<td>3RD</td>
<td>15</td>
<td>APPM 1360-4 Calculus II for Engineers (APPM 1350)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PHYS 1140-1 Gen. Phys/Lab (PHY 1110, co-req APPM 1360)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 2012-3 Introduction to Geomatics (APPM 1350 or equiv.) #</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AREN 1027-3 Engineering Drawing #</td>
</tr>
<tr>
<td>2ND</td>
<td>15</td>
<td>APPM 1350-4 Calculus I for Engineers (2yr HS Alg, 1yr Geom., 1/2yr Trig or approval by faculty advisor)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PHY 1110-4 Gen. Physics I (co-req APPM 1350)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CSCI 1320-4 Intro Engr. Computing (co-req APPM 1350)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 1027-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AREN 1027-3 Engineering Drawing #</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S-H Elective-3</td>
</tr>
<tr>
<td>1ST</td>
<td>16</td>
<td>APPM 1235-4 Pre-Calculus for Engineers (score of 70)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CHEN 1211-4 Gen Chem for Engineers $</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1yr HS CHEM or Satis. in CHEM 1001 or CHEM 1021 &amp; HS Alg)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CHEM 1221-1 General Chemistry Lab for Engineers $</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GEEN 1400-3 Engineering Projects OR Basic Engineering Elective **</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVEN 1317-1 Introduction to Civil &amp; Environmental Engineering # *</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S-H Elective-3</td>
</tr>
</tbody>
</table>

# Course is offered only in SEMESTER shown (fall or spring)
$ CHEN 1211 & CHEM 1221 may be taken concurrently or separately.
* Any Introduction to Engineering is an equivalent course for CVEN 1317
** GEEN 1400 maybe replaced with a Basic Engineering Elective in the engineering college with a designator
***CVEN 3698 maybe replaced with one of the following Basic Science Electives (EBIO 1030, EBIO 1210, ATOC 1050, ATOC 1060, OR GEOL 1010)
Civil Engineering

Students select **three of five proficiencies** [to ensure students can “design in more than one context]

**Technical electives:** 12 credits must be 3000-level or above; with at least up to 6 credits from CEAE courses.

The list below shows proficiency courses and CEAE electives for the sub-discipline areas in civil engineering. For recommended courses sequence, consult the Suggested Course Plan in the advising guide and your faculty advisor.

**GEOTECHNICAL ENGINEERING**

**Proficiency:** CVEN 3718 Geotech Engr II (Fall & Spring), prereq: CVEN 3708

**Technical Electives:**
- CVEN 4728 Foundation Engineering (Fall), prereq: CVEN 3718 or consent
- CVEN 5748 Design of Earth Structures (Spring), prereq: CVEN 5708 or consent OR any 4XXX level or above, Geotech Engineering course

**WATER RESOURCES ENGINEERING**

**Proficiency:** CVEN 4333 Engineering Hydrology (Spring), coreqs CVEN 3227 & 3323

**Technical Electives:**
- CVEN 4353 Ground Water Engineering (Fall), prereq: CVEN 3313
- CVEN 5363 Modeling of Hydrologic Systems (Spring), prereq: CVEN 3323 or coreq CVEN 4333
- CVEN 4383 Groundwater Modeling (Spring), recommended prereq: CVEN 4353
- CVEN 4323 Water Resource Engineering Design (Junior or Senior)

**CONSTRUCTION ENGINEERING AND MANAGEMENT**

**Proficiency:** CVEN 3256 Construction Engineering (Fall & Spring) prereq: CVEN 3246

**Technical Electives:**
- AREN 4506—Project Management I: Construction Project Planning (Fall & Spring), prereq: CVEN 3246 [starts Spring 2014 & repeats every semester thereafter].
- AREN 4606—Project Management II: Construction Project Execution and Control (Spring) prereq: AREN 4506 [Starts Spring 2015 and repeats every Spring].

**STRUCTURAL ENGINEERING/ STRUCTURAL MECHANICS**

**Proficiency:** CVEN 4545 Steel Design (Spring) or CVEN 4555 Reinforced Concrete (Fall), prereq: CVEN 3525

**Technical Electives:**
- CVEN 4161 Mechanics of Materials II (Fall), prereq CVEN 3161
- CVEN 4545 or CVEN 4555 (whichever not selected as proficiency)
- CVEN 4525 Analysis of Framed Structures, (Spring), prereq: CVEN 3525

