CIVIL ENGINEERING
UNDERGRADUATE HANDBOOK

SPRING 2023

The Pennsylvania State University
University Park Campus
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Important News

- Jena Bogovich (jzb6652) started with the department last month as our new Undergraduate Academic Adviser. Her office is located in 219A Sackett. Jena is available to assist with academic planning and timely completion of graduation, as well as other academic concerns and campus referrals. Please schedule an appointment or see her schedule in Starfish: [https://psu.starfishsolutions.com/starfish-ops/instructor/serviceCatalog.html#/connection/387265](https://psu.starfishsolutions.com/starfish-ops/instructor/serviceCatalog.html#/connection/387265). CEE faculty advisers are also available to assist with questions related to CEE technical areas and electives, career planning, research, and graduate school opportunities. You can find your faculty adviser’s contact information in Starfish.

- CE 438W (Construction Engineering Design Capstone) has replaced CE 439W (Geotechnical and Materials Engineering Design Capstone) at the University Park campus. CE 438W is a capstone focused on construction with geotechnical components. The prerequisites for CE 438W are CE 432 and (CE 435 or CE 436). Please plan accordingly if you are planning to take this course in the spring.

- The prerequisites for the Structures Capstone (CE 448W) have changed to Prerequisite: CE 342; Concurrent requisite: CE 341. Please plan accordingly if you are planning to take this course in the spring.

- CE 497 (Energy Use, Climate Change, and Our Engineered Infrastructure) has replaced CE 371 (Water and Wastewater Treatment) in the courses offered at University Park. CE 497 course can be used to fulfill the “2 out of 3 Civil Engineering electives requirement” for Environmental, but an e-petition must be filled (See §3.2.5).

- The prerequisites for several courses are in the process of being updated. Please refer to this handbook for the current prerequisites.
1. Curriculum Updates

1.2 New course offerings

- **CE 397: Construction Cost Estimating.** Methods and procedures for construction project estimating and bidding, including extracting quantities from drawings, classifying work in accordance with specifications, compiling and pricing estimates, preparing bids, and computer applications.
  
  **Technical Area:** Construction
  
  **Pre- or Corequisite:** CE 332
  
  **Typically offered:** Fall and Spring

- **CE 397: Construction Safety and Risk Management.** This course mainly focuses on the study of construction safety and introduces students to OSHA regulations and industry practices related to creating and maintaining safe construction sites. Topics include construction accident prevention, safety information sources, mandatory training, record keeping and maintenance of records, compliance with OSHA worker safety and environmental safety laws inspection procedures, and penalties for lack of conformance to safety laws, weather precautions, emergency planning, and OSHA procedures and regulations. The course also introduces the student to the concepts of risk management and control.
  
  **Technical Area:** Construction
  
  **Prerequisite:** CE 332
  
  **Typically offered:** Fall

- **CE 402: Computing Methods for Civil and Environmental Engineering.** Essential computing methods, implementations, and applications in civil and environmental engineering. Basic programming with Python, scientific and technical visualization, root finding, interpolation and curve fitting, direct and iterative solution of linear equation systems, numerical integration, numerical differentiation, and numerical solution of ordinary differential equations.
  
  **Technical Area:** Relevant to all areas
  
  **Prerequisite:** CMPSC 200 or CMPSC 201 or CMPSC 121 or CMPSC 131; **Concurrent**: MATH 251
  
  **Typically offered:** Fall

- **CE 438W: Construction Engineering Design Capstone.** Geotechnical reports, material specifications, quality control, equipment, estimation, scheduling, design details, excavations, foundations, retaining walls, formwork, and pavements. This course provides an overview of a comprehensive construction project with significant soils work.
  
  **Technical Areas:** Construction, Geotechnical and Materials Engineering
  
  **Prerequisites:** CE 432 and (CE 435 or CE 436)
  
  **Typically offered:** Spring
  
  **Note:** This course replaces **CE 439W: Geotechnical and Materials Engineering Design Capstone, which will no longer be offered at University Park.**

- **CE 497: Construction Equipment and Methods.** Major construction equipment and selected construction methods for civil and structural systems, including appropriate equipment based on operational parameters, principles of construction productivity measurement and analysis, process design, and discrete event simulation.
Technical Area: Construction
Prerequisite: CE 332
Typically offered: Fall

- **CE 497: Business & Legal Aspects in Construction.** This course will introduce the student to basic business principles and the fundamental principles of contracts and their interpretation as they relate to contracting and the construction industry. Knowledge of construction project management is critical in understanding the business and legal aspects in construction.
  
  Technical Area: Construction
  Prerequisite: CE 432 and 7th semester standing
  Typically offered: Spring

- **CE 497: Construction Planning & Scheduling.** Methods and procedures for construction project scheduling, including work breakdown structures, activity duration estimates, scheduling logic, precedence networking, Gantt charts, CPM and PERT techniques, resource scheduling, schedule updating and reduction, and computer applications.
  
  Technical Area: Construction
  Pre- or Corequisite: CE 332 and 6th semester standing
  Typically offered: Fall

- **CE 497: Energy Use, Climate Change, and Our Engineered Infrastructure.** Methods to quantify energy use in understandable units; energy analysis of transportation, homes, and industry; identification and quantification of greenhouse gas emissions; basics of climate change; renewable energy growth; energy storage; and environmental and climate justice.
  
  Technical Area: Environmental
  Prerequisite: None
  Typically offered: Fall and Spring
  
  Notes: This course replaces CE 371: Water and Wastewater Treatment, which will no longer be offered at University Park. This course can be used to fulfill the “2 out of 3 Civil Engineering electives requirement” for Environmental (See §3.2.5).

1.2 Courses no longer offered

CE 371: Water and Wastewater Treatment, CE 439W: Geotechnical and Materials Engineering Design Capstone, and CE 441: Structural Design of Foundations will no longer be offered at the University Park campus.
1.3 New prerequisite changes

The Department of Civil & Environmental Engineering is currently relaxing the prerequisite requirements for several courses to decrease enrollment problems for students. Note that students will need to file a prerequisite override request (in PionPATH) before they can register (instructions in §2.2.1), as the Department’s changes have not yet been implemented in PionPATH.

