

Electrical Engineering Technology - Biomedical Equipment Major (BMT)

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Graduates of the program Electrical Engineering Technology - Biomedical Equipment Major are welcomed in hospitals and companies where medical equipment is designed, tested, installed, and operated because of their strong background in electronics and information systems along with knowledge of specialized biomedical equipment.

Graduates of the Biomedical Equipment Major earn an Associate of Applied Science degree and are prepared to take on the challenging tasks of hospital healthcare technology management, by maintaining multi-million dollar equipment such as MRI, CT, sonogram, X-ray, and other medical equipment.

The curriculum also provides an effective foundation for transfer into a related bachelor's degree program.

For more information, please contact the Engineering and Information Technologies Division at (513) 569-1743.

To apply for this program at Cincinnati State, visit the Admissions (<http://www.cincinnati.edu/academics/admission/>) section of the College website.

Electrical Engineering Technology - Biomedical Equipment Major (BMT)

| Semester 1 | | Lec | Lab | Credits |
|------------|--|-----|-----|---------|
| EET 131 | Circuit Analysis 1 (B) | 3 | 2 | 4 |
| MAT XXX | Mathematics Elective 1 (G) | 3 | 2 | 4 |
| ENG 101 | English Composition 1 (G) | 3 | 0 | 3 |
| FYE 1XX | First Year Experience Elective (B) | 1 | 0 | 1 |
| Semester 2 | | | | |
| EET 132 | Circuit Analysis 2 (T) | 3 | 2 | 4 |
| CIT 190 | Career Preparation: Engineering and Information Technologies (B) | 1 | 0 | 1 |
| EET 121 | Digital Systems 1 (T) | 2 | 3 | 3 |
| BMT 161 | Biomedical Instrumentation 1 (T) | 3 | 3 | 4 |
| Semester 3 | | | | |

| EET 291 | Full-Time Cooperative Education 1: Electronics Engineering Technology (T) | 1 | 40 | 2 |
|---------------------------------------|---|-----------|------------|-----------|
| NETC 121 | Network Communications 1 (B) | 2 | 2 | 3 |
| MAT XXX | Mathematics Elective 2 (B) | 3 | 2 | 4 |
| Semester 4 | | | | |
| BIO 117 | Human Body in Health and Disease (B) | 3 | 0 | 3 |
| ESET 251 | Electronics (T) | 3 | 2 | 4 |
| PHY XXX | Physics Elective (G) | 3 | 2 | 4 |
| EET 122 | Digital Systems 2 (T) | 2 | 3 | 3 |
| Semester 5 | | | | |
| ENG 10X | English Elective (G) | 3 | 0 | 3 |
| BMT 262 | Biomedical Instrumentation 2 (T) | 3 | 3 | 4 |
| EMET XXX | Electro-Mechanical Engineering Technology Elective (T) | 2 | 3 | 3 |
| EET XXX | Electrical Engineering Technology Elective 1 (T) | 2 | 3 | 3 |
| Semester 6 | | | | |
| EET XXX | Electrical Engineering Technology Elective 2 (T) | 1 | 40 | 2 |
| ECO 10X | Economics Elective (G) | 3 | 0 | 3 |
| Total Credits: | | 50 | 112 | 65 |
| Electives | | | | |
| Mathematics Elective | | | | 8 |
| Take one of the following series: | | | | |
| MAT 125 & MAT 126 | Algebra and Trigonometry and Functions and Calculus | | | |
| Or | | | | |
| MAT 251 & MAT 252 | Calculus 1 and Calculus 2 | | | |
| First Year Experience Elective | | | | |
| FYE 100 | College Success Strategies: Overview | | | 1 |
| FYE 105 | College Success Strategies: Overview and Application | | | 2 |

