Mechanical Engineering Course Descriptions

MEC 101: Engineering Computing and Problem Solving I, Prerequisite: None, *Fall*, Credits 2. Computer integrated introduction to engineering design and analysis. The mechanical engineering profession, engineering ethics, and engineering impact on society. Engineering equations, graphs, dimensional analysis, curve fitting, optimization in engineering design. Introduction to vectors and engineering statics, failure, and materials selection. Use of spreadsheets and MATLAB.

MEC 102: Engineering Computing and Problem Solving II, Prerequisite: MEC 101, *Spring*, Credits 2. Introduction to programming with MATLAB. Topics include base systems, finite machine arithmetic, variables and storage, control structures, iteration, arrays and matrix operations, functions, reading and writing data files, interfacing MATLAB with other languages. Emphasis is on developing good programming skills, debugging, documenting code, and optimization.

New! **MEC 125: Fundamentals of Machining Practices, Prerequisite: MEC major or permission of instructor, *Spring and Fall*, Credits 1.** Hands-on experience in the fundamentals of machining including metrology tools and devices, saw, sheet metal working, drilling, reaming, taping, turning, boring, milling, welding, and rapid prototyping.

MEC 200: Technical Communication in Mechanical Engineering I, Prerequisites: MEC Major; U2 standing, *S/U Grading, Spring,* Credits 1. Introduction to technical writing and oral communication with topics chosen from mechanical engineering. Includes technical memo and report writing and an introduction to researching sources of information. Emphasizes the development of oral presentation skills

MEC 202: Engineering Drawing and CAD I, Prerequisite: MEC major, or permission of the Department, *Fall and Spring,* Credits 1. Introduces methods used to communicate design ideas through the techniques of freehand technical sketching and computer-aided design software. Includes the principles of engineering drawing and sketching for mechanical design and the application of computer-aided design software in developing engineering drawings and mechanical designs.

MEC 203: Engineering Drawing and CAD II, Prerequisite: MEC 202, *Fall and Spring,* Credits 2. Application of computer graphics and solid modeling to design and representation of 3D objects, their assembly and tolerance analysis. Includes hands-on experience in the use of CAD software packages for solid modeling.

New! **MEC 213: Studies in Nanotechnology, Prerequisites: PHY 131 or PHY 125; CHE 131 or ESG 198, *Spring*, Credits 2.** The emerging field of nanotechnology develops solutions to engineering problems by taking advantage of the unique physical and chemical properties of nanoscale materials. This interdisciplinary, co-taught course introduces materials and nano-fabrication methods with applications to electronics, biomedical, mechanical and environmental engineering. Guest speakers and a semester project involve ethics, toxicology, economic and business implications of nanotechnology. Basic concepts in research and design methodology and characterization techniques will be demonstrated. Course is cross-listed as BME 213, MEC 213, and EST 213 and is required for the Minor in Nanotechnology Studies (NTS).

New! **MEC 214: Probability and Statistics for Mechanical Engineers**, **Prerequisite: MAT 126 or 131 or 141 or AMS 151; MEC major or permission of instructor, *Spring*, Credits 1**. Foundations of probability and statistics as applied to mechanical measurements and experimentation. Basic statistical analysis of data and assessing likelihood of future events based on past history. Concept of random sampling. Uncertainty analysis and error propagation, using both analytical and graphical tools. Assessing dominant sources of error in measurements.

MEC 260: Engineering Statics, Prerequisites: PHY 131/133 or 141 or 125, Co-requisite: MAT 203 or AMS 261, *Fall,* Credits 3. A review of vector algebra. Concept of force. Equilibrium of particles. Moments about points and lines, couples and equivalent force systems. Equilibrium of rigid bodies. Analysis of simple structures such as trusses, frames, and beams. Centroids, centers of gravity, and moments of inertia. Dry friction with applications to wedges, screws, and belts. Method of virtual work, potential energy, and stability.

MEC 262: Engineering Dynamics, Prerequisites: MEC260 with a grade of "C" or higher, *Spring,* Credits 3. Vectorial kinematics of particles in space, orthogonal coordinate systems. Relative and constrained motions of particles. Dynamics of particles and the systems of particles, equations of motion, energy and momentum methods. Collisions. Two- and three-dimensional kinematics and dynamics of rigid bodies. Moving frames and relative motion. Free, forced, and damped vibrations of particles and rigid bodies.

