

Civil Engineering

Faculty: Horst, Chair, Al-Omaishi, Bechtel, Brennan, Krstic

Civil engineers plan, design, and supervise the construction of a wide variety of facilities essential to modern life. Projects include buildings, bridges, highways, mass transit systems, airports, tunnels, dams, flood controls, water and wastewater treatment plants, and offshore structures. The civil engineering program supports the following major areas of civil engineering: structural engineering, transportation engineering, water resources engineering, and geotechnical engineering. The program offers student laboratory activities in materials testing (structural), fluids measurements (water resources), and soils testing (geotechnical), CAD drafting, and surveying.

Program Educational Objectives

The civil engineering program has established the following educational objectives. These objectives outline what TCNJ civil engineers should be able to accomplish during the first few years after graduation.

- To contribute to the economic development of the country through the practice of engineering;
- To become successful in their chosen career path, whether it is in the practice of engineering, in advanced studies in engineering or science, or in other complementary disciplines;
- To make progress towards leadership roles in industry or public service;
- To maintain career skills through life-long learning and be on the way towards achieving professional licensure.

Civil Engineering Program Outcomes

The program outcomes listed below are expected of all graduates of the civil engineering program. These outcomes outline what TCNJ civil engineering graduates are expected to know and be able to do at graduation. These outcomes outline the knowledge, abilities, tools, and skills the program gives the graduates to enable them to accomplish the School of Engineering educational objectives.

Civil engineering graduates will have:

- An ability to apply knowledge of mathematics, science, and engineering;
- An ability to design and conduct experiments, as well as to analyze and interpret data;
- An ability to design a system, component, or process to meet desired needs;
- An ability to function in multidisciplinary teams;
- An ability to identify, formulate, and solve engineering problems;
- An understanding of professional and ethical responsibility;
- An ability to communicate effectively;
- The broad education necessary to understand the impact of engineering solutions in a global and societal context;
- A recognition of the need for and an ability to engage in life-long learning;

- A knowledge of contemporary issues;
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice;
- An ability to apply knowledge of mathematics through differential equations, calculus-based physics, chemistry, and at least one additional area of science, consistent with the program educational objectives;
- An ability to conduct civil engineering experiments and analyze and interpret the resulting data;
- An ability to design a system, component, or process in more than one civil engineering context;
- An ability to explain basic concepts in management, business, public policy, and leadership;
- An ability to apply knowledge of four technical areas appropriate to civil engineering;
- An ability to explain the importance of professional licensure.

Academic Policies and Standards

A student may repeat any course without seeking approval. However, if a student wishes to repeat a course more than once, permission must be obtained from the chair of the department or coordinator of the program of study and, if appropriate, the chair of the department offering the course. Permission to repeat a major course more than once will be granted only in cases of extreme extenuating circumstances, e.g., illness, financial, etc. When an engineering course is repeated, only the most recent earned grade is counted in the grade point average, although all grades earned will appear on the student's transcript.

Seniors pursuing bachelor of science degrees in an engineering major are required to take the Fundamentals of Engineering Examination for the Professional Engineer's License.

Given the nature of the engineering curricula, it is extremely important to follow the recommended course sequence. Violations of this guideline may result in dismissal from the engineering majors.

Program Entrance, Retention, and Exit Standards

Every major program at the College has set standards for allowing students to remain in that program, to transfer within the College from one program to another, and to graduate from a program. The following are the standards for engineering majors. Minimum grades are noted in parentheses.

- Retention in the engineering programs is based on the following performance standards in these "critical content courses": PHY 201 (C-); MAT 127 (C-), MAT 128 (C-). A student who does not achieve these minimum performance standards, earns a grade of F, and/or has a cumulative GPA of less than 2.0 will be placed on the Engineering Programs Retention List. Placement on the Retention List for two consecutive semesters or three non-consecutive semesters will result in dismissal from the major. Students dismissed from the major may appeal for re-entry into the major.
- To ensure academic success, first year, sophomore, and first-semester junior students will not be permitted to take more than 4.5 course units unless they have a GPA of 2.75 or greater. Upper class students can register for 5.5 course units if they are in good academic standing.

