

CVEN Block Diagram – Fall 2023

Sem.	CR						
8 SPR	16	CVEN 4899-4cr Senior Design Project (See notes***) #	<u>Technical Elective-3cr</u>	<u>Technical Elective-3cr</u>	<u>Proficiency-3cr</u> See page 2		<u>HSS Elective-3cr</u> Upper-division
7 FALL	17	CVEN 4897-2cr Professional Issues in CVEN (Junior standing) #	<u>Technical Elective-3cr</u> AREN/CVEN only	<u>Technical Elective-3cr</u> AREN/CVEN only	<u>Proficiency-3cr</u> See page 2	<u>Free Elective-3cr</u>	<u>HSS Elective-3cr</u> Upper-division
6 SPR	15	CVEN 3227-3cr Probability, Stats., Decision for CVEN (Junior standing) #		<u>Proficiency-3cr</u> See page 2	CVEN 3111-3cr Analytical Mechanics 2 (CVEN 2121) #	<u>College-Approved Writing Elective-3cr**</u>	<u>HSS Elective-3cr</u>
5 FALL	15	CVEN 3246-3cr Introduction to Construction (36+ credit hours)	CVEN 3323-3cr Hydraulic Engineering (CVEN 3313)	CVEN 3414-3cr Fund. of Env. Eng. (CHEN 1201, APPM 1360)	CVEN 3525-3cr Structural Analysis (CVEN 3161)	CVEN 3708-3cr Geotechnical Engineering 1 (CVEN 3161) #	
4 SPR	17	APPM 2360-4cr Introduction to Linear Algebra & Diff. Equations (APPM 1360)	CVEN 3313-3cr Theoretical Fluid Mechanics (CVEN 2121)	AREN 2110-3cr Thermodynamics OR CVEN 2545-3cr Constr. Materials (see notes*)	CVEN 3161-3cr Mechanics of Materials 1 (CVEN 2121, pre/co-req APPM 2360)	CVEN 3698-3cr Engineering Geology (pre/co-reqs CVEN 2121 and APPM 2350) #	CVEN 2017-1cr Excel Python R Primer (CSCI 1200) #
3 FALL	18	APPM 2350-4cr Calculus 3 for Engineers (APPM 1360)	PHYS 1120-4cr Gen. Physics 2 (PHYS 1110, pre/co-req APPM 1360)	PHYS 1140-1cr Experimental Physics 1 (pre/co-req PHYS 1120)	CVEN 2121-3cr Analytical Mechanics 1 (PHYS 1110, pre/co-req APPM 2350)	CVEN 2012-3cr Intro to Geomatics	<u>HSS Elective-3cr</u>
2 SPR	14	APPM 1360-4cr Calculus 2 for Engineers (APPM 1350)	PHYS 1110-4cr Gen. Physics 1 (pre/co-req APPM 1350)		CVEN 1027-3cr OR AREN 1027-3cr Engineering Drawing	GEEN 1400-3cr Engrg. Projects OR Basic Engineering Elective	
1 FALL	16	APPM 1350-4cr Calculus 1 for Engineers (APPM 1235 or placement)	CHEN 1201-4cr Gen. Chem. for Engineers 1 (1yr HS chem. or CHEM 1021, HS algebra)	CHEM 1114-1cr Lab in General Chemistry 1 (co-req CHEN 1201)	CVEN 1317-1cr Introduction to Civil & Environ. Engineering #	CSCI 1200-3cr Intro to Computational Thinking #	<u>HSS Elective-3cr**</u>

Course is offered only once per year (FALL or SPRING as shown)

Fall 2023/Updated May 2026

() Prerequisite and co-requisite requirements for course listed.

* AREN 2110 Thermodynamics (PHYS 1110, pre/co-req APPM 1360) offered FALL only. CVEN 2545 Construction Materials (sophomore standing, recommended prereq CVEN 2121) offered SPRING only.

** College-approved writing courses are listed at

<https://www.colorado.edu/engineering-advising/get-your-degree/degree-requirements/humanities-social-sciences-and-writing-requirements>. Students who want to take ENES 1010 in their first year can switch the HSS elective in Term 1 with the writing course in Term 6.

*** Requisites for CVEN 4899: (pre/co-reqs CVEN 3718 and 4728) or (pre/co-reqs CVEN 3323 and 4333) or (prereqs CVEN 3256 and AREN 4506) or (prereq CVEN 4555 and co-req CVEN 4545) or (pre/co-req CVEN 3424).

