CIVIL AND ENVIRONMENTAL ENGINEERING (CEE)

Subject-area course lists indicate courses currently active for offering at the University of Louisville. Not all courses are scheduled in any given academic term. For class offerings in a specific semester, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm).

500-level courses generally are included in both the undergraduate- and graduate-level course listings; however, specific course/section offerings may vary between semesters. Students are responsible for ensuring that they enroll in courses that are applicable to their particular academic programs.

Course Fees
Some courses may carry fees beyond the standard tuition costs to cover additional support or materials. Program-, subject- and course-specific fee information can be found on the Office of the Bursar website (https://louisville.edu/bursar/tuitionfee/university-fees/).

CEE 205. Mechanics I: Statics 3 Units
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): ENGR 101 and PHYS 298.
Description: Apply fundamental concepts of statics to examine forces, equilibrium, friction, centroids and moments of inertia, to analyze and solve engineering problems. Both vector and scalar methodologies are used.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

CEE 254. Mechanics of Solids 3 Units
Term Typically Offered: Fall Only
Prerequisite(s): CEE 205.
Description: Analysis of deformable engineered members subjected to concentric, flexural, torsion, and combined loading. Examination of statically determinate and indeterminate systems to analyze and design engineering structures.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

CEE 255. Mechanics of Materials Laboratory 1 Unit
Term Typically Offered: Fall Only
Corequisite(s): CEE 254.
Description: A materials testing laboratory in which the properties of materials such as wood and steel are evaluated. Performance of tension, compression, shear, bending, and torsion tests on various specimens. Experimental determination of stresses. CEE majors.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

CEE 260. Civil Engineering Field Measurements 2 Units
Term Typically Offered: Fall Only
Prerequisite(s): ENGR 110; restricted to CEE majors.
Corequisite(s): CEE 261.
Description: Focus is on plane surveying, including the use and care of surveying instruments, and laying out engineered facilities. Use of propriety Computer-Aided Engineering software is introduced. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

CEE 261. Civil Engineering Field Measurements Laboratory 1 Unit
Term Typically Offered: Fall Only
Prerequisite(s): Restricted to Civil Engineering Majors.
Corequisite(s): CEE 260.
Description: Practical applications of plane surveying techniques, including the use and care of surveying instruments, and laying out engineered facilities are introduced.
For class offerings for a specific term, refer to the Schedule of Classes (https://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

CEE 288. Civil and Environmental Engineering Cooperative Education Seminar 0 Units
Grading Basis: Pass/Fail
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): CEE 205, CHEM 201, ENGL 101, ENGR 102, ENGR 110, student must be in Good Standing with GPA of 2.25 or higher.
Description: Discussion of the policies and procedures for cooperative education and instruction in self-directed job search techniques, including interviewing skills, resume preparation, and guidelines for the co-op report. This is a prerequisite for each cooperative education term.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

CEE 289. Civil and Environmental Engineering Cooperative Education I 1 Unit
Grading Basis: Pass/Fail
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): CEE 288.
Fee: An additional $300.00 is charged for this course.
Description: Full-time technical work experience related to the student's academic program.
Course Attribute(s): CBL - This course includes Community-Based Learning (CBL). Students will engage in a community experience or project with an external partner in order to enhance understanding and application of academic content.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

