Mechanical Engineering

Degree Offered: Master of Science in Mechanical Engineering
Website: [http://www.uab.edu/engineering/home/departments-research/me/graduate](http://www.uab.edu/engineering/home/departments-research/me/graduate)
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Mechanical engineering is a broad-based discipline, and graduate students will have opportunities to explore a number of research areas where they will work alongside nationally and internationally known faculty mentors. The ME department offers a Master of Science in Mechanical Engineering degree, including both Thesis and Non-Thesis options.

Additional Information

Deadline for Entry Term(s): Fall: August 1; Spring: December 1; Summer: May 1
Deadline for All Application Materials to be in the Graduate School Office: Six weeks before term begins

Master of Science in Mechanical Engineering Admissions Requirements

- A bachelor's degree from an accredited (or equivalent) program in engineering or the physical sciences is required for admission to graduate study in mechanical engineering with not less than B-level scholarship overall or over the last 60 semester hours of earned credit.

- The School of Engineering is waiving all GRE test requirements through at least Fall 2021. Previously, the MSBME program required the GRE general test for all applicants who did not receive a BS degree from a program accredited by the Engineering Accreditation Commit of ABET ([http://www.abet.org](http://www.abet.org)), or from other programs with reciprocal agreement under the Washington Accord ([http://www.ieagreements.org/accords/washington/](http://www.ieagreements.org/accords/washington/)).

- In addition, a minimum score of 80 on the TOEFL (minimum of 18 on each subsection) or a 6.5 on the IELTS is required for international applicants whose native language is not English.

A student with an undergraduate degree in a field of engineering other than mechanical or in the physical sciences may also be accepted into the mechanical engineering program. However, such a student will normally have to take additional, preparatory coursework as part of an expanded plan of study (see "Preparatory Courses" later in this section).

Special Topics (590/690/790) courses and Independent Study (591/691/791) courses are reviewed for degree applicability for each program in the School of Engineering. No more than 6 combined hours of Special Topics and/or Independent Study courses will be applied to the degree without appeal to and approval from the Program Director.

The School of Engineering offers similar courses at the 400/500 and 600/700 levels. While the higher numbered course has more advanced content, there is a significant overlap in topics. Therefore, students are not allowed to take a 500-level or 700-level course for credit if they have previously taken the related 400-level or 600-level course, respectively.

Plan I (Thesis Option)

1. Upon admission to the program, the Graduate Program Director will advise the student on courses for the first semester. During the first semester, the student will be assigned a Committee Chair, based on research interest, who will assist the student in formulating their graduate study committee. The committee will consist of the Chair and two graduate faculty members with experience or expertise related to the student's thesis topic. The Chair, in coordination with the committee, will aid the student in course selection.

2. In addition to the general Graduate School requirements, the student must successfully complete at least 24 semester hours of coursework, including:
   - 6 semester hours in committee-approved mathematics courses
   - 18 semester hours in committee-approved mechanical engineering courses or approved related courses, including at least 2 semester hours of ME 694 Seminar in Mechanical Engineering and 3 semester hours in a course outside the student's research or specialization area.

3. A student is eligible for admission to candidacy after (1) a written thesis has been orally presented to and approved by the committee and (2) successful completion of Responsible Conduct in Research training.

4. After admission to candidacy, the student must register for at least 6 hours of ME 699 Thesis Research in addition to the 24 semester hours of coursework.

5. The student must successfully complete and defend a thesis.

Plan II (Non-thesis Option)

Generally, Plan II will be approved for students working full-time and attending UAB on a part-time basis or when the student demonstrates that Plan II offers superior educational benefits. After 15 credit hours of coursework are completed, the student should select a project director and begin work on the final project. The election of Plan II must be approved by the student's graduate advisor.

1. The student must successfully complete at least 33 semester hours of coursework, including:
   - 6 semester hours in approved mathematics courses
   - A minimum of 27 semester hours in approved mechanical engineering courses or approved related courses. Of these 27 semester hours, students must enroll in:
     - at least 3 semester hours in a course outside the student's research or specialization area
     - at least 2 semester hours of ME 694 Seminar in Mechanical Engineering
     - at least 3 hours of ME 698 Non-Thesis Research involving design or research

2. The student must make a presentation on the research project and submit a final report which must be approved by the project director.

