Mechanical Engineering

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Mechanical Engineering (ME) is essential to a wide range of activities that include the research, design, development, manufacture, management, and control of engineering systems, subsystems, and their components. Mechanical engineers use the fundamentals of engineering mechanics, energy, thermal-fluid sciences, and material sciences to design and analyze mechanical systems that perform useful tasks required by society. For example, mechanical engineers work with the design and function of machines, devices, and structures in the areas of manufacturing, processing, power generation, and transportation (air, land, sea, and space). As a result of a rapidly expanding technology in recent years, mechanical engineers have become more versed in computer-aided design; robotics; bioengineering; environmental engineering; solar, wind, and ocean energy sources; and space exploration. The breadth of the field provides the graduate with many possibilities for a satisfying career.

Typically, mechanical engineers are employed by the manufacturing, power, aerospace, automotive, computer hardware and software, and processing industries. Careers are also available in design and development organizations as well as in many federal and state agencies. The department will make any reasonable effort to accommodate people with disabilities.

Accreditation. The Mechanical Engineering program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org/.

Program Objectives. The Mission of the Mechanical Engineering program at Minnesota State Mankato is to provide a broad-based education that will enable graduates to enter practice in the mechanical engineering profession, serving the needs of the State of Minnesota and the Nation.

Graduates of the Mechanical Engineering program at Minnesota State Mankato will be prepared:

1. with a strong technical foundation to practice mechanical engineering, or to pursue graduate studies;
2. to become registered professional engineers;
3. to communicate technical information effectively with the public, their peers, customers, and employers;
4. with an understanding of the need for life-long learning and of the importance for community and professional involvement; and
5. with an awareness of cultural, societal, and professional issues.

The program mission and educational objectives are fully compatible with the mission of Minnesota State Mankato and the College of Science, Engineering, and Technology. Program objectives are monitored by the constituencies (mechanical engineering profession through the program's Industrial Advisory Board and employers, alumni, students, and faculty of the program).

Other important features of the mechanical engineering program at Minnesota State Mankato include the following:

- Students are required to take a department-administered diagnostic test in their junior year. The purpose of this test is to provide feedback which will be used to strengthen the curriculum and to improve the preparation of students.
- Students are required to take the Fundamentals of Engineering exam in their senior year - a precursor to professional registration.
- Students are encouraged to work in engineering related areas for exposure to industrial practice. Internships are strongly recommended.
- Senior students must participate in a full academic year design experience working in a team similar to development teams in industry and government. Industrial sponsored projects are offered when available.

Recommended high school preparation is two years of algebra, one year of geometry, one-half year of trigonometry, one-half year of college algebra, and a year each of physics and chemistry. Engineering drafting and a computer language such as BASIC are also recommended. Without this background it may take longer than four years to earn the degree.

Admission to Program is necessary before enrolling in 300- and 400-level courses. Admission to program is granted by the department. Near the end of the sophomore year, students should submit applications for admission to the mechanical engineering program. Application to the program may be obtained from the Department of Mechanical and Civil Engineering or downloaded from the department homepage. Failure to submit an application will result in the student being denied registration in upper division courses in the Mechanical Engineering Program.

Admission to the program is based on GPA and performance in selected courses and is subject to approval by the Department of Mechanical and Civil Engineering. Only students admitted to the program are permitted to enroll in upper-division ME courses. Generally, no transfer credits are allowed for upper-division mechanical engineering courses. For any exceptions to this policy special written permission must be obtained and will be reviewed by the department. The department makes a special effort to accommodate transfer students. Transfer students are encouraged to contact the department as soon as possible to facilitate a smooth transition. Please feel free to write, call or visit the department.

Before being admitted to upper division mechanical engineering courses, a student must complete a minimum of 47 credits, including the following courses: General Physics (calculus based) 8 credits; Calculus and Differential Equations 16 credits; Introduction to Engineering 2 credits; Computer Graphics Communication 1 credit; Geometric Dimensioning and Tolerancing 1 credit; Introduction to Problem Solving and Engineering Design 2 credits; Engineering Mechanics (Statics and Dynamics) 6 credits; Electrical Engineering (Circuits, including lab) 4 credits; Chemistry 3 credits; and English Composition 4 credits. Moreover, students are required to take a diagnostic test. The purpose of the test is to identify areas of weakness so that we can provide future improvement in those areas.

