# Bachelor of Science in Engineering Technology

# Engineering Technology with a Major in Electrical Engineering Technology (BSET)

## Electrical Engineering Technology

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The Bachelor of Science in Engineering Technology with a major offers courses at the senior level in communications systems technology, embedded systems technology, power systems technology, mechatronics systems technology, and computer engineering technology. Students in this program take common courses in areas such as DC and AC circuits, electronic devices and circuits, digital electronics, linear electronics, microcontrollers, programming, Programmable Logic Controllers (PLCs), and electric machines. Supporting laboratories provide experience in instrumentation, testing and troubleshooting, and design and implementation. The program culminates with a senior project that integrates coursework with a practical project assignment in the student's area of interest. To satisfy the upper-division general education requirements, students are required to complete one of the following three options: 1) Option D: 6 hours of elective upper-division course work from outside of and not required by the student's major and college; 2) Option A: Any University-approved minor (minimum of 12 hours determined by the department), second degree, or second major; or 3) Option B: Any University-approved interdisciplinary minor (12 hours, three of which may be in the major). Graduates should be qualified for application positions in electronic and electrical product design and development, electronic and electrical system operation and maintenance, field operations, and various other technical functions.

## Mission Statement

The mission of the Electrical Engineering Technology (EET) program is to sustain a high quality undergraduate program of study leading to the Bachelor of Science in Engineering Technology degree. It is a significant component of the University's commitment to science, engineering and technology, particularly in fields of major importance to the region. Through ODUGlobal (https://online.odu.edu/academics/programs/electrical-engineering-technology/), the electrical engineering technology program provides opportunities for technical personnel throughout the state and elsewhere to enhance their education and pursue baccalaureate level studies. Simultaneously, the program supports the general education components that yield a well-rounded graduate who is aware of societal needs and issues.

## Program Educational Objectives

The objective of the electrical engineering technology program is to prepare graduates to establish themselves as successful professionals in electrical systems technology, computer engineering technology, or related areas during the first few years of their careers by having demonstrated their ability to:

1. Identify and solve increasingly complex technical problems, both theoretically and practically, as raised by continually evolving technologies and industry needs and practices.
2. Make educated, responsible, and ethical decisions in response to the needs of the profession and society, with these decisions solidly grounded in science and engineering fundamentals.

3. Work effectively as a member or leader of technical teams and clearly communicate ideas leading to successful team outcomes.

Typical technical problems that EET graduates will be able to address include planning, specification, development, design, procurement of equipment and materials, implementation, and performance verification. Typical technical tasks the EET graduates will be expected to perform include: conducting engineering experiments, making observations, collecting and analyzing data, and formulating conclusions.

## Student Outcomes

The electrical engineering technology program has adopted, after deliberations by its constituents, outcomes for the Bachelor of Science program in electrical engineering technology. These outcomes are listed below:

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;
5. An ability to function effectively as a member or leader on a technical teams.

## Accreditation

The Bachelor of Science in Engineering Technology - Electrical Engineering Technology is accredited by the Engineering Technology Accreditation Commission (ETAC) of ABET, https://www.abet.org (https://www.abet.org/), under the General Criteria and the Electrical/Electronic(s) Engineering Technology Program Criteria.

The curriculum provides EET graduates with instruction in the knowledge, techniques, skills, and use of modern tools necessary to enter careers in the design, application, installation, manufacturing, operation, and/or maintenance of electrical/electronic(s) systems. Graduates of the EET program are well-prepared for the design, development, and implementation of electrical/electronic(s) systems.

The curriculum includes the following topics:

1. application of circuit analysis and design, computer programming, associated software, analog and digital electronics, microcontrollers, and engineering standards to the building, testing, operation, and maintenance of electrical/electronic(s) systems;
2. application of natural sciences and mathematics at or above the level of trigonometry to the building, testing, operation, and maintenance of electrical/electronic systems;
3. analysis, design, and implementation of one or more of the following: control systems, instrumentation systems, communications systems, computer systems, power systems or energy systems;
4. application of project management techniques to electrical/electronic(s) systems; and
5. utilization of differential and integral calculus, as a minimum, to characterize the performance of electrical/electronic systems.

## Requirements

### Lower-Division General Education

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|---|---|
| Written Communication (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#written) | 6 |
| Oral Communication (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#oral) | 3 |

| | | |
|---|---|---|
| Mathematics (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#math) | | 3 |
| Language and Culture (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#language) | | 0-6 |
| Information Literacy and Research (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#information) | | 3 |
| Human Behavior (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#behavior) | | 3 |
| Human Creativity (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#creativity) | | 3 |
| Interpreting the Past (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#interpret) | | 3 |
| Literature (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#literature) | | 3 |
| Philosophy and Ethics (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#philosophy) | | 3 |
| The Nature of Science (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#nature) | | 8 |
| Impact of Technology (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#impact) | | 3 |

The General Education requirements in information literacy and research, impact of technology, and philosophy and ethics are met though the major.