CEE 309. Introduction to Environmental Engineering 3 Units
Term Typically Offered: Summer Only
Prerequisite(s): CHEM 201 and PHYS 298.
Description: This course is intended as an introduction to the basic science and engineering principles that are involved in assessment of environmental quality, in understanding environmental processes and in developing solutions to environmental problems.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Units</th>
<th>Term Typically Offered</th>
<th>Prerequisite(s)</th>
<th>Description</th>
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<tbody>
<tr>
<td>CEE 322</td>
<td>Structural Analysis</td>
<td>3</td>
<td>Summer Only</td>
<td>CEE 254</td>
<td>Classical approaches to analysis determinate and indeterminate structures, including trusses, beams, and frames are presented. Different methods are used to determine the internal forces and the deformation of these structural systems. For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</td>
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<tr>
<td>CEE 370</td>
<td>Engineering Hydraulics</td>
<td>3</td>
<td>Spring Only</td>
<td>CEE 254 and ME 206</td>
<td>A study of the fundamental principles of hydraulics, including fluid statics, kinematics, and dynamics. Application of basic concepts and principles to fluid flow through pipes, open channels, turbo machines, and flow measurement. For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</td>
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<tr>
<td>CEE 371</td>
<td>Engineering Hydraulics Lab</td>
<td>1</td>
<td>Spring Only</td>
<td>CEE 370</td>
<td>A hydraulic experimental laboratory in which the static and dynamic properties of fluids are evaluated. Experimental determination of fluid properties, fluid behavior, and the flow dynamics including flowrates and forces. For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</td>
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<tr>
<td>CEE 389</td>
<td>Civil and Environmental Engineering Cooperative Education II</td>
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<td>Grade Basis: Pass/Fail. Term Typically Offered: Fall, Spring, Summer. Prerequisite(s): CEE 289. Fee: An additional $300.00 is charged for this course. Description: Full-time technical work experience related to the student’s academic program. Course Attribute(s): CBL - This course includes Community-Based Learning (CBL). Students will engage in a community experience or project with an external partner in order to enhance understanding and application of academic content. For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</td>
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<tr>
<td>CEE 401</td>
<td>Civil Engineering Professional Practice</td>
<td>2</td>
<td>Fall Only</td>
<td>CEE 254</td>
<td>Professional practices, issues relating to effective communication skills (written and oral) and engineering ethics are emphasized. The course includes simulations and presentations by legal and engineering practitioners. For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</td>
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<tr>
<td>CEE 405</td>
<td>Practicum in Civil and Environmental Engineering Education</td>
<td>1</td>
<td>Fall, Summer</td>
<td>CEE 205, consent of the instructor</td>
<td>A guided learning experience in inquiry-based instructional techniques and best practices in STEM education that includes a field experience as an undergraduate teaching assistant. Permission to enroll required. Note: May be repeated for a maximum of 3 credit hours.</td>
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<tr>
<td>CEE 421</td>
<td>Fundamentals of Concrete Design</td>
<td>3</td>
<td>Spring Only</td>
<td>CEE 254</td>
<td>Introduction to concrete design specifications (ACI); the design of structural systems in concrete, slabs, buildings, and frames. For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</td>
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<tr>
<td>CEE 422</td>
<td>Fundamentals of Steel Design</td>
<td>3</td>
<td>Fall Only</td>
<td>CEE 322</td>
<td>Introduction to the AISC LRFD steel design specification. Design of steel tension members, beams, columns, beam-columns, and connections. For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</td>
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<td>CEE 450</td>
<td>Geomechanics</td>
<td>3</td>
<td>Fall Only</td>
<td>CEE 370, ENVS 301</td>
<td>Application of mechanical principles to the behavior of soil masses. Soil mineralogy; hydraulic behavior; consolidation theory and settlement analyses; shear strength. For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</td>
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<tr>
<td>CEE 451</td>
<td>Geomechanics Laboratory</td>
<td>1</td>
<td>Fall Only</td>
<td>CEE 450</td>
<td>Laboratory measurement of soil properties including index properties, permeability, compressibility, and shear strength. For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</td>
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<td>CEE 452</td>
<td>Foundation Engineering</td>
<td>3</td>
<td>Spring Only</td>
<td>CEE 450</td>
<td>Character of natural soil deposits. Subsurface exploration and testing. Foundation types, limitations. Bearing capacity and settlement analyses. Design of foundations. For class offerings for a specific term, refer to the Schedule of Classes (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</td>
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<td>CEE 460</td>
<td>Transportation Systems Engineering</td>
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<td>CEE 470</td>
<td>Surface Water Hydrology</td>
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<td>CEE 471</td>
<td>Water Supply and Sewerage</td>
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<td>CEE 489</td>
<td>Civil Engineering Cooperative Education III</td>
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<td>CEE 503</td>
<td>Fundamentals of Engineering Exam Review</td>
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<td>CEE 520</td>
<td>Design of Structural Systems</td>
<td>3</td>
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<td>CEE 522</td>
<td>Fundamentals of Prestressed Concrete</td>
<td>3</td>
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<td>CEE 523</td>
<td>Timber Design</td>
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For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)
CPE 524. Bridge Design 3 Units  
Term Typically Offered: Summer Only  
Description: This class offers detailed coverage of engineering basics for the design of short- and medium-span bridges. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)  

CPE 530. Construction Materials 3 Units  
Term Typically Offered: Spring Only  
Prerequisite(s): CPE 254 and CPE 255.  
Description: Properties of construction materials such as cement, concrete, asphalt, and structural elastomers. Design of Portland cement concrete and asphaltic concrete mixes. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)  