For transfer students the distribution of credits specified in the previous paragraph may vary, but the total credits must satisfy departmental transfer requirements. Transfer students should contact the department for individual evaluation. Transfer students must take a minimum of 12 credits at Minnesota State Mankato prior to being considered for full admission to the program.

All courses and credits shown above must be completed, for grade, before enrollment in 300-level engineering courses. To be considered for admission a grade of "C" or better must be achieved in each course, and a the student must have a cumulative GPA of 2.5 for all courses listed above. All courses taken from the list above (including those for repeated courses) will be considered in the computation of the GPA for admission to the program. Transfer credits will not be used in the computation of the GPA for admission to the program. Transfer students should refer to the Supplemental Information in the Undergraduate Bulletin for information about procedures to be followed when applying for admission to the university. If a student is denied admission to the Mechanical Engineering Program, he/she can reapply to the Mechanical Engineering Program for admission in subsequent years.

POLICIES/INFORMATION

Satisfactory Progress. Once admitted to the mechanical engineering program, a student must maintain satisfactory progress in the upper-division Mechanical Engineering program by: (1) maintaining a cumulative GPA of 2.3 for all

upper-division engineering courses; and (2) achieving a GPA of at least 2.0 each semester for all courses required for the major. All courses, including repeated courses, will be used in the GPA calculations above.

P/N Grading Policy. P/N credit will not be applied to any course used to meet the mechanical engineering degree requirements.

Probation Policy. Once admitted to the program, a student who does not maintain satisfactory progress as defined above will be placed on program probationary status for a maximum of one semester. During the probationary period, the student must achieve satisfactory progress and, in addition: (a) must complete at least 8 credits, approved by the department, of upper-division engineering courses for grade from the prescribed Mechanical Engineering curriculum; and (b) shall not receive a degree without first conforming to the satisfactory progress criteria. A student who does not maintain satisfactory progress will not be allowed to continue in the program. The student may later reapply for admission to the program. If readmitted, only probationary status will be granted, and continuation in the program will be based on performance in courses specified in a contract with the department.

Appeals. A student may appeal any department decision in writing. The department will consider such appeals individually.

For the most up-to-date list of Mechanical engineering courses, please visit our Website at me.mnsu.edu.

MECHANICAL ENGINEERING BSME

Required (Special General Education, 23 credits). The Bachelor of Science in Mechanical Engineering degree does NOT adhere to the 44 credits of general education required by other programs. Rather, it requires a special distribution of communication, humanities and social science courses. Courses may be chosen to satisfy the university diversity cultures requirement concurrently.

Required Communication Courses (7 credits)
ENG 101 Composition (4) **AND**
CMST 102 Public Speaking (3) **OR**
ENG 271 Technical Communication (4)

Required Humanities and Social Science Courses (minimum 16 credits). To satisfy this requirement, the course selected must provide both breadth and depth and not be limited to a selection of unrelated introductory courses. Not all courses in humanities and social sciences are acceptable. Each student should discuss with his/her mechanical engineering advisor the selection of courses to meet this requirement early in their academic career. An updated list of acceptable courses is posted in the department office and on the website.

Specifically, the minimum requirements consist of at least 6 credits in the humanities area, and (b) at least 9 credits in the social science area, of which 3 credits must be either microeconomics or macroeconomics; (a), and (b) must total at least 16 credits. To provide the measure of depth to the course of study, at least three credits at the 300 level or above must be included in the 16 credit requirement. At least one upper-division course must follow a course in the same subject area.

Specifically, the minimum requirements consist of (a) three credits of microeconomics or macroeconomics, (b) at least 6 credits in the humanities area, and (c) at least 6 credits in the social science area; again, (a), (b), and (c) must total at least 16 credits.

To provide the measure of depth to the course of study, at least three credits at the 300 level or above must be included in the 16 credit requirement. At least one upper-division course must follow in the same subject area.

