ME 206. Mechanics II: Dynamics 3 Units
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): ENGR 102 and CEE 205.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 251. Thermodynamics I 3 Units
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): ENGR 102 and PHYS 298.
Description: This course covers: fundamental thermodynamic concepts involving heat and work; obtaining properties for typical working fluids, real and ideal gases; first and second laws of thermodynamics; entropy and reversible and irreversible processes; and basic cycles. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 280. Structured Programming for Mechanical Engineering 2 Units
Term Typically Offered: Fall, Spring
Prerequisite(s): CECS 121.
Description: Software development using structured computer programming. Design and implementation of programs with application to mechanical engineering problems such as numerical solution methods and kinematics. Uses a suitable programming language such as MATLAB.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 289. Mechanical Engineering Cooperative Education I 1 Unit
Grading Basis: Pass/Fail
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): ME 288.
Fee: An additional $20.00 is charged for this course.
Description: Full-time technical work experience related to the student’s academic program.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 288. Mechanical 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)

ME 310. Thermodynamics II 3 Units
Term Typically Offered: Spring, Summer
Prerequisite(s): ME 251.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 311. Fluid Mechanics I 3 Units
Term Typically Offered: Fall, Spring
Prerequisite(s): ME 206 and ME 251.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 312. Fluid Mechanics Laboratory 1 Unit
Term Typically Offered: Fall, Spring
Corequisite(s): ME 311.
Fee: An additional $20.00 is charged for this course.
Description: Experimental measurements of static and dynamic fluid properties. Concepts of laboratory testing. Introduction to technical report writing.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)
ME 323. Mechanics of Materials  
Term Typically Offered: Fall, Summer  
Prerequisite(s): CEE 205 and ENGR 201.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 324. Mechanics of Materials Laboratory  
Term Typically Offered: Fall, Summer  
Corequisite(s): ME 323.  
Fee: An additional $20.00 is charged for this course.  
Description: Experimental measurements of mechanical material properties and experimental verification of solid mechanics theory. Concepts of laboratory testing. Introduction to technical report writing.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 380. Computer Aided Design  
Term Typically Offered: Fall, Spring  
Prerequisite(s): ENGR 151 and ME 323.  
Description: An introduction to the engineering design process emphasizing the use of modern computer-based analysis, design and presentation tools for mechanical engineering applications.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 381. Introduction to Manufacturing  
Term Typically Offered: Fall, Spring  
Prerequisite(s): CHE 253 and ME 251.  
Corequisite(s): ME 380.  
Description: Introduction to manufacturing processes with an emphasis on considerations for mechanical engineering design. Topics covered include casting, machining, forming, assembly, and modern methods for both polymer and metal materials.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 389. Mechanical Engineering Cooperative Education II  
Grading Basis: Pass/Fail  
Term Typically Offered: Fall, Spring, Summer  
Prerequisite(s): ME 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 (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 401. Fluid Mechanics II  
Term Typically Offered: Fall, Spring  
Prerequisite(s): ME 311 and ENGR 205.  
Description: Differential analysis of fluid flow, viscous flow in pipes, flow over immersed bodies, compressible flow and turbomachinery.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 414. Mechanical Measurements  
Term Typically Offered: Fall, Spring  
Prerequisite(s): ENGR 205, ME 312, and ME 324.  
Description: General consideration of signals and utilization of instruments to measure physical properties of systems. Review and introduction of useful mathematical concepts such as statistical data analysis. Introduction to digital data acquisition and signal processing.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 415. Senior Mechanical Engineering Laboratory  
Term Typically Offered: Fall, Spring  
Corequisite(s): ME 414.  
Fee: An additional $15.00 is charged for this course.  
Description: Experiments in heat transfer, mechanics, acoustics, pumps, electrical circuits, sound dynamics, and HVAC systems.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 422. Machine Design I  
Term Typically Offered: Fall, Spring  
Prerequisite(s): ME 323 and CHE 253.  
Description: Fundamental concepts related to the design of mechanical components and machines. The engineering design process. Design for strength and reliability. Open-ended design projects are assigned.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 432. Intermediate Mechanics of Materials  
Prerequisite(s): ME 323.  
Description: Principle of virtual work. Principle of minimum potential energy. Matrix formulation of static and dynamic structural mechanics problems with a strong emphasis on computer applications.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 435. System Dynamics  
Term Typically Offered: Spring, Summer  
Prerequisite(s): ECE 252, ENGR 205 and ME 311.  
Description: Modeling of mechanical, fluid, electrical, and mixed systems. Determination of time and frequency domain response of such systems to transient and periodic inputs. Specific applications.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)
ME 440. Heat Transfer  
Term Typically Offered: Fall, Spring  
Prerequisite(s): ME 311  
Description: A study of the fundamental laws and applications of heat transfer by conduction, convection, and radiation. For class offerings for a specific term, refer to the Schedule of Classes.

ME 442. Machine Design II  
Term Typically Offered: Fall, Spring  
Prerequisite(s): ME 422.  
Description: Design and application of machine elements such as springs, rolling element bearings, gearing, and journal bearings. Open-ended design projects are assigned. For class offerings for a specific term, refer to the Schedule of Classes.

