



Nuclear Technology

Program No: 10-624-1

Associate Degree in Applied Science

Degree Completion Time: Four Terms

In general, an academic year consists of two terms; however, degree completion time may vary based on student scheduling needs and class availability.

2012-2013

Catalog No.	Class Title	Credit(s)
Term 1		
10624105	Health Physics Calculations and Statistics	3.00
10624110	Nuclear Technology and Regulations	3.00
10660105	DC Fundamentals	3.00
10804118	Intermediate Algebra w Applications	4.00
10801195	Written Communication	3.00
	Total	16.00
Term 2		
10624114	Nuclear Systems and Sources	3.00
10624122	Radiation Physics	3.00
10624123	Radiation Physics-Lab	2.00
10660110	AC Fundamentals	3.00
10620157	Hydraulics Industrial	2.00
10801196	Oral/Interpersonal Communications	3.00
	Total	16.00
Term 3 (Summer)		
10806134	General Chemistry	4.00
10624118	Radiation Biology	3.00
	Total	7.00
Term 4		
10624149	Reactor Plant Components	4.00
10809122	Introduction to American Government	3.00
10806154	General Physics 1	4.00
10624138	Radioactive Materials Management	2.00
10624132	Radiological Emergencies	2.00
10624134	Radiation Shielding	2.00
10624135	Radiation Shielding Lab	1.00
	Total	18.00
Term 5		
10624140	Radiochemistry	2.00
10809198	Psychology-Introduction to	3.00
10624145	Applied Health Physics	3.00
10624156	Nuclear Technology Program Internship OR 10624146 Applied Physics Lab (2 cr)	2.00
	Total	10.00
Term 6 (Summer)		
10624148	Reactor Theory and Operation	3.00
	Total	3.00
	Program Total	70.00
Note:	<p>Program start dates vary; check with your counselor for details or see http://gotoltc.edu/pdfs/coursecalendar.pdf.</p> <p>Various classes have prerequisites. Check with your counselor.</p> <p>Curriculum and program acceptance requirements are subject to change.</p>	

About the Career

The increasing use of radiation and radioactive materials in today's world has created a demand for nuclear technicians. This demand is expected to remain high for years to come. 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.

About Shared Programs

Nuclear Technology classes are offered at LTC's main campus with ITV broadcasting to Northeast Wisconsin Technical College's campus in Green Bay. This means you have the option to obtain face-to-face training or via an alternate method that better fits your needs. The Nuclear Technology program is a shared program with Northeast Wisconsin Technical College.

Careers

Graduates of LTC's Nuclear Technology program have a wide variety of career opportunities waiting for them in:

- Nuclear Power Facilities
- Radioactive Waste Handling Facilities
- Radiopharmaceutical Companies
- Universities and National Laboratories
- Medical Facilities
- U.S. Department of Energy Sites
- Hospitals
- Emergency Management

Admissions Steps

- Application
- Application Fee
- Entrance Assessment Scores
- Transcripts
- Program Advising Session
- Functional Abilities Statement of Understanding Form

Program Outcomes

You'll learn to:

- 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.

Approximate Costs

- \$126 per credit plus \$10 online fee
- Other fees vary by program (books, supplies, materials, tools, uniforms, health-related exams, etc.)

Functional Abilities

Functional abilities are the basic duties that a student must be able to perform with or without reasonable accommodations. At the postsecondary level, students must meet these requirements, and they cannot be modified.

Entrance Assessment Scores

Accuplacer	ACT
Arithmetic - 100	Mathematics - 20
Reading - 79	Reading - 18
Sentence Skills - 86	English - 18
Elem. Algebra - 55	Elem. Algebra - NA

Transfer agreements are available with the following institutions:

Capella University
Concordia University
Franklin University
Herzing University
Lakeland College
Marian College

Ottawa University
Silver Lake College
Thomas Edison State College
University of Phoenix
Upper Iowa University
UW-Green Bay

UW-Oshkosh
UW-Stout

IMPORTANT: For more information on these agreements, visit gotoltc.edu/transfer.