1.3.1 New changes (not in the Fall 2022 Handbook)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Previously</th>
<th>Now</th>
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<tbody>
<tr>
<td>CE 342</td>
<td>Pre: CE 336 and CE 340</td>
<td>Pre: CE 340; Pre or Co: CE 336</td>
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<tr>
<td>Design of Steel Structures</td>
<td></td>
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<tr>
<td>CE 438W</td>
<td>Pre: CE 432</td>
<td>Pre: CE 432 and (CE 435 or CE 436)</td>
</tr>
<tr>
<td>Construction Engineering Capstone</td>
<td></td>
<td></td>
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<tr>
<td>CE 448W</td>
<td>Pre: CE 342 and CE 441; Pre or Co: ENGL 202C</td>
<td>Pre: CE 342; Pre or Co: CE 341</td>
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<tr>
<td>Advanced Structural Design</td>
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1.3.2 Changes in previous handbook

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<thead>
<tr>
<th>Course Code</th>
<th>Previously</th>
<th>Now</th>
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<tbody>
<tr>
<td>CE 321</td>
<td>Pre: CE 310</td>
<td>Pre or Co: CE 310</td>
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<tr>
<td>Highway Engineering</td>
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<tr>
<td>CE 410</td>
<td>Pre: CE 332 and AE 372</td>
<td>Pre: CE 332 or AE 372</td>
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<td>Sustainable Res. Land Develop.</td>
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<tr>
<td>CE 421W</td>
<td>Pre: CE 321</td>
<td>Pre or Co: CE 321</td>
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<tr>
<td>Transportation Design</td>
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<tr>
<td>CE 422</td>
<td>Pre: 3 credits in probability or statistics</td>
<td>Pre: STAT 401 or IE 424</td>
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<tr>
<td>Transportation Planning</td>
<td></td>
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<tr>
<td>CE 423</td>
<td>Pre: CE 321</td>
<td>Pre or Co: CE 321</td>
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<tr>
<td>Traffic Operations</td>
<td></td>
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<tr>
<td>CE 465W</td>
<td>Pre: CE 461; Pre or Co: CE 462</td>
<td>Pre: CE 461 or CE 462</td>
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<tr>
<td>Water Resources Capstone Course</td>
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</table>
2. Advising Resources

2.1 Important contacts

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jena Bogovich</td>
<td>219A Sackett Building</td>
<td><a href="mailto:jzb6652@psu.edu">jzb6652@psu.edu</a></td>
</tr>
<tr>
<td>Department Adviser</td>
<td>(814) 867-6130</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Academic Planning</td>
</tr>
<tr>
<td></td>
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<td>General education requirements</td>
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<td>Timely completion for graduation</td>
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<td>Academic recovery planning</td>
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<td>Campus referrals</td>
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<td>Academic support, such as time-management, tutoring resources, goal-setting, etc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>University policy/procedures</td>
</tr>
<tr>
<td>Dr. Chris Gorski</td>
<td>231F Sackett Building</td>
<td><a href="mailto:cag981@psu.edu">cag981@psu.edu</a></td>
</tr>
<tr>
<td>Department Coordinater</td>
<td>(814) 865-5673</td>
<td></td>
</tr>
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<td>Course petition requests</td>
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<td></td>
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<td>Return from suspension reviews</td>
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<td>Re-enrollments</td>
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<td>Pre-requisite override requests</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ETM extensions/exceptions</td>
</tr>
<tr>
<td>Brenton Hockenberry</td>
<td>218 Sackett Building</td>
<td><a href="mailto:blh5621@psu.edu">blh5621@psu.edu</a></td>
</tr>
<tr>
<td>Program Assistant</td>
<td>(814) 867-0470</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Troubleshooting graduation requirement issues and course registration issues.</td>
</tr>
<tr>
<td>Faculty Advisers</td>
<td>See Starfish or PionPATH for contact information</td>
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<tr>
<td></td>
<td></td>
<td>General CEE technical questions</td>
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<td>Information and course planning for technical areas/electives</td>
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<td>Career planning, opportunities, and internships</td>
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<td>Research opportunities</td>
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<td></td>
<td></td>
<td>Graduate school information</td>
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2.2 How-to Guides

2.2.1 Register for a course without meeting the prerequisites.

In some cases, a student may need to register for a course if (1) they do not meet all the prerequisite requirements, (2) the prerequisites in PionPATH are outdated (see §1.3), or (3) PionPATH fails to recognize that the student has met the prerequisite requirements. In these cases, a student must submit a prerequisite override request using these steps below. Note that students will not be automatically enrolled if the prerequisite override request is approved. They will still need to enroll in the course after approval.

- Go to the Student Home Base at https://www.PionPATH.psu.edu/
- Click on the “Enrollment” button
- Click request Prerequisite Override from the left-hand menu
- Complete form and submit

A step-by-step guide can be found at https://PionPATHsupport.psu.edu/student-help/ by clicking the “Requesting a Prerequisite Override (doc)” link.

2.2.2 View your Academic Requirements Report.

The best way for students to evaluate their progress towards graduation and determine what courses they need to take is to view their Academic Requirements Report in PionPATH. Academic Requirements can be found by selecting “Degree Planning and Progress” from your student home base and then clicking “My Academic Requirements” on the left-hand navigation bar. Details on how to view and interpret your Academic Requirements Report can be found at https://PionPATHsupport.psu.edu/student-help/ (scroll down to “Running a Degree Audit”).

2.2.3 File an e-petition to have a course appear on a degree audit.

In certain cases, the University Registrar's Academic Requirements Report will not recognize when an eligible course satisfies a degree requirement. In such cases, students will need to file an electronic petition (e-petition) to the College to initiate the approval process. A New Substitution form can be started at https://coursesub.psu.edu/Student/Home.aspx. Common acceptable substitutions include:

- Move “3”: Substitute a course in one of the Knowledge Domains areas of Arts, Humanities, Social and Behavioral Sciences, Natural Sciences, or Health and Wellness for a course in one of the other areas. For example, a student might take three courses in the Arts, and only one course in the Social and Behavioral Sciences. In another example, a student might take two courses in the Natural Sciences and two courses in Health and Wellness; or a student might take two courses in the Natural Sciences and three courses in the Humanities. This substitution is referred to as the Move 3 substitution (previously: 3-6-9).
- World Language Substitution: Students who have earned credit for a level 3 or higher foreign language (e.g. SPAN 003, FR 003, etc.) may use these 3 credits to fulfill 3 credits of GA, GH, or GS. If this substitution is made, this course cannot be the only course in a Knowledge Domain.
• First year seminar: If student attended campus with no first-year seminar (FYS), the student would need to petition one credit that is not used to meet any other graduation requirement for the missing FYS credit.

• EMCH 210 instead of EMCH 211 + EMCH 213: Substitution petition. Due to EMCH 211 (3 cr.) and EMCH 213 (3 cr.) totally 6 credits, and EMCH 210 (5 cr.) being one credit low, the student must identify one additional credit from a course that is not currently being used to meet any other graduation requirement that will be used to make up the missing credits in the petition.

• MATH 250 plus MATH 252 in place of MATH 251.

• IE 424 in place of STAT 401. IE 424 cannot be used as a technical elective.

• ROTC: petition 3 cr. for ME 201 and 3 cr. for GA, GH, or GS; must have 18 credits in the program before petitioning.

• CMPSC 121, CMPSC 131, or ESC 261M instead of CMPSC 200 or 201.

• Technical Electives: petition anything not on the approved list.

• Transfer credits: general transferred credits that do not automatically count as direct transfers.

