

Civil Engineering (CVEG)

Micah Hale
Head of the Department
4190 Bell Engineering Center
479-575-4954

Department of Civil Engineering Website (<https://civil-engineering.uark.edu/>)

Civil engineering is the oldest of all engineering fields, yet it is as contemporary as the need to provide solutions to today's environmental, geotechnical, structural and transportation problems. The civil engineer plans, designs, builds, and operates projects for the advancement and well-being of society while coordinating and conserving human and natural resources. Civil engineering projects range from small to monumental and include public water systems, buildings, bridges, rail and highway networks, water and wastewater treatment plants, solid and hazardous waste disposal facilities, airports, and soil conservation and flood diversion controls.

The civil engineering profession offers a vast array of opportunities. Civil engineers may work in private employment or with public agencies. They may work indoors in activities such as planning and design, or outdoors in areas such as construction supervision. Employment is possible anywhere in the world.

The objective of the Civil Engineering undergraduate program is to produce graduates who are prepared to pursue:

- Careers in the broad field of civil engineering
- Licensure as a professional engineer
- Advanced education

To fulfill this objective, all students must take courses in geotechnical, environmental, transportation, and structural engineering. Courses are designed to present "real world" applications without sacrificing conceptual and theoretical basics. Students complete design problems in each of these areas; and, as part of the senior year, they participate in two major design projects.

Completion of degree requirements provides graduates with the following learning outcomes:

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
- An ability to communicate effectively with a range of audiences
- An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
- An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Requirements for B.S. in Civil Engineering Elective Courses

Students must select three 3-hour civil engineering elective courses in conference with their adviser. Normally, the civil engineering courses are selected from among the 4000-level elective CVEG courses. Exceptional students may be allowed to choose from the 5000 (graduate-level) course series.

Students must also choose one elective course in science, engineering, technology, or math (STEM) field.

Humanities and social science electives are selected from courses approved by the university which satisfy the University General Education Curriculum and the Arkansas State Minimum Core requirements.

Students are required to complete 40 hours of upper division courses (3000-4000 level). It is recommended that students consult with their adviser when making course selections.

Civil Engineering Design Electives

Students must complete two of the following four CVEG design project electives: CVEG 4812 Environmental Design Project, CVEG 4822 Geotechnical Design Project, CVEG 4832 Structural Design Project, and CVEG 4842 Transportation Design Project. Each design project elective is associated with a specific design-oriented course. The associated course must be taken at the same time as the design project elective. The associated courses may be taken alone but the design electives cannot.

STEM Electives

Students must also choose one elective course in science, engineering, technology, or math (STEM) from among the following:

CSCE 2004	Programming Foundations I	4
ELEG 3903	Electric Circuits and Machines	3
GNEG 3113	Special Topics-Study Abroad	3
GNEG 3811	Alternating Cooperative Education (must get 3 separate rotations)	1
MEEG 2013	Dynamics	3
MEEG 2403	Thermodynamics	3
MEEG 2703	Computer Methods in Mechanical Engineering	3
GEOS 3023	Introduction to Cartography	3
GEOS 3543	Geospatial Applications and Information Science	3
GEOS 4533	Introduction to Petroleum Geophysics	3
MATH 3083	Linear Algebra	3
MATH 4363	Numerical Analysis	3

Any 3000-level or above science, technology, engineering or math course. (It is recommended that students consult with their adviser when making this selection.)

Civil Engineering B.S.C.E. Eight-Semester Degree Program

The Civil Engineering B.S.C.E. program is eligible for freshman students who want to participate in an Eight-Semester Degree Program. See the Eight-Semester Degree Policy (<http://catalog.uark.edu/undergraduatecatalog/academicregulations/eightsemesterdegreecompletionpolicy/>) for details of the program.

The following section contains the list of courses required for the Bachelor of Science in Civil Engineering degree and a suggested sequence. Not all courses are offered every semester, so students who deviate from the suggested sequence must pay careful attention to course scheduling and course prerequisites.

See the list of state minimum core (<http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/>) courses available for engineering students.