Early Acceptance

Early Acceptance Programs are designed for academically superior high school students. Early Acceptance Programs allow high-achieving
ME 531. Introduction to Vehicle Drive Systems Engineering. 3 Hours.

Introduction to fully electric and hybrid vehicle engineering. Mechatronic system and component design. Batteries and energy storage devices. Plug-in hybrid electric vehicles.

ME 545. Combustion. 3 Hours.

Evaluation of the impact of fuel characteristics and operating conditions on the performance of coal-fired utility steam-raising plant and the prospects for continued reliance on coal as fuel for electric power generation. The phenomena emphasized are the behavior of turbulent jets; ignition, devolatilization and combustion of coal particles; radiative heat transfer and the effect of ash deposits on heat transfer; formation of air pollutants and their removal from combustion products; integrated gasification combined cycle; and capture and sequestration of carbon dioxide. Thermodynamics II, Introduction to Fluid Mechanics, and Introduction to Heat Transfer or equivalents are recommended prerequisites for this course.

ME 547. Internal Combustion Engines. 3 Hours.

Fundamentals of reciprocating internal combustion engines: engine types, engine components, engine design and operating parameters, thermochemistry of fuel-air mixtures, properties of working fluids, ideal models of engine cycles, engine operating characteristics, gas-exchange processes, fuel metering, charge motion within the cylinder, combustion in spark-ignition and compression ignition engines.

ME 549. Power Generation. 3 Hours.

Application of thermodynamics, fluid mechanics, and heat transfer to conversion of useful energy. Includes terrestrial and thermodynamic limitations, fossil fuel power plants, renewable energy sources, and direct energy direct energy conversion. Thermodynamics II or equivalent is a recommended prerequisite for this course.

ME 554. Heating, Ventilating & AC. 3 Hours.

Fundamentals and practice associated with heating, ventilating, and air conditioning; study of heat and moisture flow in structures, energy consumption, and design of practical systems. Introduction to Heat Transfer or equivalent is a recommended prerequisite for this course.

ME 555. Thermal-Fluid Systems Design. 3 Hours.

Comprehensive design problems requiring engineering decisions and code/Standard compliance. Emphasis on energy system components: piping networks, pumps, heat exchangers. Includes fluid transients and system modeling. Introduction to Heat Transfer is a recommended prerequisite for this course.

ME 556. Building Energy Modeling and Analysis. 3 Hours.

Computer modeling of energy use and thermal comfort in buildings using several software tools. Interpretation and analysis of the results. Implementing energy efficiency measures in the model and studying the effects on energy use.

Prerequisites: ME 242 [Min Grade: C] and ME 322 [Min Grade: C]

ME 564. Introduction to Finite Element Method. 3 Hours.

Concepts and applications of finite element method. Development and applications of basic elements used in engineering mechanics. Use of finite element analysis software. Application of finite element concept to several areas of mechanics. Mechanics of Solids or equivalent is a recommended prerequisite for this course.

ME 575. Mechanical Vibrations. 3 Hours.

ME 577. Systems Engineering. 3 Hours.
Exposure to the field of systems engineering, mission design, requirements development, trade studies, project life cycle, system hierarchy, risk analysis, cost analysis, team organization, design fundamentals, work ethics, compare and evaluate engineering alternatives, systems thinking.

ME 578. Automated Manufacturing. 3 Hours.
Introduction to automated manufacturing technology. Components of automated systems (controllers, sensors and actuators) and automated manufacturing sub-systems (3D printer, CNC, robot and computer vision) will be studied in a lecture/lab environment with hands on activities. A basic understanding of engineering graphics and computer methods at the undergraduate level is required for this course.

ME 580. Instrumentation and Measurements. 3 Hours.
Thorough exploration of fundamental measurement concepts and techniques for data acquisition and validation. Explanation of important selection criteria for the identification and configuration of commercially available data acquisition devices. Students will get hands on experience following best practices for data acquisition (high speed vs low speed) relevant to their field of study or career. Many types of sensors, their underlying technology, and measurement techniques will be discussed (i.e. accelerometers, load cells, Digital Image Correlation, etc.) to demonstrate best practices for sensor selection for a wide range of specialized applications.

ME 590. Special Topics in Mechanical Engineering. 1-3 Hour.
Special Topics in Mechanical Engineering.

