MECHANICAL ENGINEERING

The mechanical engineering field is one of the oldest of the several engineering fields. It is also one of the broadest in scope, for it is not identified with nor restricted to any particular technology (like nuclear engineering), nor to any particular vehicle (like land-based automobiles), nor to any particular device or particular system. It is, in fact, concerned with so many areas of modern technology that the tasks and challenges of the mechanical engineer are most interesting and varied.

The field is logically associated with mechanical things, but this can lead to a restrictive image. For example, one often associates mechanical engineers with automobiles and, thus, with engines. To the non-engineer this is an acceptable association that implies a knowledge of pistons and carburetors. As engineers know, this picture is very shallow; the breadth of understanding implied when one thinks of designing an engine challenges the imagination. Automobile engines are just one of many devices that convert energy into useful work. To understand this conversion process is also to understand the basic principles of energy conversion applicable to solar engines, jet engines, gas turbines, fuel cells, ship-propulsion systems, rocket engines, hydro-electric power plants, and new kinds of converters not yet developed. The mechanical engineer possesses this universally applicable background in thermodynamics, heat transfer, fluid mechanics, aerodynamics, and combustion theory that is basic to all such systems. The mechanical engineer also has a similar understanding of materials from steels to textiles to biological materials to the latest plastics and the most exotic high temperature composites. The point is that everything that is built is achieved by applying these same principles and using these same materials.

To understand the dynamic nature of most mechanical devices and systems requires a thorough mastery of forces and stresses, of vibrations and acoustics, of shock and impact, of deformation and fracture. Yet, these are basic to virtually every product devised by people or found in nature. Automobiles are just one small example of where they are important.

Thus, the mechanical engineer is a designer who creates physical things of all sorts because the mechanical engineer's breadth of background is everywhere applicable. The mechanical engineer produces machines to build other machines, and thus is in the forefront of new manufacturing technology. In this role the engineer is faced with the task of building new things created by all kinds of engineers. This exposes the engineer to other technologies, and the mechanical engineer must be able to grasp their essence easily. For example, as the builder of energy devices to tap the oceans' resources, the mechanical engineer is simultaneously one of the oceanographers, one of the chemists, and one of the environmentalists, as well as the master designer.

The mechanical engineer is comfortable working with people as well as with machines. For example, the role in vehicle design is that of making technical advances in performance, efficiency, and cost while simultaneously meeting the life and comfort requirements of operators and passengers. Logically, then, the mechanical engineer is active in the new fields of biomechanics, biomaterials, biomedical fluid mechanics and heat transfer, air and water pollution, water desalinization, sensory aids, and prostheses.

Undergraduate Degree Program

The Bachelor of Science Engineering in Mechanical Engineering provides first a strong foundation in all of the basic ingredients of engineering: the natural and physical sciences, mathematics, a comprehensive socio-economic-cultural background, the behavioral sciences, and finally the basic engineering sciences that begin the development of problem-solving skills.

The program provides for the detailed study of several advanced topics, including fluid machinery, heat transfer, manufacturing processes, vibration theory, stress analysis, metallurgy, electrical science, and control systems.

The greatest strength of the undergraduate program is the project-oriented design work that requires the student to organize thinking of the multitude of factors on which every design is based - performance, efficiency, esthetics, cost, reliability, safety, reparability, etc. - and to reach sound conclusions that the student must be prepared to defend and implement. This is the art of engineering, and its study permeates the courses and laboratories of the upper-level instruction in this field.

For those who choose the cooperative education option, it is possible to develop a more thorough understanding of how design factors are considered and how decisions are implemented in industrial organizations.

The Bachelor of Science in Engineering in Mechanical Engineering program is accredited by the Engineering Accreditation Commission of ABET, https://www.abet.org (https://www.abet.org/)

Program Educational Objectives

The Program Educational Objectives of the mechanical engineering program are that our graduates will:

- Be successfully employed in their discipline or a closely related field and contribute to the economy of the state and the nation
- Continue to enhance their knowledge base and skills, through graduate degrees or other professional development, to keep abreast of ongoing changes in technology and related disciplines
- Be well rounded and well suited to work with colleagues and professionals with diverse backgrounds and cultures, and a wide range of competencies

Program Outcomes

To achieve the educational objectives, the graduates of the program will have:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations, and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

**Dearborn Discovery Core**

Please see the Dearborn Discovery Core (General Education) ([https://umdearborn.edu/faculty-staff/academic-program-and-course-development/dearborn-discovery-core-general-education/](https://umdearborn.edu/faculty-staff/academic-program-and-course-development/dearborn-discovery-core-general-education/)) webpage or additional information.

