



# 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.

2008-2009

Catalog No.	Class Title	Credit(s)
<b>Term 1</b>		
10624105	Health Physics Calculations and Statistics	3.00
10624114	Nuclear Systems and Sources	3.00
10660105	DC Fundamentals	3.00
10804113	College Technical Mathematics 1A	3.00
10804114	College Technical Mathematics 1B	2.00
10801195	Written Communication	3.00
	<b>Total</b>	<b>17.00</b>
<b>Term 2</b>		
10624110	Nuclear Technology and Regulations	2.00
10624118	Radiation Biology	3.00
10660110	AC Fundamentals	3.00
10620130	Introduction to Mechanisms Mechanics	3.00
10620159	Hydraulics I	2.00
10806134	General Chemistry	4.00
	<b>Total</b>	<b>17.00</b>
<b>Term 3 (Summer)</b>		
10624122	Radiation Physics	3.00
10623123	Radiation Physics-Lab	2.00
	<b>Total</b>	<b>5.00</b>
<b>Term 4</b>		
10624155	Internship OR 10624134 Radiation Shielding (2.00) AND 10624132 Radiological Emergencies (2.00)	4.00
10809198	Psychology-Introduction to	3.00
	<b>Total</b>	<b>7.00</b>
<b>Term 5</b>		
10620162	Pneumatics I	2.00
10660130	Electronic Devices/Digital	4.00
10620141	Motor Operation and Control	3.00
10806154	General Physics I	4.00
10801197	Technical Reporting	3.00
	<b>Total</b>	<b>16.00</b>
<b>Term 6 (Summer)</b>		
10624148	Reactor Theory and Operation OR 10449104 Principles of Industrial Hygiene	3.00
10809122	Introduction to American Government	3.00
	<b>Total</b>	<b>6.00</b>
	<b>Program Total</b>	<b>68.00</b>
<b>Note:</b>	<p>Program start dates vary; check with your counselor for details or see <a href="http://gotoltc.com/pdfs/coursecalendar.pdf">http://gotoltc.com/pdfs/coursecalendar.pdf</a>.</p> <p>Catalog numbers assigned to "elective" classes are for administrative use only. Consult with program counselor regarding your elective selection.</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.

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.

## 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

## Program Goals

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

- \$92 per credit plus \$10 online fee
- Other fees vary by program (books, supplies, materials, tools, uniforms, health-related exams, etc.)

## Entrance Assessment Scores

Assessment Areas	ACT	Accuplacer
Math	18	83
Read	14	79
Write	15	86

## Transfer agreements are available with the following institutions:

Capella University  
Lakeland College  
Silver Lake College  
UW-Stout

IMPORTANT: For more information on these agreements, visit [gotoltc.edu/transfer](http://gotoltc.edu/transfer).

### **10449104 Principles of Industrial Hygiene**

...prepares the learner to anticipate, recognize, and control occupational exposure to hazardous chemicals and physical stresses; conduct exposure monitoring; research regulations, literature, and other documents on occupational illness and disease; and evaluate exposure control procedures and practices for basic toxicology, air quality, noise, vibration, blood-borne pathogens, temperature extremes, radiation and ergonomics.

### **10620130 Mechanisms Mechanics Introduction to**

...prepares the learner to use tools and fasteners safely; identify belt and chain drive components; install and adjust belt and chain drives; apply bearing and lubrication information; perform coupling alignment using straight edge, feeler gauge, and dial indicator methods; identify various gear drives; calculate gear ratios; and analyze first-, second-, and third-class levers.

### **10620141 Industrial Controls and Motors**

...prepares the learner to select control devices by function and operation; illustrate electrical circuits using symbols, diagrams, and abbreviations; explain the operation of magnetic solenoids; apply motor control techniques; select relay type for industrial application; apply the basic rules of line and wiring diagrams; compare the types of timers and timing circuits used in control and explain the coding systems used; explain each type of control device and how it is used in an electrical circuit. Also prepares the learner to verify DC motor operational theories; select DC and AC motor types for general applications; identify AC motor components and wiring applications; verify single-phase operational theory; identify three phase motor components and wiring applications; verify three-phase motor operational theory; identify motor starting methods for industrial applications; verify electro-mechanical motor starting principals of operation; select the motor breaking method for industrial applications; verify the operational theory of speed and acceleration methods for motors used in industrial applications; design three-phase power motor circuits for industrial applications; design control circuits for three phase power motor circuits.