ME 591. Individual Study in Mechanical Engineering. 1-6 Hour.
Individual Study in Mechanical Engineering.

ME 611. Advanced Fluid Mechanics. 3 Hours.
Fundamental laws of motion for viscous fluid, classical solutions of the Navier-Stokes equations, inviscid flow solutions, laminar boundary layers, and stability criteria.

ME 613. Introduction to Computational Fluid Dynamics. 3 Hours.
Review of governing equations of fluid dynamics, mathematical behavior of partial differential equations, basic aspects of discretization, basic CFD techniques, basic grid generation, coordinate transformations, advanced numerical schemes, future CFD methodology. A knowledge of a computer language is required.

ME 614. Advanced Computational Fluid Dynamics. 3 Hours.

ME 615. Introduction to Turbulent Flows. 3 Hours.
Characteristics of turbulence, length and time scales, energy cascade, vorticity stretching, Reynolds averaging technique, Closure problem, Boussinesq hypothesis, Eddy viscosity concepts, introduction to zero-, one-, and two-equation models, Reynolds stress model.

ME 631. Dynamics and Mobility of Vehicles: Modeling and Simulation. 3 Hours.
The main goal of the course is to present advanced research and engineering knowledge in recent vehicle dynamics of road and off-road wheeled and track vehicles with an emphasis on vehicle longitudinal/ lateral mobility and energy efficiency. Applications include vehicles for personal transportation, military vehicles, construction equipment and farm tractors. A unique feature of this course is its inverse vehicle dynamics approach. Another distinctive feature of the course is a mechatronics-based approach to modeling and simulation of multi-domain systems that include mechanical, electrical and electronics components such as sensors and actuators. Coupled and interactive dynamics of vehicle systems is presented, and a modeling process of vehicle operational properties is based on various equations of analytical and adaptive dynamics. Students will gain knowledge and analytical hands-on skills through innovative homework and a research project. Skills in one of programming software/languages are required (e.g., MATLAB/Simulink, ADAMS/Car, LabVIEW, etc.).

The main goal of this course is to give detailed understanding, analytical knowledge and engineering experience in research, design and experimental study of autonomous wheel power management systems (AWPMS). The AWPMS are autonomous mechatronic and autonomously operated mechanical systems that distribute power among the drive wheels of vehicles. AWPMS include various configurations of torque vectoring systems, limited slip differentials and hydraulically controlled differentials, electronically-locking differentials, and positive engagement of the wheels. AWPMS that are operationally integrated with steering and suspension systems are also presented in the course. Characteristics of wheel power management systems for a specific vehicle application are proved in the course by using inverse vehicle dynamics formulation and requirements to vehicle energy efficiency, mobility, stability of motion, and turnability. Students will learn mechanical design principles for mechatronic systems and methods for developing control algorithms. Methods for experimental study of wheel power management systems and vehicles are also presented in the course; including 4x4 vehicle chassis dynamometer with individual wheel control and test setups. Students will exercise analytical skills and gain hands-on experience through innovative homework and a research project.

ME 640. Heat Conduction. 3 Hours.
Introduction to methods of solution for heat conduction problems. Topics include separation of variables in rectangular, cylindrical and spherical coordinates, solution to the heat equation on semi-infinite and infinite domains, Duhamel's Theorem, use of Green's Function, and use of the Laplace Transform. A basic understanding of heat transfer at the undergraduate level is required for this course.

ME 641. Radiation Heat Transfer. 3 Hours.
Introduction to radiation heat transfer. Topics include radiation from black bodies and nonblack opaque surfaces, configuration factors for diffuse surfaces, radiation exchange in enclosures of diffuse-grey and specularly reflecting surfaces, radiation combined with conduction and convection, and energy transfer for absorbing, emitting and scattering media. A basic understanding of heat transfer at the undergraduate level is required for this course.
ME 642. Statistical Mechanics. 3 Hours.
Explanation of macroscopic thermodynamic and transport properties, based upon classical and quantum mechanical descriptions of elementary particles, atoms, and molecules. Analysis of the distributions of these objects over their allowed energy states and the relationships between those distributions and macroscopic properties. Thermodynamics II or equivalent is a recommended prerequisite for this course.

