

Program Number 10-624-1 Associate Degree in Applied Science • Four Terms

ABOUT THE PROGRAM

The increasing use of radiation and radioactive materials in today's world has created a demand for nuclear technicians. The Nuclear Technology program offers the student a unique opportunity to obtain the specialized training in demand by businesses and organizations licensed to utilize radioactive materials. This program can result in starting salaries higher than many four-year degree programs. It is also an excellent springboard for a four-year degree in the high-demand field of health physics and radiation safety.

PROGRAM OUTCOMES

- Work safely within industrial and radiological hazard areas.
- Understand and communicate nuclear technology-related concepts effectively in both oral and written formats.
- Diagnose equipment requiring electrical or mechanical repair and carry out preventive maintenance procedures.
- Perform radiological surveys for radiation and radioactive contamination.
- Follow procedures for operating and maintaining systems and equipment at nuclear facilities.
- Participate in applying nuclear technologies to a variety of industrial, medical, and research processes.
- Apply your knowledge in a variety of related occupational jobs such as reactor plant operations, maintenance, quality assurance, etc.

ADMISSIONS STEPS

- Work with Admissions Specialist to:
 - Submit Application and \$30 Fee
 - Complete an assessment for placement (Accuplacer or ACT)
 - Submit Official Transcripts (High School and Other Colleges)
- Meet with Program Advisor/Counselor to Discuss Program Details

APPROXIMATE COSTS

- \$132 per credit (resident)
- \$198 per credit (out-of-state resident)
- Other fees vary by program (books, supplies, materials, tools, uniforms, health-related exams, etc.) Visit gotoltc.edu/payingforcollege for details.

PLACEMENT SCORES

Accuplacer/ACT scores will be used to develop your educational plan. Contact your program advisor/counselor for details.

SPECIAL NOTE

Nuclear Technology classes are offered at LTC's main campus with ITV broadcasting to Northeast Wisconsin Technical College's campus in Green Bay and Blackhawk Technical College's campus in Janesville. The Nuclear Technology program is a shared program with Northeast Wisconsin Technical College and Blackhawk Technical College. Highly-achieving students may potentially earn *NUCP certification by maintaining a "B" or above in all core and supporting courses that they attend in person with LTC-proctored tests. (*NUCP certification is contingent upon LTC's partnership with an appropriately identified nuclear facility. Check with your program advisor/counselor for additional details.) Because of NUCP restrictions, on-line students are not eligible for this certification. Working adults in the nuclear/radiation/health physics industry should reference the Nuclear Radiation Safety/Health Physics program guide.

CAREER & EDUCATION ADVANCEMENT OPPORTUNITIES

LTC credits transfer to over 30 universities. For more information visit gotoltc.edu/transfer.

CONTACT

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Catalog No.	Class Title	Credit(s)
Term 1		
10624105	Health Physics Calculations and Statistics	3
10624110	Nuclear Technology and Regulations	3
10660105	DC Fundamentals	3
10804118	Intermediate Algebra w Applications	4
10801195	Written Communication OR	3
	10801197 Technical Reporting OR	
	10801136 English Composition 1	
		16
Term 2		
10624114	Nuclear Systems and Sources	3
10624122	Radiation Physics	3
10624123	Radiation Physics-Lab	2
10660110	AC Fundamentals	3
10620157	Hydraulics Industrial	2
10801196	Oral/Interpersonal Communications	3
		16
Summer		
10806134	General Chemistry	4
10624118	Radiation Biology	3
		7
Term 3		
10624149	Reactor Plant Components	4
10809122	Introduction to American Government	3
10806154	General Physics 1	4
10624138	Radioactive Materials Management	2
10624132	Radiological Emergencies	2
10624134	Radiation Shielding	2
10624135	Radiation Shielding Lab	1
		18
Term 4		
10624140	Radiochemistry	2
10624148	Reactor Theory and Operation	3
10809198	Psychology-Introduction to	3
10624145	Applied Health Physics	3
10624146	Applied Physics Lab OR 10624156	2
	Nuclear Technology Program Internship	
		13
		TOTAL 70

Curriculum and Program Acceptance requirements are subject to change.
Program start dates vary; check with your advisor/counselor for details.



