Nuclear Engineering Technology

Gainful Employment	Program Name	Program Type	Area of Study
	Nuclear Engineering Technology (9416) , AAS (https://catalog.lakelandcc.edu/degree-certificate-programs/nuet/9416/)	Degree	NUET

NUET 1000 Nuclear Industry Fundamental Concepts **3 Credits**

Prerequisite: placement into ENGL 1110 or ENGL 1111, placement into MATH 1650, admission to the Nuclear Engineering Technology Program; or permission of program director.

This course introduces fundamental concepts used throughout the nuclear industry as an integral part of daily operations. Topics include Human Performance Enhancement (HPE) fundamentals, an introduction to the Systematic Approach to Training (SAT), conduct of On-The-Job training (OJT) and Task Performance Evaluation (TPE), Foreign Material Exclusion (FME), radiological concepts, including protective clothing dress-out, and an overview of the Energy Harbor safety manual. In addition, it includes OSHA compliance courses required by the Perry Plant and an overview of the regulatory and licensing aspects of a commercial nuclear power plant. The course also provides an introduction to nuclear power plant systems.
(3 contact hours)

NUET 1100 Radiation Detection and Protection **3 Credits**

Prerequisite: placement into ENGL 1110 or ENGL 1111, placement into MATH 1650, admission to the Nuclear Engineering Technology Program; or permission of program director.

This course presents the theory, application detection and shielding of the various types of radiation. It also covers detection devices such as typical survey meters, core power detectors and personnel monitoring devices. The course will also discuss how exposure to radiation can be minimized and the biological impact of radiation.
(4 contact hours: 2 lecture, 2 lab)

NUET 1200 Plant Drawings **3 Credits**

Prerequisite: NUET 1000 or ELEC 1120.

This course covers the use of and relationship among typical drawings found at an industrial setting. Topics include using mechanical, electrical, and isometric drawings; the information contained in the lead sheet of a set of drawings; the use of notes and legends; standard symbology used in engineering drawings; and the use of various types of drawings together in order to perform work, locate components, or use for other typical applications.
(4 contact hours: 2 lecture, 2 lab)

NUET 1300 Power Plant Components **3 Credits**

Prerequisite: NUET 1000.

This course introduces students to fundamental components and pieces of equipment that are used throughout electrical power generating facilities such as pumps, valves, heat exchangers, motors, and generators. It also includes lubrication principles, fire barriers, hangers and snubbers, HVAC systems, and miscellaneous electrical equipment. In addition, the course covers the purpose, construction, theory of operation, and typical maintenance requirements of these devices.
(3 contact hours)

NUET 2000 Reactor Plant Materials **3 Credits**

Prerequisite: CHEM 1100, NUET 1000.

This course provides students with an understanding of the various materials used in the operation of a nuclear power plant. Topics include phase equilibrium of materials, mechanical properties and behavior of materials, environmental effects on materials, corrosion and impurities effect on reactor plant materials, and nuclear-specific topics such as fuel pellets, fuel rod cladding, control rods, radiation effects on materials, enrichment of radioactive isotopes, and fuel pellet fabrication.
(4 contact hours: 2 lecture, 2 lab)

NUET 2050 Nuclear Field Experience **2 Credits**

Prerequisite: permission of Nuclear Engineering Technology department chair, MATH 1101 or MATH 1180 or MATH 1650, NUET 1000, NUET 1100, NUET 1200, NUET 1300, matriculated into the NUET program with at least 10 credits completed, minimum 3.0 cumulative GPA, and the student must be able to pass Edison Electric Institute (EEI) MOSS/PASS tests, a background check, and drug and psychological screenings as part of the employment process (background check, drug, and psychological screenings performed by FirstEnergy).

This field experience is a planned paid work activity designed to expose the student to the various technical work areas within a nuclear power plant. The course provides the student with the opportunity to experience day-to-day operations and maintenance procedures associated with a nuclear power plant. This course is a two (2) credit technical elective in the Nuclear Engineering Technology program.
(24 contact hours: 24 lab)

NUET 2250 Reactor Theory, Safety and Design **3 Credits**

Prerequisite: NUET 2000 (can be taken concurrently), PHYS 1610 (can be taken concurrently), MATH 1650.

This course provides an understanding of the principles of reactor theory, including the fission process; the neutron life cycle; the concepts of subcritical multiplication, criticality, and reactivity; thermal limits and their importance to operation; the functions and construction of fission product barriers; the practical application of the concepts of defense in depth and redundancy; and the roles of the various employees in reactor safety. In addition, the course discusses reactor protection concepts, Design Basis Accident (DBA), transient preventions and mitigation of core damage, radiochemistry and analysis, and hydrogen gas in reactor water following a transient or accident.

(3 contact hours)

NUET 2300 Thermo-Fluid Sciences **4 Credits**

Prerequisite: admission to the Nuclear Engineering Technology program or permission of department chair or program coordinator, MATH 1700, PHYS 1610.

This course presents basic concepts of thermodynamics, heat transfer, and fluid dynamics as they apply to power plant applications. It covers the topics of energy, entropy, thermodynamic cycles, and heat transfer. The course also discusses the basics of heat exchangers.

(6 contact hours: 3 lecture, 3 lab)

NUET 2400 Capstone and Case Studies in Nuclear Engineering Technology **2 Credits**

Prerequisite: NUET 1100, NUET 1200, NUET 1300, NUET 2000, NUET 2300 (can be taken concurrently); or permission of program chair or program coordinator.

This is a capstone course that will utilize topics that were covered throughout the curriculum. A large portion of the course will examine case studies from the nuclear power industry. It will also examine case studies of incidents from other industries. The course will discuss precursors to poor decision making and how the proper use of human performance enhancement (HPE) and event free tools can minimize the risks of accidents.

(2 contact hours)