Required for Major (Prerequisites, 47 credits)
Science and Mathematics (31 credits)
CHEM 191 Chemistry for Engineers (3)
MATH 121 Calculus I (4)
MATH 122 Calculus II (4)
MATH 223 Calculus III (4)
MATH 321 Ordinary Differential Equations (4)
PHYS 221 General Physics I (4)
PHYS 222 General Physics II (3)
PHYS 232 General Physics II Lab (1)

Science Elective (4 credits) either:
PHYS 223 and PHYS 233 **OR** BIOL 105 **OR** CHEM 202

Engineering Science (16 credits)
EE 230 Circuits Analysis I (3)
EE 240 Evaluation of Circuits (1)
ME 101 Introduction to Engineering-Mechanical (2)
ME 103 Computer Graphics Communication (1)
ME 113 Geometric Dimensioning and Tolerancing (1)
ME 201 Introduction to Problem Solving and Engineering Design (2)
ME 212 Statics (3)
ME 214 Dynamics (3)

Required for Major (58 credits)
EE 244 Introduction to Digital Systems (2)
EE 253 Logic Circuits Lab (1)
ME 206 Materials Science (3)
ME 223 Mechanics of Materials (3)
ME 241 Thermodynamics (3)
ME 291 Engineering Analysis (3)
ME 321 Fluid Mechanics (3)
ME 324 Heat Transfer (3)
ME 329 Applied Thermodynamics (3)
ME 333 Manufacturing Processes (3)
ME 336 Mechanical Engineering Experimentation I (2)
ME 341 Linear Systems (3)
ME 417 Design of Machine Elements (3)
ME 420 Computer Aided Engineering (3)
ME 428 Design Project I (3)
ME 436 Mechanical Engineering Experimentation II (2)
ME 438 Design Project II (3)
ME 463 Automatic Controls (3)
ME 466 Mechanical Engineering Experimentation III (2)
ME 492 Mechanical Engineering Seminar (1)
ME Elective (3)
ME Elective (3)
Consult with your advisor for selection of electives.

Required Minor: None.

COURSE DESCRIPTIONS

ME 101 (2) Introduction to Engineering - Mechanical
To prepare students for a career in engineering with emphasis on mechanical; introduce the engineering fundamentals and the skills necessary to have a successful learning experience; and to prepare students for engineering education and profession through interactions with upper-class engineering students and practitioners.

ME 102 (1) Introduction to Engineering II
A continuation of ME 101 covering historical and global perspectives, engineering discipline and functions, professional aspects of engineering, ethical aspects of engineering, creativity and innovation, basics of personal computers-word processing and spreadsheets, introduction to problem solving.
Variable

ME 103 (1) Computer Graphics Communication
Standards of graphics communication. Orthographic projections, dimensioning, tolerancing, section views. Extensive use of modern software to create engineering drawings. Introduction to solid modeling of parts and assemblies. This course includes laboratory component.

ME 113 (1) Geometric Dimensioning and Tolerancing
This course is intended to provide the students with an understanding of the principles and methodologies of geometric dimensioning and tolerancing. Topics include: Datums, Material condition symbols, Tolerances of Form and profile, Tolerances of orientation and runout, location tolerances, and Virtual condition. This course includes laboratory component.
Co-req.: ME 103.

ME 201 (2) Introduction to Problem Solving and Engineering Design
This course has two main parts. Part one covers problem solving and fundamentals of programming including data types, decision making, repetitive loops, and arrays. Engineering applications requiring programming are included. Part two covers engineering design philosophy and methodology, communication skills, and teamwork. A design project is also included.
Pre: ME 101
Co-req: ME 103, MATH 121
Fall, Spring

ME 206 (3) Materials Science
Physical principles of elastic and plastic deformation of materials. Dislocation theory. Fatigue, creep, fracture, hardness, phase diagrams and other mechanical phenomena in materials. Ceramics and composite materials. Residual stresses. Lecture and lab demonstrations.
Pre: ME 223
Fall

ME 212 (3) Statics
Resultants of force systems, equilibrium, analysis of forces acting on structural and machine elements, friction, second moments, virtual work.
Pre: PHYS 221
Fall, Spring

ME 214 (3) Dynamics
Kinematics and kinetics of particles, systems of particles and rigid bodies, work-energy, linear and angular impulse momentum, vibrations.
Pre: ME 212
Fall, Spring

ME 223 (3) Mechanics of Materials
Load deformation, stress, strain, stress-strain relationship, buckling, energy concepts, stress analysis of structural and machine elements.
Pre: ME 212
Fall, Spring

ME 241 (3) Thermodynamics
Fundamental concepts of thermodynamics. Thermal properties of substances and state equations. Conservation of mass, first and second laws. Examples of applications to different engineering systems.
Pre: PHYS 221
Fall