For course transfers from another university, use the Penn State Transfer Credit Tool (https://public.PionPATH.psu.edu/psc/CSPRD/EMPLOYEE/SA/c/PE_AD077.PE_AD077_TRN_CRD_T.GBL?Page=PE_AD077_MAIN_SRCH&Action=U&). This tool will determine if another course is an exact match for a Penn State course. If so, you will need to ask the other institution to send Penn State documents confirming completion of that class (e.g., an official transcript). When processed, these courses will be automatically included in the correct location in your Academic Requirements Report. If your course is not an exact match, you will need to submit a New Transfer Review form (https://coursesub.psu.edu/Student/Home.aspx).
3. Degree Requirements

Students must earn 127 credits to complete the B.S. degree in Civil Engineering. A complete list of the required courses can be found in the links in §3.1.

3.1 Useful resources

- The entrance to CE major requirements:
  https://bulletins.psu.edu/undergraduate/colleges/engineering/civil-engineering-bs/#howtogetintext

- A complete list of the degree requirements for a B.S. in Civil Engineering:
  https://bulletins.psu.edu/undergraduate/colleges/engineering/civil-engineering-bs/#programrequirementstext

- Instructions on how to access a student’s degree audit:
  https://PionPATHsupport.psu.edu/student-help/ (scroll down to “Degree Audit”).

3.2 Requirements

3.2.1 General Education

The CE program requires that students meet the University’s General Education Requirements. Penn State requires the completion of a minimum of 45 General Education credits. 27 of these credits are automatically fulfilled through current CE requirements:

- MATH 140 & 141 fulfill Quantification (GQ)
- ENGL 15, CAS 100, & ENGL 202C fulfill Writing/Speaking (GWS)
- CHEM 110, PHYS 211 & 212 fulfill Natural Sciences (GN)
- ECON 102 or 104 fulfills Social and Behavioral (GS)

There are 18 additional credits of General Education (Knowledge Domains) students still need to complete. Students have the most flexibility with Arts, Humanities, and Social Sciences (AHS). These 30 credits must include:

- 3 credits of Arts (GA)
- 3 credits of Humanities (GH)
- 3 credits of Health and Wellness (GHW)
- 3 credits of Social and Behavioral (GS)
- 6 credits of Inter-Domain OR Linked Courses in different knowledge domains (e.g. GA, GH, or GS)

Additionally, students must also fulfill a US Cultures (US) requirement (3 credits) and an International Cultures (IL) requirement (3 credits), which is most effectively done by having AHS courses count as both AHS and US or IL.
Students are encouraged to meet with an adviser to assist with general education course selection. Additional details on General Education requirements can be located in the Undergraduate Degree Bulletin. A General Education Planning Tool is also available: https://genedplan.psu.edu/Home/Index

### 3.2.2 C or Better Courses

To fulfill graduation requirements, students must earn a C grade or better in the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>Cornerstone Engineering Design</td>
</tr>
<tr>
<td>EMCH 211</td>
<td>Statics</td>
</tr>
<tr>
<td>EMCH 212</td>
<td>Dynamics</td>
</tr>
<tr>
<td>EMCH 213</td>
<td>Strength of Materials</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus with Analytic Geometry I</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Ordinary and Partial Differential Equations (or MATH 250 + MATH 252)</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
</tr>
<tr>
<td>CAS 100(A or B)</td>
<td>Effective Speech</td>
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<tr>
<td>ENGL 15 (or 30H)</td>
<td>Rhetoric and Composition</td>
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<tr>
<td>CE 310</td>
<td>Surveying</td>
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<td>CE 321</td>
<td>Highway Engineering</td>
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<tr>
<td>CE 332</td>
<td>Professionalism, Economics &amp; Construction Project Delivery</td>
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<td>CE 335</td>
<td>Engineering Mechanics of Soils</td>
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<td>CE 336</td>
<td>Materials Science for Civil Engineers</td>
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<td>CE 340</td>
<td>Structural Analysis</td>
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<tr>
<td>CE 360</td>
<td>Fluid Mechanics</td>
</tr>
<tr>
<td>CE 370</td>
<td>Introduction to Environmental Engineering</td>
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### 3.2.3 Cumulative GPA minimum

A cumulative GPA of 2.00 or better is required for graduation. If the cumulative GPA drops below 2.00, the student may be dropped for poor scholarship. If the student is dropped as a degree candidate, the College of Engineering requires that all deficiencies be removed before they can be re-enrolled in the major. When half of the deficiencies are removed, the student may pursue enrolling in Division of Undergraduate Studies (DUS).

### 3.2.4 Laboratory Requirement

The Civil Engineering curriculum requires that students select one CE lab in addition to the prescribed ones. Students can choose from CE 337 or CE 475 to meet this requirement. For the 4-credit CE 475 course, 1-credit is counted towards this lab requirement and 3-credits are counted towards a technical elective.
3.2.5 Technical Elective Requirements

Students must take 18 credits of technical elective credits, which are courses in CE beyond the core requirements and relevant courses in other departments. Six (6) credits must be earned by taking two courses among the three categories below. The two courses must be taken from different lists categories (i.e., this requirement is commonly referred to as the “2 out of 3 requirement”).

1. Structural Engineering (CE 341, 342, or 447)
2. Water Resource Engineering (CE 461 or 462)
3. Environmental Engineering (CE 473, 475, 476, 479, or 497\(^1\))

The other 12 credits may be taken from any CE 3xx or 4xx courses not being used to meet other curricular requirements as technical electives. Of these 12 credits, at least 3 credits must be a CE course.

Alternatively, any 400-level courses from the following list can be used to meet the technical elective requirement. Students will still need to meet the prerequisites for courses offered in other Departments.

ACS Acoustics
AERSP Aerospace Engineering
AE Architectural Engineering (except AE 401, 402, 403, 404, or 430)
ABE Agricultural and Biological Engineering
BME Biomedical Engineering
CHE Chemical Engineering
CMPEN Computer Engineering
CMPSC Computer Science
CO-OP Complete 1 credit each of ENGR 295A/I, 395A/I, 495A/I
CSE Computer Science and Engineering
ECON Economics
EDSGN Engineering Design
EE Electrical Engineering
EGEE Energy and Geo-Environmental Engineering
EMCH Engineering Mechanics
EME Energy and Mineral Engineering
ENGR Engineering
ENVE Environmental Engineering
ENVSE Environmental Systems
ERM Environmental Resource Management
ESC Engineering Science
FSC Fuel Science
GEOG Geography
GEOSC Geosciences
IE Industrial Engineering (except IE 424)

\(^1\) Students may use the CE 497: Energy Use, Climate Change, and Our Engineered Infrastructure to fulfil this requirement, but they must file an e-petition to have it count.
<table>
<thead>
<tr>
<th>Code</th>
<th>Program</th>
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<td>MATSC</td>
<td>Material Science and Engineering</td>
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<td>METEO</td>
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<td>Nuclear Engineering</td>
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<td>PNG</td>
<td>Petroleum and Natural Gas Engineering</td>
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<tr>
<td>STAT</td>
<td>Statistics (except STAT 401)</td>
</tr>
<tr>
<td>SUR</td>
<td>Surveying</td>
</tr>
</tbody>
</table>