**Foundational Studies**

Writing and Communication (GEWO) – 6 Credits

Upper-Level Writing Intensive (GEWI) – 3 Credits

Quantitative Thinking and Problem Solving (GEQT) – 3 Credits

Critical and Creative Thinking (GECC) – 3 Credits

**Areas of Inquiry**

Natural Science (GENS) – 7 Credits

- Lecture/Lab Science Course
- Additional Science Course

Social and Behavioral Analysis (GESB) – 9 Credits

Humanities and the Arts (GEHA) – 6 Credits

Intersections (GEIN) – 6 Credits

**Capstone**

Capstone (GECE) – 3 Credits

**Major Requirements**

A candidate for the degree Bachelor of Science in Engineering (Mechanical Engineering) is required to pursue scholastic quality and to complete satisfactorily the following program of study:

In addition to completion of the Dearborn Discovery Core, the following courses are required to earn a BSE degree in Mechanical Engineering from UM-Dearborn.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>PHYS 151</td>
<td>General Physics II</td>
<td>4</td>
</tr>
<tr>
<td>ECON 201</td>
<td>Prin: Macroeconomics (ECON 201 or 202 also fulfill 3 credits of DDC Social and Behavioral Analysis)</td>
<td>3</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Prin: Microeconomics</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 100</td>
<td>Introduction to Engineering and Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 126</td>
<td>Engineering Computer Graphics</td>
<td>2</td>
</tr>
<tr>
<td>ENGR 216</td>
<td>Computer Meth for Engineers</td>
<td>2</td>
</tr>
<tr>
<td>ENGR 250</td>
<td>Principles of Eng Materials</td>
<td>3</td>
</tr>
<tr>
<td>ME 230</td>
<td>Thermodynamics</td>
<td>4</td>
</tr>
<tr>
<td>ME 260</td>
<td>Design Stress Analyses</td>
<td>4</td>
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</table>

**Mechanical Engineering Major Core**

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**Upper-Level Design Electives**

3-4

select at least one course from this area

- BENG 370 | Biomechanics I
- BENG 426 | Fundamentals of Drug Delivery
- BENG 451 | Microfluidics
- BENG 470 | Advanced Biomechanics
- BENG 481 | Biomimetics
- ENGR 360 | Design Thinking : Process, Method & Practice
- ENGR 493 | Exper Hnrs Dir Dsgn
- ME 4191 | Structural Mech & Design
- ME 4202 | Design Turbo. and Wind Gen.
- ME 423 | Thermal Sys Des & Optimization
- ME 4361 | Design of HVAC Systems
- ME 440 | Intro to Mechanical Vibrations
- ME 445 | Sound and Noise Controls
- ME 4461 | Mech Vibration & Noise Control
- ME 4471 | Solar Energy Sys Analy&Design
- ME 452 | Sustainable Energy & Environ
- ME 460 | Design for Manufacturing
- ME 469 | Senior Design II
- ME 472 | Prin & Appl of Mechatronic Sys
- ME 483 | Dsgn Cons in Poly and Comp Mat
- ME 490 | Directed Design Project

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<tr>
<th>Code</th>
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<tbody>
<tr>
<td>COMP 270</td>
<td>Tech Writing for Engineers (Also fulfills 3 credits of DDC Written and Oral Communication)</td>
<td>3</td>
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<tr>
<td>MATH 115</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 116</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 215</td>
<td>Calculus III</td>
<td>4</td>
</tr>
<tr>
<td>MATH 228</td>
<td>Diff Eqns with Linear Algebra</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 134</td>
<td>General Chemistry IA</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 136</td>
<td>General Chemistry IIA</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 150</td>
<td>General Physics I</td>
<td>8</td>
</tr>
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</table>
ME 265  Applied Mechanics  4 Credit Hours
A comprehensive introduction to the science of applied mechanics, encompassing a study of forces and the stresses, deflections, and motions which they produce. Topics include the concept of equilibrium and static force analysis; the mechanics of deformable bodies (internal stresses, constitutive relationships, strains, deflections, failure); statics of indeterminate systems; kinematics; kinetics of particles, systems of particles, and rigid bodies. Four hours lecture. This course is not open to ME majors (F, S, W).
Prerequisite(s): PHYS 150 and (MATH 205* or Mathematics Placement with a score of 215 or MATH 215*)
Restriction(s): Cannot enroll if Major is Mechanical Engineering.