| | | |
|---|--|---|
| FYE 110 | College Success Strategies: Practice and Application | 3 |
| Physics Elective | | |
| PHY 151 | Physics 1: Algebra and Trigonometry-Based | 4 |
| PHY 201 | Physics 1: Calculus-Based | 5 |
| English Composition Elective | | |
| ENG 102 | English Composition 2: Contemporary Issues | 3 |
| ENG 103 | English Composition 2: Writing about Literature | 3 |
| ENG 104 | English Composition 2: Technical Communication | 3 |
| ENG 105 | English Composition 2: Business Communication | 3 |
| Electro-Mechanical Engineering Technology Elective | | |
| EMET 245 | Laser 1 | 3 |
| EMET 141 | Programmable Logic Controllers | 3 |
| EMET 252 | Motors, Motor Controls, and Variable Drives | 3 |
| EMET 270 | Robotics and Servomechanisms | 3 |
| Electrical Engineering Technology Electives | | |
| Any EET (2XX level) | | |
| or, any ESET (2XX level) | | |
| or, any PSET | | |
| or, any EMET not used to fulfill the Electro-Mechanical Engineering Technology Elective | | |
| Economics Elective | | |
| ECO 105 | Principles of Microeconomics | 3 |
| ECO 110 | Principles of Macroeconomics | 3 |

Some courses are offered in alternative versions identified with a letter after the course number-- for example, ENG 101 and ENG 101A.

- This curriculum displays only course numbers without the added letter.
- The alternative version, when available, meets the requirements of the course version without the added letter.

The letters G, B, and T (displayed after course titles or elective descriptions) identify types of courses required by the Ohio Department of Higher Education as part of an associate's degree curriculum.

G = General Education course in this curriculum

B = Basic Skills course in this curriculum

T = Technical course in this curriculum

Electrical Engineering Technology - Biomedical Equipment Major (BMT)

- Ability to select and apply knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies.
- Ability to function effectively as a member or leader on a technical team.
- Ability to apply written, oral, and graphical communication in both technical and non-technical environments; and ability to identify and use appropriate technical literature.

- Ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes.
- Commitment to quality, timeliness, and continuous improvement.
- Ability to apply project management techniques to electrical/electronic(s)/biomedical systems development.
- Proficiency in the application of circuit analysis and design, network systems, healthcare software, analog and digital electronics, electric motor technology, and engineering standards to the building, testing, operation, and maintenance of electrical, electronic, and biomedical systems.
- Proficiency in using exceptional troubleshooting skills based on hands-on knowledge of key biomedical instrumentation.

Faculty

Program Chair

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BMT Courses

BMT 161 Biomedical Instrumentation 1 4 Credits. 3 Lecture Hours. 3 Lab Hours.

A course on the role of the biomedical engineering technician, and fundamentals of systems and device maintenance. Topics include: hospital organization and regulations, professional certifications, safety, medical device maintenance, and technology management.
Prerequisites: EET 131

BMT 191 Part-Time Cooperative Education 1: Biomedical Equipment and Information Systems Technology 1 Credit. 1 Lecture Hour. 20 Lab Hours.

Students seeking an associate's degree participate in their first part-time field learning experience related to their degree. Students are expected to register for academic courses during the same semester. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: None

BMT 192 Part-Time Cooperative Education 2: Biomedical Equipment and Information Systems Technology 1 Credit. 1 Lecture Hour. 20 Lab Hours.

Students seeking an associate's degree participate in their second part-time field learning experience related to their degree. Students are expected to register for academic courses during the same semester. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: BMT 191

BMT 193 Part-Time Cooperative Education 3: Biomedical Equipment and Information Systems Technology**1 Credit. 1 Lecture Hour. 20 Lab Hours.**

Students seeking an associate's degree participate in their third part-time field learning experience related to their degree. Students are expected to register for academic courses during the same semester. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: BMT 192

BMT 194 Part-Time Cooperative Education 4: Biomedical Equipment and Information Systems Technology**1 Credit. 1 Lecture Hour. 20 Lab Hours.**

Students seeking an associate's degree participate in their fourth part-time field learning experience related to their degree. Students are expected to register for academic courses during the same semester. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: BMT 193