First Year	Units	
	Fall	Spring
MATH 2554 Calculus I (ACTS Equivalency = MATH 2405) (Satisfies General Education Outcome 2.1) ¹	4	
GNEG 1111 Introduction to Engineering I Satisfies General Education Outcome 3.4:	1	
GEOS 1113 Physical Geology (ACTS Equivalency = GEOL 1114 Lecture) & GEOS 1111L Physical Geology Laboratory (ACTS Equivalency = GEOL 1114 Lab)	4	
CHEM 1103 University Chemistry I (ACTS Equivalency = CHEM 1414 Lecture)	3	
ENGL 1013 Composition I (ACTS Equivalency = ENGL 1013) (Satisfies General Education Outcome 1.1)	3	
MATH 2564 Calculus II (ACTS Equivalency = MATH 2505)		4
GNEG 1121 Introduction to Engineering II		1
ENGL 1033 Technical Composition II (ACTS Equivalency = ENGL 1023) (Satisfies General Education Outcome 1.2)		3
Select one of the following to satisfy General Education Outcome 4.2:		3
PLSC 2003 American National Government (ACTS Equivalency = PLSC 2003)		
HIST 2003 History of the American People to 1877 (ACTS Equivalency = HIST 2113)		
HIST 2013 History of the American People, 1877 to Present (ACTS Equivalency = HIST 2123)		
Satisfies General Education Outcome 3.4:		
PHYS 2054 University Physics I (ACTS Equivalency = PHYS 2034)		4
Year Total:	15	15

Second Year	Units	
	Fall	Spring
MATH 2574 Calculus III (ACTS Equivalency = MATH 2603)	4	

CVEG 2013 Civil Engineering Mechanics I	3	
CVEG 2002 Introduction to Civil Engineering Plans and CADD	2	
CVEG 2053 Surveying Systems & CVEG 2051L Surveying Systems Laboratory	4	
Fine Arts Elective (Select a course to satisfy General Education Outcome 3.1) ²	3	
MATH 2584 Elementary Differential Equations		4
CVEG 2023 Civil Engineering Mechanics II		3
CVEG 2113 Structural Materials		3
INEG 3313 Engineering Probability and Statistics Science Elective ⁷		3
Year Total:	16	17

Third Year	Units	
	Fall	Spring
INEG 2413 Engineering Economic Analysis	3	
CVEG 3303 Structural Analysis	3	
CVEG 3213 Hydraulics	3	
STEM Elective	3	
CVEG 3413 Transportation Systems Engineering	3	
CVEG 2851 Engineering Professional Practice Issues	1	
CVEG 4303 Reinforced Concrete Design I		3
CVEG 3243 Environmental Engineering		3
CVEG 3132 Soil Mechanics & CVEG 3131L Soil Mechanics Laboratory		3
CVEG 3223 Hydrology		3
Social Sciences Elective (select one course to satisfy General Education Outcomes 3.3 and 4.1) ³		3
Year Total:	16	15

Fourth Year	Units	
	Fall	Spring
Civil Engineering Elective ⁴	3	
Civil Engineering Design Elective (Satisfies General Education Outcome 6.1)	2	
CVEG 4143 Foundation Engineering	3	
CVEG 4423 Transportation Infrastructure	3	
CVEG 4890 Fundamentals of Engineering Seminar	0	
Humanities Elective (select one course to satisfy General Education Outcomes 3.2 and 5.1) ⁵	3	
Social Sciences Elective (select one course to satisfy General Education Outcome 3.3) ⁶	3	
CVEG 4513 Construction Management		3
Civil Engineering Design Elective (Satisfies General Education Outcome 6.1)		2
CVEG 4243 Environmental Engineering Design		3
Civil Engineering Electives ⁴		6
Social Sciences Elective (select one course to satisfy General Education Outcome 3.3) ⁶		3
Year Total:	17	17

