

Electrical Engineering Technology

70-credit Associate of Applied Science Degree

About the Program

After graduating from this calculus-based program, students will be prepared to start working in the electronics technology field and/or enroll with junior-level status in the Electrical Engineering program at the University of Wisconsin-Milwaukee, the Electrical Engineering program at Marquette University or the Electrical Engineering Technology program at the Milwaukee School of Engineering.

WCTC's Electrical Engineering Technology students gain skills in the rapidly expanding field of electronics in areas such as research and development, production, testing, installation and field service. Electronics technicians in the research and development field assist scientists and engineers to design, build and test experimental electronic apparatus. In manufacturing operations, technicians supervise the production and assembly of electronic equipment, set up and program automated manufacturing lines, and troubleshoot and repair automated manufacturing equipment. In field service engineering, technicians install, maintain, troubleshoot and repair computer systems, computer-controlled machine systems and other electronic devices and systems.

Potential Job Titles

- Electrical Technician
- Electronics Technician
- Electronics Repair Technician
- Senior Technician
- Technical Support Person
- Technical Sales Person

Credit Transfer

Students must receive a grade of C or higher in a class to qualify for credit transfer. Records must be reviewed, and additional credit transfer specifics obtained, from the four-year college/university to which the student wants to attend. In addition to UWM, Marquette University and MSOE, credits from the Electrical Engineering Technology program may also transfer to other colleges/universities. Visit www.wctc.edu/transfer for additional information. Since details of credit transfers change periodically, be sure to contact the intended college/university to verify credit transferability.

| Required Courses | Credits |
|---|-----------|
| First Semester | |
| 605-118 Digital Electronics | 3 |
| 662-102 DC Circuit Analysis | 4 |
| 801-195 Written Communication | 3+ |
| 804-198 Calculus I | 4 |
| 809-196 Introduction to Sociology | 3+ |
| Total semester credits | 17 |
| Second Semester | |
| 605-127 Electronic Fabrication Techniques | 2 |
| 662-104 AC Circuit Analysis | 4 |
| 662-190 Electronic Circuits I | 4 |
| 804-156 Technical Calculus II | 4 |
| 806-187 Calculus Based Physics I | 3 |
| Total semester credits | 17 |
| Third Semester | |
| 605-126 Industrial Systems | 4 |
| 605-182 Microprocessors | 3 |
| 606-153 Co-Op Education I-Industrial | 1 |
| 662-191 Electronic Circuits II | 4 |
| 804-167 Technical Calculus III | 4 |
| 806-188 Calculus Based Physics 2 | 3 |
| Total semester credits | 19 |
| Fourth Semester | |
| 605-148 Data Acquisition | 3 |
| 605-187 Electronic Data Communications | 3 |
| 662-108 Linear Circuit Analysis | 2 |
| 801-196 Oral/Interpersonal Communication | 3+ |
| 809-195 Economics | 3+ |
| 809-199 Psychology of Human Relations | 3 |
| Total semester credits | 17 |
| + Proficiency exam available | |
| <i>Curriculum is current as of catalog printing. The most current curriculum requirements for graduation will be provided upon admission to program, or review at www.wctc.edu.</i> | |

Admission Process

- Fill out a WCTC application
- Send \$30 non-refundable application fee
- Send high school transcript or GED/HSED
- Send any previous college transcripts
- Complete Skills Assessment test (COMPASS)
- Begin pursuing Financial Aid options
- Transcribed credit agreements are in effect with several Waukesha County high schools

- Four years of high school math, through pre-calculus, is suggested to complete this program in two years. WCTC offers additional coursework to help students build additional math skills.

For more information, call 262.691.5200.

**Electrical Engineering Technology
Required Courses**

605-118 Digital Electronics 3

Study practical digital electronics including basic logic components such as gates and inverters and the more complex logic devices such as multiplexers, demultiplexers, and analog/digital and digital/analog converters. Explore the basic concepts of microprocessors.