BMT 195 Part-Time Cooperative Education 5: Biomedical Equipment and Information Systems Technology**1 Credit. 1 Lecture Hour. 20 Lab Hours.**

Students seeking an associate's degree participate in their fifth part-time field learning experience related to their degree. Students are expected to register for academic courses during the same semester. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: BMT 194

BMT 196 Part-Time Cooperative Education 6: Biomedical Equipment and Information Systems Technology**1 Credit. 1 Lecture Hour. 20 Lab Hours.**

Students seeking an associate's degree participate in their sixth part-time field learning experience related to their degree. Students are expected to register for academic courses during the same semester. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: BMT 195

BMT 262 Biomedical Instrumentation 2**4 Credits. 3 Lecture Hours. 3 Lab Hours.**

A continuation of BMT 161. Topics include: patient and surgical monitoring, complex medical devices, imaging equipment, medical technology management, equipment malfunction, and globalization.

Prerequisites: BMT 161 and EET 122 and EET 132 and ESET 251

BMT 291 Full-Time Cooperative Education 1: Biomedical Equipment and Information Systems Technology**2 Credits. 1 Lecture Hour. 40 Lab Hours.**

Students seeking an associate's degree participate in their first full-time field learning experience related to their degree. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: None

BMT 292 Full-Time Cooperative Education 2: Biomedical Equipment and Information Systems Technology**2 Credits. 1 Lecture Hour. 40 Lab Hours.**

Students seeking an associate's degree participate in their second full-time field learning experience related to their degree. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: BMT 291

BMT 293 Full-Time Cooperative Education 3: Biomedical Equipment and Information Systems Technology**2 Credits. 1 Lecture Hour. 40 Lab Hours.**

Students seeking an associate's degree participate in their third full-time field learning experience related to their degree. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: BMT 292

BMT 294 Internship 1: Biomedical Equipment and Information Systems Technology**2 Credits. 1 Lecture Hour. 40 Lab Hours.**

Students seeking an associate's degree participate in their first unpaid field learning experience related to their degree. Students must follow applicable policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: BMT 151 and CIT 190

BMT 295 Internship 2: Biomedical Equipment and Information Systems Technology**2 Credits. 1 Lecture Hour. 40 Lab Hours.**

Students seeking an associate's degree participate in their second unpaid field learning experience related to their degree. Students must follow applicable policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: BMT 294

EET Courses

EET 100 Introduction to Electrical Engineering Technology**2 Credits. 1 Lecture Hour. 2 Lab Hours.**

An introduction to concepts and measuring skills for the electronics field. Topics include: current, voltage, power, Ohm's law, series circuits, meter reading, software simulation use, and circuit construction.

Prerequisites: MAT 093 or appropriate placement

EET 101 Electronic Fundamentals 1**3 Credits. 2 Lecture Hours. 3 Lab Hours.**

A course on electrical fundamentals for non-electrical majors. Topics include: DC and AC circuit theory, electrical motors and controls, electromagnetic devices, and transformers.

Prerequisites: MAT 096 or MAT 124, and ENG 085, or appropriate placements

EET 121 Digital Systems 1**3 Credits. 2 Lecture Hours. 3 Lab Hours.**

A course on analyzing, designing, and troubleshooting digital logic circuits. Topics include: basic gates and programmable logic devices (PLDs); number systems and codes; Boolean algebra; circuit simplification; and functions of logic circuits, latches, flip-flops, counters, timers, and memory.

Prerequisites: EET 131, and MAT 124 (minimum grade C) or appropriate placement

EET 122 Digital Systems 2**3 Credits. 2 Lecture Hours. 3 Lab Hours.**

A continuation of EET 121. Topics include: counter design and cascading, shift registers, PLD applications, microprocessor registers, input/output (I/O), busses, direct memory access (DMA), memory expansion, and assembly language programming.

