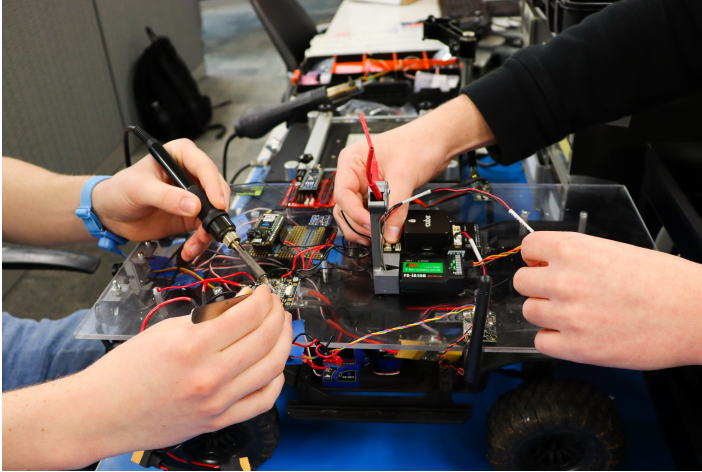


ELECTRICAL ENGINEERING TECHNOLOGY (BS)

Program Overview Bachelor of Science Degree



The Bachelor of Science Degree in Electrical Engineering Technology (ELT) is designed primarily for those students who already possess an associate degree in fields related to Electronics or Electrical Technology. The ELT program at NEIT emphasizes the hands-on, practical approach to the mastery of Electrical Engineering Technology. This approach is supplemented in the ELT program with increasing levels of electronics and electrical theory, industrial controls, mathematics, and physics. In addition to the normal laboratory performance and theory testing, participants in the ELT program are also expected to demonstrate competence in using both oral and written skills. This program is designed both to educate and to provide the personal skills for self-directed learning throughout the student's professional life.

The ELT program is a unique combination of two traditional electronic and electrical topics. The study of electronic components, electronic subsystems and programming of microprocessor systems is combined with that of automation systems or advanced industrial controls, energy management and process control. ELT students are presented with applications of complex automation controllers, network communications, data acquisition, process manufacturing and microcontroller systems in order to develop an increased level of understanding which enhances their professional value to prospective employers. At the conclusion of the ELT program, the students are expected to develop and synthesize their own design project demonstrating the applied skills acquired throughout the program or find an internship in a related field. The "hybrid" approach of the ELT program that combines traditional electronic and electrical skill sets provides students with a unique knowledge base that will allow them to pursue careers under the direction of an engineering staff but above that of the traditional electrical worker.

Graduates of this program are qualified for positions in product development, operations, or technical service. The engineering technologist works with a professional engineer or scientist in converting scientific knowledge and craftsmanship into products and techniques. Upon completion of this program, students may also choose to continue

into the NEIT Master of Science in Engineering Management degree program.

Accreditation Status



The Bachelor of Science Degree program in Electrical Engineering Technology is accredited by the Engineering Technology Accreditation Commission of ABET, <http://www.abet.org>.

Curriculum

Course	Title	Quarter Credit Hours
Term VII		
ELT 310	Programmable Automation Controllers and Lab	4
ELT 314	C++ Programming	4
EN 322	Argumentative Research Writing (COM Core) ¹	4
MA 310	Calculus I (MA/SCI Core) ¹	4
Quarter Credit Hours		16
Term VIII		
ELT 320	Supervisory Control and Data Acquisition (SCADA) and Communication Systems and Lab	4
ELT 364	Digital Circuit Design	4
MA 320	Calculus II (MA/SCI Core) ¹	4
EN 421	Technical Communications (COM Core) ¹	4
Quarter Credit Hours		16
Term IX		
ELT 360	Embedded Microcontrollers	4