AC FUNDAMENTALS ...prepares the student to analyze electrical circuits using phasers and AC math, analyze AC waveforms, measure and analyze AC power, analyze capacitors and inductors in DC and AC circuits, analyze AC circuits containing reactance and calculate resonance, apply the elements and properties of basic measuring circuits, and describe transformer characteristics. PREREQUISITES: 10660105 DC Fundamentals or 10660105C1 DC Fundamentals (3 cr) or 10605105 DC Fundamentals or 10605105C1 DC Fundamentals (3 cr)

APPLIED HEALTH PHYSICS ...prepares the learner to issue dosimetry, calculate neutron dose, monitor personal exposure, calculate radioactive airborne activity concentration, estimate radioactive airborne concentration, issue respirators, determine contamination levels, recommend protective clothing, reduce the spread of contamination, conduct an ALARA audit, reduce the total radiation exposure, maintain records, and estimate exposure to internal organs. PREREQUISITE: 10624122 Radiation Physics

APPLIED HEALTH PHYSICS-LAB ...expands the learner's ability to perform applied health physics tasks as covered in Applied Health Physics, 624-145 and should be completed within the same semester. Students will take the NUF Exam on an additional date specified by instructor. COREQUISITE: 10624145 Applied Health Physics

DC FUNDAMENTALS ...prepares the student to follow safety procedures; maintain a safe and healthy work environment; convert values to scientific and engineering notations; calculate math quantities; describe basic atomic theory; identify basic electrical terms; use established symbols standards; describe DC voltage characteristics and current sources and electrical resistance; measure and analyze electrical quantities in series and parallel circuits; and desolder/solder single lead components. COREQUISITES: 10804115 College Technical Math 1 or 10804113 College Tech Math 1A and 10804114 College Tech Math 1B or 10804118 Intermediate Algebra w Applications and 1624105 or 10624105HS Health Physics Calculations and Statistics

GENERAL CHEMISTRY ...covers the fundamentals of chemistry. Topics include the metric system, problem-solving, periodic relationships, chemical reactions, chemical equilibrium, properties of water; acids, bases, and salts; and gas laws. PREREQUISITE: 10834110 Elem Algebra or equivalent and COREQUISITE: 10838105 Intro Rdg & Study Skills or equivalent

GENERAL PHYSICS 1 ...presents the applications and theory of basic physics principles. This course emphasizes problem-solving, laboratory investigation, and applications. Topics include unit conversions and analysis, vectors, translational and rotational kinematics, translational and rotational dynamics, heat and temperature, and harmonic motion and waves. COREQUISITE: 10804114 College Tech Math 1B or equivalent

HEALTH PHYSICS CALCULATIONS AND STATISTICS ...prepares the learner to solve linear and exponential equations, logarithms, plot graphs, determine counting statistics and reliability, and work with geometry and trigonometry problems. CONDITION: 106241 Nuclear Technology Admissions Requirements Met and COREQUISITE: 10624110 Nuclear Technology & Regulations

HYDRAULICS - INDUSTRIAL ...prepares the learner to identify hydraulic component symbols; adjust a pressure relief valve; analyze the operation of a pilot operated relief valve; analyze Pascal's law; evaluate flow, velocity, work and power in industrial hydraulic circuits; analyze meter-in, meter-out, and bypass flow control circuits; evaluate the characteristics of hydraulic pumps, motors; directional and control valves; identify basic hydraulic control valves; and assemble hydraulic circuits. PREREQUISITES: Math equivalency requirements met or 31457318 Trades Math Industrial Maint and 31457318T1 Trades Math Industrial Maint 1, 31457318T2 Trades Math Industrial Maint 2 or 10804118 Intern College Algebra or COREQUISITE: 10804114 Tech Math 1B