Prerequisites: EET 121

EET 131 Circuit Analysis 1**4 Credits. 3 Lecture Hours. 2 Lab Hours.**

A course on DC electric circuits. Topics include: current, voltage, resistance, and power; laws applied to series, parallel, and series-parallel circuits; Thevenin's, Superposition, and Norton's theorems; steady state and transient behavior of capacitive and inductive devices; and magnetic properties.

Prerequisites: MAT 124 (minimum grade C) or appropriate placement
Ohio Transfer Assurance Guide Approved

Ohio Career-Technical Assurance Guide Approved

EET 132 Circuit Analysis 2**4 Credits. 3 Lecture Hours. 2 Lab Hours.**

A continuation of EET 131. Topics include: sinusoidal wave characteristics; complex numbers; phasors; transformers; RC, RL, and RLC networks; filter networks; three-phase and poly-phase systems; and power factor analysis.

Prerequisites: EET 131, and MAT 125 (minimum grade C) or appropriate placement
Ohio Transfer Assurance Guide Approved

EET 191 Part-Time Cooperative Education 1: Electronics Engineering Technology**1 Credit. 1 Lecture Hour. 20 Lab Hours.**

Students seeking an associate's degree participate in their first part-time field learning experience related to their degree. Students are expected to register for academic courses during the same semester. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: None

EET 192 Part-Time Cooperative Education 2: Electronics Engineering Technology**1 Credit. 1 Lecture Hour. 20 Lab Hours.**

Students seeking an associate's degree participate in their second part-time field learning experience related to their degree. Students are expected to register for academic courses during the same semester. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: EET 191

EET 193 Part-Time Cooperative Education 3: Electronics Engineering Technology**1 Credit. 1 Lecture Hour. 20 Lab Hours.**

Students seeking an associate's degree participate in their third part-time field learning experience related to their degree. Students are expected to register for academic courses during the same semester. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: EET 192

EET 194 Part-Time Cooperative Education 4: Electronics Engineering Technology**1 Credit. 1 Lecture Hour. 20 Lab Hours.**

Students seeking an associate's degree participate in their fourth part-time field learning experience related to their degree. Students are expected to register for academic courses during the same semester. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: EET 193

EET 195 Part-Time Cooperative Education 5: Electronics Engineering Technology**1 Credit. 1 Lecture Hour. 20 Lab Hours.**

Students seeking an associate's degree participate in their fifth part-time field learning experience related to their degree. Students are expected to register for academic courses during the same semester. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: EET 194

EET 196 Part-Time Cooperative Education 6: Electronics Engineering Technology**1 Credit. 1 Lecture Hour. 20 Lab Hours.**

Students seeking an associate's degree participate in their sixth part-time field learning experience related to their degree. Students are expected to register for academic courses during the same semester. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: EET 195

EET 291 Full-Time Cooperative Education 1: Electronics Engineering Technology**2 Credits. 1 Lecture Hour. 40 Lab Hours.**

Students seeking an associate's degree participate in their first full-time field learning experience related to their degree. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: None

EET 292 Full-Time Cooperative Education 2: Electronics Engineering Technology**2 Credits. 1 Lecture Hour. 40 Lab Hours.**

Students seeking an associate's degree participate in their second full-time field learning experience related to their degree. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: EET 291

EET 293 Full-Time Cooperative Education 3: Electronics Engineering Technology**2 Credits. 1 Lecture Hour. 40 Lab Hours.**

Students seeking an associate's degree participate in their third full-time field learning experience related to their degree. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: EET 292

EET 294 Internship 1: Electronics Engineering Technology**2 Credits. 1 Lecture Hour. 40 Lab Hours.**

Students seeking an associate's degree participate in their first unpaid field learning experience related to their degree. Students must follow applicable policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: EET 131 and CIT 190

EET 295 Internship 2: Electronics Engineering Technology**2 Credits. 1 Lecture Hour. 40 Lab Hours.**

Students seeking an associate's degree participate in their second unpaid field learning experience related to their degree. Students must follow applicable policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: EET 294