ELT 362	Embedded Microcontrollers Lab	2
ELT 374	Circuit Analysis I	4
PHY 300	Physics II & Lab (MA/SCI Core) ¹	4
Quarter Credit Hours		14
Term X		
ELT 384	Circuit Analysis II	4
ELT 410	Electrical Design and Energy Management & Lab	4
ELT 463	Sensors and Signal Conditioning	4
CHM 300	Chemistry I and Lab (MA/SCI Core) ¹	4
Quarter Credit Hours		16
Term XI		
ELT 475	Automation and Process Control & Lab	4
ELT 486	LabVIEW Programming	4
ENG 400	Microsoft Applications for Engineers	3
ENG 489	Introduction to Senior Capstone	2
Elective	300-400 Level Social Sciences Core (SS Core) ¹	4
Quarter Credit Hours		17
Term XII		
ENG 499	Senior Capstone	5
HU 331	Ethics and Technology (HU Core) ¹	4
Choose one of the following:		3-4
ENG 481	Senior Engineering Internship	
Elective	Technical Elective (see chart below)	
Quarter Credit Hours		12-13
Total Quarter Credit Hours		91-92

¹ Liberal Arts Core.

Technical Elective Choices for Term XII

Course	Title	Quarter Credit Hours
IT 374	IT Project Management	3
MCT 115	Computer-Aided Design I	4
MCT 235	Industrial Robotic Automation	4
MCT 239	Quality	4
MCT 322	Fluid Power	4
MCT 416	Operations Management	4
SE 126	Intermediate Programming Using Python	4
Business Management Courses (as space is available)		
MGM 310	Product and Service Marketing	4
MGM 313	Human Resource Management	4
MGM 320	Business Presentations	4
MGM 332	Customer Relations and Sales	4
MGM 333	Organizational Behavior	4
MGM 336	Data Analysis with Spreadsheets	4
MGM 340	Engineering Finance	3
MGM 346	Project Management	4
MGM 445	Negotiation	3
MGM 450	Career Leadership	4

Legend

C = Number of lecture hours per week

L = Number of laboratory hours per week

T = Total Quarter Credit Hours where each lecture hour per week is one credit, every 2-4 laboratory hours are one credit depending on the expected amount of pre- or post-lab work.

All bachelor's degree students are required to take 28 credits of liberal arts and math/science courses as selected from the liberal arts core. See the course descriptions section of this catalog for a list of the core area courses.

Subject to change.

Program Mission, Goals, and Outcomes

Program Mission

The mission of the Electrical Engineering Technology (ELT) program is to prepare students for immediate and productive employment in their field upon graduation. This is accomplished through educational experiences combining theory and practical application in the basic knowledge, skills, techniques, practices, and concepts employed in their profession. The program endeavors to develop the student's ability to think critically, to communicate effectively and to independently solve problems. An important objective is to instill in students the necessity for continued professional development.

ELT Program Educational Objectives

1. Graduates will assume responsibilities for training through involvement in professional organizations, formal educational opportunities, employer-based training programs, or other training that enhances their ability to be productive in their place of employment.
2. Graduates will solve problems using the modern tools of the discipline.
3. Graduates will be effective communicators capable of working as professionals in cross-functional teams.
4. Graduates respect professional, ethical, and social issues as well as a commitment to quality and dependability in their profession.

Student Outcomes

Students will develop:

1. an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly defined engineering problems appropriate to the discipline;
2. an ability to design systems, components, or processes meeting specified needs for broadly defined engineering problems appropriate to the discipline;
3. an ability to apply written, oral, and graphical communication in broadly defined technical and non-technical environments; and an ability to identify and use appropriate technical literature;
4. an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes; and
5. an ability to function effectively as a member as well as a leader on technical teams.

Student Skills Developed

Objective:

The ELT program at NEIT has a primary focus of developing practical design and implementation skills of electrical / electronic systems. Each course in the curriculum is designed to teach these skills to the students.