ME 650. Transport Phenomena. 3 Hours.
Laminar flow transports: momentum transfer (Couette/Poiseuille flows), energy transfer (free/forced convections and conductions), and mass transfer; equation of state, turbulence, chemical reactions, and numerical methods solving transport equations. Introduction to Fluid Mechanics and Introduction to Heat Transfer or equivalents are recommended prerequisites for this course.

ME 661. Math Methods in EGR I. 3 Hours.
Mathematical theory and solutions methods to problems in engineering including advanced ordinary differential equations; eigenvalue problems; multi-variable calculus and implicit functions; curve, surface ad volume representation and integration; Fourier integrals and transforms; separation of variables and transform techniques for solution of partial differential equations. Differential Equations or equivalent is recommended as a prerequisite for this course.

ME 662. Math Methods in EGR II. 3 Hours.
Mathematical theory and solution methods to problems in engineering including Scalar and vector field theory advanced partial differential equations, analysis using complex variables, conformal mapping, complex integral calculus, Green's functions, perturbation methods, and variational calculus. Math Methods in EGR I or equivalent is recommended as a prerequisite for this course.

ME 663. Engineering Statistics. 3 Hours.
Introduction to applied statistics and probability for engineering and the physical sciences. Topics include introduction to probability, discrete and random variables and their distributions, joint probability distributions, hypothesis testing, statistical inference, linear regression and correlation, design of experiments, and statistical quality control. A basic understanding of calculus and matrix algebra at the undergraduate level is required for this course.

ME 665. Computational Methods in EGR. 3 Hours.
Applications of computers to solution of problems in engineering, including matrices, roots of equations, solution of simultaneous equations, curve fitting by least squares, differentiation and integration, differential and partial differential equations. Differential Equations and Computational Engineering or equivalents are recommended prerequisites for this course.

ME 670. Intro to Continuum Mechanics. 3 Hours.
Fundamentals and application of mechanics principles to problems in continuous media. Matrix and tensor mathematics, fundamentals of stress, kinematics and deformation of motion, conservation equations, constitutive equations and invariance, linear and nonlinear elasticity, classical fluids, linear viscoelasticity. Mechanics of Solids and Differential Equations or equivalents are recommended prerequisites for this course.

ME 672. Advanced Dynamics. 3 Hours.
Advanced topics in dynamics including complex motion analysis, generalized kinematic parameters, quasivelocities, and virtual displacements, direct and inverse dynamics approach, and fundamentals of systems with variable masses. Introduction to the modeling of mechatronic systems is presented through a consideration of mechanical, electrical and electronics components. Analytical and adaptive dynamics principles are taught as a basis for control algorithm development and mechatronic system design.

ME 677. Systems Engineering. 3 Hours.
This course will give students an initial exposure to the field of systems engineering as it applies to space missions. Students will learn key topics related to spacecraft and mission design, including requirements development, trade studies, the project life cycle, system hierarchy, risk analysis, and cost analysis. The concepts presented in this course will be demonstrated with examples from current NASA missions. The students will also be exposed to concepts regarding team organization, design fundamentals, and work ethics. They will learn that systems engineering is iterative and will develop judgment that will allow them to compare and evaluate engineering alternatives. They will learn to discuss systems engineering methods and processes as well as engage in systems thinking.

ME 679. Advanced Finite Element Analysis. 3 Hours.

ME 688. Fluid-Structure Interactions. 3 Hours.
Modeling and simulation of fluid-structure interaction (FSI) phenomena using computational methods. The Arbitrary Lagrangian Eulerian (ALE) formulation, a variety of interpolation methods, mesh movement and time mapping algorithms. Solution of FSI problems using interface codes.

ME 689. Enabling Technology Tools. 3 Hours.
Computational methods and tools for simulations and modeling of mechanical and biomedical applications. Numerical geometry, numerical mesh generation, and scientific visualization tools will be introduced and applied.

ME 690. Special Topics in (Area). 1-6 Hour.
Special Topics in (Area).

ME 691. Individual Study in (Area). 1-6 Hour.
Individual Study In (Area).

ME 693. Journal Club in Mechanical Engineering. 1 Hour.
JC.

ME 694. Seminars in Mechanical Engineering. 1 Hour.
Seminar.

ME 698. Non-Thesis Research. 1-12 Hour.