Requests for other courses to count as a technical elective, outside of those listed below, will be considered by the Department Undergraduate Coordinator via an academic petition submitted through the University's Course Substitution Request System. The petition request must demonstrate the technical nature and a supporting connection to the department curriculum for the requested substitute course. Approval must be granted prior to scheduling the course.
3.3 Recommended Technical Electives by Technical Area

3.3.1 General Civil Engineering Education

CE 341: Design of Concrete Structures  
Prereq: CE 340; Co- or Prereq: CE 336  
Reg. Offering: Spring

CE 410: Sustainable Residential Land Development  
Prereq: CE 332 or AE 372  
Reg. Offering: Fall

CE 432: Construction Project Management  
Prereq: CE 332  
Reg. Offering: Fall

CE 461: Water Resource Engineering  
Prereq: CE 360  
Reg. Offering: Fall and Spring

CE 497: Energy Use, Climate Change, and Infrastructure  
Prereq: CHEM 110; MATH 111 or 141  
Reg. Offering: Fall and Spring

EDSGN 468: Engineering Design and Analysis with CAD  
Prereq: EMCH 210 or 211

ENGR 405: Project Management for Professionals  
Prereq: 4th semester standing

ENGR 408: Leadership Principles  
Prereq: 5th semester standing

3.3.2 Construction Engineering Focus

Prereq: CMPSC 121 or 131 or 200 or 201; Co- or Prereq: MATH 251  
Reg. Offering: Fall

CE 397: Construction Cost Estimating  
Co- or Prereq: CE 332  
Reg. Offering: Fall and Spring

CE 397: Construction Safety and Risk Management  
Co- or Prereq: CE 332 and 5th sem. standing  
Reg. Offering: Fall

CE 432: Construction Project Management  
Prereq: CE 332  
Reg. Offering: Fall

CE 497: Construction Equipment and Methods  
Prereq: CE 332  
Reg. Offering: Fall

CE 497: Business & Legal Aspects in Construction  
Prereq: CE 432 and 7th sem. standing
CE 497: Construction Planning & Scheduling  
Prereq: CE 332 and 6th sem. standing
Reg. Offering: Spring

3.3.3 Environmental Engineering Focus

Prereq: CMPSC 121 or 131 or 200 or 201; Co- or Prereq: MATH 251
Reg. Offering: Fall

CE 473: Ecological Design on Regenerative Aquatic Systems  
Prereq: CE 370
Reg. Offering: Fall

CE 475: Water Quality Chemistry  
Prereq: CE 370
Reg. Offering: Fall

CE 476: Solid and Hazardous Wastes  
Prereq: CE 370
Reg. Offering: Spring

CE 479: Environmental Microbiology for Engineers  
Prereq: CE 370
Reg. Offering: Fall

ERM 448: Rural Road Ecology and Maintenance  
Prerequisites: MATH 22 and MATH 26; or MATH 41; or MATH 110 or MATH 140
Co- or Prereq: ASM 327 or BE 307 or CE 335 or CE 370 or FOR 308 or FOR 470

BE 467: Design of Stormwater and Erosion Control Facilities  
Prereq: BE 307 or CE 461
Reg. Offering: Fall

BE 477: Land-Based Waste Disposal  
Prereq: BE 307 or CE 461

STAT 484: The R Statistical Programming Language  
Prereq: 3 credits of statistics

STAT 485: Intermediate R Statistical Programming Language  
Co- or prereq: STAT 484
### 3.3.4 Geotechnical and Materials Engineering Focus

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
<th>Corequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 434</td>
<td>Geotechnical Engineering Design</td>
<td>Prereq: CE 335</td>
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<tr>
<td></td>
<td></td>
<td>Reg. Offering: Spring</td>
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<tr>
<td>CE 435</td>
<td>Foundation Engineering</td>
<td>Prereq: CE 335</td>
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<td>Reg. Offering: Fall</td>
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<tr>
<td>CE 436</td>
<td>Construction Engineering Materials</td>
<td>Prereq: CE 336 and (STAT 401 or IE 424)</td>
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<td>Reg. Offering: Fall</td>
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<tr>
<td>CE 437</td>
<td>Engineering Materials for Sustainability</td>
<td>Prereq: CE 336</td>
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<td>Reg. Offering: Spring</td>
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</tbody>
</table>

### 3.3.5 Structural Engineering Focus

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
<th>Corequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 341</td>
<td>Design of Concrete Structures</td>
<td>Prereq: CE 340; Co- or Prereq: CE 336</td>
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<td>Reg. Offering: Spring</td>
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<tr>
<td>CE 342</td>
<td>Design of Steel Structures</td>
<td>Prereq: CE 340; Co- or Prereq: CE 336</td>
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<td>Reg. Offering: Fall</td>
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<tr>
<td>CE 402</td>
<td>Computing Methods for Civil and Environ. Engr.</td>
<td>Prereq: CMPSC 121 or 131 or 200 or 201;</td>
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<td></td>
<td></td>
<td>Co- or Prereq: MATH 251</td>
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<td>Reg. Offering: Fall</td>
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<tr>
<td>CE 447</td>
<td>Structural Analysis by Matrix Methods</td>
<td>Prereq: CE 340</td>
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<td>Reg. Offering: Fall</td>
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<tr>
<td>AE 431</td>
<td>Advanced Concrete Design for Buildings</td>
<td>Prereq: AE 402 and AE 430 (generally CE 340 and 341 are allowed substitutes)</td>
<td></td>
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<tr>
<td>AE 432</td>
<td>Design of Masonry Structures</td>
<td>Prereq: AE 402 or CE 341</td>
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</tbody>
</table>

### 3.3.6 Transportation Engineering Focus

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
<th>Corequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 422</td>
<td>Transportation Planning</td>
<td>Prereq: STAT 401 or IE 424</td>
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<td></td>
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<td>Reg. Offering: Fall</td>
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<tr>
<td>CE 423</td>
<td>Traffic Operations</td>
<td>Co- or prereq: CE 321</td>
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<td>Reg. Offering: Fall</td>
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<tr>
<td>CE 521</td>
<td>Transportation Networks and Systems Analysis</td>
<td>Co- or prereq: 3 credits of comp. sci.</td>
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<tr>
<td>CE 523</td>
<td>Analysis of Transportation Demand</td>
<td>Prereq: STAT 401 or IE 424</td>
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<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Prerequisites</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>CE 525:</td>
<td>Transportation Operations</td>
<td>Prereq: CE 423</td>
<td></td>
</tr>
<tr>
<td>CE 526:</td>
<td>Highway and Street Design</td>
<td>Prereq: CE 421</td>
<td></td>
</tr>
<tr>
<td>CE 528:</td>
<td>Transportation Safety Analysis</td>
<td>Prereq: STAT 401 or IE 424</td>
<td></td>
</tr>
</tbody>
</table>