Skills:

1. **Circuit Design / Analysis** - Design and analysis of DC, Transient and AC steady state circuits including power supplies, filters and switching circuits.
2. **Digital and Analog signal conditioning**: Design of analog and digital circuits for sensor input and actuator control.
3. **Microcontroller control of I/O** - Design of programs using the Arduino Microcontroller and hardware interface with analog and digital I/O.
4. **PLD Design**: Custom logic design of combinatorial and sequential circuits in PLDs.
5. **Programmable Automation Controllers (PACs)** - Design of programs with Ladder Logic and other languages for control of discrete and analog I/O using the Allen Bradley Compact and Control Logix Controllers.
6. **Supervisory Control and Data Acquisition** – Design of SCADA systems for the use of system control and data collection in today's industrial world.
7. **Industrial Networking** – Using Ethernet IP, ControlNet and DeviceNet, students will understand network strategies, topologies, configuration and interaction with other control devices.
8. **PID Design** - Design and analysis of open loop/closed loop control systems and sequential process control. The control of DC, AC, Servo and Stepper motors, tank level and flow control, discrete state process control.
9. **Sensors, Hydraulics, Pneumatics** – Gives the student an understanding of how these devices interact with the control system.
10. Technical writing and presentation (reports and presentations)
11. Project planning through Senior Capstone.
12. Employment search and interviewing through Internship option.
13. Teamwork through lab team assignments.
14. Applications of Math, Physics and Chemistry toward solving engineering problems.
15. Problem-solving and troubleshooting (Homework and lab experience)
16. Computer literacy
 - **C++ coding** - of a microcontroller.
 - **AHDL** - PLD design and simulation using Altera Hardware Description Language or Xilinx Verilog.
 - **MultiSim** - for circuit design and analysis.
 - **RSLogix5000** - Ladder logic, Function Block, Sequential Function Chart and StructuredText programming PACs.
 - **C++ - for general programming applications and I/O interfacing.**
 - **Rockwell Software's Factory Talk SE** for SCADA/HMI
 - **LabVIEW** – for data acquisition and control.
 - **Microsoft Office.**

17. **Technical Electives** - Students may choose technical electives to develop skills in Information Technology, Mechanical Engineering Technology, and Electrical Engineering Technology.

Q&A and Technical Standards Questions & Answers

1. When do my classes meet?

Day Classes: Technical classes normally meet for at least three hours a day for up to five days a week. Classes normally begin in the early morning (7:45 a.m.), late morning (usually 11:25 a.m.), or mid afternoon. The time slot for your program may vary from term to term.

Evening Classes: Technical classes meet on the average of three nights a week, although there may be times when they will meet four nights a week. Classes normally begin at 5:45 p.m.

In addition, to achieve your associate degree, you will take a total of approximately eight liberal arts courses, which will be scheduled around your technical schedule over the course of your entire program. Each liberal arts course meets approximately four hours per week. Liberal arts courses are offered days, evenings, and Saturdays.

At the beginning of each term you will receive a detailed schedule giving the exact time and location of all your classes. The university requires that all students be prepared to take classes and receive services at any of NEIT's locations where the appropriate classes and services are offered.

When a regularly scheduled class falls on a day which is an NEIT observed holiday (Columbus Day, Veterans Day, Martin Luther King, Jr. Day, and Memorial Day), an alternate class will be scheduled as a make up for that class. The make up class may fall on a Friday. It is the student's responsibility to take note of when and where classes are offered.

2. How large will my classes be?

The average size for a class is about 20 to 25 students; however, larger and smaller classes occur from time to time.

3. How much time will I spend in lab?

Almost half of your technical courses consist of laboratory work. In order for you to get the most out of your laboratory experiences, you will first receive a thorough explanation of the theory behind your lab work.

4. Where do my classes meet?

Students should be prepared to attend classes at any of NEIT's classroom facilities: either at the Post Road, Access Road, or East Greenwich campus.

5. How long should it take me to complete my program?

To complete your degree requirements in the shortest possible time, you should take the courses outlined in the prescribed curriculum. For a typical six-term curriculum, a student may complete the requirements in as little as 18 months.

To complete all your degree requirements in the shortest time, you should take at least one liberal arts course each term.

Students may also elect to complete some of their liberal arts requirements during Intersession (except for EN courses), a five-week term scheduled between Spring and Summer Terms. Students will not be

assessed any additional tuition for liberal arts courses taken during the Intersession but may be assessed applicable fees.