605-126 Industrial Systems 4

Gain hands-on experience using automated control devices and systems, including thyristor characteristics and applications in phase control, concluding with DC motor control, using a commercial DC drive, programmable controller operation and programming, interfacing PLCs with material handling equipment, developing a controlling program per written specifications, and the programming and documentation of PLC programs using computers and various software packages.
Prerequisites: 605-176 Electronic Devices I or 662-190 Electronic Circuits I

605-127 Elect Fabrication Techniques 2

Build some of the electronic fabrication and repair knowledge and skills a technician is expected to possess. Study the areas of wire preparation and termination, soldering and desoldering, wire bundling and routing, and printed circuit board inspection, cleaning, and repair.
Prerequisites: 662-102 DC Circuit Analysis or 605-113 DC Electronics or 605-102 Introduction to Electronics

605-148 Data Acquisition 3

Explore the use of a broad family of measurement applications in verifying design work and characterizing a process or a product. Study measurement systems for the sensing of a physical phenomenon and for tracking or recording data over a time interval or operating cycle. Learn how to plot, chart, display, and report measurements.
Prerequisites: 605-182 Microprocessors (or concurrent)

605-182 Microprocessors 3

Study the programming and design of microcontroller-based systems. Learn how to program using assembly language programming. Use a computer to develop software that is cross-assembled and downloaded to the target system. Interface the microcontroller to the outside world, and explore topics such as serial/parallel communication and interrupts. Complete a project entailing both hardware and software.
Prerequisites: 605-118 Digital Electronics

605-187 Electronic Data Communications 3

Explore the fundamental principles of voice and data communications and the key terminology used in the communications environment. Examine networking concepts used in local and wide area networks from the telecommunication network perspective. Study the concepts of modulation and demodulation in terms of amplitude modulation, frequency modulation, and single-side band.
Prerequisites: 605-118 Digital Electronics and 605-114 AC Electronics or 662-104 AC Circuit Analysis

606-153 Co-op Educ I-Ind 1

Gain a meaningful occupational experience. Hone technical competencies and interpersonal relationships that are stressed in seminars.
Prerequisites: Approval of Co-op Ed Office

662-102 DC Circuit Analysis 4

Become familiar with the fundamental laws and properties of electrical engineering, engineering notation, and applications to direct current (DC) circuits. Explore various related topics, including resistance, Ohm's Law, series-parallel circuits, Thevenin's and Norton's Theorems, Kirchoff's Law, nodal and loop analysis, network theorems, and capacitive and inductive circuit analysis. Develop skills through computer-aided circuit simulation, and learn troubleshooting techniques during lab activities.
Prerequisites: 804-154 Technical Calculus I (or concurrent) or 804-198 Calculus I (or concurrent)

662-104 AC Circuit Analysis 4

Explore alternating current (AC) analysis of electrical networks while delving into the following topics: average and complex power, RMS values, transformers, frequency response, resonance, two-port networks, and polyphase systems. Use computer-aided circuit simulation to reinforce laboratory experiments and to illustrate AC principles. Continue to develop troubleshooting skills.
Prerequisites: 662-102 DC Circuit Analysis

662-108 Linear Circuit Analysis 2

Develop knowledge of dependent sources, RC/RL circuits, and RLC circuits. Apply formal transient analysis using differential equations to solve first- and second-order differential equations. Examine other techniques in solving RC/RL and RLC circuits.
Prerequisites: 804-156 Technical Calculus II

662-190 Electronic Circuits I 4

Discover the characteristics of common non-linear circuit elements. Discuss the important parameters of diodes, transistors, rectifiers, regulators, operational amplifiers, oscillators, and filters. Explore the design and analysis of DC and small signal amplifiers. Conduct computer-aided circuit simulation and analysis.
Prerequisites: 662-104 AC Circuit Analysis (or concurrent)