10620157 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 Interm College Algebra or **COREQUISITE:** 10804114 Tech Math 1B

10624105 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

10624110 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

10624114 Nuclear Systems and Sources

...introduces the learner to the major components of accelerators, non-ionization radiation, isotope generators, nuclear gauging devices, X-ray tubes, nuclear reactors, and natural/background sources and the radiation hazards associated with them. **CONDITION:** 106241 Nuclear Technology Admissions Requirements Met

10624118 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.

PREREQUISITES: 10624110 Nuclear Tech/Reg & 10624105 Hlth Phys Calc/Stats & 10624114 Nuclear Syst/Sources & 10624122 Rad Phys & 10624123 Rad Phys-Lab & 10804118 Interm Alg w Apps or 10804113 Tech Math 1A & 10804114 Tech Math 1B

10624122 Radiation Physics

...introduces the learner to health physics-related physics, properties of radiation, interactions of radiation with matters, detection and measuring radiation, and gas-filled and solid-state detectors.

PREREQUISITE: 10624105 Health Phys Calculations & Statistics, 10624110 Nuclear Technology & Regulations, 10804118 Interm Algebra w Applications and **CONDITION:** 106241 Nuclear Technology Admissions Requirements Met

10624123 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 10624110 Nuclear Technology & Regulations

10624132 Radiological Emergencies

...prepares the learner to plan and assist in emergencies involving radioactive material and radiation by calculating projected doses, collecting environmental samples, following emergency plans, and managing affected personnel.

PREREQUISITES: 10624110 Nuclear Technology and Regulations and 10624105 Health Physics Calculations and Statistics and 10624114 Nuclear Systems and Sources

10624134 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.

PREREQUISITE: 10624122 Radiation Physics

10624135 Radiation Shield-Lab

...expands the learner's ability to perform shielding of ionizing radiation sources and to measure the penetration of alpha beta and gamma radiation.

COREQUISITE: 10624134 Radiation Shielding

10624138 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, 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; evaluate methods used to process low level and high level waste.

PREREQUISITES: 10624105 Health Physics Calculations & Statistics, 10624110 Nuclear Technology & Regulations, 10624114 Nuclear Systems & Sources

10624140 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

10624145 Applied Health Physics

...introduces 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

10624148 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

10624149 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 Nuclear Technology and Regulations and 10624105 Health Physics Calculations & Statistics and 10804118 Intermediate Algebra w Applications and **COREQUISITE:** 10624114 Nuclear Systems and Sources

10624156 Nuclear Technology Program Internship

...internship enhances the student's ability to apply technical skills to work productively, communicate effectively, and demonstrate appropriate ethics and behavior in a professional workplace environment.

PREREQUISITES: 10624122OL Radiation Physics Online or 10624105 Health Phys Calculations, 10624110 Nuclear Tech & Regulations, 10624114 Nuclear Systems & Sources, 10624122 Radiation Physics, 10624118 Radiation Biology, 10660105 DC Fund, 10660110 AC Fund

10660105 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 and multi-lead components.

10660110 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)

10801195 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 or **CONDITION:** Written Comm Prepared Learner (Accuplacer Wrtg min score of 86 or Equivalent) and **COREQUISITE:** 10838105 Intro Rdg & Study Skills or **CONDITION:** Reading Accuplacer min score of 74 or equivalent

10801196 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 **CONDITION:** Reading accuplcer minimum score of 74 or equivalent

10804118 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: Accuplacer Math score of 100 and Accuplacer Algebra score of 55 or equivalent or 10834110 Elementary Algebra w Apps and **COREQUISITE:** 10838105 Intro Reading and Study Skills or **CONDITION:** Reading accuplacer minimum score of 74 or equivalent

10806134 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: 10804196 or 10804113 College Tech Math 1A or 10804109 Alg for Gen Chem or 10804121 Tech Math 1 or 10804195 College Tech Math 1 or 10804115 College Tech Math 1 or equiv or 10834110 Elem Algebra and 10838105 Intro Rdg & Study Skills or equiv

10806154 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: 10804197 College Tech Math 1B or 10804114 College Tech Math 1B or 10804114M1 College Tech Math 1B Mod 1 and 10804114M2 College Tech Math 1B Mod 2 or 10804115 College Tech Math 1

10809122 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.

COREQUISITE: 10838105 Intro Reading and Study Skills or Accuplacer Reading score of 74 or equivalent

10809198 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 Accuplacer Reading score of 74 or equivalent