

# 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 (<http://louisville.edu/bursar/tuitionfee/>).

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### 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. Performances 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 for laying out engineered facilities. Use of proprietary 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 (<http://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>)

<p><b>CEE 322. Structural Analysis</b>  <b>Term Typically Offered:</b> Summer Only  <b>Prerequisite(s):</b> CEE 254.  <b>Description:</b> 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>)</p>	<p><b>3 Units</b></p>	<p><b>CEE 405. Practicum in Civil and Environmental Engineering Education</b>  <b>Term Typically Offered:</b> Fall, Summer  <b>Prerequisite(s):</b> CEE 205, consent of the instructor.  <b>Description:</b> 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.  <b>Note:</b> May be repeated for a maximum of 3 credit hours.            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>)</p>	<p><b>1 Unit</b></p>
<p><b>CEE 370. Engineering Hydraulics</b>  <b>Term Typically Offered:</b> Spring Only  <b>Prerequisite(s):</b> CEE 254 and ME 206.  <b>Description:</b> 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>)</p>	<p><b>3 Units</b></p>	<p><b>CEE 421. Fundamentals of Concrete Design</b>  <b>Term Typically Offered:</b> Spring Only  <b>Prerequisite(s):</b> CEE 322.  <b>Description:</b> 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>)</p>	<p><b>3 Units</b></p>
<p><b>CEE 371. Engineering Hydraulics Lab</b>  <b>Term Typically Offered:</b> Spring Only  <b>Corequisite(s):</b> CEE 370.  <b>Description:</b> 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>)</p>	<p><b>1 Unit</b></p>	<p><b>CEE 422. Fundamentals of Steel Design</b>  <b>Term Typically Offered:</b> Fall Only  <b>Prerequisite(s):</b> CEE 322.  <b>Description:</b> 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>)</p>	<p><b>3 Units</b></p>
<p><b>CEE 389. Civil and Environmental Engineering Cooperative Education II</b>  <b>Grading Basis:</b> Pass/Fail  <b>Term Typically Offered:</b> Fall, Spring, Summer  <b>Prerequisite(s):</b> CEE 289.  <b>Fee:</b> An additional \$300.00 is charged for this course.  <b>Description:</b> Full-time technical work experience related to the student's academic program.  <b>Course Attribute(s):</b> 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>)</p>	<p><b>1 Unit</b></p>	<p><b>CEE 450. Geomechanics</b>  <b>Term Typically Offered:</b> Fall Only  <b>Prerequisite(s):</b> CEE 370, GEOS 301.  <b>Description:</b> 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>)</p>	<p><b>3 Units</b></p>
<p><b>CEE 401. Civil Engineering Professional Practice</b>  <b>Term Typically Offered:</b> Fall Only  <b>Prerequisite(s):</b> Admission to the CEE Department.  <b>Description:</b> 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>)</p>	<p><b>2 Units</b></p>	<p><b>CEE 451. Geomechanics Laboratory</b>  <b>Term Typically Offered:</b> Fall Only  <b>Corequisite(s):</b> CEE 450.  <b>Description:</b> 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>)</p>	<p><b>1 Unit</b></p>
<p><b>CEE 401. Civil Engineering Professional Practice</b>  <b>Term Typically Offered:</b> Fall Only  <b>Prerequisite(s):</b> Admission to the CEE Department.  <b>Description:</b> 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>)</p>	<p><b>2 Units</b></p>	<p><b>CEE 452. Foundation Engineering</b>  <b>Term Typically Offered:</b> Spring Only  <b>Prerequisite(s):</b> CEE 450.  <b>Description:</b> 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>)</p>	<p><b>3 Units</b></p>

