

Nuclear Engineering (NE)

COURSES

NE 3301. INTRODUCTION TO NUCLEAR ENGINEERING. 3 Hours.

Fundamentals of radiation, radiation decay, binding energy, nuclear reactions, radiation interactions, shielding, radiation detections and measurement of radiation, applications of nuclear science and engineering such as principles of nuclear reactors, reactor generations I, II, III, IV, fusion reactor, radiation therapy, food irradiation, radionuclide production, radiopharmaceuticals, principles of positron emission tomography (PET). Prerequisite: PHYS 1444; MATH 3319 or MAE 3360.

NE 4302. NUCLEAR REACTOR THEORY AND TECHNOLOGY OF THE NUCLEAR POWER PLANT. 3 Hours.

The course covers the theoretical aspect of reactor theory and analysis along with the complete understanding of the nuclear reactor systems, major components, operations, control and overall safety aspect of nuclear power plant technology. The theoretical topics in the course will include the neutronics behavior of fission reactors, primarily from a one-speed diffusion perspective. Reactor kinetics and dynamics, criticality, fission product poisoning, reactivity control, reactor stability and introductory concepts in fuel management, followed by slowing down and one-speed diffusion theory. Use of industry adopted software and power plant simulation for evaluating basic reactor parameters. Prerequisite: NE 3301 or PHYS 3446 or permission of instructor.

NE 4303. NUCLEAR POWER PLANT ENGINEERING. 3 Hours.

Thermal hydraulic processes involved in the transfer of power from the reactor core to the secondary systems of nuclear power plants. Major topics include an overview of nuclear heat generation, fluid dynamics with respect to the flow in reactor channels, steady state radial and axial temperature distribution, thermal analysis of fuel elements and subchannel flow, Hot channel factors, two-phase flow dynamics. Prerequisite: NE 3301 or MAE 3314 or MAE 3309 or permission of instructor.

NE 4391. SPECIAL TOPICS IN NUCLEAR ENGINEERING. 3 Hours.

Special topics in the field of nuclear engineering. Topic may vary from semester to semester. May be repeated for credit when topic changes. Departmental approval required in advance to use for degree credit. Prerequisite: NE 3301 or consent of instructor.