CPE 532. Experimental Stress Analysis 3 Units  
Term Typically Offered: Fall, Spring, Summer  
Prerequisite(s): CPE 530.  
Description: Fundamentals of experimental stress analysis, brittle coating, photoelastic coating, and electrical strain gage techniques, strain measurements under static and dynamic loading. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)  

CPE 540. Construction Management 3 Units  
Term Typically Offered: Fall Only  
Description: This course discusses construction management including estimating, bidding, time/cost management, provisions, surety bonds, ownership, and project scheduling. Other topics, such as temporary erosion control and plan & print reading will also be covered.  
Note: This section is restricted to students with a major in the department.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)  

CPE 541. Construction Equipment and Practice 3 Units  
Term Typically Offered: Spring Only  
Description: This course will provide an overview of construction planning and practices rather than construction management. The emphasis will be on the Construction Depth content of Civil Engineering. The topics covered in the course will be guided by the anticipated content of fundamental construction engineering practice and will follow the various chapters of the required textbook.  
Note: This section is restricted to students with a major in the department.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)  

CPE 552. Earth Pressure and Retaining Structures 3 Units  
Term Typically Offered: Fall, Spring, Summer  
Prerequisite(s): CPE 450.  
Description: Earth pressure calculation: theory and practice. Design techniques for retaining walls, reinforced earth and soil nailing. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)  

CPE 553. Advanced Foundation Design 3 Units  
Term Typically Offered:  
Description: This course covers site investigation and subsurface exploration with the purpose of foundation design. Then, the course covers the analysis and design of single piles and group piles considering pile capacity and pile head displacement. At the end, the course covers pile driving analysis to test the integrity of the concrete. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)  

CPE 560. Traffic Engineering 3 Units  
Term Typically Offered: Fall, Spring, Summer  
Prerequisite(s): CPE 460.  
Description: Examines characteristics of the vehicle, the driver, and the traffic stream. Highway and intersection capacity, theory of traffic flow, parking, traffic safety. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)  

CPE 562. Geometric Design of Highways 3 Units  
Term Typically Offered: Fall, Spring, Summer  
Prerequisite(s): CPE 460.  
Description: The concepts of geometric design for rural and urban highways, utilizing proprietary design software are introduced and applied. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)  

CPE 563. GPS Theory and Application 3 Units  
Term Typically Offered: Fall, Spring, Summer  
Prerequisite(s): CPE 460.  
Description: This course is designed to give the student an overview of the use of Global Positioning Systems in surveying and engineering applications. Elements of coordinate systems, map projections, GPS principles of operation, mapping, boundary, and construction surveys will be covered. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)  

CPE 565. GIS Applications to Transportation 3 Units  
Term Typically Offered: Fall, Spring, Summer  
Prerequisite(s): CPE 460.  
Description: Introduces an overview and application of current methods of implementing GIS solutions to highway data analysis and planning studies. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)  

CPE 570. Applied Hydraulics 3 Units  
Term Typically Offered: Fall, Spring, Summer  
Prerequisite(s): CPE 572.  
Description: Application of basic principles of hydraulic engineering to analysis of flow in floodways, through bridge openings, culverts, and spillways. Analysis of stable channel design is also considered. Commonly used computer programs are utilized to design structures in floodways. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)
CEE 571. Applied Hydrology 3 Units
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): CEE 470.
Description: Introduction to hydrologic systems; modeling runoff from watersheds using lumped and distributed methods; stormwater management and design; hydrologic and hydraulic routing including kinematic wave routing; computer rainfall-runoff simulation models. A hydrologic design project will be assigned to all students; special assignments dealing with hydrologic processes will be assigned to MS degree students.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

CEE 572. Open Channel Hydraulics 3 Units
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): CEE 370.
Description: Application of basic principles of hydraulics to open channel flow. Theory and analysis of critical, uniform and gradually varied flow and computer analysis. Select topics in rapidly varied and unsteady flow.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

CEE 573. Groundwater Hydrology 3 Units
Term Typically Offered: Occasionally Offered
Prerequisite(s): CEE 450 and CEE 470.
Description: Fundamental concepts of fluid flow and soil properties; theory of groundwater movement; mechanics of well flow; groundwater contaminant transport.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

CEE 590. Current Topics in Civil Engineering 1-4 Units
Term Typically Offered: Occasionally Offered
Prerequisite(s): Consent of instructor.
Description: An examination of one or more topics in Civil Engineering. Details announced each semester.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)