ME 290  Spec Topics in Mech Engin  1 to 3 Credit Hours
Special topics in mechanical engineering selected according to students’ interest and availability of instructors and equipment.

ME 299  Internship/ Co-op  1 Credit Hour
This is a Cooperative Education course. Students wishing to experience a work experience before graduation may elect to participate in the Cooperative Education Program (minimum of two terms). (F,W,S).
Restriction(s): Can enroll if Class is Junior or Senior or Graduate

ME 325  Thermal Fluid Sciences I  4 Credit Hours
Prerequisite(s): ENGR 216 and ME 230 and ME 260
Restriction(s): Can enroll if College is Engineering and Computer Science

ME 345  Engineering Dynamics  4 Credit Hours
Vector treatment of the kinematics and kinetics of particles, systems of particles and rigid bodies. Newton's laws, work/energy and impulse/momentum principles. Introduction to mechanical vibrations. (F, S, W).
Prerequisite(s): ENGR 216* and ME 260 and (MATH 216 or MATH 228)
Restriction(s): Can enroll if College is Engineering and Computer Science

ME 349  Instrument & Measurement Systems  3 Credit Hours
Modern instrumentation systems are considered beginning with generic issues such as calibration, error analysis, and dynamic response characteristics of instrumentation. Specific transducer systems (temperature, force and pressure, etc.) are presented, as well as interfacing techniques and elementary signal processing. (F,W,S).
Prerequisite(s): (ME 265 or ME 345) and ECE 305
Restriction(s): Can enroll if Class is Sophomore or Junior or Senior
Can enroll if Level is Undergraduate
Can enroll if College is Engineering and Computer Science
ME 3601  Design and Analysis of Machine Elements  4 Credit Hours  
Application of mechanics of materials to analysis and design of elementary mechanical components and systems. Topics include: stress and strain analysis; stress concentration; failure theories; safety factor; fatigue; fracture; combined loading; impact; buckling. Components considered: fasteners; springs; bearings; gears; beams; shafts and other power transmission components. Numerical techniques. (F, S, W).
Prerequisite(s): (ENGR 216 or ME 215) and (ME 260 or ME 265)
Restriction(s):
Can enroll if College is Engineering and Computer Science
Cannot enroll if Major is

ME 364  Prob, Stats, and Rel in Mach D  3 Credit Hours  
Introduction to probability, statistics, and reliability with emphasis on mechanical engineering applications. The course covers basic probability, descriptive statistics, probability distributions of discrete and continuous variables, statistical inferences, DOE (design of experiments), ANOVA (analysis of variance), regression, and correlation. (F, S, W).
Prerequisite(s): ME 260 and ENGR 216

ME 375  Thermal Fluid Sciences II  4 Credit Hours  
Prerequisite(s): ME 325 and ECE 305*
Restriction(s):
Can enroll if College is Engineering and Computer Science

ME 379  Thermal-Fluids Laboratory  3 Credit Hours  
An experimental investigation of thermodynamic, fluid mechanic, and heat transfer principles. Students will learn about thermal-fluids instrumentation and conduct experiments. In addition, they will design their own experiments to demonstrate their understanding of the principles. (F,W,S).
Prerequisite(s): ME 325 and (ME 349 or BENG 351) and ME 375* and (COMP 270 or COMP 106 or Composition Placement Score with a score of 40 or Composition Placement Score with a score of 107 or COMP 220)
Restriction(s):
Can enroll if College is Engineering and Computer Science

ME 381  Manufacturing Processes I  4 Credit Hours  
This course introduces the students to the fundamentals and principles of manufacturing processes for engineering materials. It seeks to transfer an understanding of the application of principles of engineering materials and their influence on manufacturing processes. Topics covered include structure and properties of materials, various conventional shaping processes viz. solidification, powder and particulate, deformation, and material removal processes; heat treatment and surface processing, and materials joining. Topics on recent advancements including but not limited to microfabrication, nanofabrication, additive manufacturing is also covered. Case studies of design for manufacturing and measurement of product quality; economical aspects and cost considerations in manufacturing systems will be studied. Three lecture hours and three laboratory hours. (F, S, W).
Prerequisite(s): ENGR 250 and (ME 260 or ME 265)
Corequisite(s): ME 381L
Restriction(s):
Can enroll if College is Engineering and Computer Science