ME 489. Mechanical Engineering Cooperative Education III  
Grading Basis: Pass/Fail  
Term Typically Offered: Fall, Spring, Summer  
Prerequisite(s): ME 389.  
Fee: 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.

ME 497. Mechanical Engineering Capstone Design Project - CUE  
Term Typically Offered: Fall, Spring  
Prerequisite(s): ME 442.  
Description: Team-oriented design of a mechanism, system or process satisfying a set of open-ended requirements. Written reports and oral presentations are required. Course Attribute(s): 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, 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.

ME 510. Thermal Design of Internal Combustion Engines  
Term Typically Offered: Fall, Spring, Summer  
Prerequisite(s): ME 310.  
Description: Thermodynamics and fluid mechanics of internal combustion engine design. Combustion stoichiometry, thermochemistry, and properties of working fluids. Ideal and real engine cycles. Fluid flow processes, combustion processes, pollutant formation and control. Engine operating characteristics. For class offerings for a specific term, refer to the Schedule of Classes.

ME 512. Finite Element Methods for Mechanical Design I  
Term Typically Offered: Occasionally Offered  
Prerequisite(s): ME 422.  
Description: Matrix analysis of static and dynamic structural systems and steady-state heat transfer. Computer aided design of trusses, frames, plane stress structures, as well as one- and two-dimensional thermal systems including conduction and convection. For class offerings for a specific term, refer to the Schedule of Classes.

ME 513. Energy Conversion  
Term Typically Offered: Fall, Spring, Summer  
Prerequisite(s): ME 310.  
Description: A study of nuclear and fossil-fueled steam generators, plus internal combustion prime movers and alternate energy sources. A computerized design project will be required. For class offerings for a specific term, refer to the Schedule of Classes.

ME 521. Mechanical Vibrations  
Term Typically Offered: Fall, Spring, Summer  
Prerequisite(s): ME 422.  

ME 523. Intermediate Dynamics  
Term Typically Offered: Fall, Spring, Summer  
Prerequisite(s): ME 206.  
Description: Extension of the concepts in introductory dynamics (ME 206) to three dimensional motion. This includes the kinematics of multiple, rotating reference frames, and Newtonian vector mechanics for particles and rigid bodies (Euler’s equations). Lagrangian analytical methods. Stability of motion. For class offerings for a specific term, refer to the Schedule of Classes.

ME 526. Vehicle Dynamics and Handling  
Term Typically Offered: Fall, Spring, Summer  
Prerequisite(s): ME 380.  
Description: Design of passenger and commercial vehicles for optimal dynamic performance with a focus on architecture layout, characterization of critical subsystems, and CAE-based kinematic and kinetic modeling. For class offerings for a specific term, refer to the Schedule of Classes.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
<th>Term Typically Offered</th>
<th>Prerequisite(s)</th>
<th>Description</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 532</td>
<td>Experimental Stress Analysis</td>
<td>3</td>
<td>Fall, Spring, Summer</td>
<td>ME 323, ME 414 and ME 415 or graduate standing in Mechanical Engineering.</td>
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<tr>
<td>ME 534</td>
<td>Experimental Vibrations</td>
<td>3</td>
<td>Summer Odd Years</td>
<td>ME 435</td>
<td>Review of multiple degree-of-freedom vibration modeling and analysis.</td>
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<tr>
<td>ME 535</td>
<td>Control System Design</td>
<td>3</td>
<td>Fall, Spring, Summer</td>
<td>ME 435</td>
<td>Study of transient and steady state response.</td>
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<tr>
<td>ME 536</td>
<td>Applied Stress Analysis</td>
<td>3</td>
<td>Fall Only</td>
<td>ME 435</td>
<td>Review of basic concepts in structural mechanics.</td>
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<tr>
<td>ME 540</td>
<td>Microfluidics</td>
<td>3</td>
<td>Fall Only</td>
<td></td>
<td>Introduction to the basic theory and practical applications of microfluidics.</td>
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<tr>
<td>ME 542</td>
<td>Gas Turbines</td>
<td>3</td>
<td>Fall, Spring, Summer</td>
<td>ME 310 and ME 401</td>
<td>Theory and design of various types of gas turbine engines.</td>
<td></td>
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<tr>
<td>ME 544</td>
<td>Design of Fluid Power Systems</td>
<td>3</td>
<td>Fall, Spring, Summer</td>
<td>ME 380 and ME 401</td>
<td>Design methodology of hydraulic circuits and fluid power components.</td>
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<tr>
<td>ME 547</td>
<td>Design Methods</td>
<td>3</td>
<td>Fall Only</td>
<td>ME 422</td>
<td>This course uses broad based engineering knowledge to design mechanical</td>
<td></td>
</tr>
<tr>
<td>ME 549</td>
<td>Geometric dimensioning and Tolerancing</td>
<td>3</td>
<td>Fall Only</td>
<td></td>
<td>Introduction to the terms, rules, symbols, and concepts of GD&amp;T and</td>
<td></td>
</tr>
<tr>
<td>ME 551</td>
<td>Materials for Additive Manufacturing</td>
<td>3</td>
<td>Fall Only</td>
<td></td>
<td>Course will explore polymeric and particulate materials in the context of</td>
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</tbody>
</table>

