

Bachelor of Science in Engineering Technology

Engineering Technology with a Major in Mechanical Engineering Technology (BSET)

Mechanical Engineering Technology

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The MET program offers courses at the senior level specializing in mechanical systems design, mechatronics systems, marine systems, manufacturing systems, and nuclear systems. Students in this program take common courses in areas such as computer-aided drafting, statics, strength of materials, dynamics, thermodynamics, fluid mechanics, and automation and controls. The program culminates in a senior project that integrates coursework with a practical project assignment in the student's area of interest. Graduates should be qualified for application positions in mechanical product design, development and manufacturing, mechanical system operation and maintenance, field operations, and various other technical functions.

Mission Statement

The mission of the Mechanical Engineering Technology (MET) 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, the mechanical 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 mechanical engineering technology program is to prepare graduates to establish themselves as successful professionals in mechanical systems 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 member or leader of technical teams and clearly communicate ideas leading to successful team outcomes.

Student Outcomes

After deliberations by its constituents, the mechanical engineering technology program has adopted five student outcomes for the Bachelor of Science program in mechanical 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; and
5. an ability to function effectively as a member, as well as, a leader on technical teams.

Accreditation

The Bachelor of Science in Engineering Technology - Mechanical 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 Mechanical Engineering Technology Program Criteria.

The curriculum prepares MET graduates with the knowledge, techniques, skills, and use of modern equipment in mechanical engineering technology. Baccalaureate degree graduates build on the strengths of associate degree programs by gaining proficiency in the analysis, applied design, development, implementation, or oversight of more advanced mechanical components, systems, or processes. The following curricular topics are covered:

1. Application of principles of geometric dimensioning and tolerancing;
2. Use of computer-aided drafting and design software;
3. Perform selection, set-up, and calibration of measurement tools/instrumentation;
4. Elements of differential and integral calculus;
5. Manufacturing processes;
6. Material science and selection;
7. Solid mechanics (such as statics, dynamics, strength of materials, etc.);
8. Mechanical system design;
9. Thermal sciences (such as thermodynamics, fluid mechanics, heat transfer, etc.);
10. Electrical circuits (AC and DC) and electronic controls;
11. Application of industry codes, specifications, and standards; and
12. Technical communications are typically used in the preparation of engineering proposals, reports, and specifications.

The capstone experience, ideally multidisciplinary, must be project-based and include formal design, implementation, and test processes.

Requirements

Lower-Division General Education

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

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

Mechanical Engineering Technology Grade Requirements

Critical MET course sequences within the Mechanical 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:

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
ENGT 200	Statics	3
MET 300	Thermodynamics	3
ENGT 435W	Senior Design Project	3

Mechanical Engineering Technology Major

General Education

Complete lower-division requirements	32-38
Complete upper-division requirements (minimum of 6 credit hours with option D)	6

Mechanical Engineering Technology Major

Complete the mechanical engineering technology departmental and major requirements as shown on the degree program guide	83
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Total Credit Hours	121-127
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Degree Program Guide*

The Degree Program Guide is a suggested curriculum to complete this degree program in four years. It is just one of several plans that will work and is presented only as broad guidance to students. 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	Title	Credit Hours
Freshman		
Fall		
ENGN 121	Introduction to Engineering and Technology	4
MATH 162M	Precalculus I (grade of C or better required)	3
ENGL 110C	English Composition (grade of 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 (grade of 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 (grade of C or better required) or Writing, Rhetoric, and Research: Special Topics	3
Credit Hours		14
Sophomore		
Fall		
ENGT 230	Engineering Graphics and Computer Solid Modeling	3
ENGT 200	Statics (grade of C or better required)	3
MATH 211	Calculus I (grade of C or better required)	4
COMM 101R	Public Speaking	3
PHYS 112N	Introductory General Physics	4
Credit Hours		17
Spring		
ENGT 220	Strength of Materials	3
MET 225	Strength of Materials Laboratory	1
ENGT 270	Automation and Controls	3
ENGT 286	Automation and Controls Laboratory	1
MET 200	Materials and Manufacturing Processes	3
Human Behavior (S)		3
Credit Hours		14
Junior		
Fall		
MET 300	Thermodynamics (grade of C or better required)	3

MET 310	Dynamics	3
MET 330	Fluid Mechanics	3
MET 331	Fluid Mechanics Laboratory	1
ENGT 365	Geometric Dimensioning and Tolerancing	3
Human Creativity (A)		3
Credit Hours		16
Spring		
MET 320	Design of Machine Elements	3
MET 340	Heat Transfer	3
MET 350	Thermal Applications	3
MET 351	Thermal Applications Laboratory	1
ENGT 305	Advanced Technical Analysis	3
Literature (L)		3
Credit Hours		16
Senior		
Fall		
ENGT 434	Introduction to Senior Design Project	3
ENMA 302	Engineering Economics	3
ENMA 480	Ethics and Philosophy in Engineering Applications ****	3
Approved Elective **		3
Interpreting the Past (H)		3
Credit Hours		15
Spring		
ENGT 435W	Senior Design Project (grade of C or better required)	3
Approved Elective **		3
Approved Elective **		3
Upper-Division General Education ***		3
Upper-Division General Education ***		3
Credit Hours		15
Total Credit Hours		121

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

Approved Electives for Mechanical Engineering Technology Majors

MET 427	Mechatronic System Design	3
MET 430	Mechanical Subsystem Design	3
MET 431	Modeling and Simulation of Mechatronic Systems	3
MET 450	Energy Systems	3
MET 460	Refrigeration and Air Conditioning	3
MET 471	Nuclear Systems I	3
MET 472	Nuclear Systems II	3
MET 475	Marine Engineering I	3

MET 476	Marine Engineering II	3
MET 485	Maintenance Engineering	3
EET 360	Electrical Power and Machinery	3
EET 405	Data Communications and Computer Networks	3
MFET 310	Design for Manufacturing	3
MFET 320	Introduction to Mechatronics	3
MFET 330	Quality Systems in Manufacturing	3
MFET 340	Computer Integrated Manufacturing	3
MFET 410	Computer Numerical Control in Production	3
MFET 420	Introduction To Welding Technologies	3
MFET 430	Additive Manufacturing	3
MFET 440	Advanced Manufacturing Processes	3
MFET 450	Lean Engineering	3
MFET 460	Facilities Planning and Material Handling	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.