ME 399  Internship/ Co-op  1 Credit Hour  
This is a Cooperative Education course. Students wishing to experience a work experience before graduation may elect to participate in the Cooperative Education Program (minimum of two terms)
Restriction(s):
Can enroll if Class is Junior or Senior or Graduate

ME 410  Finite Element Method with Appl  3 Credit Hours  
A presentation of the basic concepts and fundamentals of the Finite Element Method of Analysis in general, followed by applications to both continuum and field problems. Selected areas of application: dynamics and vibration including wave propagation; acoustics; fluid mechanics including film lubrication and ground water flow; heat transfer; elasticity and stress/strain analysis including structures; electrical field problems including electrostatics and electromagnetics (YR).
Prerequisite(s): (ME 345 and ME 3601 and ME 375*) or (BENG 370 and BENG 325*)
Restriction(s):
Can enroll if College is Engineering and Computer Science

ME 4191  Structural Mech & Design  4 Credit Hours  
A presentation of the methods of plane elasticity to solve a variety of problems arising in the analysis and design of structures. Review of the concepts of plane stress and strain, basic equations of plane elasticity and problems, energy methods approximate/numerical techniques, elastic-plastic bending and torsion, fracture and fatigue. (YR).
Prerequisite(s): ME 345 and ME 3601
Restriction(s):
Can enroll if Class is Junior or Senior
Can enroll if Level is Undergraduate
Can enroll if College is Engineering and Computer Science

ME 4202  Design Turbo. and Wind Gen.  4 Credit Hours  
Principles of turbomachinery design and practices with emphasis on wind power generation. Euler’s equation for energy transfer calculations. Two- and three-dimensional velocity diagrams. Aerodynamics of wind turbines. Wind turbine design and control. Power generation of wind turbines, wind energy system economics and environmental impacts. Design procedures and characteristics of compressors, fans and blowers. Basic design calculations and selection of pumps. A turbomachinery design project by using the theory learned from the course may be required. (YR).
Prerequisite(s): ME 375
Restriction(s):
Can enroll if College is Engineering and Computer Science

ME 423  Thermal Sys Des & Optimization  4 Credit Hours  
Design, analysis, and optimization of thermal fluid systems using principles of thermodynamics, fluid mechanics, and heat transfer. Application of thermal sciences in component and system design. Optimized design methodology for improving operations of thermal systems to minimize energy consumption and/or operating costs. (OC)
Prerequisite(s): ME 375*
Restriction(s):
Can enroll if College is Engineering and Computer Science
Cannot enroll if Major is
ME 4301    Computational Thermo-Fluids    3 Credit Hours

Prerequisite(s): ME 325 and ME 375*
Restriction(s):
Can enroll if College is Engineering and Computer Science

ME 4361    Design of HVAC Systems    4 Credit Hours
A comprehensive treatment of the design principles and practices in the heating, ventilating, and air conditioning. Psychrometrics, design loads, distribution systems, equipment selection. (YR).

Prerequisite(s): ME 325 and ME 375*
Restriction(s):
Can enroll if College is Engineering and Computer Science

ME 440    Intro to Mechanical Vibrations    3 Credit Hours
This introductory course on mechanical vibrations covers theories with applications, which include free and forced vibration analysis of damped and undamped, discrete (ranging from single to multi-degree-of-freedom), and simple continuous structures (such as strings, shafts, and beams), and design of vibration absorbers. Students may not receive credit for both ME 440 and ME 4461. (YR).

Prerequisite(s): ME 345 and ME 349
Restriction(s):
Can enroll if College is Engineering and Computer Science Cannot enroll if Major is

ME 442    Control Systems Analysis and Design    4 Credit Hours

Prerequisite(s): ECE 305 and ME 345
Corequisite(s): ME 442L
Restriction(s):
Can enroll if College is Engineering and Computer Science

ME 445    Sound and Noise Controls    4 Credit Hours
Full Course Title: Introduction to Sound and Noise Controls This course covers basic topics in sound theory, applications, and noise control system design. Topics include sound generation, radiation and transmission, human hearing system mechanism, sound quality metrics, design of silencers, mufflers and resonator, audio system and speaker design, building acoustics, acoustical material properties and material testing, sound measurement, and octave band analysis. The student is required to conduct a course project related to noise control system design. Students may not receive credit for both ME 445 and ME 4461. (YR).

