

MECHANICAL ENGINEERING (ME)

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/>).

ME 206. Mechanics II: Dynamics 3 Units

Term Typically Offered: Fall, Spring, Summer

Prerequisite(s): ENGR 102 and CEE 205.

Description: Study of motions and forces in engineering systems. Kinematics and kinetics of particles; equations of motion. Energy and momentum methods. Introduction to rigid body dynamics. Engineering applications.

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 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 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 \$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 310. Thermodynamics II 3 Units

Term Typically Offered: Spring, Summer

Prerequisite(s): ME 251.

Description: Exergy analysis and second law efficiency. Power and refrigeration cycles. Thermodynamic relations and real gas behavior. Ideal gas mixtures and psychrometrics. Thermochemistry. Chemical equilibrium.

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.

Description: Characteristics of fluids. Fluid statics and kinematics. Applications of the Bernoulli equation. Conservative equations in integral and differential form. Dimensional analysis and modeling.

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>)

<p>ME 323. Mechanics of Materials 3 Units Term Typically Offered: Fall, Summer Prerequisite(s): CEE 205 and ENGR 201. Description: Analysis of stress and strain. Hooke's law. Deflections. Statically indeterminate problems. Buckling of columns. Energy methods. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)</p>	<p>ME 401. Fluid Mechanics II 3 Units 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)</p>
<p>ME 324. Mechanics of Materials Laboratory 1 Unit 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)</p>	<p>ME 414. Mechanical Measurements 3 Units 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)</p>
<p>ME 380. Computer Aided Design 2 Units 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)</p>	<p>ME 415. Senior Mechanical Engineering Laboratory 1 Unit 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)</p>
<p>ME 381. Introduction to Manufacturing 2 Units 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)</p>	<p>ME 422. Machine Design I 3 Units 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)</p>
<p>ME 389. Mechanical Engineering Cooperative Education II 1 Unit 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.</p> <p>For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)</p>	<p>ME 432. Intermediate Mechanics of Materials 3 Units 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)</p>
	<p>ME 435. System Dynamics 3 Units 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)</p>

<p>ME 440. Heat Transfer Term Typically Offered: Fall, Spring Prerequisite(s): ME 401. 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 (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)</p>	<p>3 Units</p>	<p>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 (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)</p>	<p>3 Units</p>
<p>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 (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)</p>	<p>3 Units</p>	<p>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 (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)</p>	<p>3 Units</p>
<p>ME 489. Mechanical Engineering Cooperative Education III Grading Basis: Pass/Fail Term Typically Offered: Fall, Spring, Summer Prerequisite(s): ME 389. 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)</p>	<p>1 Unit</p>	<p>ME 521. Mechanical Vibrations Term Typically Offered: Fall, Spring, Summer Prerequisite(s): ME 422. Description: The theory of vibrating mechanical systems. Modeling of lumped parameter and distributed parameter systems. Free and forced vibration. Damping. Periodic and transient motion. Concept of normal modes. Multiple degree-of-freedom systems. Design applications. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)</p>	<p>3 Units</p>
<p>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 (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)</p>	<p>3 Units</p>	<p>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 (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)</p>	<p>3 Units</p>
<p>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 (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)</p>	<p>3 Units</p>	<p>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 (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)</p>	<p>3 Units</p>

ME 532. Experimental Stress Analysis	3 Units	ME 544. Design of Fluid Power Systems	3 Units
Term Typically Offered: Fall, Spring, Summer		Term Typically Offered: Fall, Spring, Summer	
Prerequisite(s): ME 323, ME 414 and ME 415 or graduate standing in Mechanical Engineering.		Prerequisite(s): ME 380 and ME 401.	
Fee: An additional \$30.00 is charged for this course.		Description: Design methodology of hydraulic circuits and fluid power components. Study of rotary/linear actuators, hydrostatic transmissions, temperature control, contamination control, pneumatics, valves, and control components. Applied design projects and laboratory modules are required.	
Description: Fundamentals of experimental stress analysis. Brittle coating methods, 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)		For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)	
ME 534. Experimental Vibrations	3 Units	ME 547. Design Methods	3 Units
Term Typically Offered: Summer Odd Years		Term Typically Offered: Fall Only	
Prerequisite(s): ME 435.		Prerequisite(s): ME 422.	
Description: Experimental techniques for identifying the modal parameters of mechanical and structural systems. Review of multiple degree-of-freedom vibration modeling and analysis. Measurement of frequency response functions. Excitation techniques, instrumentation, Fourier analysis and signal processing. Acoustical modal analysis. Experiments on real mechanical and structural systems. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)		Description: This course uses broad based engineering knowledge to meld equation driven principles with customer and business driven needs/requirements. The product development process is used to design a mechanical or electro-mechanical product. Topics include: concurrent engineering, project management, voice of customer, quality function deployment, concept generation, concept selection, concept embodiment, robust design methods, design failure mode and effects analysis, design validation plan & report design for X, and value/cost analysis. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)	
ME 535. Control System Design	3 Units	ME 555. Introduction to Micro and Nanotechnology	3 Units
Term Typically Offered: Fall, Spring, Summer		Term Typically Offered: Fall, Spring, Summer	
Prerequisite(s): ME 435.		Prerequisite(s): CHE 253 or equivalent; Senior or Graduate standing in an engineering program.	
Description: Basic concepts and principles of feedback control systems. Formulation of linear control problems by classical methods. Analysis and synthesis techniques as used in the design of automatic, dynamic control systems. Study of transient and steady state response, use of time and frequency domain concepts. System performance specifications. Design applications. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)		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 540. Microfluidics	3 Units	ME 559. Process Physics & Material Science in Advanced Manufacturing	3 Units
Term Typically Offered: Fall Only		Term Typically Offered: Spring Only	
Description: Introduction to the basic theory and practical applications of microfluidics. Topics include fluid mechanics at small scales, fabrication of microfluidic devices, methods of inducing and controlling flow, and techniques to measure fluid properties. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)		Prerequisite(s): ME 323 and ME 381.	
ME 542. Gas Turbines	3 Units	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)	
Term Typically Offered: Fall, Spring, Summer		ME 562. Composite Materials	3 Units
Prerequisite(s): ME 310 and ME 401.		Term Typically Offered: Fall, Spring, Summer	
Description: Theory and design of various types of gas turbine engines used for power and propulsion. Thermodynamic cycle analysis; design basics of turbomachinery, nozzles, diffusers and combustion chambers; engine performance analysis. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)		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.
Description: Analysis of engineering systems and phenomena yielding complex domain models and solutions. Power series, Taylor series, and Laurent series. Complex analysis and potential theory. Numerical analysis for complex domain systems. Introduction to optimization and linear programming.
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.
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 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>)