**ENVIRONMENTAL ENGINEERING**

**Proficiency:** CVEN 3424 Water & Wastewater (Spring), prereq: CVEN 3414

**Technical Electives:**
- CVEN 4404 Water Chemistry (Lab CVEN 4414) (Fall), prereqs: CHEN 1211 & CVEN 3414
- CVEN 3434 Introduction to Applied Ecology (Spring), prereqs: CHEN 1211 & CHEM 1221
- CVEN 4474 Hazardous & Industrial Waste Management (Fall), prereq: CVEN 3414
- CVEN 4484 Intro to Environmental Microbiology, (Spring), prereqs: CHEN 1211, CHEM 1221, APPM 1350, 1360, 2360

**CIVIL SYSTEMS**

**Technical Electives:**
- CVEN 4147 Analysis of Framed Structures
- CVEN 5565 Life-Cycle Engineering of Civil Infrastructure Systems (Spring), recommended prereq: CVEN 3227 or equivalent

**FREE ELECTIVE:** any college-level course; AP or IB credit; cannot be similar to courses used toward graduation requirements or deficiencies; may be an S-H course, technical elective, etc.

**Transportation Systems, Timber Design, and Design of Masonry** available as a technical elective (spring), every other year. Potential Technical Electives (outside of CEAE) can be found at [http://www.colorado.edu/ceae/current-students/undergraduate-studies/civil-advising-curriculum](http://www.colorado.edu/ceae/current-students/undergraduate-studies/civil-advising-curriculum)
# GRADUATION PLANNER

**Student** __________________________

**Advisor** __________________________

**SID** _____ - _____ - ________

Transfer credits approved by __________________________

**Expected date of graduation** __________________________

## Mathematics (16)

- APPM 1350-4
- APPM 1360-4
- APPM 2350-4
- APPM 2360-4

## Basic Science (17)

- CHEM 1221-1
- CHEN 1211-4
- PHYS 1110-4
- PHYS 1120-4
- PHYS 1140-1
- CVEN 3698-3

**Or other Basic Science:** EBIO 1030, EBIO 1210, ATOC 1050, ATOC 1060, or GEOL 1010

## Basic Engineering Elective (3)

- GEEN 1400-3 Eng Projects

## Engineering Science (29)

- CVEN 1317-1
- CVEN 1027-3
- CVEN 2012-3
- CSCI 1320-4
- CVEN 2121-3
- AREN 2110-3
- CVEN 3161-3
- CVEN 3313-3
- CVEN 3111-3
- CVEN 3227-3

## CE – Fundamentals (15)

- CVEN 3246-3
- CVEN 3323-3
- CVEN 3414-3
- CVEN 3525-3
- CVEN 3708-3

## CEAE Technical Electives (6)

**Optional Selection**

<table>
<thead>
<tr>
<th>Const</th>
<th>Env</th>
<th>Geotech</th>
<th>Struct</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Technical Electives (6) may be outside CEAE**

| 1     |     |         |        |       |
| 2     |     |         |        |       |

**FREE Elective (3) may be S-H courses, technical elective, etc.**

| 1     |     |         |        |       |

## Significant Senior Design Experience (4)

- CVEN 4899-4

## Professional Issues (2)

- CVEN 4897-2

## Humanities and Social Sciences (18)

- WRTG 3030-3

**Must be 3000 level or above**

**Must be 3000 level or above**

Total Required Credits: 128

*The Basic Engineering Elective can be any 3 credit course 1XXX level given in the engineering college with a designator ASEN, AREN, APPM, CHEN, CVEN, COEN, CSCI, ECEN, EVEN, GEEN, or MCEN.*
CVEN Construction Management Emphasis - Suggested Course Plan

**Proficiencies (3 total)**
CVEN 3256 Construction Engineering (Equipment & Methods)
CVEN 3718 Geotech Engineering II
CVEN 4555 Reinforced Concrete

**CEAE Technical Electives (2 total)**
AREN 4506 Project Management I
AREN 4606 Project Management II

**Highly Recommended Tech/Free Elective (2 Tech Elective & 1 Free Elective)**
AREN 2050 Building Systems and Materials (fulfills Free Elective)
CVEN 3602 Transportation Systems
CVEN 4333 Engineering Hydrology
CVEN 4545 Steel Design
CVEN 4555 Reinforced Concrete Design
CVEN 4728 Foundation Engineering
CVEN 5565 Life-Cycle Engr of Civil Infrastructure Systems
AREN 3010 Mechanical Systems
CEM Graduate courses with Instructor consent

**Other Good Options - Tech/Free Elective**
CVEN 3698 Engineering Geology
CVEN 4353 Ground Water Engineering
CVEN 4323 Water Resource Engineering Design
CVEN 4525 Analysis of Framed Structures
CVEN 4565 Timber Design
AREN 3540 Illumination I
AREN 4110 HVAC Design
AREN 4830 Computer Simulation of Building Systems
AREN 4890 Sustainable Building Design
EMEN 4100 Business Methods & Engineering Economics
EMEN 4800 Technology Ventures and Marketing
CVEN Water Resources Emphasis - Suggested Course Plan