MEC 300: Technical Communication in Mechanical Engineering II, Prerequisite: WRT 102; MEC major; U3 or U4; MEC 200. *Spring, S/U Grading.* Credits 1. Aims to ensure proficiency in the types of communication necessary for success in the engineering profession. Provides students with the ability to apply their knowledge of correct written and spoken English to the diverse modes of communication encountered and used by engineers in the professional workplace.

MEC 301: Thermodynamics, Prerequisites: AMS 261 or MAT 203; PHY 131/133 or 141 or 125, *Fall*, Credits 3. Variables that describe the thermodynamic state of a system or control volume, including absolute temperature, internal energy, enthalpy, and entropy are introduced, and basic principles governing the transformations of energy, especially heat and work, are developed. Underlying principles are used to analyze and solve problems related to thermodynamic systems and to determine the changes in properties of the systems and surroundings implied by changes in inputs, configuration or constraints.

MEC 305: Heat and Mass Transfer, Prerequisites: MEC 301 and 364; MEC 102 or MEC 111 or MEC 112 or CSE 114 or 130 or ESG 111 or ESE 124*, Spring*, Credits 3. The fundamental laws of momentum, heat and mass transfer, and the corresponding transport coefficients. Principles of steady-state and transient heat conduction in solids are investigated. Laminar and turbulent boundary layer flows are treated, as well as condensation and boiling phenomena, thermal radiation, and radiation heat transfer between surfaces. Applications to heat transfer equipment are covered throughout the course.

MEC 309: Numerical Methods for Engineering Analysis, Prerequisites: MEC 102 or MEC 111 or MEC 112 or CSE 114 or 130 or ESG 111; AMS 261 or MAT 203; AMS 361 or MAT 303 *Fall,* Credits 3. Solving non-linear equations, systems of linear equations, interpolation/extrapolation, curve fitting, integration, and differential equations. Special

emphasis on the implementation of numerical methods in FORTRAN computer programs to solve computation problems that arise in the engineering design process.

MEC 310: Introduction to Machine Design, Prerequisites: MEC 102 or MEC 111 or MEC 112 or CSE 114 or 130 or ESG 111*;* MEC 262 (ESG 316 for ESG Majors); Pre- or co-requisites: MEC 203, *Spring,* Credits 3. Application of graphical and analytical methods to the analysis and synthesis of mechanism. Covers concepts of degrees of freedom, graphical and analytical linkage synthesis, position, velocity, acceleration, and force analysis of linkage mechanisms. Introduces principles behind the operation of various machine elements such as gears and gear trains, cams, flywheels, roller and journal bearings, couplings, clutches, brakes, belts, and chains and their design, and analysis techniques.

Revised! MEC 316: Mechanical Engineering Lab I: *Sensors and Instrumentation*, Prerequisites; MAT 303 or AMS 361; MEC 214 and MEC 363; Co-requisites: MEC 301, 364, *Fall,* Credits 3. The spatial and temporal resolution of modern instrumentation and sensors that are particular to mechanical engineering. Concepts of Fourier analysis and frequency responses are discussed together with the statistical analysis of data. Includes basic circuit components. Laboratory safety. Students learn to operate instruments for measuring temperature, pressure, flow velocity, displacement, angle, acceleration, and strain. Design project. Laboratory fee required.

MEC 317: Mechanical Engineering Laboratory II, Prerequisites: MEC 316 and MEC 364, Co-requisites: MEC 305. *Spring,* Credits 2. Hands-on experience in solid and fluid mechanics and heat transfer. Emphasis is on the understanding of fundamental principles as well as familiarity with modern experimentation. Lectures at the beginning of the course provide background information and theories of experimentation. Student groups perform four experiments each in solid mechanics and in fluid mechanics and heat transfer. Report writing is an integral part of the course, with emphasis on design of experiment, interpretation and presentation of data, error analysis, and conclusions. Laboratory fee required.

MEC 320: Engineering Design Methodology and Optimization, Prerequisites: MEC 102 or MEC 111 or MEC 112 or CSE 114 or 130 or ESG 111, Co-requisite: MEC 310, *Spring,* Credits 3. The general process of engineering design as a systematic and disciplined process. Covers materials related to the formulation of design specifications and criteria; conceptual design and evaluation of the design options; design creativity; formulation of analyzable models; simulation and optimization techniques; design for manufacture; design for reliability; engineering economics; and engineering ethics.