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)
ME 553. Design-To-Manufacture Digital Tools 3 Units
Description: Successful product design involves correctly answering three inter-related questions: (1) What does the product look like? (2) What will the product be made of? (3) How will the product be made? The three considerations based on material properties, component shapes, and processing methods offer many opportunities but impose several constraints that affect decision making in manufacturing. This online course will synthesize the learning from foundational engineering courses in materials, design and manufacturing and enable the student to undertake design challenges using the CES EduPack software to skillfully navigate the material-shape-process space.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 555. Introduction to Micro and Nanotechnology 3 Units
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): CHE 253 or equivalent; Senior or Graduate standing in an engineering program.
Description: Design, fabrication and application of micro- and nano-electro-mechanical systems (MEMS/NEMS). Scaling laws governing micro- and nanoscale physics. Use of MEMS/NEMS devices in electronics, as sensors, and for medical applications.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 556. Micro/Nano Energy Systems 3 Units
Description: Introduction to different micro- and nanoscale energy conversion technologies - their basic principle, design considerations, fabrication, and operation. Topics include mechanical energy harvesting mechanisms such as piezoelectric and electrostatic, thermal energy harvesting systems such as thermoelectric and pyroelectric, and solid-state cooling technologies such as electrocaloric and magnetocaloric.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 559. Process Physics & Material Science in Advanced Manufacturing 3 Units
Term Typically Offered: Spring Only
Prerequisite(s): ME 323 and ME 381.
Description: Materials processing lies at the core of advanced manufacturing. It is through understanding and innovations in materials processing, true progress in manufacturing development can be reached. Topics include mechanical, thermal, electrochemical, acoustic, optical energy-based material processing physics, physical metallurgy, phase transformation, solidification, heat and mass transfer, dislocation mechanics in the context of manufacturing.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 562. Composite Materials 3 Units
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): ME 422.
Description: Overview of composite materials, stress/strain analysis of a polymer matrix fiber-reinforced composite ply, classical lamination theory, failure criteria, design approaches, manufacturing methods, and applications for structural polymeric composites.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 565. Advanced Engineering Mathematics I 3 Units
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): ENGR 201 or ENGR 205 or equivalent.
Description: Formulation and solution of mathematical models for mechanical engineering problems leading to ordinary and partial differential equations. Transform solution methods and linear algebra concepts, including real and complex-domain eigenvalue problem solutions.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 566. Advanced Engineering Mathematics II 3 Units
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): ME 565 or equivalent.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 570. Sustainable Energy Systems 3 Units
Term Typically Offered: Fall Only
Prerequisite(s): ME 310 and ME 311.
Description: Analysis and design of sustainable energy systems, and exploration of concepts such as carbon capture storage for making fossil energy systems more environmentally acceptable.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 572. Energy Storage Systems 3 Units
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): ME 440 or graduate standing in Mechanical Engineering.
Description: Study of the principles and analysis of energy systems. Introduction to energy storage systems and their applications; thermal and mechanical energy storage, storage of organic fuels, hydrogen, and electrochemical energy.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 573. Electric and Hybrid Vehicles 3 Units
Prerequisite(s): By course: ME 310.
Description: By topic: Refrigeration and Heat Pump Systems, Reaction Mixture and Combustion, Chemical and Phase Equilibrium. By course: ME440. By topic: Heat Exchanger Design, Forced Convection. Introduction to the knowledge for the design, analysis, and development of electric, hybrid vehicles, and their components. Topics include the operation principle of electric cars, motors and power electronics in an electric car, battery, and relevant charging technologies.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)
ME 575. Special Topics in Mechanical Engineering 1-4 Units
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): Faculty consent.
Description: A special topics course in mechanical engineering topics not covered by regularly scheduled courses.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 580. Air Pollution Control 3 Units
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): CHEM 202, ME 310 or equivalent.
Description: Origin and fate of air pollutants, combustion and pollutant formation processes, control of emissions of gaseous and particulate pollutants and design of various pollution control devices.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 585. Design and Energy Analysis of Consumer Appliances 4.5 Units
Description: Application of classical, computational, and experimental methods and analysis to the design of mechanical and energy systems. Topics include material impacts on design, structural component design, and design and analysis of thermal fluid, and acoustic systems.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 588. Independent Study in Mechanical Engineering 1-4 Units
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): Faculty consent.
Description: A theoretical or experimental investigation of a problem area related to mechanical engineering.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

ME 595. Measurement, Reliability, and Thermal Design of Electromechanical Systems 4.5 Units
Prerequisite(s): ME 585.
Description: Application of classical, computational, and experimental methods and analyses to the design of electromechanical systems. Topics include reliability and failure analysis, measurement and control of electromechanical systems, and analysis and design optimization of thermal systems.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)