

ENGR 4504: Nuclear Reactor Simulation

3 Credit Hours

Prerequisite: ENGR 4501 and Engineering Standing

The objective of this course is to provide an understanding and knowledge about the operational aspects of a variety of nuclear power plant designs. The course integrates the previous studies in nuclear engineering and reactor power generation into safe design and operation of nuclear power plants. This course covers different reactor designs, normal operations and response to abnormal conditions and potential accident situations. Focus is placed on reactor physics fundamentals, defense in-depth, reactor start-up, normal ramp-up and operations, transient conditions, reactor feedback, reactor control, accident scenarios, and safe shut-down.

ENGR 4601: Fundamentals of Solar Power

3 Credit Hours

Prerequisite: Engineering Standing Requirements

This course discusses the principles and applications of solar energy. The course covers fundamental physics and current status of solar thermal and various Photovoltaic (PV) technologies to harvest solar energy through heating and direct conversion of light into electrical energy. The course covers the fundamental operating principles of solar collectors, solar water heating systems, air heaters, solar concentrators, sterling engines, concentrated solar thermal power (CSTP) systems and photovoltaic solar cells. In addition, the course covers solar cell simulation using MATLAB and Simulink, fundamentals of PV system design and installation. The course concludes with a real-world experiment-based design project where students effectively apply their knowledge to perform current-voltage measurements on solar cells, analyze the acquired data, extract important electrical parameters, and design a stand-alone photovoltaic system.