Students wishing to extend the number of terms needed to complete the required technical courses in their curriculum will be assessed additional tuition and fees.

6. Is NEIT accredited?

NEIT is accredited by the New England Commission of Higher Education. Accreditation by NECHE is recognized by the federal government and entitles NEIT to participate in federal financial aid programs. Some academic departments have specialized professional accreditations in addition to accreditation by NECHE. For more information on accreditation, see NEIT's catalog.

7. Can I transfer the credits that I earn at NEIT to another college?

The transferability of a course is always up to the institution to which the student is transferring. Students interested in the transferability of their credits should contact the Office of Teaching and Learning for further information.

8. Can I transfer credits earned at another college to NEIT?

Transfer credit for appropriate courses taken at an accredited institution will be considered upon receipt of an official transcript for any program, biology, science, and mathematics courses in which the student has earned a "C" or above within the past three years and for English or humanities courses in which the student has earned a "C" or above within the last ten years. An official transcript from the other institution must be received before the end of the first week of the term for transfer credit to be granted for courses to be taken during that term. Students will receive a tuition reduction for the approved technical courses based on the program rate and will be applied against the final technical term of the curriculum's tuition amount. No tuition credit is provided for courses which are not a part of the technical curriculum.

9. What is the "Feinstein Enriching America" Program?

New England Institute of Technology is the proud recipient of a grant from the Feinstein Foundation. To satisfy the terms of the grant, the College has developed a one-credit community enrichment course which includes hands-on community enrichment projects. The course can be taken for a few hours per term, spread over several terms. Students who are already engaged in community enrichment on their own may be able to count that service towards course credit.

10. How many credits do I need to acquire my Financial Aid?

In order to be eligible for the maximum financial aid award, you need to maintain at least 12 credits per academic term.

11. What does my program cost?

The cost of your program will be as outlined in your enrollment agreement, along with your cost for books and other course materials. Students who decide to take more terms than the enrollment agreement describes to complete the technical courses in their curriculum will be subject to additional fees and possible additional tuition costs. Students who elect to take the technical portion of the degree requirements at a rate faster than the rate prescribed in the curriculum and the enrollment agreement will be assessed additional tuition.

Students who require prerequisite courses will incur additional tuition and fees above those outlined in their enrollment agreement.

If a student elects to take a course(s) outside of the prescribed curriculum, additional tuition and fees will be assessed.

Remember, students who withdraw and re-enter, one time only, pay the tuition rate that was in effect for them at the time of their last day of attendance for up to one year from their last day of attendance. Second re-entrees and beyond pay the tuition rate in effect at the time they re-enter. The most economical way for you to complete your college degree is to begin your program now and continue your studies straight through for the six terms necessary to complete your degree requirements.

12. What kind of employment assistance does NEIT offer?

The Career Services Office assists NEIT students and graduates in all aspects of the job search, including resume writing, interviewing skills, and developing a job search strategy. Upon completion of their program, graduates may submit a resume to the Career Services Office to be circulated to employers for employment opportunities in their fields. Employers regularly contact us about our graduates. In addition, our Career Services Office contacts employers to develop job leads. A strong relationship with employers exists as a result of our training students to meet the needs of industry for over fifty years. No school can, and NEIT does not, guarantee to its graduates employment or a specific starting salary.

13. Where will job opportunities exist?

Graduates have obtained employment in the local area. However, one of the most exciting aspects of this program is the ability to look nationally for employment opportunities.

14. Is there any state or federal licensing required in my field?

Under existing (1996) Rhode Island law no license is required for any of the careers which you will be preparing to enter.

Because of the complex nature of licensing requirements and because these requirements change periodically, we cannot list all the requirements for all the types of licenses available in all the states. NEIT IS NOT RESPONSIBLE FOR ANY CHANGES IN LICENSING REQUIREMENTS THAT ANY STATE LEGISLATURE, INCLUDING, RI'S, MAY IMPLEMENT AT ANY TIME. Each student should take personal responsibility for determining the licensing requirements in the specific trade and state in which he or she plans to work. Your instructor or department chair can give you help as needed.