### 3.3.7 Water Resources Engineering Focus

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 402:</td>
<td>Computing Methods for Civil and Environ. Engr.</td>
<td>Prereq: CMPSC 121 or 131 or 200 or 201; Co- or Prereq: MATH 251</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reg. Offering: Fall</td>
</tr>
<tr>
<td>CE 461:</td>
<td>Water Resource Engineering</td>
<td>Prereq: CE 360</td>
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<tr>
<td></td>
<td></td>
<td>Reg. Offering: Fall and Spring</td>
</tr>
<tr>
<td>CE 462:</td>
<td>Open Channel Hydraulics</td>
<td>Prereq: CE 360</td>
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<tr>
<td></td>
<td></td>
<td>Reg. Offering: Fall and Spring</td>
</tr>
<tr>
<td>BE 467:</td>
<td>Design of Stormwater and Erosion Control Facilities</td>
<td>Prereq: BE 307 or CE 461</td>
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<tr>
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<td></td>
<td>Reg. Offering: Fall</td>
</tr>
<tr>
<td>ERM 447:</td>
<td>Stream Restoration</td>
<td>Prereq: ASM 327 or BE 307 or CE 360 or CE 370</td>
</tr>
<tr>
<td>ERM 448:</td>
<td>Rural Road Ecology and Maintenance</td>
<td>Prereq: MATH 22 and MATH 26; or MATH 41; or MATH 110 or MATH 140</td>
</tr>
</tbody>
</table>
### 3.4 Generic Civil Engineering 3rd and 4th year course plan

Courses that span two semesters can be taken in either semester.

<table>
<thead>
<tr>
<th>Prerequisites</th>
<th>Fall, 3rd Year</th>
<th>Spring, 3rd Year</th>
<th>Fall, 4th Year</th>
<th>Spring, 4th Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDSGN 100</td>
<td>CE 310 Surveying, 3 cr.</td>
<td>CE 321 Highway Engineering, 3 cr.</td>
<td>CE 4XXW Capstone, 3 cr.</td>
<td>CE Elective 3 cr.</td>
</tr>
<tr>
<td>MATH 141</td>
<td>CE 370 Introduction to Environmental Engineering, 3 cr.</td>
<td>CE Elective 3 cr.</td>
<td>CE Elective 3 cr.</td>
<td></td>
</tr>
<tr>
<td>CHEM 110</td>
<td>CE 335 Soil Mechanics, 3 cr.</td>
<td>Technical Elective 3 cr.</td>
<td>Technical Elective 3 cr.</td>
<td></td>
</tr>
<tr>
<td>GEOSC 001</td>
<td>CE 336 Material Science for Civil Engineers, 3 cr.</td>
<td>ENGL: 202C Technical Writing, 3 cr.</td>
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</tr>
<tr>
<td>STAT 401 or IE 424</td>
<td>CE 340 Structural Analysis, 3 cr.</td>
<td>Complete any remaining general education requirements</td>
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</tr>
<tr>
<td>EMCH 213 or EMCH 210</td>
<td>CE 360 Fluid Mechanics, 3 cr.</td>
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<tr>
<td>EMCH 212</td>
<td>CE 332 CE 332: Professionalism, Economics &amp; Construction Project Delivery, 3 cr.</td>
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</tr>
</tbody>
</table>

* Solid black arrows indicate prerequisite courses.
* Dashed orange arrows indicate courses that are pre- or corequisites.
* Courses that span two semesters can be taken in either semester.
* * If students take CE 475 (Water Quality Chemistry, 4 credits), 1 credit may replace CE 337, and 3 credits of CE 475 lecture may count as a CE elective.
3.5 CE Capstone courses.

The department of Civil Engineering at the University Park campus currently offers five capstone courses (denoted with a “W” for writing intensive). *Capstone courses are only offered in the Spring Semester at the University Park campus.*

- **CE 421W: Transportation Design**; Corequisite: CE 321 (offered in Fall and Spring)

  **Transportation Engineering Capstone Path**

  - **Fall, 3rd Year**
    - CE 310: Surveying, 3 cr.
  - **Spring, 3rd Year**
    - CE 321: Highway Engineering, 3 cr.
    - CE 421W: Transportation Design, 3 cr.
  - **Fall, 4th Year**
    - CE 421W: Transportation Design, 3 cr.
  - **Spring, 4th Year**
    - CE 421W: Transportation Design, 3 cr.

  Dashed arrows indicate concurrent requisites.

- **CE 438W: Construction Engineering Capstone Design**; Prerequisites: CE 432 (offered in Fall) and (CE 435 (offered in Fall) or CE 436 (offered in Fall)).

  **Construction, Geotechnical, and Materials Engineering Capstone Paths**

  - **Fall, 3rd Year**
    - CE 332: CE 332: Professionalism, Economics & Construction Project Delivery, 3 cr.
  - **Spring, 3rd Year**
    - CE 332: CE 332: Professionalism, Economics & Construction Project Delivery, 3 cr.
    - CE 432: Construction Project Management, 3 cr.
    - CE 336: Material Science for Civil Engineers, 3 cr.
  - **Fall, 4th Year**
    - CE 336: Material Science for Civil Engineers, 3 cr.
    - CE 435: Foundation Engineering, 3 cr.
  - **Spring, 4th Year**
    - CE 438W: Construction Engineering Capstone Design, 3 cr.
    - CE 438W: Construction Engineering Capstone Design, 3 cr.

  Solid arrows indicate prerequisite courses.
• **CE 448W: Advanced Structural Design;** Prerequisite: CE 342 (offered in Fall); Pre- or Corequisite: CE 341 (offered in the Spring semester).

**Structural Engineering Capstone Path**

<table>
<thead>
<tr>
<th>Fall, 3rd Year</th>
<th>Spring, 3rd Year</th>
<th>Fall, 4th Year</th>
<th>Spring, 4th Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 340</td>
<td></td>
<td>CE 342</td>
<td>CE 448W</td>
</tr>
<tr>
<td>Structural Analysis, 3 cr.</td>
<td></td>
<td>Design of Steel Structures, 3 cr.</td>
<td>Advanced Structural Design, 3 cr.</td>
</tr>
<tr>
<td>CE 336</td>
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<tr>
<td>Material Science for Civil Engineers, 3 cr.</td>
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</tbody>
</table>

Solid arrows indicate prerequisite courses.
Dashed arrows indicate concurrent requisites.

• **CE 465W: Water Resources Capstone Design;** Prerequisite: CE 461 (offered Fall and Spring) or CE 462 (offered Fall and Spring).

**Water Resource Engineering Capstone Path**

<table>
<thead>
<tr>
<th>Fall, 3rd Year</th>
<th>Spring, 3rd Year</th>
<th>Fall, 4th Year</th>
<th>Spring, 4th Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 360</td>
<td></td>
<td></td>
<td>CE 465W</td>
</tr>
<tr>
<td>Fluid Mechanics, 3 cr.</td>
<td></td>
<td></td>
<td>Water Resource Capstone Design, 3 cr.</td>
</tr>
<tr>
<td>CE 461</td>
<td></td>
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<td>OR</td>
</tr>
<tr>
<td>Water Resource Engineering, 3 cr.</td>
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</tr>
<tr>
<td>CE 462</td>
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<tr>
<td>Open Channel Hydraulics, 3 cr.</td>
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</table>

OR

• **CE 472W: Environmental Engineering Capstone Design;** Prerequisite: CE 370 (offered Fall and Spring).