Total Units in Sequence: 128

- ¹ Students have demonstrated successful completion of the learning indicators identified for learning outcome 2.1, by meeting the prerequisites for MATH 2554.
- ² The Fine Arts Elective courses which satisfy General Education Outcome 3.1 include: ARCH 1003, ARHS 1003, COMM 1003, DANC 1003, LARC 1003, MLIT 1003, MLIT 1003H, MLIT 1013, MLIT 1013H, MLIT 1333, THTR 1003, THTR 1013, or THTR 1013H.
- ³ The Social Sciences Elective courses which satisfy General Education Outcomes 3.3 and 4.1 include: ANTH 1023, COMM 1023, HDFS 1403, HDFS 2413, HIST 1113, HIST 1123, HIST 2093, HUMN 1114H, HUMN 2114H, INST 2013, INST 2813, INST 2813H, PLSC 2013, PLSC 2813, PLSC 2813H, RESM 2853, SOCI 2013, SOCI 2013H, or SOCI 2033.
- ⁴ See the elective list among the program requirements.
- ⁵ The Humanities Elective courses which satisfy General Education Outcomes 3.2 and 5.1 include: CLST 1003, CLST 1003H, CLST 1013, HUMN 1124H, PHIL 2003, PHIL 2003C, PHIL 2003H, PHIL 2103, or PHIL 2103C.
- ⁶ The Social Sciences Elective courses which satisfy General Education Outcome 3.3 include: AGECE 1103, AGECE 2103, ANTH 1023, COMM 1023, ECON 2013, ECON 2023, ECON 2143, EDST 2003, HDFS 1403, HDFS 2413, HDFS 2603, HIST 1113, HIST 1113H, HIST 1123, HIST 1123H, HIST 2003, HIST 2013, HIST 2093, HUMN 1114H, HUMN 2114H, INST 2013, INST 2813, INST 2813H, PLSC 2003, PLSC 2013, PLSC 2203, PLSC 2813, PLSC 2813H, PSYC 2003, RESM 2853, SOCI 2013, SOCI 2013H, SOCI 2033. Note, courses cannot be counted twice in degree requirements.
- ⁷ Chose one from the list below:
PHYS 2074, GEOS 3514, BIOL 1543 and BIOL 1541L, BIOL 2013 and BIOL 2011L, or
CHEM 1123 and CHEM 1121L.

Honors Program Requirements

Students enrolled in the Honors College who are to receive the Bachelor of Science in Civil Engineering must complete a minimum of 12 hours of honors credit. At least 6 hours must be completed within the Civil Engineering program including at least 3 hours resulting in an Honors Thesis. The CVEG honors courses are acceptable as engineering electives and in some cases may be substituted for required courses. The following Civil Engineering courses are offered for honors credit: CVEG 491VH Honors Studies in Geotechnical Engineering, CVEG 492VH Honors Studies in Environmental Engineering, CVEG 493VH Honors Studies in Structural Engineering, CVEG 494VH Honors Studies in Transportation Engineering, and CVEG 4983H Honors Undergraduate Thesis.

Becknell, Natalie K., M.S.C.E., B.S.C.E. (University of Arkansas), Instructor, 2012.

Bernhardt-Barry, Michelle, Ph.D., M.S.C.E., B.S.C.E. (Texas A&M University), Associate Professor, 2013, 2019.

Braham, Andrew F., Ph.D. (University of Illinois-Urbana-Champaign), M.S., B.S. (University of Wisconsin-Madison), Associate Professor, 2010, 2018.

Coffman, Rick, Ph.D. (University of Missouri-Columbia), M.S. (University of Texas at Austin), B.S. (University of Wyoming), Professor, 2009, 2021.

Fairey, Julian, Ph.D., M.S.C.E. (University of Texas at Austin), B.S.C.E. (University of Alberta, Canada), Associate Professor, 2008, 2014.

Fernstrom, Eric, Ph.D. (University of Arkansas), Teaching Assistant Professor, 2014, 2021.

Hale, Micah, Ph.D., M.S.C.E., B.S.C.E. (University of Oklahoma), Professor, 21st Century Leadership Chair in Civil Engineering, 2002, 2013.

Hall, Kevin D., Ph.D. (University of Illinois-Urbana-Champaign), M.S.C.E., B.S.C.E. (University of Arkansas), Professor, Walter E. Hicks and Blossom Russel Hicks Professorship for Infrastructure Engineering, 1993, 2002.

Hernandez, Sarah, Ph.D., M.S. (University of California, Irvine), B.S. (University of Florida), Associate Professor, 2015, 2021.

Heymsfield, Ernie, Ph.D. (City University of New York), M.S.C.E. (Polytechnic University), Associate Professor, 2001, 2007.

Mitra, Suman, Ph.D. (University of California, Irvine), M.S., B.S. (Bangladesh University of Engineering and Technology), Assistant Professor, 2019.

Morrow, Tommy K., Ph.D. (University of Texas at Austin), Instructor, 2019.

Murray, Cameron, Ph.D. (University of Oklahoma), M.S.C.E., B.S.C.E. (University of Arkansas), Assistant Professor, 2017.

Prinz, Gary S., Ph.D., M.S., B.S. (Brigham Young University), Associate Professor, 2014, 2019.

Selvam, R. Panneer, Ph.D. (Texas Tech University), M.S.C.E. (South Dakota School of Mines and Technology), M.E., B.E. (University of Madras, India), University Professor, James T. Womble Professor of Computational Mechanics and Nanotechnology Modeling, 1986, 2010.

