Nuclear Engr (NE)

Courses

NE 5519 Energy Systems and Nuclear Power: 3 semester hours.
Fundamentals of conventional and renewable energy systems. Energy sources, distribution, use and environmental effects. Nuclear power plant "balance of plant" design. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: ME 3307 and MATH 3360 or instructor permission.

NE 5521 Mathematical Methods in Nuclear Engineering: 3 semester hours.
First and second order ordinary differential equations (ODEs), generalization to systems of ODEs, Laplace transforms, series solutions to second order ODEs, special functions and Sturm-Liouville systems; partial differential equations by separation of variables. Examples will emphasize practical problems of interest to nuclear engineers. PHYS 6602 may be substituted for this course. PREREQ: MATH 3360.

NE 5543 Thermal Fluids Laboratory: 1 semester hour.
Measurement of thermal and fluid properties, experiments on fluid flow and heat transfer systems. Equivalent to ME 5543. PREREQ: ME 3341 and NE 5576 or NE 4476.

NE 5545 Reactor Physics: 3 semester hours.
Neutron balance equations in reacting systems, diffusion and diffusion-perturbation theory, introductory reactor kinetics, the multi-group energy approach, neutron slowing down and thermalization, introductory concepts in reactor systems. PREREQ: NE 3302 or NSEN 6685, and NE 5521 or equivalent.

NE 5546 Nuclear Fuel Cycle Systems: 3 semester hours.
Uranium mining, milling, conversion; enrichment technology including cascade analysis; fuel fabrication, criticality safety in the nuclear fuel cycle, introdution to ORIGEN and Monte-Carlo methods and codes, reactor fuel management, waste management (LLW, HLW, TRU waste). PREREQ: NE 3302 or NSEN 6684 or equivalent.

NE 5548 Design Control and Use of Radiation Systems: 3 semester hours.
Generation detection and measurement systems design for control and use of neutrons and gamma rays in industrial and medical applications. Radiation protection, regulations, environmental and economic considerations. COREQ: ENGR 5545.

NE 5551 Nuclear Seminar: 1 semester hour.
Current topics in nuclear science and engineering. Specific, evaluted graduate-level activities and/or performances are identified in the course syllabus. PREREQ: Graduate student status in NSEN or HPHY program.

NE 5558 Monte Carlo Methods and Applications: 3 semester hours.
Basics of the application of stochastic methods to calculate the transport of neutrons, photons, and other sub0-atomic particles. Includes introduction to the MCNP code, and sample application problems in both nuclear reactor design and in applications such as radiation beams used for cancer therapy.

NE 5576 Heat Transfer: 3 semester hours.
Principles and engineering applications of heat transfer. Analysis of conduction, convection and radiation heat transfer. Design of heat exchangers. Cross-listed as ME 5576. PREREQ: ME 3341.

NE 5578 Reliability and Risk Assessment: 3 semester hours.
Methods of evaluating process and equipment reliability. Probabilistic methods applied to analysis and design. Setting probabilistic design objectives and calculating probabilistic performance. Specific, evaluated graduate-level activities and/or performances are identified in the course syllabus. PREREQ: MATH 3360 and EE 4416 or permission of instructor.

NE 5587 Medical Applications in Engineering and Physics: 3 semester hours.
Applications of engineering and physics, principles, particularly nuclear science, to medicine. Covers radioisotopes, x-ray imaging, magnetic resonance and ultrasound imaging, radiation protection, codes and standards. PREREQ: MATH 3360 and PHYS 2212.

NE 5588 Nonproliferation and Safeguard: 3 semester hours.
Science and technology-oriented case studies, technical basis, and management of material accountancy and inventory control; technologies and practices for safeguarding special nuclear materials; detection of nuclear proliferation. PREREQ: permission of instructor

NE 5599 Experimental Course: 1-6 semester hours.
The content of this course is not described in the catalog. Title and number of credits are announced in the Class Schedule. Experimental courses may be offered no more than three times with the same title and content. May be repeated.

NE 6699 Experimental Course: 1-6 semester hours.
The content of this course is not described in the catalog. Title and number of credits are announced in the Class Schedule. Experimental courses may be offered no more than three times with the same title and content. May be repeated.

NE 8850 Doctoral Dissertation: 1-24 semester hours.
Research toward completion of the dissertation for the Ph.D. in Engineering and Applied Science. Variable credits. May be repeated. Graded S/U.