**Environmental Engineering Capstone Path**

<table>
<thead>
<tr>
<th>Fall, 3rd Year</th>
<th>Spring, 3rd Year</th>
<th>Fall, 4th Year</th>
<th>Spring, 4th Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 370</td>
<td></td>
<td></td>
<td>CE 472W</td>
</tr>
</tbody>
</table>
4. CE Course Offerings and Prerequisites

Below is a complete list of the permanent CE courses currently offered at the University Park campus. Changes to prerequisites and corequisites that do not yet appear in PionPATH are shown in blue.

4.1 Core required CE courses (C or Better grade required, except CE 337).

**CE 310**  SURVEYING (3) – Fundamental surveying measurements, traverse computations, coordinate geometry, mapping, GPS and GIS, circular and parabolic curves, earthwork, boundary surveys, CAD applications.
Prereqs:  EDSGN 100, MATH 141
Reg. Offering:  Fall and Spring

**CE 321**  HIGHWAY ENGINEERING (3) – Highway engineering principles; vehicle and driver characteristics; geometric and pavement design; traffic engineering; capacity and analysis and signal timing.
Pre- or Coreq:  CE 310
Reg. Offering:  Fall and Spring

**CE 332**  PROFESSIONALISM, ECONOMICS & CONSTRUCTION PROJECT DELIVERY (3) – Introduction to the engineering management process; engineering economics; construction project delivery systems; contract documents; preliminary cost estimating; ethics; and professional practice.
Prereq:  None
Reg. Offering:  Fall and Spring

**CE 335**  ENGINEERING MECHANICS OF SOILS (3) – Soil compositions, classification, subsurface exploration, groundwater flow, stress analysis, compaction, soil behavior, consolidation, and shear strength.
Prereq:  EMCH 213 or EMCH 210; Coreq: GEOSC 001
Reg. Offering:  Fall and Spring

**CE 336**  MATERIALS SCIENCE FOR CIVIL ENGINEERS (3) – Introduction to civil engineering materials; their structure and behavior; relationship between structure and behavior.
Prereq:  EMCH 213 or EMCH 210; Coreq: STAT 401 or IE 424
Reg. Offering:  Fall and Spring

**CE 337**  CIVIL ENGINEERING MATERIALS LAB (1) – Materials: soils, aggregates, concrete, steel, wood and polymers. (Note this course is required but does not require a C or better grade.)
Pre- or Coreq:  CE 335 or CE 336
Reg. Offering:  Fall and Spring
CE 340  STRUCTURAL ANALYSIS (3) – Analysis of statically determinate and indeterminate trusses, beams, and frames; reactions; axial forces; shears; moments; deflections; introduction to influence lines.
Prereq:  EMCH 213 or EMCH 210
Reg. Offering:  Fall and Spring

CE 360  FLUID MECHANICS (3) – Mechanics of fluids; flow in conduits and around bodies; friction and energy loss; fluid measurements.
Prereq:  EMCH 212
Reg. Offering:  Fall and Spring

CE 370  INTRODUCTION TO ENVIRONMENTAL ENGINEERING (3) – Nature and scope of environmental issues; air, water, land impacts; fundamentals and processes of pollution control, drinking water and wastewater treatment.
Prereqs:  CHEM 110; MATH 111 or MATH 141
Reg. Offering:  Fall and Spring

4.2 Additional CE courses

4.2.1 General Civil Engineering courses (relevant to all areas)

CE 402  COMPUTING METHODS FOR CIVIL AND ENVIRONMENTAL ENGINEERING. Essential computing methods, implementations, and applications in civil and environmental engineering. Basic programming with Python, scientific and technical visualization, root finding, interpolation and curve fitting, direct and iterative solution of linear equation systems, numerical integration, numerical differentiation, and numerical solution of ordinary differential equations.
Prereq:  CMPSC 200 or CMPSC 201 or CMPSC 121 or CMPSC 131; Coreq: MATH 251
Reg. Offering:  Fall

CE 410  SUSTAINABLE RESIDENTIAL LAND DEVELOPMENT (3) – Residential land development design process including conservation and green design approaches; site assessment; grading and earthwork; utility design and layout; and stormwater management.
Prereq:  CE 332 or AE 372
Reg. Offering:  Fall

CE 411  RESIDENTIAL CONSTRUCTION DESIGN PROJECT (1) – Interdisciplinary teams will develop a complete design and investment package for a real life new residential or real estate development.
Prereq:  fifth semester standing or higher
Reg. Offering:  Fall
4.2.2 Construction Engineering Courses

CE 432  CONSTRUCTION PROJECT MANAGEMENT (3) – Fundamentals of project management, construction scheduling using the CPM technique, construction project pre-planning, and control of quality, safety, and costs.
Prereq: CE 332
Reg. Offering: Fall

CE 438W  CONSTRUCTION ENGINEERING DESIGN CAPSTONE (3). Geotechnical reports, material specifications, quality control, equipment, estimation, scheduling, design details, excavations, foundations, retaining walls, formwork, and pavements. This course provides an overview of a comprehensive construction project with significant soils work.
Prereq: CE 432 and (CE 435 or CE 436)
Reg. Offering: Spring

4.2.3 Environmental Engineering Courses

CE 472W  ENVIRONMENTAL ENGINEERING CAPSTONE DESIGN (3) – Principles and design of unit operations for water; domestic and industrial wastewater treatment, equipment selection and application.
Prereq: CE 370
Reg. Offering: Spring

CE 473  ECOLOGICAL DESIGN OF REGENERATIVE AQUATIC SYSTEMS (3) – This course utilizes fundamental ecological principles to design: ecological wastewater treatment systems; constructed wetlands for mine water treatment; and regenerative aquaponic systems with an emphasis on sustainable development at the water-energy-food nexus.
Prereq: CE 370
Reg. Offering: Fall

CE 475  WATER QUALITY CHEMISTRY (4) – Chemistry applicable to the understanding and analysis of water quality, pollution and treatment.
Prereq: CE 370
Reg. Offering: Spring

CE 476  SOLID AND HAZARDOUS WASTES (3) – This course covers three main topics: 1) municipal solid waste handling and disposal (including landfill-gas-to-energy, direct waste-to-energy, and recycling options); 2) the fate and transport of hazardous wastes in the environment; and 3) the design of appropriate technologies for the remediation of contaminated soil and groundwater.
Prereq: CE 370
Reg. Offering: Spring
CE 479  ENVIRONMENTAL MICROBIOLOGY FOR ENGINEERS (3) – Introductory microbiology for engineers; microbe structure, function, and diversity; environmental ecosystems; diagnostic labs.
Prereq:  CE 370
Reg. Offering: Fall

