

# CIVIL ENGINEERING (CIVL)

## CIVL 139 - Foundations of Academic Discovery

Foundations of Academic Discovery serves as the entry point to the Rock Integrated Studies Program. With its strong faculty-student interaction, the course promotes intellectual inquiry, critical and creative thinking, and academic excellence. Through varied content, the course introduces students to academic discourse and information literacy while exploring topics such as diversity and inclusion and global awareness. This course will set students along the path to becoming engaged with issues and scholarship important to a 21st century education while they learn about themselves and their place in the world.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Enrollment limited to students with a semester level of Freshman 1 or Freshman 2.

Enrollment limited to students with the ROCK STUDIES 2 STUDENT or ROCK STUDIES STUDENT attributes.

## CIVL 190 - Experimental

A unique and specifically focused course within the general purview of a department which intends to offer it on a "one time only" basis and not as a permanent part of the department's curriculum.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

## CIVL 195 - Workshop

A workshop is a program which is usually of short duration, narrow in scope, often non-traditional in content and format, and on a timely topic.

Credits: 1-6

Term(s) Typically Offered: Offered as Needed

## CIVL 198 - Selected Topics

A Selected Topics course is a normal, departmental offering which is directly related to the discipline, but because of its specialized nature, may not be able to be offered on a yearly basis by the department.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

## CIVL 210 - Elementary Survey

Introductory course in surveying methods and theory. Topics will include surveying, and route surveying.

Prerequisite: MATH 225<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered Fall Terms

## CIVL 290 - Experimental

A unique and specifically focused course within the general purview of a department which intends to offer it on a "one time only" basis and not as a permanent part of the department's curriculum.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

## CIVL 295 - Workshop

A workshop is a program which is usually of short duration, narrow in scope, often non-traditional in content and format, and on a timely topic.

Credits: 1-6

Term(s) Typically Offered: Offered as Needed

## CIVL 298 - Selected Topics

A Selected Topics course is a normal, departmental offering which is directly related to the discipline, but because of its specialized nature, may not be able to be offered on a yearly basis by the department.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

## CIVL 310 - Structural Engineering

Introduction to the elastic behavior of structural components. Analysis of statically determinate systems. Deflection calculations by virtual work and elastic load methods. Analysis of simple statically indeterminate structures. Influence lines. Interaction of structural components. Typical structural engineering loads.

Prerequisite: ENGR 230<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 4

Term(s) Typically Offered: Offered Fall Terms

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

## CIVL 320 - Transportation Engineering

Introduction to basic concepts in transportation engineering including: planning, design, and operations. Introduces the challenges and issues in modeling transportation problems. Studies of various concepts related to the design of highway facilities, level of service, and demand for transportation services. Concepts related to signal optimization, policy implications and the basics of transportation planning.

Prerequisite: MATH 230<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered Fall Terms

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

## CIVL 330 - Environmental Engineering

A course in environmental engineering fundamentals that applies biological, chemical, and mathematical principles to solve environmental engineering problems using the mass balance approach.

Prerequisites: MATH 230<sup>D</sup> and BIOL 101<sup>D</sup> and CHEM 107<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 4

Term(s) Typically Offered: Offered Fall Terms

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

## CIVL 340 - Geotechnical Engineering

Soil properties, identification and classification of earth material; subsurface exploration; soil strength, stresses, settlement, substructure design; computer applications.

Prerequisite: ENGR 230<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered Spring Terms

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**CIVL 350 - Water Resources Engineering**

This course is designed to review the fundamentals and practices of water resources engineering with a focus on engineering applications of hydraulics and hydrology. The concepts of fluid mechanics (hydrostatics, conservation laws) will be applied to analyze flow phenomena in demonstrations and field trips.

Prerequisite: ENGR 301<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered Spring Terms

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**CIVL 390 - Experimental**

A unique and specifically focused course within the general purview of a department which intends to offer it on a "one time only" basis and not as a permanent part of the department's curriculum.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**CIVL 395 - Workshop**

A workshop is a program which is usually of short duration, narrow in scope, often non-traditional in content and format, and on a timely topic.

Credits: 1-6

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**CIVL 398 - Selected Topics**

A Selected Topics course is a normal, departmental offering which is directly related to the discipline, but because of its specialized nature, may not be able to be offered on a yearly basis by the department.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**CIVL 410 - Structural Steel Design**

This course covers the analysis and design of structural steel members for tensile, compressive, flexural and combined loading.