INTERMEDIATE ALGEBRA WITH APPLICATIONS ...offers the learner algebra content with applications. Topics include properties of real numbers, order of operations, algebraic solution for linear equations and inequalities, operations with polynomial and rational expressions, operations with rational exponents and radicals, algebra of inverse, logarithmic and exponential functions. PREREQUISITES: 10834110 Elementary Algebra w Apps or equivalent

INTRO TO PSYCHOLOGY ...introduces students to a survey of the multiple aspects of human behavior. It involves a survey of the theoretical foundations of human functioning in such areas as learning, motivation, emotions, personality, deviance and pathology, physiological factors, and social influences. It directs the student to an insightful understanding of the complexities of human relationships in personal, social, and vocational settings. COREQUISITE: 10838105 Intro Reading and Study Skills or equivalent

INTRODUCTION TO AMERICAN GOVERNMENT ...introduces American political processes and institutions. It focuses on rights and responsibilities of citizens and the process of participatory democracy. Learners examine the complexity of the separation of powers and checks and balances. It explores the role of the media, interest groups, political parties and public opinion in the political process. It also explores the role of state and national government in our federal system.

NUCLEAR SYSTEMS AND SOURCES ...introduces the learner to the major components of natural/man-made background sources, x-ray tubes and applications, medical-used radioactivity materials, accelerators, nuclear gauging devices, non-ionization radiations, and electricity/research nuclear reactors and associated health physics topics. CONDITION: 106241 Nuclear Technology Admissions Requirements Met or Nuclear Tech Dominion Grant

NUCLEAR TECHNOLOGY AND REGULATIONS ...introduces the learner to atomic and nuclear structure; radioactivity and basic dosimetry; regulation standards; and Title 10 Parts 19, 20, 30 and 35 of the Code of Federal Regulations. CONDITION: 106241 Nuclear Technology Admissions Requirements Met

ORAL/INTERPERSONAL COMM ...provides students with the skills to develop speaking, verbal and nonverbal communication, and listening skills through individual speeches, group activities, and other projects. COREQUISITE: 10838105 Intro Reading and Study Skills or equivalent

RADIATION BIOLOGY ...prepares the learner to convert measuring units and activity to dose rates, predict the effect of radiation on living cells and human organs, evaluate radiation risk, and calculate internal doses. PREREQ: 10624110 Nuc Tch/Rg, 10624105 Hlth Phys C I/ Stat, 10624114 or 10624114HS Nuc Sys/Src & 10624122 Rad Phys, 10624123 Rad Phys-Lb, 10804118 or 10804118OL Inter Alg wApps or 10804113 Tech Math 1A & 10804114 Tech Math 1B COREQ: 10624110HS Nuc Tch/Rg

RADIATION PHYSICS ...introduces the learner to health physics-related physics, including the properties of radiation's; interactions of radiation with matters; basic principles of radiation detection and measurement; and different kinds of radiation detectors; i.e., gas-filled and solid-state detectors. PREREQUISITE: 10624105 Hlth Phys Calc & Stats, 10624110 Nuclear Tech & Reg or COREQUISITE: 10624110HS Nuclear Tech & Reg, and PREREQUISITE: 10804118 Intern Alg w Apps or 10804118OL Intern Alg w Apps and CONDITION: 106241 Nuclear Tech Admissions Req Met

RADIATION PHYSICS-LAB ...expands the learners ability to perform calculations, select instruments, and analyze samples. This course is associated with 624-122, Radiation Physics. COREQUISITE: 10624122 Radiation Physics and PREREQUISITE: 10801195 Written Communications or 10801197 Technical Reporting and COREQUISITE: 10624110 Nuclear Technology & Regulations or 10624110HS Nuclear Technology & Regulations