MEC 323: Internal Combustion Engine, Prerequisites: MEC 305, *Varies*, Credits 3. Introduces different types of internal combustion engines and their operations. Topics include the innovative concept of gas generator-expander engine; thermodynamics fundamentals; fuel-air cycle analysis; engine combustion and emission processes; engine operating characteristics. Includes both the relevant fundamental concepts and the extensive practical knowledge base on which engine research, development, and design depend.

New! MEC 325: Manufacturing Processes and Machining, Prerequisite: ESG 332, Pre-or Co-Requisite: MEC 125. *Spring*, Credits 3. The relationship between product design and manufacturing. Materials properties and influence. Introduces traditional and nontraditional manufacturing processes and their capabilities and limitations. Measurement

inspection, reliability, and quality engineering. Economic impact of modern process engineering.

MEC 350: Energy Conversion and Alternate Energy Technologies, Prerequisites: MEC 301, *Varies*, Credits 3. Energy conversion principles, principal energy sources, and energy storage systems. Production technologies of useful energy and useful work with emphasis on technologies based on energy sources other than fossil or nuclear fuels, including direct energy conversion technologies (fuel cells, batteries, hybrid electric vehicles, and MHD generators), solar energy (solar thermal energy and photovoltaics), and wind energy.

MEC 363: Mechanics of Solids, Prerequisite: MEC 260 with a grade of "C" or higher, *Spring,* Credits 3. Stress and deformation of engineering structures and the influence of the mechanical behavior of materials. Concepts of stress and strain, constitutive relations, analysis of statically indeterminate systems, study of simple bars and beams, and stability conditions. Emphasis on force equilibrium, elastic response of materials, geometric compatibility, Mohr's circle, stresses and deflections in beams, and torsion and buckling of rods. Design for bending, shear and combined states of stress.

MEC 364: Introduction to Fluid Mechanics, Prerequisite: MEC 262, Pre- or Corequisite: MEC 301, *Fall,* Credits 3. Fundamental properties of fluids and their conservation laws with applications to the design and evaluation of flows of engineering interest. Topics include hydrostatics, surface tension, dimensional analysis and dynamic similitude, Euler's equation, rotating coordinate systems, boundary layers, lubrication, drag on immersed bodies, open channel and pipe flows, and turbomachinery.

MEC 381: Transport and Fate of Pollutants, Prerequisite: AMS 361 or MAT 303, Credits 3. General mechanisms that describe the physical transport and chemical transformations of pollutants in the air, water, and soil. Major global cycles are also considered from a transport-transformation perspective. Specific examples include lake eutrophication, acid rain deposition, river pollution, and the dispersal of air pollutants from single (point) sources and multiple (area) sources.

MEC 391: Introduction to Automotive Engineering I, Prerequisites: MEC 262, MEC 363, First part of a year-long course. Review of Society of Automotive Engineers (SAE) Collegiate Design competitions of past years and the rules of specific competitions and other competition-related issues. Selected engineering topics and mathematical/software tools are introduced including their application to solving engineering problems and to achieving design objectives.

MEC 392 Introduction to Automotive Engineering II, Prerequisite: MEC 391. Credits 3. A continuation of MEC 391.

MEC 393: Engineering Fluid Mechanics, Prerequisite: MEC 364, Credits 3. The application of the principles of fluid mechanics to important areas of engineering practice such as turbomachinery, hydraulics, and wave propagation. Prepares students for advanced coursework in fluid dynamics. Extends the study of viscous effects, compressibility, and inertial begun in MEC 364.

MEC 398: Thermodynamics II, Prerequisite: MEC301 and MEC 364, Credits 3. Psychometrics and psychometric charts. Thermodynamic considerations for the design and performance of cooling towers, humidifiers, and dehumidifiers. Reacting mixtures,

combustion, and chemical equilibrium. Thermodynamics of fluid flow, simple compression and expansion processes. Analysis and design of gas and vapor power cycles. Cycles with reheat, intercooling, and cogeneration plants. Refrigeration cycles.

MEC 402: Mechanical Vibrations, Prerequisites: MEC 262 and MEC 363, Credits 3. Modeling, analysis and design for mechanical vibrations. Fundamentals of free vibration, harmonically excited vibration and vibration under general forcing conditions are considered for one degree, two degree and multidegree of freedom systems; continuous systems; vibration design strategies including isolation and absorbers.

MEC 406: Energy Management in Commercial Buildings, Prerequisites: MEC 398, Credits 3. Basic heating, ventilating, and air-conditioning (HVAC) system design and selection for commercial buildings. Includes both low-rise and high-rise structures. Selection of central plant components and equipment, calculation of space heating and cooling load, computer techniques for estimating annual energy consumption. ASHRAE codes. Building controls. BACnet.