## Upper-Division General Education

- Option A: Any University-approved disciplinary minor (minimum of 12 hours), second degree, or second major.

- Option B: Any University-approved interdisciplinary minor (12 credit hours, 3 of which may be in the major).

- Option D: Two Upper-Division Courses (6 credit hours) from outside the College of Engineering and Technology and not required by the major.

## Requirements for Graduation

Requirements for graduation include the following:

- Minimum of 120 credit hours.
- Minimum of 30 credit hours overall and 12 credit hours of upper-level courses in the major program from Old Dominion University.
- Minimum overall cumulative grade point average of C (2.00) in all courses taken.
- Minimum overall cumulative grade point average of C (2.00) in all courses taken toward the major.
- Minimum overall cumulative grade point average of C (2.00) in all courses taken toward a minor.
- Completion of ENGL 110C, ENGL 211C or ENGL 231C, and the writing intensive (W) course in the major with a grade of C or better. The W course must be taken at Old Dominion University.
- Completion of Senior Assessment.

## Electrical Engineering Technology Grade Requirements

Critical EET course sequences within the Electrical Engineering Technology curricula require a minimum grade of C before progressing to subsequent courses. A grade of C- does not satisfy the requirement for a C grade.

The following courses require a minimum grade of C:

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|---|---|---|
| ENGL 110C | English Composition | 3 |
| ENGL 211C or ENGL 231C | Writing, Rhetoric, and Research / Writing, Rhetoric, and Research: Special Topics | 3 |
| MATH 162M | Precalculus I | 3 |
| MATH 163 | Precalculus II | 3 |
| MATH 211 | Calculus I | 4 |
| EET 110 | Electrical Circuits I | 3 |

| | | |
|---|---|---|
| EET 200 | Electrical Circuits II | 3 |
| ENGT 435W | Senior Design Project | 3 |

## Electrical Engineering Technology Major

**General Education**

| | |
|---|---|
| Complete lower-division requirements | 32-38 |
| Complete upper-division requirements | 6 |
| **Electrical Engineering Technology Major** | |
| Complete electrical engineering technology departmental and major requirements as shown on the degree program guide | 83 |
| **Total Credit Hours** | **121-127** |

Graduates of the electrical engineering technology major are eligible to take the Fundamentals of Engineering (FE) exam in Virginia and many other states.

## Degree Program Guide*

The Degree Program Guide is a suggested curriculum to complete this degree program in four years. Each student is strongly encouraged to develop a customized plan in consultation with their academic advisor. Additional information can also be found in Degree Works.

Course prerequisites are strictly enforced. Critical EET course sequences within the Electrical Engineering Technology curricula require a minimum grade of C before progressing to subsequent courses. Refer to the individual EET course descriptions for information on specific C grade and other prerequisite requirements. A grade of C- does not satisfy the requirement for a C grade.

| Course | Title | Credit Hours |
|---|---|---|
| **Freshman** | | |
| **Fall** | | |
| ENGN 121 | Introduction to Engineering and Technology | 4 |
| MATH 162M | Precalculus I (C or better required) | 3 |
| ENGL 110C | English Composition (C or better required) | 3 |
| CHEM 121N | Foundations of Chemistry I Lecture | 3 |
| CHEM 122N | Foundations of Chemistry I Laboratory | 1 |
| | **Credit Hours** | **14** |
| **Spring** | | |
| MATH 163 | Precalculus II (C or better required) | 3 |
| PHYS 111N | Introductory General Physics | 4 |
| ENGN 122 | Computer Programming for Engineering | 4 |
| ENGL 211C or ENGL 231C | Writing, Rhetoric, and Research (C or better required) or Writing, Rhetoric, and Research: Special Topics | 3 |
| | **Credit Hours** | **14** |
| **Sophomore** | | |
| **Fall** | | |
| EET 110 | Electrical Circuits I (C or better required) | 3 |
| EET 120 | Fundamentals of Logic Circuits | 3 |
| EET 125 | Logic Circuits Laboratory | 1 |
| MATH 211 | Calculus I (C or better required) | 4 |
| PHYS 112N | Introductory General Physics | 4 |

