

Suggested Courses for ME Students Interested in Automotive Engineering

Technical Electives:

A limit of 6 credits of List #2 technical electives can be used to satisfy the 15 credits of technical electives required to earn a BSME degree. There is no limit in List #1 technical electives. Be sure to consult the current list of approved technical electives for the year in which you plan to graduate to make sure the courses listed below are valid technical electives.

List #2 Technical Elective:

BSE 2484 – Engines and Power Trains (3 credits)

Fundamentals of the construction and operation of current internal combustion power units. Control of power utilizing clutches, transmissions, drive shafts, and differentials.

List #1 Technical Electives:

ME 4204 – Internal Combustion Engines (3 credits) Spring only.

Analysis and design of gasoline and diesel engines. Fundamental processes and their application in current technology. Thermodynamics: air standard and air-fuel cycles. Combustion: stoichiometry, fuels, chemical equilibrium, chemical kinetics, flame propagation, knock, pollutant formation and control. Flow processes: volumetric efficiency, intake and exhaust tuning, two-stroke scavenging, carburetion, fuel injection, super- and turbo-charging. Pre: ME3124, ME3404. Cannot be taken P/F.

ME 3604 – Kinematics (3 credits) Spring only.

Kinematic analysis and design of cams, gears, and linkages, velocity, acceleration and force analysis, kinematic synthesis, balancing, kinematic and force analysis by complex numbers, computer-aided analysis, and synthesis of linkages. Pre: ESM 2304.

ME 4524 – Introduction to Robotics and Automation (3 credits) Spring only.

Automation, robot technology, kinematics, dynamics, trajectory planning, and control of two-dimensional and spatial robots; robot programming; design and simulation of robotic devices. Also taught as ECE 4704. Pre: ECE 2574, STAT 4714 or ME 3514, STAT 3604. Graduating Seniors only.

ME 4534 – Land Vehicle Dynamics (3 credits) Spring only.

Analytical methods for land vehicle dynamics. Mechanics of pneumatic tires on pavement and steel wheels on rails. Vehicle stability, handling, response to random guide way and roadway irregularities, ride quality computation methods and standards, suspension design. Pre: ME3514.

ME4544 – Automotive Engineering (3 credits) Fall only.

Vehicle performance, drive train, suspension, steering, and brake systems. Steady state and transient conditions. Senior standing in Mechanical Engineering required. Cannot be taken P/F.

ME 4554 – Advanced Technology Motor Vehicles (3 credits) Fall only.

Energy use and environmental issues for motor vehicles: Emissions standards, fleet requirements, dynamometer testing, fuel economy, and vehicle performance. Alternative fuel vehicles:

Characteristics and infrastructure of fuels, batteries, electric vehicles, and hybrid electric vehicles. Vehicle design: Modeling and simulation of vehicle energy use and performance, component sizing. Fuel cells for transportation. Heavy-duty vehicles and busses. Low mass vehicles and future vehicle technology. Pre: 3114 or 3124 or 3134. Cannot be taken P/F. Graduating Seniors only.

ME 4614: Mechanical Design II (3 credits) Spring only.

Design of mechanical elements such as welded joints hydrodynamic bearings, spur gears, shafts, brakes. Alternative fatigue design methods, cumulative fatigue, mechanical design computer software. Pre: 3614.

ME 4624 – Finite Element Practice in Machine Design (3 credits) Fall only.

Application of the finite element method to stress analysis problems in mechanical design. Modeling techniques, proper use of existing computer programs, interpreting of results, application to design modification. Pre: 3614.

ME 4634 – Intro Computer-Aided Design and Manufacture (3 credits) Spring only

Participants will study the computer-aided design and manufacturing of mechanical systems. A mechanical system will be designed including preliminary design, analysis, detail design, numerical control programming, and documentation. Applications programs will be written and interfaced to the CAD/CAM database. All assignments will be carried out on a CAD/CAM system. Cannot be taken P/F.

ME 4644: Introduction to Rapid Prototyping (3 credits) Fall only.

Participants will study topics fundamental to rapid prototyping and automated fabrication, including the generation of suitable CAD models, current rapid prototyping fabrication technologies, their underlying material science, the use of secondary processing, and the impact of these technologies on society. The rapid prototyping process will be illustrated by the actual design and fabrication of a part. Programming skills required. Graduating Seniors only. Cannot be taken P/F.

ME 4664 – Intro Global Collaborative Engineering Design (3 credits) Fall only.

Participants will study topics fundamental to global collaborative engineering design, product data management, and collaborative product data management. These topics will be applied during a team project with team members located overseas, utilizing state-of-the-art collaborative engineering and product data management software and hardware technologies. Partially duplicates 5664. Credit may only be received for one course. Pre: ME2024, ME4634.

ME 4724 – Engineering Acoustics (3 credits) Fall only.

Basic acoustical theory and practice, acoustic terminology, measurement, transmission, and perception of sound, muffler design, noise control techniques. Pre: ME3514.

ME 4735,4736: Mechatronics (3 credits each)

Electromechanical system modeling, control and applications. Design and building of electronic interfaces and controllers for mechanical devices, sensors, signal acquisition, filtering, and conditioning. Microcontroller-based closed-loop control and device communications. Sensor and actuator selection, installation, and application strategies are studied. A term design project is a key component to this course (for 4736). Pre: (ECE 3254, ME 3514) or (ECE 2004, ECE 2704) for 4735; 4735 for 4736. 4735 offered in Fall; 4736 offered in Spring. Cannot be taken P/F.