Prerequisite(s): (ME 265 and BENG 351) or (ME 345 and ME 349)
Restriction(s):
Can enroll if College is Engineering and Computer Science Cannot enroll if Major is

ME 4461    Mech Vibration & Noise Control    4 Credit Hours
Fundamentals of mechanical vibration and principles of noise control. Use of transducers and instruments to conduct sound and vibration measurements. Free and forced vibration in single and multiple degrees-of-freedom systems, damping, eigenvalues, eigenvectors, frequency response function, modal analysis, description of sound fields, acoustical materials and material testing, acoustics of rooms and enclosures, sound quality, and principles of noise control. Students will be required to conduct either a vibration or a noise control project. Two one-and-one-half hour lectures and one three-hour laboratory. (YR).

Prerequisite(s): (ME 345 or ME 265) and (ME 349* or BENG 351*)
Corequisite(s): ME 4461L
Restriction(s):
Can enroll if College is Engineering and Computer Science

ME 4471    Solar Energy Sys Analy&Design    4 Credit Hours
The course introduces students to the fundamentals of solar energy conversion and solar energy systems. Principles in thermodynamics and heat transfer required to understand the solar energy use is reviewed. Design of different types of solar energy systems are explored and assessed. Issues relating to the practical implementation of solar energy will also be considered. (OC).

Prerequisite(s): ME 325 and ME 375*
Restriction(s):
Can enroll if College is Engineering and Computer Science

ME 452    Sustainable Energy & Environ    4 Credit Hours
This course introduces students to fundamentals of energy sources. It covers a wide range of conventional and alternative, (including renewable) sources, and presents tools for assessing their sustainability and environmental impacts. It also reviews issues related to energy storage, transportation and distribution, challenges, and future opportunities. A course project is completed involving the design and plan for practical implementation of a sustainable energy technology. (YR).

Prerequisite(s): ME 325 and ME 375*
Restriction(s):
Can enroll if College is Engineering and Computer Science

ME 460    Design for Manufacturing    3 Credit Hours

Prerequisite(s): ME 3601 and ME 381
Restriction(s):
Can enroll if College is Engineering and Computer Science

ME 4671    Senior Design I    4 Credit Hours
A guided design project course with emphasis on the decision-making process associated with establishing alternatives and evaluation procedures to synthesize designs. Students propose design projects and work in teams to produce analytical designs, and conduct evaluative experiments, and/or construct a physical design prototype. Engineering ethics and responsibility. At the end of the semester, the students are required to submit written reports and give oral presentations with a demonstration of their projects. (FW).

Prerequisite(s): ME 345 and ME 3601 and ME 375 and ME 379*
Restriction(s):
Can enroll if Class is Junior or Senior
Can enroll if Major is Mechanical Engineering
ME 4681  ME/BENG Dual Senior Design  4 Credit Hours
Full Title: Interdisciplinary Senior Design for ME/BENG Dual Degree
Students A guided interdisciplinary design project course where student
teaches propose design projects, design a device, system or process
related to mechanical-and bio-engineering and conduct evaluative
experiments and/or construct a physical prototype. Engineering ethics
and responsibility. At the end of the semester, the students are required to
submit written reports and give oral presentations with a demonstration
of their projects. Credit can only be awarded for one of the following
courses: BENG 4671, ME 4671, and ME 4681. (F, W).
Prerequisite(s): BENG 351 and BENG 370 and BENG 364 and ME 375 and
( BENG 375 or BENG 381)
Restriction(s): Can enroll if Class is Junior or Senior
Can enroll if Major is

ME 469  Senior Design II  1 to 4 Credit Hours
Student teams develop mechanical or interdisciplinary design projects,
or continue projects begun in ME 4671. Work includes mechanical
engineering design, and could possibly include fabrication and testing.
Projects can involve efforts by interdisciplinary teams. Written and oral
presentations are required.
Prerequisite(s): ME 4671
Restriction(s): Can enroll if College is Engineering and Computer Science

ME 472  Prin & Appl of Mechatronic Sys  4 Credit Hours
This course provides the student with hands-on interdisciplinary
experience of mechatronic systems, which integrate mechanical,
electrical/electronic components with microprocessors to design a
high-performance system. Subjects include Mechanical and Electrical
Actuators, Digital Transducers and Modulators, Microcomputers and
Microcontrollers. Laboratory projects cover robotic programming,
materials handling, and fluid power systems. Student will be required to
perform a course design project with mechatronic application in nature.
(OC)
Prerequisite(s): (ME 265 or ME 345) and (ME 442 or ECE 460*)
Restriction(s): Cannot enroll if Class is Freshman or Sophomore
Can enroll if College is Engineering and Computer Science