ME 291 (3) Engineering Analysis
Probability and statistics. Uncertainty, distributions. Numerical solution of algebraic, transcendental and differential equations. Numerical integration and differentiations. Structured programming language required.
Pre: ME 212
Coreq: MATH 321
Fall, Spring

ME 293 (1) MAX Scholar Seminar
This class provides MAX scholars with an opportunity to explore a set of topics related to achieving success in academic, professional and personal realms. Speakers will include faculty, graduate students, visiting researchers and industry members as well as student participants. Students will be required to participate in mentoring of lower division MAX scholarship recipients and provide written and oral presentations of various topics during the semester. This course may be repeated and will not count towards graduation requirements.
Pre: Recipient of a MAX scholarship or instructor consent.
Fall, Spring

ME 299 (2) Thermal Analysis
Basic principles of thermodynamics, fluid mechanics, and heat transfer. First and second laws of thermodynamics and application to engineering systems and their design. Not for mechanical engineering major.
Pre: PHYS 222, MATH 321
Spring

ME 308 (2) Design Morphology
Components of the product realization process are covered including process steps, financial analysis and project planning. Design case studies are presented.
Variable

ME 321 (3) Fluid Mechanics
Introduction to fluid flow, fluid properties, fluid statics, the integral and differential approach to basic flow equations. Bernoulli's equation, similitude and dimensional analysis, viscous internal and external flows, one dimensional compressible flow.
Pre: ME 214
Coreq: ME 241 or ME 299
Fall

ME 324 (3) Heat Transfer
Steady and unsteady conduction. Free and forced convection. Heat transfer by radiation. Combined modes of heat transfer. Elements of heat exchangers design.
Pre: ME 241, ME 321
Spring

ME 327 (3) Mechanical Engineering Design I
Applications of principles of mechanics to the design of various machine elements such as bearings, shafts, gears, clutches, brakes and springs. Design factors and fatigue. Design problems considering engineering calculations, manufacturability and safety.
Pre: ME 214, ME 223
Variable

ME 329 (3) Applied Thermodynamics
Energy analysis and design of thermodynamic systems including power and refrigeration cycles. Thermodynamic relations. Application of thermodynamics to mixtures and solutions. Psychometrics. Introduction to chemical thermodynamics. Third law of thermodynamics.
Pre: ME 241
Spring

ME 331 (1) Materials Properties Lab
Elastic and plastic deformation of materials. Fatigue and impact. Microstructure. Structural deflections. General mechanical properties of materials related to the performance of products.
Pre: ME 206, ME 223
Variable

ME 333 (3) Manufacturing Processes
Introduction to manufacturing, tribology, casting, bulk deformation, sheet metal forming, material removal, joining, polymers, powder metals, ceramics, automation, integrated systems. Design for manufacture.
Pre: ME 206, ME 223
Spring

ME 336 (2) Mechanical Engineering Experimentation I
Experiments in Mechanical Engineering, load-deformation, load-failure, fatigue, impact, hardness. Introduction to traditional machining and material processing. This course includes laboratory.
Coreq: ME 333
Spring

ME 341 (3) Linear Systems
Analysis of linear systems in the time and frequency domains. Physical systems modeled and analyzed using time domain techniques. Fourier and Laplace Transforms.
Pre: ME 291
Fall

ME 357 (3) Mechanical Engineering Design II
Motion, velocity, acceleration, and dynamic forces in various mechanisms and machines. Design of selected mechanical motion devices. Optimum design.
Pre: ME 327
Variable

ME 414 (3) Intermediate Dynamics
Two and three dimensional kinematics, multi-degree of freedom systems, Newton's equations, impulse-momentum, energy methods, Lagrange's equations.
Pre: ME 341
Variable

ME 415 (3) Structural Analysis
Structural analysis of determinate and indeterminate beams, trusses, frames, plates shells; influence lines, moving loads, deflection analysis. Use of computer software is expected.
Pre: ME 223
Fall

ME 416 (3) Thermal/Fluid Systems Design
The application of the principles of thermodynamics, fluid mechanics, and heat transfer to the design and analysis of selected ener gy systems of current interest, such as nuclear, solar, geothermal, and also conventional systems. Lecture and design projects.
Pre: ME 324, ME 329
Variable