MEC 410: Design of Machine Elements, Prerequisites: MEC 310 and MEC 363*, Fall,* Credits 3. Application of analytical methods, material science, and mechanics to problems in design and analysis of machine components. Includes the design of mechanical components such as bearings, gears, shafting, springs, fasteners, belts, clutches, and brakes, and takes into consideration factors such as manufacturability and reliability. Design projects with open-ended and interactive problems are assigned to integrate several machine elements in a system.

MEC 411: Control System Design and Analysis, Prerequisites: MEC 262; AMS 361 or MAT 303, *Fall,* Credits 4. Analysis and design of feedback control systems. Topics include system modeling; transfer function, block diagram and signal-flow graph; sensors, actuators, and control circuit design; control system characteristics and performance; stability analysis; root locus method; Bode diagram; PID and lead-lag compensator design.

MEC 412: Computer-Aided Design, Prerequisites: MEC 310 and MEC 363, Credits 4. Application of the computer to solution methods and design in engineering. Discusses computer graphics, geometric modeling, and finite element analysis in structural mechanics, fluid mechanics, and heat transfer. Applied stress analysis. Applied fluid mechanics and heat transfer. Includes hands-on experience in the use of CAD software packages for solid modeling, system modeling, and finite element analysis. Integrated CAD in which the analysis of fluid flow, heat transfer, and solid mechanics are combined to solve a design problem.

MEC 420: Turbomachinery and Applications, Prerequisites: MEC 364, Credits 3. Classification of turbomachines, rotating flows, aerothermodynamic design of turbomachines, energy transfer between fluid and rotor, axial and radial devices, compressible gas flow, three-dimensional effects, rotating stall and surge theory. Numerous applications and design issues. Sample devices include propellers, fans, blowers, windmills, Pelton wheels, turbines, compressors, lawn sprinklers, etc.

MEC 421: Statistical Quality Control and Design of Experiments, Prerequisites: MEC 317, Credits 3. Online techniques that determine and control the quality of mass-manufactured products on a real-time basis by means of statistical analysis. Offline use and applications of the design-of-experiment and Taguchi methods to optimize a product and a

process design. The concept of total quality management. Histograms, tests for normality, variables, and attribute control charts, orthogonal arrays, and signal-to-noise arrays. Z-transform for the evaluation of the percentage of nonconforming parts, tests for special causes. Zbar-R charts, and process capability analysis. Acceptance quality level and lobby-lot inspection. This course offered as both AMS 421 and MEC 421.

MEC 422: Thermal System Design, Prerequisite: MEC 305, *Spring,* Credits 3. Device design and system design. Quantitative data for system design including operating characteristics of compressors, turbines, heat exchangers, piping systems, internal combustion engines, and other component equipment. Component matching and system simulation. Optimization including thermo-economic evaluation and energy analysis. Case studies: refrigeration and air conditioning systems; combined cycles; steam-injected gas turbines.

MEC 440: Mechanical Engineering Design I, Prerequisites: MEC 300, 310, 317, 320, 326, and MEC major: U4 standing, Co-requisite: MEC 410 and 411, *Fall,* Credits 3. Part I of the two-semester capstone design project sequence. Senior students select a project, develop the necessary technical background, and write a proposal, progress reports, and a preliminary design report. Includes an oral presentation on the development and progress of the project. Not counted as a technical elective. Laboratory fee required. The final grade will be assigned at the end of the two course sequence MEC 440-441.

MEC 441: Mechanical Engineering Design II, Prerequisite: MEC 440, *Spring,* Credits 3. Part II of the two-semester capstone design project sequence. Students complete the project design, building and test a prototype, write a mid-term report and a final design report as well as giving an oral presentation. Not counted as a technical elective. Laboratory fee required.

MEC 442: Introduction to Experimental Stress Analysis, Prerequisites: MEC 363, *Varies*, Credits 3. The concepts of three-dimensional stress and strain, their transformation laws, and their mutual relationships are discussed in detail. Results from theory of elasticity as pertinent to experimental stress analysis are also presented. Experimental techniques studied include two-dimensional photoelasticity, resistance strain gauge, moire method, brittle coating, and analog methods. The application of different techniques to the measurement of stress and strain in models as well as actual structures is demonstrated. Students form small groups and each group is assigned different laboratory projects to gain experience in various experimental stress analysis methods.