- Entrance (internal transfer) into the engineering programs from another program within the College is based upon the following performance standards in these “foundation courses”: PHY 201 (C-); MAT 127 (C-), MAT 128 (C-). Internal transfer within engineering programs will be considered as long as enrollment limits are not exceeded.
- Graduation requires an in-major cumulative GPA of 2.0.

Bachelor of Science in Civil Engineering

First Year

Fall

CHE	201/General Chemistry I	1 course unit
ENG	142/Fundamentals of Engineering Design	
	<i>or</i>	
CSC	215/Computer Science I	1 course unit
ENG	095/Introduction to Engineering	0 course unit
ENG	091/Engineering Seminar I	0 course unit
FSP	First Seminar (Social Sciences)*	1 course unit
MAT	127/Calculus A	1 course unit
PHY	201/General Physics I	1 course unit

*By advisement only.

Spring

CSC	215/Computer Science I	
	<i>or</i>	
ENG	142/Fundamentals of Engineering Design	1 course unit
ENG	092/Engineering Seminar II	0 course unit
MAT	128/Calculus B	1 course unit
PHY	202/General Physics II	1 course unit
WRI	102/Academic Writing (if not exempted)	(1 course unit)
	Liberal Learning Elective	1 course unit

Sophomore Year

Fall

CIV	211/Surveying	.5 course unit
CIV	213/CAD Laboratory	.5 course unit
	Liberal Learning Elective	1 course unit
ENG	222/Statics	1 course unit
ENG	272/Advanced Engineering Mathematics I	1 course unit
PHY	120/Introduction to Geology	1 course unit

Spring

CIV	251/Strength of Materials	1 course unit
CIV	343 Engineering Prob and Statistics	.5 course unit
ENG	262/Dynamics	1 course unit
MAT	229/Multivariable Calculus	1 course unit
ECO	101/Principles of Microeconomics	1 course unit

Junior Year**Fall**

ENG 093/Engineering Seminar III	0 course unit
CIV 311/Structural Analysis	1 course unit
CIV 331/Soil Mechanics	1 course unit
CIV 333/Soil Mechanics Laboratory	.5 course unit
CIV 361/Fluid Mechanics	1 course unit
CIV 411/Transportation Engineering	1 course unit

Spring

ENG 094/Engineering Seminar IV	0 course unit
CIV 372 Construction Plan & Est.	1 course unit
CIV 351/Structural Steel Design	1 course unit
CIV 363/Fluid Measurement Laboratory	.5 course unit
CIV 444/Intro to Finite Element	.5 course unit
CIV 385/Hydraulic Engineering and Hydrology	1 course unit
CIV 431/Foundation Engineering	1 course unit

Senior Year**Fall**

CIV 451/Civil Eng Econ and Mng	1 course unit
ENG 099/Senior Professional Seminar	0 course unit
CIV 371/Civ Eng. Materials	1 course unit
Civil Engineering Elective*	1 course unit
CIV 421/Reinforced Concrete Design	1 course unit
CIV 495/Senior Project I	.5 course unit
Civil Engineering Elective*	1 course unit

Spring

ENG 098/Fundamentals of Engineering Review	0 course unit
IDS 252/Society, Ethics, and Technology	1 course unit
CIV 496/Senior Project II	.5 course unit
Civil Engineering Elective*	1 course unit
Civil Engineering Elective*	1 course unit
Liberal Learning Elective*	1 course unit

Total course units**39 course units****By advisement only.***Civil Engineering Electives**

CIV 321 Numerical Methods	CIV 381 Environmental Engineering
CIV 441 Structural Steel Design II	CIV 442 Architecturally Informed Structural Design
CIV 443 Foundation Engineering II	CIV 445 Water Resources Engineering
CIV 446 Hydraulic Structure Design	CIV 461 Reinforced Concrete Design II
CIV 471 Transportation Engineering II	CIV 481 Structural Analysis II