ME 417 (3) Design of Machine Elements
Application of principles of mechanics to the design of various machine elements such as gears, bearings, springs, rivets, welding. Stresses in mechanical elements. Design factors, fatigue, manufacturability. Lectures and design projects.
Pre: ME 214, ME 223
Spring

ME 418 (3) Mechanical Systems Design
The application of mechanics to the design and analysis of motion and force transmitting systems. Optimum design.
Pre: ME 417
Variable

ME 420 (3) Computer Aided Engineering
Theoretical background in, and hand-on application of, both solid modeling and finite element methods. CAE Systems, Graphical standards, databases, solid modeling techniques. Derivation and solution offinite element equations for various types of elements and systems. Extensive use of modern software to perform both design and analysis. This course includes laboratory component.
Co-req.: Senior standing in ME.
Fall

ME 421 (3) Intermediate Fluid Mechanics
Potential flow, boundary layer flow, turbomachinery. Design aspects in fluid-flow systems. Formulation of continuity, momentum and energy equations, applications to control volumes, two-dimensional and axially symmetric potential flows.
Pre: ME 321
Variable

ME 422 (3) Mechanics of Composite Materials
Introduce anisotropic mechanics theories, engineering application of various composite materials, mechanical behaviors and fabrication of composites, experimental and theoretical approach for composite designs, contemporary issues such as nano/microcomposites.
Pre: ME 223

ME 423 (3) Intermediate Mechanics of Materials
Stresses and deformation of curved beams, beams on elastic foundations, indeterminate problems, torsion of noncircular bars, introduction to plates and shells, thick walled cylinders, failure theories.
Pre: ME 417
Variable

ME 424 (3) Analysis and Design of Heat Transfer Equipment
Analysis of heat and mass flow, design of heat exchangers and accompanying piping system. Methods of heat transfer enhancement, heat pipes.
Pre: ME 324
Variable

ME 425 (3) Thermal Analysis & Control of Electronic Equipment
Thermal consideration in the design of heat-exchange equipment. Review of heat transfer modes; contact resistance; air handling. Numerical methods. Cool ing techniques; fins, extended surfaces, cold plates, heat pipes, immersion cooling, thermoelectric coolers. Enhanced heat transfer.
Pre: ME 324
Variable

ME 426 (3) Aerosol Theory and Technology
Introduction to the theory of aerosols and particulate systems. Properties, behavior, and physical principles of aerosols; including particle size statistics, Brownian motion and diffusion, and coagulation. Application in areas such as environmental systems, respiratory deposition, bioterrorism, and materials processing.

ME 427 (3) Kinematics & Dynamics of Mechanisms
Computer-oriented methods of synthesis. Dynamics of mechanisms. Force and moment balancing of mechanisms; shaking forces. Term design projects.
Pre: ME 417
Variable

ME 428 (3) Design Project I
The first course in a two semester sequence that provides a complete design experience under professional guidance. The course covers: the product realization process, financial analysis, quality, patents, ethics and case studies. The students initiate a design project early in the semester to be completed in ME 438.
Pre: Senior standing in mechanical engineering
Fall

ME 429 (3) Energy Conversion
Methods of energy conversion. Topics may include hydroelectric, geothermal, wind and solar power generation, as well as unconventional methods of energy conversion. Term design problems.
Pre: ME 324, ME 329
Variable

ME 430 (3) Dynamics of Machinery
Force transmissibility, bearing reactions, applications to cams, flywheels, gear linkages, shaking forces, balancing, isolators, critical speeds. Term design problems.
Pre: ME 417
Variable

ME 433 (3) Design for Manufacture and Assembly
Current design for assembly (DFA) techniques are discussed. Both "manual" and software approaches are utilized, and enforced with numerous examples. Design for manufacturability (DFM) is addressed for many common manufacturing processes including: sheet metal, casting, forging, plastics, machining, snap fits, elastomers, surface finishes/protective finishes, powdered metal, and extrusions. Recent DFM software is utilized. Class project required.
Variable

ME 434 (3) Computer Control of Manufacturing Systems
A study of the principles, techniques, and applications of computer numerically controlled machine tools. The planning, use, expansion, and updating of computerized systems to meet the needs of industry . An introduction to Computer Aided Manufacturing (CAM) systems.
Pre: Senior standing in Engineering
Variable

