

## CVEN Block Diagram – Students entering the CVEN program Fall 2017-Spring 2020

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 II (CVEN 2121) #	<u>College-Approved Writing Course-3cr**</u>	<u>HSS Elective-3cr</u>
5 FALL	15	CVEN 3246-3cr Introduction to Construction (Junior standing)	CVEN 3323-3cr Hydraulic Engineering (CVEN 3313) #	CVEN 3414-3cr Fund. of Env. Eng. (CHEN 1211, APPM 1360)	CVEN 3525-3cr Structural Analysis (CVEN 3161)	CVEN 3708-3cr Geotechnical Engineering 1 (CVEN 3161)	
4 SPR	16	APPM 2360-4cr Introduction to Linear Algebra & Diff. Equations (APPM 1360)	CVEN 3313-3cr Theoretical Fluid Mechanics (CVEN 2121) #	AREN 2110-3cr Thermodynamics (PHYS 1110, co-req APPM 1360)	CVEN 3161-3cr Mechanics of Materials I (CVEN 2121, co-req APPM 2360)	CVEN 3698-3cr Engr. Geology <u>OR</u> Basic Sci. Elective ****	
3 FALL	18	APPM 2350-4cr Calculus III for Engineers (APPM 1360)	PHYS 1120-4cr Gen. Physics II (PHYS 1110, co-req APPM 1360)	PHYS 1140-1cr Experimental Physics 1 (co-req PHYS 1120)	CVEN 2121-3cr Analytical Mechanics I (PHYS 1110, co-req APPM 2350*)	CVEN 2012-3cr Intro to Geomatics	<u>HSS Elective-3cr</u>
2 SPR	15	APPM 1360-4cr Calculus II for Engineers (APPM 1350)	PHYS 1110-4cr Gen. Physics I (co-req APPM 1350)	CSCI 1320-4cr Comp. Science 1 (co-req. APPM 1350)	CVEN 1027-3cr <u>OR</u> AREN 1027-3cr Engineering Drawing		
1 FALL	16	APPM 1350-4cr Calculus I for Engineers (APPM 1235 or placement)	CHEN 1211-4cr Gen. Chem. for Engineers (1yr HS chem. or CHEM 1021, HS algebra)	CHEM 1221-1cr Gen. Chem. Lab for Engineers (co-req CHEN 1211)	CVEN 1317-1cr Introduction to Civil & Environ. Engineering #	GEEN 1400-3cr Engrg. Projects <u>OR</u> Basic Engineering Elective	<u>HSS Elective-3cr</u>

Fall 2017/Revised September 2020

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

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

\* Co-requisite APPM 2350; OR co-requisite APPM 1360 and prerequisite GEEN 3830 Engineering Math.

\*\* College-approved writing courses: HUEN/ENES 1010 (first-year students only); or ENLP 3100, HUEN/ENES 3100, WRTG 3030, WRTG 3035, or PHYS 3050 (junior standing).

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

\*\*\*\* CVEN 3698 may be replaced with one of the following Basic Science Electives: EBIO 1030, 1201; ATOC 1050, 1060; GEOL 1010.

## **CVEN ELECTIVES AND AREAS OF FOCUS**

**Students must complete at least three of five proficiency courses** (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

**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, co-req CVEN 3227) – fall and spring

**Technical Electives:**

CVEN 4353 Groundwater Engineering (CVEN 3313) – fall

CVEN 5363 Modeling of Hydrologic Systems (CVEN 3323 or 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

**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)

**Technical Electives:**

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

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

CVEN 4525 Matrix Structural Analysis (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

**Technical Electives:**

CVEN 4404 Water Chemistry/CVEN 4414 Water Chemistry Lab (CHEN 1203 or 1211, CHEM 1221, 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](http://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.