MEC 450 Mechatronics, Prerequisites: MEC 316 and MEC 319; *Fall,* Credits 3. An introduction to the design, modeling, analysis and control of mechatronic systems (smart systems comprising mechanical, electrical, and software components). Fundamentals of the basic components needed for the design and control of mechatronic systems, including sensors, actuators, data acquisition systems, microprocessors, programmable logic controllers, and I/O systems, are covered. Hands-on experience in designing and building practical mechatronic systems is provided through integrated lab activities.

MEC 455: Applied Stress Analysis, Prerequisite: MEC 363, *Spring,* Credits 3. A study of linear elastic solids with emphasis on internal stress analysis. Simple boundary value problems at plane structures are analyzed with various solution techniques. Major topics are stress and strain tensors, linear elasticity, principle of virtual work, torsion, stress functions, stress concentration, elementary fracture, and plasticity.

MEC 460 Introduction to Robotics, Prerequistes: MEC 262; U4 standing, *Spring*, Credits 3. Theory and Applications Robot components and mechatronic aspects of robotics (sensors, actuators, end effectors, system integration). Rotation, translation, rigid-body transform. Robotics foundations in kinematics and inverse kinematics, dynamics, serial and parallel manipulators and their duality. Introduction to mobile robots and LEGO Robotics, control theories, motion planning, trajectory generation, grasping and manipulation, robotic programming language, industrial robotics, manufacturing automation, and societal impacts. Hands-on projects. *Note*: Not for Credits in addition to CSE 378.

MEC 470 Introduction to Engineering Tribology, Prerequistes: MEC 363 and 364; Spring, Credits 3. Focus is on the fundamentals of tribology, the science of surfaces in relative motion, with an introduction to friction, lubrication, and wear. The basics of tribology science: engineering surfaces, contact mechanics, lubrication theory, wear processes and modeling, wear properties of materials, and tribology test methods will be covered. Analysis of tribological aspects of machine components and bearings. Industrial case studies will be presented to place the topics in context to industry and society.

MEC 475: Undergraduate Teaching Practicum, Prerequisites: U4 standing; a minimum GPA of 3.00 in all Stony Brook courses and the grade of B or better in the course in which the student is to assist; permission of department, Credits 3. Students assist the faculty in teaching by conducting recitation or laboratory sections that supplement a lecture course. The student receives regularly scheduled supervision from the faculty instructor. May be used as an open elective only and repeated once.

MEC 488: Mechanical Engineering Internship, Prerequisite: Permission of undergraduate program director, Credits 3 to 9. *S/U Grading*. Participation in off-campus engineering practice. Students are required to submit to the department a proposal at the time of registration and two term reports before the end of the semester. May be repeated up to a limit of 12 credits. **Note**: MEC 488 may *not* be used for to satisfy degree requirements in any way, and is <u>not</u> a technical elective.

MEC 490: Topics in Mechanical Engineering, Prerequisites: U3 or U4 standing in a B.E. degree major; permission of department (course prerequisites vary with topic), Fall, Spring, Credits 1-4. Treatment of an area of mechanical engineering that expands upon the undergraduate curriculum. Topics may include advanced material in a specialty, development of a specialized experimental technique, or a specific area of design. Topics may vary from semester to semester. Semester supplements to this Bulletin contain specific description when course is offered. May be repeated for Credits as the topic changes.

MEC 491: Topics in Mechanical Engineering, Prerequisites: U3 or U4 standing in a B.E. degree major; permission of department (course prerequisites vary with topic), Fall, Spring, Credits 1-4. Treatment of an area of mechanical engineering that expands upon the undergraduate curriculum. Topics may include advanced material in a specialty, development of a specialized experimental technique, or a specific area of design. Topics may vary from semester to semester. Semester supplements to this Bulletin contain specific description when course is offered. May be repeated for Credits as the topic changes.

MEC 492: Topics in Mechanical Engineering, Prerequisites: U3 or U4 standing in a B.E. degree major; permission of department (course prerequisites vary with topic), Fall, Spring, Credits 1-4. Treatment of an area of mechanical engineering that expands upon the undergraduate curriculum. Topics may include advanced material in a specialty,

development of a specialized experimental technique, or a specific area of design. Topics may vary from semester to semester. Semester supplements to this Bulletin contain specific description when course is offered. May be repeated for Credits as the topic changes.

MEC 499: Research in Mechanical Engineering, Prerequisite: Permission of department, Credits 0–4. An independent research project under the supervision of a mechanical engineering faculty member. Permission to register requires the agreement of the faculty member to supervise the research and submission of a one-page research proposal. May be repeated but only six credits of research electives may be counted as technical electives.

