ENGINEERING FUNDAMENTALS (ENGR)

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).

ENGR 101. Engineering Analysis I - QR 4 Units
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): MATH ACT of 27 or successful completion of ENGR 190 or equivalent.
Description: Introduction to vector methods and development and use of differentiation and integration to solve engineering problems, including those involving motion, related rates, optimization, moments and centers of mass.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ENGR 102. Engineering Analysis II 4 Units
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): ENGR 101.
Description: Development and use of: integrating techniques, transcendental functions, vectors in three dimensions, polar coordinates, and power series to solve engineering problems, including work, hydrostatic force, statics, heating, cooling, and catenaries.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ENGR 110. Engineering Methods, Tools, and Practice I 2 Units
Term Typically Offered: Fall, Spring
Prerequisite(s): Must be a Speed School of Engineering Student.
Description: ENGR 110 is designed to provide first-year engineering students with an introduction to critical thinking, essential methods, tools and skills for success in engineering. Activities and assignments will focus on developing skills and knowledge in: engineering professionalism (ethics, culture, and risk), basic programming, graphical communication, problem solving, design analysis, and teamwork (including diversity and inclusion).
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ENGR 111. Engineering Methods, Tools and Practice ll 2 Units
Term Typically Offered: Spring, Summer
Prerequisite(s): ENGR 110.
Description: ENGR 111 requires students to apply and demonstrate the skills developed in ENGR 110 by successfully completing a team design project. Oral and written presentations are required.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ENGR 149. Introduction to Engineering Graphics 1 Unit
Term Typically Offered: Fall Only
Prerequisite(s): Must be a Speed School of Engineering Student.
Description: Designed for transfer students who require a prerequisite course in Engineering Graphics upon entering J.B. Speed School of Engineering, but who do not take ENGR 110 and ENGR 111. ENGR 149 offers a comprehensive introduction to 3D visualization, freehand sketching, and construction of engineering drawings using manual drawing techniques. An introductory unit of construction of 3D part models using SolidWorks is also included.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ENGR 150. Engineering Graphics Fundamentals 2 Units
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): Must be a Speed School of Engineering Student.
Description: An introduction to the concepts of engineering graphics including 2-dimensional and 3-dimensional drawings and related industry standards. Freehand sketching and computer generated 2D and parametric solid model (3D) drawing is included.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ENGR 151. Engineering Graphics Technology 1 Unit
Term Typically Offered: Fall, Summer
Prerequisite(s): ENGR 110 or ENGR 149.
Description: This course builds on manual drawing skills learned in ENGR 110, and introduces students to the concepts of engineering graphics using two-dimensional and three-dimensional computer aided drawing programs, dimensioning of drawings and applicable industry standards are also included.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ENGR 190. Introductory Calculus - QR 4 Units
Term Typically Offered: Fall Only
Prerequisite(s): Math ACT of 24 or higher.
Description: Review of algebra, trigonometry, analytic geometry, and introduction of elementary calculus in preparation for Engineering Analysis I.
Note: This course may not be used for credit toward the JB Speed School of Engineering BS and MENG degrees.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)
### ENGR 201. Engineering Analysis III
**Term Typically Offered:** Fall, Spring, Summer  
**Prerequisite(s):** ENGR 102.  
**Description:** Development and use of: partial derivatives, Lagrange multipliers, Fourier series, vector-valued functions, and multiple integrals to solve engineering problems, including those involving thermodynamics, motion, fluid flow, curl, flux, and divergence. For class offerings for a specific term, refer to the Schedule of Classes.

### ENGR 205. Differential Equations for Engineering  
**Term Typically Offered:** Fall, Spring, Summer  
**Prerequisite(s):** ENGR 201.  
**Description:** First- and higher-order differential equations (DE), systems of DE, partial DE, difference equations, numerical methods, Laplace transforms, engineering applications involving mechanical vibrations, electrical circuits, impact forces, and mixing problems. For class offerings for a specific term, refer to the Schedule of Classes.

### ENGR 209. ELLC Summer Research Project  
**Grading Basis:** Pass/Fail  
**Term Typically Offered:** Summer Only  
**Prerequisite(s):** Permission of the department; student must have participated in the Engineering Living-Learning Community during the most recent academic year.  
**Description:** Selected students will participate in a ten week research experience with a specific faculty member within their engineering department. Departments include: Bioengineering, chemical Engineering, Civil Engineering, Computer Engineering and Computer Science, Electrical and Computer Engineering, Industrial Engineering, and Mechanical Engineering. Students will meet as a group three times in the summer semester and will be required to spend a total of ten hours per week working with their faculty mentor. Oral and written presentations at the end of the summer semester are required. For class offerings for a specific term, refer to the Schedule of Classes.

### ENGR 307. Numerical Methods for Engineering  
**Term Typically Offered:** Fall, Spring, Summer  
**Prerequisite(s):** ENGR 201 and ENGR 205.  
**Description:** Errors and error propagation, solving one and several equations, polynomial interpolation and divided differences, least squares approximation, numerical differentiation and integration, eigenvalues, eigenvectors, solving ordinary and systems of differential equations. For class offerings for a specific term, refer to the Schedule of Classes.

### ENGR 330. Linear Algebra for Engineering  
**Term Typically Offered:** Fall, Spring, Summer  
**Prerequisite(s):** ENGR 201.  
**Description:** Elimination and LU-factorization, dimension, rank, and nullspace, linear transformations and similarity, orthogonally and least squares, eigentheory and diagonalizability, linear differential equations and systems of linear differential equations. For class offerings for a specific term, refer to the Schedule of Classes.

### ENGR 393. Independent Study in Engineering Fundamentals  
**Term Typically Offered:** Occasionally Offered  
**Prerequisite(s):** Consent of a faculty sponsor.  
**Description:** Independent study in any engineering fundamentals related area under the guidance of a faculty member. For class offerings for a specific term, refer to the Schedule of Classes.

### ENGR 400. Special Topics in Engineering Fundamentals  
**Term Typically Offered:** Occasionally Offered  
**Description:** Investigation of topics in any engineering fundamentals related areas that are not covered in regular courses. Topics will be announced in the Schedule of Courses.

### ENGR 405. Practicum in Engineering Fundamentals Education  
**Term Typically Offered:** Fall, Spring, Summer  
**Prerequisite(s):** ENGR 205 and Consent of Instructor.  
**Description:** A guided learning experience in inquiry-based instructional techniques and best practices in STEM education that includes field experience as an undergraduate teaching assistant. Permission to enroll required. May be repeated for a maximum of 3 hours. For class offerings for a specific term, refer to the Schedule of Classes.

### ENGR 589. Research Methods for Engineering and Engineering Education  
**Term Typically Offered:** Fall, Spring, Summer  
**Prerequisite(s):** Experience as an undergraduate teaching assistant. Permission to enroll required. May be repeated for a maximum of 3 hours. For class offerings for a specific term, refer to the Schedule of Classes.