Thompson, Graham W., M.S., (New Mexico State University), B.S. (University of Arkansas), Instructor, 2021.

Welcher, Richard, M.S.C.E., B.S.C.E. (University of Arkansas), Instructor, 2011.

Williams, Rodney D., Ph.D., M.S., B.S.C.E. (University of Arkansas), Instructor, 1998.

Williams, Stacy Goad, Ph.D., M.S.C.E., B.S.C.E. (University of Arkansas), Associate Professor, 1997.

Wood, Clinton M., Ph.D. (University of Texas at Austin), M.S.C.E., B.S.C.E. (University of Arkansas), Associate Professor, 2013, 2019.

Zhang, Wen, Ph.D. (Purdue University), M.S. (University of Kansas), Associate Professor, 2011, 2018.

Courses

CVEG 2002. Introduction to Civil Engineering Plans and CADD. 2 Hours.

Development and preparation of design and construction plans; plan terminology and features; introduction to computer-aided drafting and design (CADD) software. Corequisite: Drill component. Prerequisite: Civil Engineering major or departmental consent. (Typically offered: Fall, Spring and Summer)

CVEG 2013. Civil Engineering Mechanics I. 3 Hours.

CVEG 2013 provides the student with a foundation in the theory and principles of statics for use in subsequent civil engineering courses. The course applies mathematics and physics to solve practical problems of structural systems. Corequisite: MATH 2574. Prerequisite: MATH 2564 and PHYS 2054. (Typically offered: Fall and Spring)

CVEG 2023. Civil Engineering Mechanics II. 3 Hours.

CVEG 2023 provides the student with a foundation in the theory and principles of mechanics of materials for use in subsequent civil engineering courses. This course applies mathematics and physics to solve problems in mechanics. Prerequisite: CVEG 2013 or MEEG 2003. (Typically offered: Fall and Spring)

CVEG 2051L. Surveying Systems Laboratory. 1 Hour.

Laboratory exercises demonstrating the principles and practices of surveying systems. Corequisite: CVEG 2053. (Typically offered: Fall)

CVEG 2053. Surveying Systems. 3 Hours.

Coordinate geometry, measurements, and total integrated surveying systems; total stations, electronic data collection, and reduction; error analysis; applications to civil engineering and surveying practice. Corequisite: CVEG 2051L. Prerequisite: MATH 2554 or MATH 2445. (Typically offered: Fall)

CVEG 2113. Structural Materials. 3 Hours.

Production, properties, behavior, and structural applications of concrete, steel, timber, masonry, and plastic. Statistical analysis methods for quality control are also covered. Lecture 2 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: MEEG 2003 or CVEG 2013. Pre- or Corequisite: MEEG 3013 or CVEG 2023. (Typically offered: Fall and Spring)

CVEG 2851. Engineering Professional Practice Issues. 1 Hour.

Study of various issues related to the professional practice of engineering including ethics, professionalism, professional licensure, project procurement, social and political issues, globalism, and other legal issues. (Typically offered: Fall and Spring)

CVEG 3131L. Soil Mechanics Laboratory. 1 Hour.

Index, strength, and consolidation properties of soils; test methods and specifications for soil sampling and testing. Corequisite: CVEG 3132. (Typically offered: Fall and Spring)

CVEG 3132. Soil Mechanics. 2 Hours.

Introduction to geotechnical engineering. Properties of soils related to foundations, retaining walls, earth structures, and highways. Lecture 2 hours, laboratory 3 hours per week. Corequisite: CVEG 3131L. Pre- or Corequisite: CVEG 3213 and MATH 2584. Prerequisite: (MEEG 3013 or CVEG 2023) and GEOS 1113 and CVEG 2002. (Typically offered: Fall and Spring)

CVEG 3213. Hydraulics. 3 Hours.

Study of incompressible fluids. Topics include fluid properties, fluid statics, continuity, energy and hydraulic gradients, fundamentals of flow in pipes and open channels. Hardy Cross analyses, measurement of flow of incompressible fluids, hydraulic similitude and dimensional analysis. Lecture 2 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: CVEG 2013 or MEEG 2003. (Typically offered: Fall and Spring)

CVEG 3223. Hydrology. 3 Hours.

Flood routing procedures in storage reservoirs and channels. Hydrologic planning including storage reservoir design, frequency duration analysis, and related techniques. Prerequisite: (CVEG 2053 or BENG 2643), (CVEG 3213 or MEEG 3503 or CHEG 2133). (Typically offered: Fall and Spring)

CVEG 3243. Environmental Engineering. 3 Hours.