ME 481  Manufacturing Processes II  3 Credit Hours
A study of casting, welding, plastic forming, and machining of materials;
analysis of forces, energy requirements, and temperature effects; design
specifications economically obtainable in terms of dimensional accuracy,
surface finish, and material properties, functional characteristics of
equipment. Two lectures and a laboratory. (OC).
Prerequisite(s): ME 381
Restriction(s): Can enroll if College is Engineering and Computer Science

ME 483  Dsgn Cons in Poly and Comp Mat  3 Credit Hours
Physical and mechanical behavior of unreinforced and reinforced
(composite) polymeric materials in relation to their applications in
modern technology. Emphasis is given to the design considerations
with these materials in contrast to those with metallic materials.
Time-dependent properties, such as creep and stress relaxation, are
considered. (OC).
Prerequisite(s): ME 360 or ME 3601
Restriction(s): Can enroll if College is Engineering and Computer Science

ME 490  Directed Design Project  1 to 3 Credit Hours
Directed design project involving not only design but also analysis,
fabrication, and/or testing. Topics may be chosen from any of the areas
of mechanical engineering. The student will submit a report on their
project and give an oral presentation at the end of the term. Enrollment
in this course requires approval from the ME department. Registration for more
than 1 credit is only permitted in special cases and will be considered on
an individual basis. (F, S, W).
Restriction(s): Cannot enroll if Class is
Can enroll if College is Engineering and Computer Science

ME 491  Directed Research Problems  1 to 3 Credit Hours
Special problems selected for laboratory or library investigation with
intent of developing initiative and resourcefulness. Enrollment in this
course requires approval from the ME department. Registration for more
than 1 credit is only permitted in special cases and will be considered on
an individual basis. (F, S, W).
Restriction(s): Cannot enroll if Class is
Can enroll if College is Engineering and Computer Science

ME 492  Guided Study in Mechanical Engineering  1 to 3 Credit Hours
Individual study, design, or laboratory research in a field of interest to
the student. Topics may be chosen from any of the areas of mechanical
engineering. The student will submit a report on their project at the end
of the term. Enrollment in this course requires approval from the ME
department. Registration for more than 1 credit is only permitted in
special cases and will be considered on an individual basis. (F, S, W).
Restriction(s): Cannot enroll if Class is
Can enroll if College is Engineering and Computer Science

ME 493  Advanced Vehicle Energy Sys  3 Credit Hours
This course will introduce the advanced energy conversion systems in
automotive vehicles and cover the fundamentals, characteristics, and
design consideration of the energy systems. The topic includes using
alternative fuels in internal combustion engines, advanced power train
systems in hybrid, electric, and fuel cell vehicle, and exhaust energy
recovery systems. (YR).
Prerequisite(s): ME 325 and ECE 305
Restriction(s): Can enroll if College is Engineering and Computer Science

ME 496  Internal Combustion Engines I  3 Credit Hours
Comparison of several forms of internal combustion engines including
Otto and diesel-type piston engines; performance parameters and testing;
thermodynamic cycles and fuel-air cycles; combustion in SI and Diesel
engines; charge formation and handling; ignition; elements of exhaust
emissions. (OC).
Prerequisite(s): ME 325

ME 4981  Automotive Engineering  4 Credit Hours
The course covers the basic topics in automotive engineering: a)
fundamental vehicle dynamics; b) Engine-transmission compatibility and
matching; c) analysis of vehicle performance in acceleration, gradability,
speed, fuel economy, ride comfort, stability and safety; d) computer
modeling and simulation of vehicle systems by numerical techniques; e)
transmission design and analysis; f) design of vehicle systems such as
brakes, suspensions, steering mechanisms and other subsystems. (YR).
Prerequisite(s): ME 345 and ME 3601
Restriction(s): Can enroll if College is Engineering and Computer Science
Cannot enroll if Major is
ME 499 Internship/ Co-Op 1 Credit Hour
A four-month professional work experience period of the Engineering Internship Program, integrated and alternated with the classroom terms.

Restriction(s):
Can enroll if Class is Senior or Graduate

*An asterisk denotes that a course may be taken concurrently.

Frequency of Offering

The following abbreviations are used to denote the frequency of offering:
(F) fall term; (W) winter term; (S) summer term; (F, W) fall and winter terms; (YR) once a year; (AY) alternating years; (OC) offered occasionally