Other Courses Offered by the Mechanical Engineering Department in the Recent Past (but are not currently scheduled to be offered.)

MEC 100: Introduction to Engineering: Mechanical, Prerequisite: None, *Fall,* Credits 3. Introduction to the engineering experience in general and mechanical engineering in particular through lectures by faculty and invited speakers from industry, field trips, films and laboratory demonstrations. Lectures cover creative thinking and problem-solving, design team work, computer utilization, engineering ethics and legal issues, use of libraries and other sources of information, career opportunities in mechanical engineering and related fields, emerging technologies and the cross-disciplinary nature of engineering.

MEC 111: Computer Science for Engineers, Pre- or corequisites: AMS 151 or MAT 125 or 131 or 141; PHY 125 or 131/133 or 141, Spring, Credits 3. An introduction to computer science and the use of the computer for solving scientific and engineering-related problems. Students gain experience using the FORTRAN programming language. Primarily for engineering students not planning to take advanced computer science courses. May not be taken simultaneously with CSE 110. Students who have a C or higher in CSE 114 may not take MEC 111.

MEC 112: Practical C/C++ for Scientists and Engineers, Prerequisites: AMS 151 or MAT 125, 131 or 141; PHY 125, 131/133 or 141. Credits 3. Introduces computer sciences and the use of the computer for solving scientific and engineering problems using the C/C++ programming language. Students gain experience using graphical interface (GUI) and object-oriented programming concepts. Primarily for engineering students who are not planning to take advanced computer science courses. Students who have earned a C or higher in CSE 114 may not take MEC 112.

MEC 495: Professional Engineering Seminar, Prerequisites: CEAS major; U4 standing, Credits 1. S/U Grading. Prepares the student to enter the workplace as a practicing engineer. Topics include professional ethics, professional activities, professional engineering licensing, patents, seeking entry-level employment, and exposure to the engineering work environment. Aids in preparation for the EIT/FE exam. Includes speakers from a variety of disciplines, within the College and from industry.

DEC E Category Courses offered from Mechanical Engineering

MEC 104: Practical Science of Things, Prerequisite: Satisfaction of entry skill in mathematics requirement, Credits 3. A practical introduction to the science and engineering of objects and phenomena in everyday life. The basic principles that underlie the operation common to modern devices such as roller coasters, balloons, vacuum cleaners, airplanes, bicycles, thermostats, air conditioners, automobiles, and GPS systems are developed by investigating how they work. Issues of design, safety, and environmental impact are also discussed.

MEC 105: Everyday Science, Prerequisite: Satisfaction of entry skill in mathematics requirement, Credits 3. A practical introduction to the science and engineering of objects and phenomena in everyday life. The basic principles that underlie the operation common to

modern devices such as xerographic copiers, tape recorders, computers, microwaves, lasers, CDs, plastics, nuclear weapons, and magnetic resonance imaging (MRI) are developed by investigating how they work. Issues of design, safety, and environmental impact are also discussed.

MEC 160: Introductory Nuclear Science and Technology, Prerequisite: MAT 123 or level 4 on the mathematics placement examination, Credits 3. Introduces the basic concepts of nuclear science. Topics include: basic atomic structure; isotopes; mass-energy equivalence; binding energy; decay of radionuclides; nuclear reactions; fission and fusion; the interaction of radiation with matter; and biological effects of radiation. Discusses nuclear science concepts in the context of relevant applications such as nuclear medicine and imaging, nuclear power, radioactive waste, food irradiation, and weapons. Not intended for science majors.

DEC H Category Courses Offered from Mechanical Engineering

MEC 280: Pollution and Human Health, Prerequisite: One D.E.C. category E course, Credits 3. An examination of major environmental pollution problems such electromagnetic radiation, ozone layer depletion, and global warming, with a specific focus on the resulting effects on human health. Assessment of health risks in relation to the formulation of environmental and workplace regulations is also considered.

MEC 290: Nuclear Technology: History, Society, Medicine and the Environment, Prerequisite: One D.E.C. category E course, Credits 3. Introduces the history and applications of nuclear technology in our society and addresses the social and environmental implications and issues. Topics include radiation types and sources; biological effects, standards, and radiation protection; fission, breeding, and fusion; nuclear waste; weapons. Discusses current applications including power, food irradiation, medical applications, isotope dating, and advanced applications such as space power and propulsion, accelerators, and antiprotons.