662-191 Electronic Circuits II 4

Analyze amplifier, filter, and oscillator circuits, including power, multistage, differential, and operational amplifiers and first- and second-order active filters. Use computational and other techniques to analyze biasing, input and output impedance calculations, Bode and phase plots, feedback, compensation, and circuit stability.
Prerequisites: 662-190 Electronic Circuits I

801-195 Written Communication 3

Study and practice the transfer of information, ideas, and experiences in written form through reports, letters, memoranda, and other documents. Gain proficiency in the areas of organization, clarity, accuracy, and directness.
Prerequisites: COMPASS-Writing Skills or ACT-English or ASSET-Writing Skills or Accuplacer Sentence Skills or TABE Advanced Language or 831-103 Intro to College Writing or 851-771 Writing-Program Readiness

801-196 Oral/Interpersonal Comm 3

Practice the necessary skills for effective speech delivery, listening, assertiveness, conflict resolution, teamwork, and general interpersonal communication.

804-156 Technical Calculus II 4

Apply integration techniques, partial derivatives, graphing conics, double integrals, polar coordinates, and first- and second-order differential equations to problems in science and engineering.
Prerequisites: 804-154 Technical Calculus I or 804-198 Calculus I

804-167 Technical Calculus III 4

Apply vectors and solid analytic geometry, vector-valued functions, series expansions, multiple line and surface integrals, and partial differentiation to problems in science and engineering.
Prerequisites: 804-156 Technical Calculus II

804-198 Calculus I 4

Analyze and graph algebraic expressions, especially conic sections. Develop an intuitive understanding of limits, derivatives and integrals. Apply the derivative and the integral to certain physical problems.
Prerequisites: 804-115 College Technical Math 1 and 804-116 College Technical Math 2 or 804-151 Technical Math I and 804-152 Technical Math II

806-187 Calculus Based Physics I 3

Use a calculus-based approach to the study of physics. Topics include: units and unit conversions, mechanics, rotational mechanics, work and energy, oscillations and waves.
Prerequisites: 804-154 Technical Calculus I or 804-198 Calculus I

806-188 Calculus Based Physics 2 3

A continuation of Calculus Based Physics 1. It is designed to provide a calculus-based approach to the study of physics. Topics include: electric fields, magnetic fields, Maxwells' equations, electromagnetic waves, and optics. Lab activities are related to and support classroom presentations.
Prerequisites: 806-187 Calculus Based Physics I or 806-161 Physics I/Calculus Based

809-195 Economics 3

Discuss the major institutions and principles that underlie the contemporary American economic system, and consider topics such as the free enterprise system, supply and demand, circular flow, government involvement, the Federal Reserve System, economic growth and development, the effects of international trade, comparative economic systems, and global economics.
Prerequisites: COMPASS-Reading Skills or 858-775 Reading - Program Readiness or 838-105 Intro Reading & Study Skills or TABE Advanced Reading or Accuplacer Reading Comprehensi or College Proficiency - Reading or Grandfathered Rdg Requirement or ACT-Reading

809-196 Introduction to Sociology 3

Learn the basic concepts of sociology: culture, socialization, social stratification, multiculturalism, and the five institutions, including family, government, economics, religion, and education. Other topics include demography, deviance, technology, environment, social issues, social change, social organization, and workplace issues.
Prerequisites: COMPASS-Reading Skills or 858-775 Reading - Program Readiness or 838-105 Intro Reading & Study Skills or TABE Advanced Reading or Accuplacer Reading Comprehensi or College Proficiency - Reading or Grandfathered Rdg Requirement or ACT-Reading

809-199 Psychology of Human Relations 3

Examine the principles of interaction as applied to human relations at home and on the job. Explore topics such as self concept personality development, learning, motivation, emotions, stress, human relations processes, and special relationships.
Prerequisites: COMPASS-Reading Skills or 858-775 Reading - Program Readiness or 838-105 Intro Reading & Study Skills or TABE Advanced Reading or Accuplacer Reading Comprehensi or College Proficiency - Reading or Grandfathered Rdg Requirement or ACT-Reading