**COREQUISITES:** 10660110 AC Fundamentals or 10660110C1 AC Fundamentals (3 cr) or 10605110 AC Fundamentals or 10605110C1 AC Fundamentals (3 cr)

### **10620159 Hydraulics I**

...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.

### **10620162 Pneumatics**

...prepares the learner to identify, evaluate and regulate pneumatic components and controls. Participants evaluate and apply pressure drop vs. flow relationship, vacuum generation, directional control valves, flow control valves, linear actuators, and pneumatic motors.

**PREREQUISITE:** 10620159 Hydraulics I or 10620159C1 Hydraulics I (2 cr) and 10620160 Hydraulics II or 10620160C1 Hydraulics II (2 cr)

### **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.

### **10624110 Nuclear Technology and Regulations**

...introduces the learner to atomic and nuclear structure; radioactivity and half-life; regulation standards; and Title 10 Parts 19, 20, 30 and 35 of the Code of Federal Regulations.

### **10624114 Nuclear Systems and Sources**

...introduces the learner to the major components of accelerators, lasers, isotope generators, nuclear gauging devices, X-ray tubes, nuclear reactors, and natural/background sources and the radiation hazards associated with them.

### **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 Technology and Regulations and 10624105 Hlth Physics Calculations and Statistics and 10624114 Nuclear Syst and Sources and 10624122 Radiation Physics and 10624123 Radiation Physics-Lab or 10624123C2 Radiation Physics

### **10624122 Radiation Physics**

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

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

### **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

### **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.

### **10624155 Health Physics 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.

### **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.

**COREQUISITES:** 10660105 DC Fundamentals or 10660105C1 DC Fundamentals (3 cr) or 10605105 DC Fundamentals or 10605105C1 DC Fundamentals (3 cr)

### **10660130 Electronic Devices/Digital**

...prepares the learner to: evaluate characteristics of solid-state electronics; troubleshoot solid-state diodes and power supply circuits; troubleshoot solid-state transistors and circuits; troubleshoot thyristor controlled circuits; troubleshoot operational amplifier circuits; convert among numbering systems used in digital electronics; analyze basic logic gates; analyze the operation of flip-flops; analyze the operation of registers and register circuits; and analyze the evaluate the operation of transducer devices.

**PREREQUISITES:** 10660110 AC Fundamentals or 10660110C1 AC Fundamentals (3 cr) or 10605110 AC Fundamentals or 10605110C1 AC 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.

### **10801197 Technical Reporting**

...provides students with the skills to prepare and present oral and written technical reports. Types of reports may include lab and field reports, proposals, technical letters and memos, technical research reports, and case studies. Designed as an advanced communication course for students who have completed at least the prerequisite introductory writing course.

**PREREQUISITE:** 10801195 Written Communication or 10801195TV Written Communication ITV

### **10804113 College Technical Mathematics 1A**

...prepares the student to solve linear, quadratic, and relational equations; graph; formula rearrangement; solve systems of equations; percent; proportions; and operations on polynomials. Emphasis will be on the application of skills to technical problems. Successful completion of College Technical Mathematics 1A and College Technical Mathematics 1B is the equivalent of College Technical Mathematics 1.

**PREREQUISITE:** Accuplacer Math minimum score of 79 or Equivalent or 10804100 Math Proficiency

### **10804114 College Technical Math 1B**

...is a continuation of College Technical Math 1A. Topics include: measurement systems; computational geometry; right and oblique triangle trigonometry; and trigonometric functions on the unit circle. Emphasis will be on the application of skills to technical problems. Successful completion of College Technical Mathematics 1A and College Technical Mathematics 1B is the equivalent of College Technical Mathematics 1.

**PREREQUISITE:** 10804113 College Tech Math 1A, or 10804196 College Tech Math 1A, or 10804109 Algebra Computation

### **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 College Tech Math 1A or 10804113 College Tech Math 1A or 10804109 Algebra Comp or 10804121 Technical Math I or 10804108 ModuMath Algebra or 10804195 College Tech Math 1 or 10804115 College Tech Math 1 or College Algebra equivalent

### **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.

**PREREQUISITE:** 10804121 Technical Math I or 10804116 Trigonometry or **COREQUISITE:** 10804197 College Tech Math 1B or 10804114 College Tech Math 1B 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.

### **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.