

NUCLEAR ENGINEERING TECHNOLOGY (NTEC)

NTEC 1000 Introduction to Nuclear Systems (3 Credits)

This course is an introduction to the major systems of a commercial nuclear power plant. Designed for the student with no prior knowledge of engineering principles, it adheres to a systematic approach to operations and explains the underlying theoretical principles. The course focuses on Pressurized Water Reactor (PWR) and Boiling Water Reactor (BWR) plant design. The course also presents an overview of the Pressurized Heavy Water Reactor (PHWR), Fast Breeder Reactor (FBR), and High Temperature Gas-cooled Reactor (HTGR).

Previous: Legacy Equivalent(s): NUC* 100

NTEC 1100 Radiation Health Safety (2 Credits)

This course is an introduction to basic concepts associated with nuclear physics and nuclear radiation, health, and safety. Topics include nuclear structure, radioactivity, and interaction of radiation with matter, shielding, radiation measurement, exposure, and biological effects.

Prerequisites: MATH 1610, CHEM 1210

Prerequisite or corequisite: NTEC 1110, NTEC 1170

Previous: Legacy Equivalent(s): NUC* 110

NTEC 1110 Radiation Health Safety Lab (1 Credits)

This course is designed to give the student hands-on experience working with a variety of radiation monitoring devices. The students will also gain experience in the processing and analysis of counting data.

Prerequisites: MATH 1610, CHEM 1210

Prerequisite or corequisite: NTEC 1100, NTEC 1170

Additional fees may apply

Previous: Legacy Equivalent(s): NUC* 111

NTEC 1170 Atomic and Reactor Physics (4 Credits)

This course is an introduction to modern physics concepts of the structure of the atom, the properties of atomic particles, the nature of light, relativity theory and elementary quantum mechanics. An understanding of fission energy concepts and transmutations will be provided.

Prerequisites: MATH 1610, NTEC 1000, PHYS 1104

Prerequisite or corequisite: MATH 2600, PHYS 1105,

NTEC 1100 & NTEC 1110

Previous: Legacy Equivalent(s): NUC* 117

NTEC 1180 Nuclear Chemistry (1 Credits)

This course is an introduction to the basic concepts of nuclear reactor chemistry. Topics covered include oxidation-reduction reactions, principles of corrosion, corrosion control practices, and important nuclear chemical reactions.

Prerequisites: CHEM 1210, MATH 1610, NTEC 1000

Prerequisite or corequisite: NTEC 1170

Previous: Legacy Equivalent(s): NUC* 118

NTEC 2095 Nuclear Co-op I (3 Credits)

In this course, students will work in industry gaining hands-on experience while applying academic knowledge acquired during their first year of classroom/ laboratory college education. A specific project will be agreed upon by the co-op student, industry supervisor, and faculty advisor. A minimum of 225 documented industry contact hours must be devoted by the co-op student during the semester internship.

Prerequisites: Permission of instructor

Prerequisite or corequisite: Students must have completed all freshman level technology courses and have a GPA of 2.50 or higher.

Previous: Legacy Equivalent(s): NUC* 295

NTEC 2100 Nuclear Instruments and Controls (2 Credits)

The study of the underlying electrical, mechanical, physical, and chemical principles by which the instrumentation and modern PWR (pressurized water reactor) and BWR (boiling water reactor) systems control the safe generation of nuclear-based power. Emphasis is placed on the full understanding of the nuclear fission process and the interactions of the numerous subsystems required monitoring and controlling this important energy technology.

Prerequisites: EET 1045, NTEC 1170, NTEC 2500

Prerequisite or corequisite: NTEC 2110

Previous: Legacy Equivalent(s): NUC* 210

NTEC 2110 Nuclear Instruments and Controls Lab (1 Credits)

These laboratory exercises transfer acquired electrical, mechanical, physical, and chemical technology gained in earlier courses in hands-on applications to 15 selected nuclear instrument-controlled subsystems. Emphasis is placed on the full understanding of the detection capabilities and subsequent safe nuclear system control.