ME 699. Thesis Research. 1-12 Hour.
Prerequisites: GAC M

ME 711. Advanced Fluid Mechanics. 3 Hours.
Fundamental laws of motion for viscous fluid, classical solutions of the Navier-Stokes equations, inviscid flow solutions, laminar boundary layers, and stability criteria.
ME 713. Introduction to Computational Fluid Dynamics. 3 Hours.
Review of governing equations of fluid dynamics, mathematical behavior of partial differential equations, basic aspects of discretization, basic CFD techniques, basic grid generation, coordinate transformation, advanced numerical schemes, future CFD methodology. A knowledge of a computer language is required.

ME 714. Advanced Computational Fluid Dynamics. 3 Hours.

ME 715. Introduction to Turbulent Flows. 3 Hours.
Characteristics of turbulence, length and time scales, energy cascade, vorticity stretching, Reynolds averaging techniques. Closure problem, Boussinesq hypothesis, Eddy viscosity concepts, introduction to zero-, one-and two-equation models, Reynolds stress model.

ME 731. Dynamics and Mobility in Vehicles: Modeling and Simulation. 3 Hours.
The main goal of the course is to present advanced research and engineering knowledge in recent vehicle dynamics of road and off-road wheeled and track vehicles with an emphasis on vehicle longitudinal/lateral mobility and energy efficiency. Applications include vehicles for personal transportation, military vehicles, construction equipment and farm tractors. A unique feature of this course is its inverse vehicle dynamics approach. Another distinctive feature of the course is a mechatronics-based approach to modeling and simulation of multi-domain systems that include mechanical, electrical and electronics components such as sensors and actuators. Coupled and interactive dynamics of vehicle systems is presented, and a modeling process of vehicle operational properties is based on various equations of analytical and adaptive dynamics. Students will gain knowledge and analytical hands-on skills through innovative homework and a research project. Skills in one of programming software/languages are required (e.g., MATLAB/Simulink, ADAMS/Car, LabVIEW, etc.).

The main goal of this course is to give detailed understanding, analytical knowledge and engineering experience in research, design and experimental study of autonomous wheel power management systems (AWPMS). The AWPMS are autonomous mechatronic and autonomously operated mechanical systems that distribute power among the drive wheels of vehicles. AWPMS include various configurations of torque vectoring systems, limited slip differentials and hydraulically controlled differentials, electronically-locking differentials, and positive engagement of the wheels. AWPMS that are operationally integrated with steering and suspension systems are also presented in the course. Characteristics of wheel power management systems for a specific vehicle application are proved in the course by using inverse vehicle dynamics formulation and requirements to vehicle energy efficiency, mobility, stability of motion, and turnability. Students will learn mechanical design principles for mechatronic systems and methods for developing control algorithms. Methods for experimental study of wheel power management systems and vehicles are also presented in the course; including 4x4 vehicle chassis dynamometer with individual wheel control and test setups. Students will exercise analytical skills and gain hands-on experience through innovative homework and a research project.

ME 740. Heat Conduction. 3 Hours.
Introduction to methods of solution for heat conduction problems. Topics include separation of variables in rectangular, cylindrical and spherical coordinates, solution to the heat equation on semi-infinite and infinite domains, Duhamel's Theorem, use of Green's Function, and use of the Laplace Transform. A basic understanding of heat transfer at the undergraduate level is required for this course.

ME 741. Radiation Heat Transfer. 3 Hours.
Introduction to radiation heat transfer. Topics include radiation from black bodies and nonblack opaque surfaces, configuration factors for diffuse surfaces, radiation exchange in enclosures of diffuse-grey and specularly reflecting surfaces, radiation combined with conduction and convection, and energy transfer for absorbing, emitting and scattering media. A basic understanding of heat transfer at the undergraduate level is required for this course.

ME 742. Statistical Mechanics. 3 Hours.
Explanation of macroscopic thermodynamic and transport properties, based upon classical and quantum mechanical descriptions of elementary particles, atoms, and molecules. Analysis of the distributions of these objects over their allowed energy states and the relationships between those distributions and macroscopic properties.

ME 750. Transport Phenomena. 3 Hours.
Laminar flow transports: momentum transfer (Couette/Poiseuille flows), energy transfer (free/forced convections and conductions), and mass transfer; equation of state, turbulence, chemical reactions, and numerical methods solving transport equations.