CVEN ELECTIVES AND AREAS OF FOCUS

Students must complete at least **three of the five** proficiency courses listed below (to ensure students can “design in more than one context”). Proficiency courses and recommended technical electives for each sub-discipline are listed below. For further suggestions, consult the Suggested Course Plan in the CVEN Advising Guide and your faculty mentor.

Students must complete one set of pre/co-requisites for CVEN 4899 Senior Design from the options below.

GEOTECHNICAL ENGINEERING

Proficiency: CVEN 3718 Geotechnical Engineering II (CVEN 3708) – fall and spring

Recommended Technical Electives:

CVEN 4728 Foundation Engineering (CVEN 3718) – spring

CVEN 5708 Soil Mechanics (CVEN 3718 recommended, instructor consent) – fall

Any CVEN 5xx8 introductory graduate-level Geotechnical Engineering course (instructor consent)

Pre- or co-requisites for Senior Design: CVEN 3718 Geotechnical Engineering II and CVEN 4728 Foundation Engineering

WATER RESOURCES ENGINEERING

Proficiency: CVEN 4333 Engineering Hydrology (CVEN 3313, pre/co-req CVEN 3227) – fall and spring

Recommended Technical Electives:

CVEN 4353 Groundwater Engineering (CVEN 3313) – fall

CVEN 5363 Modeling of Hydrologic Systems (CVEN 3323 or pre/co-req CVEN 4333 recommended, instructor consent) – spring

CVEN 4383 Groundwater Modeling (CVEN 4353 recommended) – spring

CVEN 4323 Water Resources Engineering Design (Junior standing) – intermittent

Pre- or co-requisites for Senior Design: CVEN 3323 Hydraulic Engineering and CVEN 4333 Engineering Hydrology

CONSTRUCTION ENGINEERING AND MANAGEMENT

Proficiency: CVEN 3256 Construction Equipment and Methods (CVEN 3246) – fall and spring

Recommended Technical Electives:

AREN 4506 Pre-Construction Estimating and Scheduling (CVEN 3246) – fall and spring

AREN 4606 Construction Project Execution and Control (AREN 4506) – spring

Prerequisites for Senior Design: CVEN 3256 Const. Equip. & Methods and AREN 4506 Pre-Const. Estimating and Scheduling

STRUCTURAL ENGINEERING/ STRUCTURAL MECHANICS

Proficiency: CVEN 4545 Steel Design – spring or CVEN 4555 Reinforced Concrete Design – fall (CVEN 3525)

Recommended Technical Electives:

CVEN 4161 Mechanics of Materials II (CVEN 3161) – fall

CVEN 4545 or CVEN 4555 (whichever course not selected as proficiency)

CVEN 4525 Computational Structural Analysis 1 (CVEN 3525) – fall

Requisites for Senior Design: Prerequisite CVEN 4555 Reinforced Concrete Design and co-requisite: CVEN 4545 Steel Design

ENVIRONMENTAL ENGINEERING

Proficiency: CVEN 3424 Water and Wastewater Treatment (CVEN 3414) – spring

Recommended Technical Electives:

CVEN 4404 Water Chemistry/CVEN 4414 Water Chemistry Lab (CHEN 1203 or 1211, CHEM 1221, pre/co-req CVEN 3414) – fall

CVEN 3434 Introduction to Applied Ecology (CHEN 1201 and CHEM 1114) – spring

CVEN 4474 Hazardous and Industrial Waste Management (CVEN 3414) – fall

CVEN 4484 Intro to Environmental Microbiology (CHEN 1201, CHEM 1114, APPM 2350) – spring

Pre- or co-requisites for Senior Design: CVEN 3424 Water and Wastewater Treatment

ELECTIVE REQUIREMENTS

Basic Engineering Elective – any 3-credit technical course given in the engineering college with a designator ASEN, AREN, APPM, CHEN, COEN, CVEN, CSCI, ECEN, EMEN, EVEN, GEEN, or MCEN, or other course approved by the CEAE Curriculum Committee. Remedial courses (precalculus, etc.) or courses approved as HSS electives may not be used.

Free Elective – Any college-level course, except: cannot be remedial courses needed to fulfill deficiencies (precalculus, introductory chemistry, etc.) and cannot be similar to other courses used toward graduation requirements (algebra-based physics, etc.).

Humanities and Social Science (HSS) Elective – See the College requirements and list of approved courses at www.colorado.edu/engineering/academics/policies/HSS.

Technical Elective – Generally, an upper-division (3000+) science or engineering course with technical content. All upper-division AREN/CVEN courses are technical electives; up to 6 credits outside of AREN/CVEN may be selected from the approved course list posted at <https://www.colorado.edu/ceae/node/111/attachment>. Up to 3 credits of independent study are allowed for technical elective credit.