ME 436 (2) Mechanical Engineering Experimentation II
Experimental and analytical studies of phenomena and performance of fluid flow, heat transfer, thermodynamics, refrigeration and mechanical power systems. This course includes laboratory component.
Pre: ME 291, ME 324, ME 329
Fall

ME 438 (3) Design Project II
The second course of a two semester sequence, taken the semester in which the student expects to graduate. These two courses provide a complete design experience. This course includes: completion of the design project, design presentations, design report, design evaluations and manuals.
Pre: ME 428
Spring

ME 439 (3) Air Conditioning & Refrigeration
Refrigeration cycles and equipment, refrigerant properties, heating and cooling loads, psychometric analysis of air conditioning. Distribution of air conditioning medium and air quality as applied to design.
Pre: ME 324, ME 329
Variable

ME 441 (3) Vehicle Dynamics
The dynamics of ground vehicles is studied, including pneumatic tires, vehicle handling, vehicle performance (including transmissions), modeling & simulation, and current research topics such as ITS/AVCS (Intelligent Transportation Systems Program/Advanced Vehicle Control Systems). Emphasis is on fundamentals, simulation, and limited experimentation. Class project required.
Pre: Senior standing in Mechanical Engineering
Variable

ME 443 (3) Theory of Elasticity
Fundamental equations of elasticity in three dimensions, plane stress and plane strain, flexure and torsion of bars of various shapes.
Pre: ME 223
Variable

ME 446 (1) Senior Mechanical Engineering Laboratory
Application of the engineering sciences and the principles of measurement to the evaluation of operating characteristics of mechanical equipment and systems. Design of measurement systems. Collection, analysis, and interpretation of the data and the presentation of the results.
Pre: Senior standing in Mechanical Engineering
Variable

ME 447 (3) Design of Machine Elements II
Application of principles of mechanics of materials and of material failure theories to the design and analysis of shafts, journal bearings, helical, bevel and worm gears, clutches, brakes, couplings, and flexible mechanical elements. Statistical consideration.
Pre: ME 417
Spring

ME 450 (3) Finite Element Method
Energy and residual methods, 2D and 3D problems in stress analysis. Application of steady and transient heat flow, hydrodynamics, creeping flow.
Pre: ME 223 and ME 324 or instructor consent
Variable

ME 462 (3) Vibrations
Free and forced vibration in linear single degree of freedom systems, design and analysis of multiple degree of freedom systems with and without damping, vibration of coupled systems.
Pre: ME 341
Variable

ME 463 (3) Automatic Controls
Analysis of control systems using the methods of Evans, Nyquist and Bode. Improvement of system performance by feedback compensation. Introduction to digital control.
Pre: ME 341
Fall

ME 464 (3) Mechatronics
Synergistic combination of mechanical engineering, electronics, controls and programming in the design of mechatronic systems. Sensors, actuators and microcontrollers. Survey of the contemporary use of embedded microcontrollers in mechanical systems, case studies.
Pre: ME 417, ME 463
Spring

ME 466 (2) Mechanical Engineering Experimentation III
Experiments in vibrations: Motion measurement, force measurement, free vibration, frequency response, impact response, noise, signal processing. Experiments in control: system modelling and characterization in the time and frequency domains, feedback and compensation, PID control, control of velocity and position. This course includes laboratory.
Pre: ME 463
Spring

ME 471 (3) Production Tool Design
Classroom discussions and actual design projects are combined to gain knowledge and experience necessary to design tools commonly used in modern manufacturing processes. Course consists of designing tools, gages, simple jigs, fixtures, punches and dies as employed in mass production processes.
Pre: Senior standing in Engineering
Variable

ME 491 (1-4) In-Service
Variable

ME 492 (1) Mechanical Engineering Seminar
To acquaint students with various engineering careers, various industries, and various societal and ethical problems.
Pre: Senior standing in Mechanical Engineering
Spring

ME 493 (1) MAX Scholar Seminar
This class provides MAX scholars with an opportunity to explore a set of topics related to achieving success in academic, professional and personal realms. Speakers will include faculty, graduate students, visiting researchers and industry members as well as student participants. Students will be required to participate in mentoring of lower division MAX scholarship recipients and provide written and oral presentations of various topics during the semester This course may be repeated and will not count towards graduation requirements.
Pre: Recipient of a MAX scholarship or instructor consent.
Fall, Spring

ME 497 (1-6) Internship
Variable

ME 499 (1-6) Individual Study
Variable