4.2.4 Geotechnical and Materials Courses

CE 337  CIVIL ENGINEERING MATERIALS LAB (1) – Materials: soils, aggregates, concrete, steel, wood and polymers.
Pre- or Coreq:  CE 335 or CE 336
Reg. Offering: Fall and Spring

CE 434  GEOTECHNICAL ENGINEERING DESIGN (3) – Fundamental engineering geology, subsurface exploration including geophysical techniques, principles of shallow and deep foundation designs, slope stability, geosynthetics design, groundwater and drainage, and geotechnical earthquake engineering.
Prereq:  CE 335
Reg. Offering: Spring

CE 435  FOUNDATION ENGINEERING (3) – Bearing capacity, settlement, and structural design of shallow foundations; lateral earth pressure; design of retaining and sheet-pile walls; and an introduction to deep foundations.
Prereq:  CE 335
Reg. Offering: Fall

CE 436  CONSTRUCTION ENGINEERING MATERIALS (3) – Design, production, application, specification, and quality control of construction materials unique to civil engineering.
Prereqs:  CE 336 and (STAT 401 or IE 424)
Reg. Offering: Fall

CE 437  ENGINEERING MATERIALS FOR SUSTAINABILITY (3) – Environmental impact of materials; life-cycle assessment; material selection to optimize performance; design, evaluation, and production of green construction materials.
Prereq:  CE 336
Reg. Offering: Spring
CE 438W CONSTRUCTION ENGINEERING DESIGN CAPSTONE. Geotechnical reports, material specifications, quality control, equipment, estimation, scheduling, design details, excavations, foundations, retaining walls, formwork, and pavements. This course provides an overview of a comprehensive construction project with significant soils work.
Prereq: CE 432 and (CE 435 or CE 436)
Reg. Offering: Spring

4.2.5 Structural Engineering Courses

CE 341 DESIGN OF CONCRETE STRUCTURES (3) – Design of reinforced concrete beams, slabs, and columns with emphasis on ultimate-strength methods; pre-stressed concrete; buildings and bridge applications.
Prereq: CE 340; Co- or Prereq: CE 336
Reg. Offering: Spring

CE 342 DESIGN OF STEEL STRUCTURES (3) – Design and analysis of structural steel tension members, beams, columns, beam-columns, composite beams, and connections.
Prereq: CE 340; Co- or Prereq: CE 336
Reg. Offering: Fall

CE 447 STRUCTURAL ANALYSIS BY MATRIX METHODS (3) – Analysis of truss and frame structures using flexibility and stiffness methods of matrix analysis; computer applications.
Prereq: CE 340
Reg. Offering: Fall

CE 448W ADVANCED STRUCTURAL DESIGN (3) – Wind, snow, seismic, bridge loads, and building design using steel, concrete and pre-stressed concrete; advanced steel connections. Capstone project; computer applications.
Prereq: CE 342; Co- or prerreq: CE 341
Reg. Offering: Spring

4.2.6 Transportation Engineering Courses

CE 421W TRANSPORTATION DESIGN (3) – Design of streets and highway facilities; emphasis on geometric elements, intersections and interchanges, roadway drainage, and pavement design procedures.
Pre- or Coreq: CE 321
Reg. Offering: Spring

CE 422 TRANSPORTATION PLANNING (3) – Transportation systems planning, modeling, and management; data collection, analysis, and forecasting.
Pre- or Coreq: STAT 401 or IE 424
Reg. Offering: Fall
CE 423  TRAFFIC OPERATIONS (3) – The highway capacity manual, concepts and analyses, freeway operations, signalized and unsignalized intersections, signal coordination, traffic impact studies.
Pre- or Coreq:  CE 321
Reg. Offering:  Fall

4.2.7 Water Resource Engineering Courses

CE 461  WATER-RESOURCE ENGINEERING (3) – Qualitative and quantitative description of the hydrologic cycle, flood and drought frequency analysis, climate and land use change impacts, risk analysis and uncertainty, water resource management at regional, national and global scale.
Prereq:  CE 360
Reg. Offering:  Fall and Spring

CE 462  OPEN CHANNEL HYDRAULICS (3) – Open channel hydraulics for free surface flow in rivers, canals, steep chutes, transitions, and through bridges and culverts.
Prereq:  CE 360
Reg. Offering:  Fall and Spring

CE 465W  WATER RESOURCES CAPSTONE DESIGN (3) – Hydraulic design of river structures and open channels including super critical and spatially varied flow; hydrologic/hydraulic computer modeling; design project.
Prereq:  CE 461 or CE 462
Reg. Offering:  Spring
5. Opportunities and Student Activities

**American Concrete Institute (ACI)**

The ACI (American Concrete Institute) student club is open to any student interested in concrete structures or materials. Along with the local ACI Pittsburg Chapter, the Chapter organizes ACI Grade I Certification training and promotes advanced concrete knowledge. Student teams have the resources to travel to the semi-annual Concrete Conventions and participate in student competitions. The ACI advisor is Dr. Aleksandra Radlińska.

**American Society of Civil Engineers (ASCE)**

ASCE is the professional civil engineering society, with a student chapter open to freshmen and sophomores interested in the organization and all students enrolled in civil engineering. This organization was established to expand the college experience for students in civil engineering and aid in establishing the professional contacts that are so valuable to the practicing engineer. Student chapter members hold offices, secure speakers for chapter meetings, visit engineering works, attend professional meetings, present papers, and keep abreast of professional activities through ASCE publications. These activities stimulate early professional consciousness and prepare students for entry into the profession and into the American Society of Civil Engineers. The ASCE faculty advisor is Dr. Aleksandra Radlińska and the faculty practitioner advisor is Mr. Thomas Skibinski, P.E.

Chapter activities include concrete canoe races and steel bridge competitions. How do you make concrete float? Join the committee that designs the concrete mix used in making the canoe, and then designs, builds, and races the canoe. Does constructing a bridge over imaginary water interest you? Join the steel bridge team to design, construct and test the load of 2,500 pounds on the bridge. The Concrete Canoe team advisor is Mr. Thomas Skibinski, and the Steel Bridge team advisors are Mr. Thomas Skibinski and Dr. Pinlei Chen.

The Central Pennsylvania Section of ASCE offers $1,000 scholarships to civil engineering students. Competition is open to students who are enrolled at Penn State, Bucknell or another school with permanent residence within the boundaries of the Central Pennsylvania Section. The application can be downloaded from [http://www.asce-pa.org/members_scholarships.html](http://www.asce-pa.org/members_scholarships.html).

For further information concerning the Penn State chapter please visit the Jeremy Herbstritt Student Lounge, 105 Sackett, or the Penn State ASCE web page [http://www.pennstateasce.com/](http://www.pennstateasce.com/).