Proficiencies: (3 total)
CVEN 4333 Engineering Hydrology
CVEN 3424 Water and Wastewater
Choose one additional course from the following list:
CVEN 3718 Geotechnical Engineering II
CVEN 4555 Reinforced Concrete
CVEN 4545 Steel Design

CEAE Technical Electives (2 total)
CVEN 4353 Groundwater Engineering
CVEN 4323 Water Resource Engineering
Design CVEN 4383 Groundwater Modeling
CVEN 5363 Modeling of Hydrologic Systems

Highly Recommended Tech/Free Electives (2 Tech Electives & 1 Free Elective)
Courses listed under CEAE Technical Electives and Proficiencies that are not used to fulfill either the CEAE Technical Elective or the Proficiencies requirement
GEOG 4321 Snow Hydrology
GEOG 4501 Water Resources and Water Management of the Western United States
ATO 3600 Principles of Climate (requires ATO 1050 Weather and the Atmosphere)

Other Good Options – Tech/Free
Electives CVEN 3434 Introduction to
Applied Ecology CVEN 4404 Water
Chemistry
APPM 4350 Methods of Applied Mathematics: Fourier Series and Boundary Value Problems
CVEN SESM Emphasis --Suggested Course Road Map

Proficiencies (3 total)
CVEN 4545 Steel Design (spring) or CVEN 4555 Reinforced Concrete (fall)
CVEN 3718 Geotech Engineering JI
CVEN 3256 Construction Engineering

CEAE Technical Electives (2 total)
CVEN 4161 Mechanics of Materials II (fall)
CVEN 4545 Steel Design (spring) or CVEN 4555 Reinforced Concrete (fall) (not taken above)

Recommended Tech Electives (2 total) and Free Elective (1 total)
Primarily Design Oriented Careers
CVEN 4525 Matrix Structural Analysis
CVEN 4535 Construction Materials
CVEN 4565 Timber Design (every other spring)
AREN 4315 Design of Masonry Structures (every other spring)
CVEN 4728 Foundation Engineering

Primarily Theoretical Oriented Careers and Graduate School Preparation
CVEN 4525 Matrix Structural Analysis
CVEN 4511 Finite Element Analysis
CVEN 5111 Introduction to Structural Dynamics
CVEN 5131 Continuum Mechanics and Elasticity
CVEN Environmental Engineering Emphasis - Suggested Course Plan

**Proficiencies (3 total)**
CVEN 3424 Water & wastewater
CVEN 4333 Engineering Hydrology
   CVEN 3718 Geotechnical Engineering II

**CEAE Technical Electives (2 total)**
CVEN 4404 Water Chemistry
CVEN 4484 Environmental Microbiology

**Highly Recommended Tech/Free Electives (2 Tech Electives & 1 Free Elective)**
CVEN 4464 Environmental Engineering Processes
CVEN 3434 Intro to Applied Ecology
CVEN 4554 Fundamentals of Air Quality Management
CVEN 4594 Water Reuse and Reclamation
EVEN 4100 Environmental Sampling and Analysis
CVEN 4474 Hazardous Waste Management
CVEN/EVEN 4434 Environmental Engineering Design
CVEN 4969 Water Air Sanitation Hygiene
(starting in 2017)
CVEN Geotechnical Engineering Emphasis · Suggested Course Plan

Proficiencies: (3 total)
CVEN 3718 Geotechnical Engineering 2 CVEN 4555 Reinforced Concrete
CVEN 4333 Engineering Hydrology

CEAE/Geotech Technical Electives (2 total)
CVEN 4728 Foundation Engineering CVEN 5708 Soil Mechanics
Any CVEN 5**8 introductory graduate level geotechnical engineering course

Other Highly Recommended Tech/Free Electives (2 Free Electives & 2 Tech Electives)
Courses listed under CEAE/Geotech Technical Electives and Proficiencies that are not used to fulfill either the CEAE/Geotech Technical Elective or the Proficiencies requirement
CVEN 4161 Mechanics of Materials II
CVEN 4511 Introduction to Finite Element Analysis CVEN 5131 Continuum Mechanics & Elasticity

Other Good Options - Tech/Free Electives
APPM 3050 Scientific Computing in Matlab
APPM 4350 Methods of Applied Mathematics: Fourier Series and Boundary Value Problems
CVEN 3424 Water & Wastewater
CVEN 5454 Statistical Methods for Natural/Engineered Systems GEOL 5714 Field Geophysics

Note - Free Elective:
**CVEN 3698 Engineering Geology (if not already taken)