Introduction to theories and fundamentals of physical, chemical, and biological processes with emphasis on water supply and wastewater collection, transportation, and treatment. Lecture 2 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: MATH 2584 and CHEM 1103. (Typically offered: Fall and Spring)

CVEG 3303. Structural Analysis. 3 Hours.

Truss analysis, influence lines for beams and frames, and effects of moving loads. Deformation of beams, frames, and trusses. Analysis of indeterminate structures by moment area, slope deflection, and moment distribution methods; approximate methods of analysis. Lecture 3 hours, drill 3 hours per week. Corequisite: Drill component. Prerequisite: MEEG 3013 or CVEG 2023. (Typically offered: Fall and Spring)

CVEG 3413. Transportation Systems Engineering. 3 Hours.

Transportation Systems Engineering: Introduction to transportation systems engineering and planning. Includes the following topics: transportation governance, financing, and the effect on the environment; traffic flow theory; safety; traffic operations and control; capacity; and travel demand modeling. Prerequisite: CVEG 2053 and (INEG 2314 or INEG 3313). (Typically offered: Fall)

CVEG 4143. Foundation Engineering. 3 Hours.

Analysis and design of retaining walls, footings, sheet piles, and piles. Determination of foundation settlements in sand and clay. Prerequisite: CVEG 3132 and INEG 2413. (Typically offered: Fall and Spring)

CVEG 4203. Environmental Regulations and Permits. 3 Hours.

Topics include federal and state environmental regulations, the permitting process, permit requirements and related issues. Prerequisite: CVEG 3243 and senior standing. (Typically offered: Fall)

CVEG 4243. Environmental Engineering Design. 3 Hours.

Application of physical, biological, and chemical operations and processes to the design of water supply and wastewater treatment systems. Prerequisite: CVEG 3243 and INEG 2413. (Typically offered: Fall and Spring)

CVEG 4263. Air Pollution Control. 3 Hours.

Fundamentals of air pollution causes, effects, and measurements; as well as, control methods with application to current industrial problems. Prerequisite: CVEG 3213 or MEEG 3503. (Typically offered: Spring)

CVEG 4273. Open Channel Flow. 3 Hours.

Open Channel Flow includes advanced open channel hydraulics, flow measurement techniques, a hydrology review, culvert and storm drainage design, natural channel classification (fluvial geomorphology) and rehabilitation, computer methods and environmental issues. Prerequisite: CVEG 3213 and CVEG 3223. (Typically offered: Spring)

CVEG 4303. Reinforced Concrete Design I. 3 Hours.

Design of reinforced concrete elements with emphasis on ultimate strength design supplemented by working stress design for deflection and crack analysis. Prerequisite: CVEG 2113 and CVEG 3303. (Typically offered: Fall and Spring)

CVEG 4313. Structural Steel Design I. 3 Hours.

Design of structural steel elements by elastic design the Load and Resistance Factor Design method. Intensive treatment of tension members, beams, columns, and connections. Pre- or Corequisite: CVEG 2113. Prerequisite: CVEG 3303. (Typically offered: Fall and Spring)

CVEG 4323. Structural Loadings. 3 Hours.

Theoretical background to and practical code requirements for various structural loadings. These include dead loads, occupancy loads, roof loads and ponding, snow loads, granular loads, vehicular loads, wind loading, and seismic loads. Prerequisite: CVEG 3303, INEG 2413 and (CVEG 4303 or CVEG 4313). (Typically offered: Spring)

CVEG 4343. Reinforced Masonry Design. 3 Hours.

Properties of masonry materials and assemblages. Masonry workmanship and quality control. Design of reinforced masonry elements against gravity and lateral loads. Design of masonry connections and joints. Application to 1- and 2-story buildings. Prerequisite: CVEG 4303. (Typically offered: Irregular)

CVEG 4353. Timber Design. 3 Hours.

Selection of timber beams, columns, and beam-columns. Physical properties of wood, analysis and design of timber connections. Truss design, glulam members, timber bridge design, treatment for decay, and fire protection. Pre- or Corequisite: CVEG 2113. Prerequisite: CVEG 3303. (Typically offered: Irregular)

CVEG 4413. Pavement Evaluation and Rehabilitation. 3 Hours.

Introduction of concepts and procedures for pavement condition surveys; evaluation by nondestructive and destructive testing; maintenance strategies; rehabilitation of pavement systems for highway and airfields; pavement management systems. Prerequisite: CVEG 4433. (Typically offered: Irregular)

CVEG 4423. Transportation Infrastructure. 3 Hours.