Prerequisites: EET 1045, NTEC 1170, and NTEC 2500

Prerequisite or corequisite: NTEC 2100

Additional fees may apply

Previous: Legacy Equivalent(s): NUC* 211

NTEC 2195 Nuclear Co-op II (3 Credits)

In this course, students will work in industry gaining enhanced hands-on experience while applying academic knowledge acquired during their first year of classroom/laboratory college education along with hands-on experience gained in their 12-week summer internship, as well as from initial nuclear co-op experience. A specific project will be agreed upon by the co-op student, industry supervisor, and faculty advisor. A minimum of 225 documented industry contact hours must be devoted by the co-op student during the semester.

Prerequisites: Consent of Program Coordinator. Students must have completed all freshman level technology courses, a summer internship, and NTEC 2095.

Previous: Legacy Equivalent(s): NUC* 296

NTEC 2200 Nuclear Simulator (1 Credits)

A study of the primary and secondary systems of a Pressurized Water Reactor (PWR), with emphasis on control and protective subsystems, plant start-up, normal plant operation, and critical shut-down procedures. Reactor accident analyses are stressed for total reactor system comprehension. This is the capstone event for the nuclear degree program.

Prerequisites: NTEC 1170, NTEC 1180, NTEC 2500, NTEC 2610

Prerequisite or corequisite: NTEC 2210

Previous: Legacy Equivalent(s): NUC* 220

NTEC 2210 Nuclear Simulator Lab (1 Credits)

A study of reactor plant primary and secondary systems, control and protective systems, plant start-up, normal plan operation, and critical shut-down procedures is covered through the extensive hands-on utilization of a modern nuclear reactor simulator. This is the capstone event for the nuclear degree program.

Prerequisites: NTEC 1170, NTEC 1180, NTEC 2500, NTEC 2610

Prerequisite or corequisite: NTEC 2200

Additional fees may apply

Previous: Legacy Equivalent(s): NUC* 221

NTEC 2300 Nuclear Topics (2 Credits)

This course is a state-of-the-art survey course studying factors impacting modern nuclear power generation, including environmental impacts, fuel management, preventive maintenance, equipment operation, failure and analysis, safety engineering, human factors engineering, and emergency planning procedures. Additionally, an overview of other regional nuclear related business activities will be presented.

Prerequisites: NTEC 1170, NTEC 1180, NTEC 2500, NTEC 2610

Previous: Legacy Equivalent(s): NUC* 230

NTEC 2500 Reactor Theory (4 Credits)

This course studies nuclear energy with emphasis on fission, reactor types, moderation of neutrons, activation and decay schemes, transmutations, neutron diffusion theory, and theoretical reactor operation including heat transfer, power transients, instrumentation, and resultant radiation.

Prerequisites: MATH 2600, NTEC 1170, NTEC 1180, PHYS 1105

Previous: Legacy Equivalent(s): NUC* 250

NTEC 2600 Nuclear Material Science (2 Credits)

This course will acquaint the student with constitution, properties and characteristics of engineering materials and provide a foundation for stress analysis on structures in equilibrium with emphasis on applications to nuclear power, including effects of material irradiation.

Prerequisites: MATH 2600, NTEC 1170, NTEC 1180, PHYS 1105

Prerequisite or corequisite: NTEC 2610

Previous: Legacy Equivalent(s): NUC* 260

NTEC 2610 Nuclear Material Science Lab (1 Credits)

This lab will focus on performing experiments in metallographic examination, mechanical testing, and heat treatment of a variety of ferrous and nonferrous metals. Experiments to determine properties of materials such as strain, fatigue, corrosion, compression, and tensions will also be conducted. Brittle fracture and thermal stress will be performed as well as effects of irradiating materials.

Prerequisites: MATH 2600, NTEC 1170, NTEC 1180, PHYS 1105

Prerequisite or corequisite: NTEC 2600

Additional fees may apply

Previous: Legacy Equivalent(s): NUC* 261