<p><b>CEE 460. Transportation Systems Engineering</b> <span style="float: right;"><b>3 Units</b></span>  <b>Term Typically Offered:</b> Spring Only  <b>Prerequisite(s):</b> CEE 260 and first-year professional school standing.  <b>Description:</b> A study of the planning, design, implementation, and evaluation of transportation systems across the modes. Issues of legislation, regulation, and funding are also examined. 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>)</p>	<p><b>CEE 489. Civil Engineering Cooperative Education III</b> <span style="float: right;"><b>1 Unit</b></span>  <b>Grading Basis:</b> Pass/Fail  <b>Term Typically Offered:</b> Fall, Spring, Summer  <b>Prerequisite(s):</b> CEE 288 and CEE 389.  <b>Fee:</b> An additional \$300.00 is charged for this course.  <b>Description:</b> Full-time technical work experience related to the student's academic program.  <b>Course Attribute(s):</b> 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.</p> <p>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>)</p>
<p><b>CEE 470. Surface Water Hydrology</b> <span style="float: right;"><b>3 Units</b></span>  <b>Term Typically Offered:</b> Fall Only  <b>Prerequisite(s):</b> CEE 370.  <b>Description:</b> Hydrologic cycle, rainfall, rainfall abstractions including infiltration theory, and runoff. Unit hydrograph theory and its application in runoff computation from watersheds. Statistical applications in hydrology including frequency analysis, flood routing and hydrologic engineering and design. 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>)</p>	<p><b>CEE 503. Fundamentals of Engineering Exam Review</b> <span style="float: right;"><b>2 Units</b></span>  <b>Grading Basis:</b> Pass/Fail  <b>Term Typically Offered:</b> Fall, Spring, Summer  <b>Prerequisite(s):</b> 4th-year standing.  <b>Description:</b> Review of topics covered on eight-hour NCEES Fundamentals of Engineering examination. Not to be counted towards meeting the requirements for a degree. 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>)</p>
<p><b>CEE 471. Water Supply and Sewerage</b> <span style="float: right;"><b>3 Units</b></span>  <b>Term Typically Offered:</b> Spring Only  <b>Prerequisite(s):</b> CEE 470.  <b>Description:</b> Quantity of water and sewage; collection and distribution of water supplies; quality of water supplies; characteristics of sewage and disposal; principles and design of processes for preliminary, primary and secondary treatment of water supplies and sewage including screening, clarification and filtration; and stormwater management. 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>)</p>	<p><b>CEE 520. Design of Structural Systems</b> <span style="float: right;"><b>3 Units</b></span>  <b>Term Typically Offered:</b> Fall, Spring, Summer  <b>Prerequisite(s):</b> CEE 421, CEE 422, and CEE 452.  <b>Description:</b> Introduction to the design of structural systems. Model building codes. Material, structural system and foundation system selection. Design of connections. Economic, detailing constructability and erection issues. Preparation of engineering drawings. Review of shop drawing. 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>)</p>
<p><b>CEE 480. Civil &amp; Environmental Engineering Capstone Design - CUE</b> <span style="float: right;"><b>3 Units</b></span>  <b>Term Typically Offered:</b> Spring Only  <b>Prerequisite(s):</b> CEE 422 and CEE 460.  <b>Corequisite(s):</b> CEE 421, CEE 452, and CEE 471.  <b>Description:</b> An introduction to integrated civil engineering design, incorporating aspects of geotechnical, structural, transportation, and water resources engineering into a more comprehensive design project.  <b>Course Attribute(s):</b> CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status.</p> <p>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>)</p>	<p><b>CEE 522. Fundamentals of Prestressed Concrete</b> <span style="float: right;"><b>3 Units</b></span>  <b>Term Typically Offered:</b> Fall, Spring, Summer  <b>Prerequisite(s):</b> CEE 322 and CEE 421.  <b>Description:</b> Introduction to pre-tensioned and post-tensioned prestressed concrete. Design of precast concrete slabs, buildings, and bridges in accordance with ACI specifications and the Prestressed Concrete Institute (PCI) recommended practices. Application of computer programs for member analysis and design. 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>)</p>
	<p><b>CEE 523. Timber Design</b> <span style="float: right;"><b>3 Units</b></span>  <b>Term Typically Offered:</b> Fall, Spring, Summer  <b>Prerequisite(s):</b> CEE 254 or consent of instructor.  <b>Description:</b> Concepts of Structural Timber design will be taught. The properties of wood materials will be reviewed and the procedures for the design of typical timber components will be presented. In addition to course assignments, and tests, required of all students, students taking this course for graduate credit will be required to complete a group design of a simple building. 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>)</p>

<p><b>CEE 530. Construction Materials</b>  <b>Term Typically Offered:</b> Spring Only  <b>Prerequisite(s):</b> CEE 254 and CEE 255.  <b>Description:</b> 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 (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>	<p><b>3 Units</b></p>	<p><b>CEE 565. GIS Applications to Transportation</b>  <b>Term Typically Offered:</b> Fall, Spring, Summer  <b>Prerequisite(s):</b> CEE 460.  <b>Description:</b> 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 (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>	<p><b>3 Units</b></p>
<p><b>CEE 532. Experimental Stress Analysis</b>  <b>Term Typically Offered:</b> Fall, Spring, Summer  <b>Prerequisite(s):</b> CEE 530.  <b>Description:</b> 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 (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>	<p><b>3 Units</b></p>	<p><b>CEE 570. Applied Hydraulics</b>  <b>Term Typically Offered:</b> Fall, Spring, Summer  <b>Prerequisite(s):</b> CEE 572.  <b>Description:</b> 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 (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>	<p><b>3 Units</b></p>
<p><b>CEE 552. Earth Pressures and Retaining Structures</b>  <b>Term Typically Offered:</b> Fall, Spring, Summer  <b>Prerequisite(s):</b> CEE 450.  <b>Description:</b> 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 (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>	<p><b>3 Units</b></p>	<p><b>CEE 571. Applied Hydrology</b>  <b>Term Typically Offered:</b> Fall, Spring, Summer  <b>Prerequisite(s):</b> CEE 470.  <b>Description:</b> 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 (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>	<p><b>3 Units</b></p>
<p><b>CEE 560. Traffic Engineering</b>  <b>Term Typically Offered:</b> Fall, Spring, Summer  <b>Prerequisite(s):</b> CEE 460.  <b>Description:</b> 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 (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>	<p><b>3 Units</b></p>	<p><b>CEE 572. Open Channel Hydraulics</b>  <b>Term Typically Offered:</b> Fall, Spring, Summer  <b>Prerequisite(s):</b> CEE 370.  <b>Description:</b> 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 (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>	<p><b>3 Units</b></p>
<p><b>CEE 562. Geometric Design of Highways</b>  <b>Term Typically Offered:</b> Occasionally Offered  <b>Prerequisite(s):</b> CEE 460.  <b>Description:</b> 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 (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>	<p><b>3 Units</b></p>	<p><b>CEE 573. Groundwater Hydrology</b>  <b>Term Typically Offered:</b> Occasionally Offered  <b>Prerequisite(s):</b> CEE 450 and CEE 470.  <b>Description:</b> 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 (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>	<p><b>3 Units</b></p>
<p><b>CEE 563. GPS Theory and Application</b>  <b>Term Typically Offered:</b> Fall, Spring, Summer  <b>Prerequisite(s):</b> CEE 460.  <b>Description:</b> 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 (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>	<p><b>3 Units</b></p>	<p><b>CEE 590. Current Topics in Civil Engineering</b>  <b>Term Typically Offered:</b> Occasionally Offered  <b>Prerequisite(s):</b> Consent of instructor.  <b>Description:</b> 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 (<a href="http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm">http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm</a>)</p>	<p><b>1-4 Units</b></p>