**CEE Alumni Mentoring Program**

The program connects CEE Alumni mentors with current students on a one-to-one relationship for guidance, information, and networking related to the student’s professional development. Registration required to match an Alumni with a student: [http://www.cee.psu.edu/alumni/mentor/registering.aspx](http://www.cee.psu.edu/alumni/mentor/registering.aspx).
Chi Epsilon
Chi Epsilon is the national honor society for juniors and seniors enrolled in civil engineering. Membership is by invitation and is based on scholarship, character, practicality, and sociability. The purpose of this organization is to recognize and develop the fundamental characteristics of the successful civil engineer. The faculty advisor is Dr. Jay Regan.

Constructors Association of Western Pennsylvania (CAWP) Construction Cost Estimating Competition
Please contact Mr. Thomas Skibinski, P.E. (tjs36@psu.edu) for details.

Earthquake Engineering Research Institute (EERI-PSU)
The national chapter of the EERI (http://www.eeri.org/site/) is a “nonprofit, technical society of engineers, geoscientists, architects, planners, public officials and social scientists” with the aim of reducing earthquake risk by advancing science, improving the understanding of the impact of earthquakes on society, and advocating comprehensive and realistic measures for reducing the harmful effects of earthquakes. Dr. Gordon Warn is faculty advisor.

Engineering Cooperative Education
Students can participate in the College of Engineering’s Cooperative Education program beginning with the junior year. By alternating semesters of work and study, a year of work experience is accrued. Using the summer sessions before the junior year and during the senior years, it requires four and one-half years to earn a Bachelor of Science degree with a Certificate in Engineering Cooperative Education. Completion of three work assignments and a report for each assignment is required for certification. Continuing participation in the program is contingent upon satisfactory academic and work performance.

To obtain additional information on the Co-op program, students are encouraged to attend one of the workshops presented by the Engineering Career Resources & Employer Relations Office. The Engineering Career Resources & Employer Relations Office is located in 117 Hammond Building. (http://www.engr.psu.edu/career). The cooperative education coordinator for our department is Dr. William Burgos. The coordinator will also grade the co-op reports.

Engineers for a Sustainable World
Engineers for a Sustainable World (ESW) is an international nonprofit network of students and professionals united by their shared vision for technical sustainability. By working with ESW, our members gain both the technical and professional skills to tackle the world’s biggest problems by participating in the design, construction, and implementation of solutions for their local community. The Penn State student chapter advisors are Dr. Rachel Brennan and Dr. John Gershenson.
Engineers in Action

Engineers in Action is a service organization that strives to bring together students of all backgrounds to revitalize communities by designing and constructing pedestrian footbridges over impassable rivers. During the rainy seasons, many communities do not have safe means to cross flooding rivers separating them from their markets, healthcare, and education. Isolation caused by impassable rivers is a root cause of poverty all over the world which is why EIA’s mission is to empower today’s students to become tomorrow’s global leaders by designing and building bridges with under-served communities. The faculty advisor is Mr. Brian Naberezny.

Engineers Without Borders

The national chapter of the EWB-USA (http://www.ewb-usa.org) is an international nonprofit organization that supports community-driven development programs worldwide through the design and implementation of sustainable engineering projects, while fostering responsible leadership. The Penn State student chapter advisor is Dr. Jay Regan.

Institute Of Transportation Engineers (ITE)

ITE is a professional organization of students who are interested in transportation and traffic engineering. A number of meetings are held each year, with representatives of transportation firms and agencies serving as guest speakers. Meetings are posted on the ITE bulletin board on the second floor of Sackett Building. The ITE advisor is Dr. Vikash Gayah.

National Association of Home Builders (NAHB)

The National Association of Home Builders (NAHB) Student Chapter is a focus for students interested in housing, light commercial construction, and development. It provides students with the opportunity to learn more about the housing industry. Students who are in the following majors are eligible for membership in the NAHB Student Chapter: Civil and Environmental Engineering, Architectural Engineering, Architecture, Landscape Architecture and Real Estate. There are a number of benefits, professional, academic, and social, to joining the student chapter. There are a number of scholarships available to students interested in housing and/or residential construction (http://www.engr.psu.edu/ce/divisions/residential/undergraduate_scholarships.html).

Any student interested in becoming an NAHB Student Chapter member should contact Dr. Ali Memari, Hankin Chair of Residential Building Construction or Tracy Dorman in 206 B Sackett Building; 814-865-2341 or tdorman@engr.psu.edu.

Study Abroad

Studying abroad is a great way to gain international experience either with academic credit, internships or service-learning opportunities. For details on programs, applying and other opportunities of studying abroad, visit Global Penn State at https://global.psu.edu/. The faculty advisor is Dr. William Burgos.
6. Summer Course Offerings in Summer 2023

6.1 Summer Session I (May 15 to June 26, 2023)

**CE 321: Highway Engineering**
Highway engineering principles; vehicle and driver characteristics; geometric and pavement design; traffic engineering; capacity and analysis and signal timing. Instructor: Ilgin Guler, sig123@psu.edu

**CE 332: Professionalism, Economics & Construction Project Delivery**
Introduction to the engineering management process; engineering economics; construction project delivery systems; contract documents; preliminary cost estimating; ethics; and professional practice. Instructor: Thomas Skibinski, tjs36@psu.edu

**CE 336: Materials Science for Civil Engineers**
Introduction to civil engineering materials: material properties, behavior, and eco-informed material choice. Instructor: Aleksandra Radlinska, azr172@psu.edu

**CE 340: Structural Analysis**
Analysis of statically determinate and indeterminate trusses, beams, and frames; reactions; axial forces; shears; moments; deflections; introduction to influence lines. Instructor: Sayed Soleimani, svs7394@psu.edu

**CE 342: Design of Steel Structures**
Design and analysis of structural steel tension members, beams, columns, beam-columns, composite beams, and connections. Instructor: Sayed Soleimani, svs7394@psu.edu

**CE 360: Fluid Mechanics**
Mechanics of fluids; flow in conduits and around bodies; friction and energy loss; fluid measurements. Instructor: Alfonso Mejia, aim127@psu.edu

**CE 370: Introduction to Environmental Engineering**
Nature and scope of environmental issues; air, water, land impacts; fundamentals and processes of pollution control, drinking water and wastewater treatment. Instructor: Nathaniel Warner, nrw6@psu.edu

6.2 Summer Session II (June 28 to August 11, 2023)

**CE 335: Engineering Mechanics of Soils**
Soil compositions, classification, subsurface exploration, groundwater flow, stress analysis, compaction, soil behavior, consolidation, and shear strength. Instructor: Tong Qiu, tuq1@psu.edu

**CE 476: Solid and Hazardous Wastes**
This course covers three main topics: 1) municipal solid waste handling and disposal (including landfill-gas-to-energy, direct waste-to-energy, and recycling options); 2) the fate and transport of hazardous wastes in the environment; and 3) the design of appropriate technologies for the remediation of contaminated soil and groundwater. Prerequisite: CE 370. Instructor: Rachel Brennan, rab44@psu.edu