Prerequisite: CIVL 310<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered Spring Terms

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**CIVL 411 - Reinforced Concrete Design**

This course covers strength design concepts, beams, columns, slabs, retaining walls, single and combined footings with computer applications.

Prerequisite: CIVL 310<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**CIVL 412 - Finite Element Analysis**

Modern analysis techniques used to investigate a variety of systems in engineering and science. Computational models of problems are developed using energy concepts, structural mechanics, and matrix operations. The methods used are implemented using a general finite element program and the accuracy of the results is evaluated. The learned theoretical approach is applied to common structural elements such as trusses, beams, frames, and plates.

Prerequisite: CIVL 310<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**CIVL 420 - Traffic Engineering**

This course covers the fundamentals of traffic engineering and traffic flow theory: traffic signal design, intersection design, and traffic impact studies. Students will be taught using Highway Capacity Software, SYNCHRO, and other traffic software packages.

Prerequisite: CIVL 320<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered Spring Terms

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**CIVL 421 - Highway Engineering**

Principles of geometric design of highways, intersections, interchanges, and terminals. Practical issues of vertical and horizontal curvature, highway evaluation, driver and vehicle dynamics, and traffic safety are also addressed. Computer-aided design and modeling.

Prerequisite: CIVL 320<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**CIVL 422 - Transportation Terminal Design**

The course covers the transportation design of airports, rail stations and truck terminals to facilitate the transport of passengers and freight in the transportation systems. Terminals are designed to provide security, storage, and access to different modes of transportation.

Prerequisite: CIVL 320<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**CIVL 430 - Storm Water Management**

Quality and quantity of urban storm water. Receiving water problems and sources of pollutants. Runoff quality and quantity characteristics. Selection and design of controls; regulations.

Prerequisite: CIVL 350<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered Fall Terms

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**CIVL 431 - Environmental Engineering Design**

Process design of treatment/remediation systems to solve specific environmental problems, including evaluation alternatives and computer simulation.

Prerequisite: CIVL 330<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**CIVL 432 - Groundwater Hydrology**

The course covers the fundamental science and engineering behind groundwater systems, including but not limited to: the hydrologic cycle, groundwater flow, and wellhead protection and management.

Prerequisite: CIVL 350<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**CIVL 440 - Construction Management**

Provides students with an overview of the responsibilities and risk associated with management within the construction industry. Emphasis is given to responsibilities and relationships between owners, contractors, labor and suppliers, construction estimates and schedules, construction contracts and safety.

Prerequisite: CIVL 340<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**CIVL 441 - Sustainable Development**

Provides an overview of sustainable development with emphasis on the role of the engineer. Study the role of LEED and other sustainable development programs in changing development design.

Prerequisite: CIVL 330<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**CIVL 460 - Capstone Design I**

This course will provide students with the opportunity to work as part of a multi-disciplinary Civil Engineering design team. The course will consist of developing the preliminary design plans with presentations and reports. Students will learn about the regulatory process, LEED design, and site planning. Lectures in professional practice and teaming will augment the design project.

Credits: 3

Term(s) Typically Offered: Offered Fall Terms

Enrollment limited to students with a semester level of Senior 1 or Senior 2.

Enrollment is limited to students with a program in Civil Engineering.

**CIVL 461 - Capstone Design II**

This course will provide students with the opportunity to work as part of a multi-disciplinary Civil Engineering design team. The course will consist of a design project with presentations and reports. Lectures in professional practice and teaming will augment the design project.

Prerequisite: CIVL 460<sup>D</sup>

<sup>D</sup> Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered Spring Terms

Enrollment limited to students with a semester level of Senior 1 or Senior 2.

Enrollment is limited to students with a program in Civil Engineering.

**CIVL 490 - Independent Study**

Independent Study courses give students the opportunity to pursue research and/or studies that are not part of the university's traditional course offerings. Students work one on one or in small groups with faculty guidance and are typically required to submit a final paper or project as determined by the supervising professor.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**CIVL 495 - Workshop**

A workshop is a program which is usually of short duration, narrow in scope, often non-traditional in content and format, and on a timely topic.

Credits: 1-6

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

**CIVL 498 - Selected Topics**

A Selected Topics course is a normal, departmental offering which is directly related to the discipline, but because of its specialized nature, may not be able to be offered on a yearly basis by the department.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.