| | | |
|---|---|---|
| Human Behavior (S) | | 3 |
| | **Credit Hours** | **18** |
| **Spring** | | |
| EET 200 | Electrical Circuits II (C or better required) | 3 |
| EET 205 | Electrical Circuits Laboratory | 1 |
| EET 210 | Electronic Circuits | 3 |
| EET 225 | Electronic Circuits Laboratory | 1 |
| EET 263 or ENGT 270 | Introduction to Programmable Logic Controllers (PLCs) or Automation and Controls | 3 |
| COMM 101R | Public Speaking | 3 |
| | **Credit Hours** | **14** |
| **Junior** | | |
| **Fall** | | |
| ENGT 305 | Advanced Technical Analysis | 3 |
| EET 300 | Advanced Circuit Analysis | 3 |
| EET 310 | Digital Electronics | 3 |
| EET 315 | Digital Electronics Laboratory | 2 |
| EET 360 | Electrical Power and Machinery | 3 |
| EET 366 | Electrical Power and Machinery Laboratory | 2 |
| | **Credit Hours** | **16** |
| **Spring** | | |
| EET 320 | Microcontroller Applications | 3 |
| EET 325 | Microcontroller Applications Laboratory | 2 |
| EET 312 | Principles of Communication Systems | 4 |
| Gen Ed. Interpreting the Past (H) | | 3 |
| Gen Ed. Literature (L) | | 3 |
| | **Credit Hours** | **15** |
| **Senior** | | |
| **Fall** | | |
| ENGT 434 | Introduction to Senior Design Project | 3 |
| Approved EET Elective [***] | | 3 |
| Approved EET Elective [***] | | 3 |
| Upper-Division General Education [***] | | 3 |
| Gen. Ed. Human Creativity (A) | | 3 |
| | **Credit Hours** | **15** |
| **Spring** | | |
| ENGT 435W | Senior Design Project (C or better required) | 3 |
| Approved EET Elective [***] | | 3 |
| Approved EET Elective [***] | | 3 |
| Upper-Division General Education [***] | | 3 |
| ENMA 480 | Ethics and Philosophy in Engineering Applications [**] | 3 |
| | **Credit Hours** | **15** |
| | **Total Credit Hours** | **121** |

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|---|---|---|
| [*] | Does not include the University's General Education language and culture requirement. Additional hours may be required. | |
| [**] | Meets the philosophy and ethics general education requirement. | |
| [***] | Additional courses will be required to complete a minor. See advisor for details. | |

## Approved Electrical Engineering Technology (EET) Electives

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|---|---|---|
| EET 330 | Linear Electronics | 3 |
| EET 335 | Linear Electronics Laboratory | 2 |
| EET 370 | Energy and The Environment | 3 |
| EET 373 | Instrumentation | 3 |
| EET 405 | Data Communications and Computer Networks | 3 |
| EET 412 | Wireless Communication Systems | 3 |
| EET 420 | Advanced Logic Design | 3 |
| EET 430 | Advanced Motion Control Systems | 3 |
| EET 470 | Microcontrollers/Embedded-Based Designs | 3 |
| EET 483 | Introduction to Smart Grids | 3 |
| EET 485 | Electrical Power Systems | 3 |

## Linked Bachelor's/Master's Degree Programs

These are designed to allow qualified students to secure a space in a master's program available in the Frank Batten College of Engineering and Technology while they are still pursuing their undergraduate degrees. An eligible student can choose a master's program in the same discipline as his/her bachelor's program or in a complementary discipline. Subject to the approval of the undergraduate and graduate program directors, a student enrolled in a linked program can count up to six credit hours of course work towards both the undergraduate and the graduate degrees. Full-time students may be able to complete the requirements for the bachelor's degree in four years and the master's degree in one additional year. Students in linked programs must earn a minimum of 150 credit hours (120 discrete credit hours for the undergraduate degree and 30 discrete credit hours for the graduate degree).

Students who are matriculated in an undergraduate major in the Frank Batten College of Engineering and Technology with a GPA of at least 3.00 overall and 3.00 in the major are eligible to apply for admission to a linked bachelor's/master's program. Transfer students who desire to be admitted to a linked program at the time they join an undergraduate major at Old Dominion University are eligible to apply if their overall GPA at their previous institution is 3.25 or higher. Prerequisite courses may be required for engineering technology majors to pursue a master's degree in engineering.

Continuance in a linked bachelor's/master's program requires maintenance of a GPA of 3.00 or higher overall and in the major.

## Bachelor-to-PhD Programs

For a select number of exceptionally well-qualified students, the college has established a linked doctoral program that enables students to be admitted directly into the PhD program upon completion of the baccalaureate degree. A select number of exceptionally well-qualified students can be admitted to the Bachelor/PhD program in their junior year while they are pursuing one of the undergraduate programs at Old Dominion University. This program encourages admitted students to work closely with faculty members and pursue a research experience. Just as in the linked Bachelor/MS program, six credit hours of graduate course work may again be counted towards the undergraduate degree and doctoral course work mentioned above for the Bachelor/PhD program. For linked bachelor's to doctoral programs, students must earn a minimum of 198 credit hours (120 discrete credit hours

for the undergraduate degree and 78 discrete credit hours for the graduate degree). Students in these programs must maintain a GPA of 3.50 or better throughout their bachelor's and doctoral studies.

The student may opt to obtain the master's degree along the way to the doctorate. To obtain the master's degree, the student must utilize the six graduate credits obtained as part of their undergraduate program, use 18 credits of the graduate course work that is part of the PhD, and work with the Graduate Program Director to plan the final 6 credits.