15. What kind of jobs will I be qualified to look for?

Generally, jobs will exist in research and design and manufacturing firms.

16. What are the Entrance Requirements for the BSELT Program?

The minimum requirement for admission to the BSELT Program is the completion of an Associate degree in Electronics with a 2.0 GPA OR the completion of an associate degree in an equivalent program (such as Electrical Technology) with a 2.5 GPA.

17. Is this degree program accredited?

The Bachelor of Science degree program in Electrical Engineering Technology is accredited by the Engineering Technology Accreditation Commission of ABET, www.abet.org.

ELECTRICAL ENGINEERING TECHNOLOGY (ELT BS)

- Need for technicians with skill set between traditional electrical workers and professional electrical engineers.
- Hybrid Curriculum of Traditional Electronics and Electrical
- Emphasis on Automation and Programming

- Energy Management and “Smart” building design and systems
- Allows ELY-AS students and EST-AS students to continue education with current technologies WITHOUT PREREQUISITE QUARTERS!
- Potential for Internship option
- Less Math & Physics than traditional EE program allows for more courses in core theme
- Students entering from EST or ELY will be required to have a 2.5 GPA.

Industries/Careers for ELT graduates include:

- Bio Tech/Life Sciences/ Pharmaceutical
- Energy Management/Renewable Energy
- Water/Waste Water
- Food & Beverage
- Discrete Manufacturing
- Building Automation
- Process Control
- Field Service Technician
- Defense Industry
- Sales Engineer

Technical Standards

These technical standards set forth by the Electrical Engineering Technology Department, establish the essential qualities considered necessary for students admitted to these programs to achieve the knowledge, skills and competencies to enter these fields. The successful student must possess the following skills and abilities or be able to demonstrate that they can complete the requirements of the program with or without reasonable accommodation, using some other combination of skills and abilities.

Cognitive Ability

- Ability to concentrate for long periods of time and retain information on intricate details of component theory and analysis/operation of electronic circuits.
- Ability to learn, remember and recall detailed information and to use it for problem solving.
- Ability to deal with materials and problems such as organizing or reorganizing information.
- Ability to use abstractions in specific concrete situations.
- Ability to break information into its component parts.
- Ability to understand spatial relationships.
- Ability to perform tasks by observing demonstrations.
- Ability to perform tasks by following written instructions.
- Ability to perform tasks following verbal instructions.

Communications Skills

- Ability to communicate effectively with faculty and students.
- Ability to read English sufficiently to read college level text books, electronics manuals, directions, technical service bulletins, wiring diagrams and safety directions and anger signals.

- Ability to demonstrate and use the knowledge acquired during the classroom training process and in the lab setting.

Adaptive Ability

- Ability to maintain emotional stability and the maturity necessary to interact with other members of the faculty and students in a responsible manner.

Physical Ability

- Ability to move test equipment from point to point and to manipulate controls on electronic test equipment.
- Ability to perform learned skills, independently, with accuracy and completeness within reasonable time frames in accordance with procedures.

Manual Ability

- Ability to wire, build, or protoboard electronic circuits using small components and hand tools.
- Ability to solder connections and fabricate cables and test leads.
- Ability to manipulate, screwdrivers, and other tools.
- Sufficient motor function and sensory abilities to participate effectively in the classroom laboratory.
- Sufficient manual dexterity and motor coordination to coordinate hands, eyes and fingers in the operation of tools and other equipment.

Sensory Ability

Visual

- Acute enough to identify and differentiate component leads, values of codes written on components, as well as color coding on components and wire cables.
- Acute enough to make circuit connections, solder connections and find circuit test points.
- Acute enough to read dials, and position of control settings of electronics testing equipment.
- Acute enough to read small numbers on precision measuring instruments.

Degree Progress Checklist

Electrical Engineering Technology - BS

Degree Progress Checklists

- For students entering October 2023 or later
- For students entering April 2021 to September 2023
- For students entering October 2020 to March 2021