Transportation infrastructure includes discussion on the geometric design of roadways, roadway drainage, roadway materials, roadway structural design, and an economic analysis of roadways. This includes the design of horizontal and vertical alignment, cross section, intersections, pavement materials, and structural capacity. Prerequisite: CVEG 3413 and INEG 2413. (Typically offered: Fall and Spring)

CVEG 4433. Transportation Pavements and Materials. 3 Hours.

Study of the engineering properties and behavior of materials commonly used in transportation facilities as they relate to the design and performance of flexible and rigid pavement systems. Lecture 2 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: CVEG 3132, CVEG 3413, and (INEG 2314 or INEG 3313). (Typically offered: Irregular)

CVEG 4513. Construction Management. 3 Hours.

Introduction to methods and procedures for management of civil engineering construction projects including organization, plans and specs, cost estimating and bidding, project planning and finance, quality control/ assurance, construction safety, cost management, labor issues, change orders, and subcontractor issues. Prerequisite: Senior standing and Civil Engineering majors only. (Typically offered: Fall and Spring)

CVEG 4812. Environmental Design Project. 2 Hours.

Comprehensive engineering design project primarily related to environmental issues. Corequisite: CVEG 4243. (Typically offered: Spring)

CVEG 4822. Geotechnical Design Project. 2 Hours.

Comprehensive engineering design project primarily related to geotechnical issues. Corequisite: CVEG 4143. Prerequisite: CVEG 4303. (Typically offered: Fall)

CVEG 4832. Structural Design Project. 2 Hours.

Comprehensive engineering design project primarily related to structural issues. Corequisite: CVEG 4323. Prerequisite: CVEG 4303 and CVEG 4313. (Typically offered: Spring)

CVEG 4842. Transportation Design Project. 2 Hours.

Comprehensive engineering design project primarily related to transportation issues. Corequisite: CVEG 4423. Prerequisite: CVEG 2002. (Typically offered: Fall)

CVEG 4863. Sustainability in Civil Engineering. 3 Hours.

Qualify and quantify the economic, environmental, societal, and engineering drivers behind sustainability in Civil Engineering. Justification of the feasibility and benefits of sustainability in environmental, geotechnical, structural, and transportation engineering through verbal and written communications. Prerequisite: Senior standing. (Typically offered: Irregular)

CVEG 488V. Special Problems. 1-6 Hour.

Special problems. Prerequisite: Senior standing. (Typically offered: Irregular) May be repeated for up to 6 hours of degree credit.

CVEG 4890. Fundamentals of Engineering Seminar. 0 Hours.

Preparation for students taking the Fundamentals of Engineering (FE) examination, administered by the National Council of Examiners for Engineering and Surveying (NCEES). Concept review and problem-solving drills for topics covered on the FE-Civil examination. Prerequisite: Civil Engineering major and senior standing. (Typically offered: Fall and Spring)

CVEG 491VH. Honors Studies in Geotechnical Engineering. 1-6 Hour.

The study of advanced topics in the geotechnical engineering field. May include participation in geotechnical engineering courses normally available only to graduate students. Prerequisite: CVEG 3132 with a grade of C or better. (Typically offered: Irregular) May be repeated for up to 6 hours of degree credit.

CVEG 492VH. Honors Studies in Environmental Engineering. 1-6 Hour.

The study of advanced topics in the environmental engineering field. May include participation in environmental engineering courses normally available only to graduate students. Prerequisite: CVEG 3243 with a grade of C or better. (Typically offered: Irregular) May be repeated for up to 6 hours of degree credit.

CVEG 493VH. Honors Studies in Structural Engineering. 1-6 Hour.

The study of advanced topics in the structural engineering field. May include participation in structural engineering courses normally available only to graduate students. Prerequisite: CVEG 3303 with a grade of C or better. (Typically offered: Irregular) May be repeated for up to 6 hours of degree credit.

CVEG 494VH. Honors Studies in Transportation Engineering. 1-6 Hour.

The study of advanced topics in the transportation engineering field. May include participation in transportation engineering courses normally available only to graduate students. Prerequisite: CVEG 3413 with a grade of C or better. (Typically offered: Irregular) May be repeated for up to 6 hours of degree credit.

CVEG 4983H. Honors Undergraduate Thesis. 3 Hours.

Thesis research for civil engineering students enrolled in the honors college. Prerequisite: Honors College. (Typically offered: Irregular)