ME 761. Math Methods in EGR I. 3 Hours.
Mathematical theory and solutions methods to problems in engineering including advanced ordinary differential equations; euvienvalue problems; multi-variable calculus and implicit functions; curve, surface and volume representation and integration; Fourier integrals and transforms; separation of variables and transform techniques for solution of partial differential equations. Differential Equations or equivalent is recommended as a prerequisite for this course.

ME 762. Math Methods in EGR II. 3 Hours.
Mathematical theory and solutions methods to problems in engineering including advanced ordinary differential equations; euvienvalue problems; multi-variable calculus and implicit functions; curve, surface and volume representation and integration; Fourier integrals and transforms; separation of variables and transform techniques for solution of partial differential equations. Differential Equations or equivalent is recommended as a prerequisite for this course.

ME 763. Engineering Statistics. 3 Hours.
Introduction to applied statistics and probability for engineering and the physical sciences. Topics include introduction to probability, discrete and random variables and their distributions, joint probability distributions, hypothesis testing, statistical inference, linear regression and correlation, design of experiments, and statistical quality control. A basic understanding of calculus and matrix algebra at the undergraduate level is required for this course.

ME 765. Computational Methods in EGR. 3 Hours.
Applications of computers to solution of problems in engineering, including matrices, roots of equations, solution of simultaneous equations, curve fitting by least squares, differentiation and integration, differential and partial differential equations. Differential Equations and Computational Engineering or equivalents are recommended prerequisites for this course.
ME 770. Intro to Continuum Mechanics. 3 Hours.
Fundamentals and application of mechanics principles to problems in
continuous media. Matrix and tensor mathematics, fundamentals of
stress, kinematics and deformation of motion, conservation equations,
constitutive equations and invariance, linear and nonlinear elasticity,
classical fluids, linear viscoelasticity. Mechanics of Solids and Differential
Equations or equivalents are recommended prerequisites for this course.

ME 772. Advanced Dynamics. 3 Hours.
Advanced topics in dynamics including complex motion analysis,
generalized kinematic parameters, quasivelocities and virtual
displacements, direct and inverse dynamics approaches, and
fundamentals of systems with variable masses. Introduction to the
modeling of mechatronic systems is presented through a consideration
of mechanical, electrical and electronics components. Analytical and
adaptive dynamics principles are taught as a basis for control algorithm
development and mechatronic system design.

ME 777. Systems Engineering. 3 Hours.
This course will give students an initial exposure to the field of systems
engineering as it applies to space missions. Students will learn key
topics related to spacecraft and mission design, including requirements
development, trade studies, the project life cycle, system hierarchy, risk
analysis, and cost analysis. The concepts presented in this course will be
demonstrated with examples from current NASA missions. The students
will also be exposed to concepts regarding team organization, design
fundamentals, and work ethics. They will learn that systems engineering
is iterative and will develop judgment that will allow them to compare and
evaluate engineering alternatives. They will learn to discuss systems
engineering methods and processes as well as engage in systems
thinking.

ME 779. Advanced Finite Element Analysis. 3 Hours.
Concepts and applications of finite element method. Development and
applications of various elements used in engineering mechanics. Use
of finite element analysis software. Application of finite element concept
and model development to fluid, heat transfer, and solid mechanics
problems. Introduction to Fluid Mechanics, Introduction to Heat Transfer,
and Mechanics of Solids or equivalents are recommended prerequisites
for this course.

ME 788. Fluid-Structure Interactions. 3 Hours.
Modeling and simulation of fluid-structure interaction (FSI) phenomena
using computational methods. The Arbitrary Lagrangian Eulerian (ALE)
formulation, a variety of interpolation methods, mesh movement and time
mapping algorithms. Solution of FSI problems using interface codes.

ME 789. Enabling Technology Tools for Scientists and Engineers. 3
Hours.
Computational methods and tools for simulations and modeling of
mechanical and biomedical applications. Numerical geometry, numerical
mesh generation, and scientific visualization tools will be introduced and
applied.

ME 790. Special Topics in ME. 1-6 Hour.
Special Topics in (Area).

ME 791. Individual Study in (Area). 1-6 Hour.
Individual Study in (Area).

ME 794. Seminars in Mechanical EGR. 1 Hour.
Seminars in areas of mechanical engineering.

ME 796. IEGR Journal Club. 1 Hour.
Journal club to discuss current research and investigations in areas of
interdisciplinary engineering.