RADIATION SHIELDING ...provides the learner with the skills to calculate radiation attenuation from various geometric radioactive sources, determine the effect of neutron radiation on materials, and estimate the exposure rate from various sources with or without shielding materials. PREREQUISITE: 10624122 Radiation Physics

RADIATION SHIELD-LAB ...expands the learner's ability to perform shielding of ionizing radiation sources and to measure the penetration of beta and gamma radiation. COREQUISITE: 10624134 Radiation Shielding

RADIOACTIVE MATERIAL AND MANAGEMENT ...introduces the learner to the proper methods used to dispose of radioactive waste in liquid, solid, gaseous forms; determine waste classification, evaluate methods used to process low-level and high-level waste, determine the package/label requirements, proper type of transport container, shipment quantity classification, storage distance for people and film during shipments by rail/vessel/public roads, proper shipping name and UN number; completion of proper shipping papers; document materials inventory/shipments. PREREQUISITES: 10624105 Health Physics Calc & Statistics, 10624110 Nuclear Technology & Regulations or COREQUISITE: 10624110HS Nuclear Technology & Regulations and PREREQUISITE: 10624114 Nuclear Systems & Sources or 10624114 HS Nuclear Systems & Sources

RADIOCHEMISTRY ...prepares the learner to separate dissolved, suspended, liquid, and ionic radioactive components; perform qualitative and quantitative analysis of samples; and prevent the production of radioactive material by using proper chemical control. PREREQUISITES: 10624122 Radiation Physics and 10806134 General Chemistry or 10806174 General Chemistry or High School Chemistry Equivalent

RADIOLOGICAL EMERGENCIES ...prepares the learner to understand a radiological emergency within the commercial nuclear power industry and explain how it is prevented, mitigated, and the proper preparations should an emergency occur. A radiological emergency is displaced radioactive substances in solid, liquid, or gaseous form in amounts which may result in doses to plant workers, plant equipment, the environment, or the public, that exceed company, state, and federal limits or regulations. Post-accident actions will be described as well as company, state, and federal regulations on radioactive releases and doses. PREREQUISITES: 10624110 Nuclear Tech and Regs or COREQUISITE: 10624110HS Nuclear Tech and Regs and PREREQUISITE: 10624105 Health Phys Calculations and Stats and 10624114 Nuclear Systems and Sources or COREQUISITE: 10624114HS Nuclear Systems and Sources

REACTOR PLANT COMPONENTS ...introduces basic mechanical and electrical components used by nuclear power plants such as different types of piping, valves, pumps, ejectors, filters, turbines, heat exchangers, compressors, lubrication systems, valve actuators, breakers, transformers, relays, and other equipment. PREREQUISITES: 10624110 Nucl Tech/Regs, 10624114HS Nucl Sys/Stats/Sources, 10624105 Hlth Phys Calc & Stats, 10804118 or 10804118OL Intern Algebra w Appl or 10804114 College Tech Math 1B COREQUISITE: 10624114 Nucl Sys/Stats/Sources, 1624110HS Nucl Tech/Regs

REACTOR THEORY AND OPERATION ...introduces the learner to the basic reactor types, the fission process, reactivity/criticality, reactor kinetics, heat removal, residual/decay heat, basic reactor types, nuclear plant water chemistry, and reactor thermodynamics. PREREQUISITE: 10624122 Radiation Physics and 10624132 Radiological Emergencies

WRITTEN COMMUNICATION ...teaches the writing process, which includes prewriting, drafting, revising, and editing. Through a variety of writing assignments, the student will analyze audience and purpose, research and organize ideas, and format and design documents based on subject matter and content. Keyboarding skills are required for this course. It also develops critical reading and thinking skills through the analysis of a variety of written documents. PREREQUISITE: 10831103 Intro to College Wrtg equivalent and COREQUISITE: 10838105 Intro Rdg & Study Skills or equivalent