

# Bachelor of Science in Engineering

## Technology

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

## Manufacturing Engineering Technology

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The Bachelor of Science in Engineering Technology (BSET) degree program in Manufacturing Engineering Technology (MFET) offers a variety of courses in the following areas: manufacturing processes, manufacturing principles, smart manufacturing, and metrology. Students in this program also take additional courses such as: engineering graphics, geometric dimensioning and tolerancing, statics, dynamics, automation and control (Programmable Logic Controller - PLCs). The program culminates with a senior project that integrates coursework with a practical project assignment in the student's area of interest. Graduates of the MFET program are qualified for positions in manufacturing systems design, development and manufacturing, maintenance, field operations, and various other technical functions. Potential positions are manufacturing engineer, quality assurance engineer, project engineer, robotics engineer, and mechatronics engineer.

### Mission Statement

The mission of the Manufacturing Engineering Technology 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 the University's distance learning program, the MFET 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 Manufacturing Engineering Technology program is to prepare graduates to establish themselves as successful professionals in manufacturing 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

The Manufacturing Engineering Technology program has adopted, after deliberations by its constituents, five student outcomes for the Bachelor of Science in Engineering Technology degree program in Manufacturing Engineering Technology. These outcomes are listed below:

1. Apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve

broadly-defined engineering problems appropriate to the discipline;

2. Design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;
3. 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. Conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes; and
5. Function effectively as a member as well as a leader on technical teams.

### Curriculum

The curriculum provides baccalaureate degree graduates with instruction in the knowledge, techniques, skills, and use of modern equipment in manufacturing engineering technology. Baccalaureate degree graduates build on the strengths of associate degree programs by gaining the knowledge, skills, and abilities for entry into manufacturing careers practicing various tools, techniques and processes. The curriculum must include instruction in the following topics:

1. Materials and manufacturing processes;
2. Product design process, tooling, and assembly;
3. Manufacturing systems, automation, and operations;
4. Statistics, quality and continuous improvement, and industrial organization and management; and
5. Capstone or integrating experience that develops and illustrates student competencies in applying both technical and non-technical skills in successfully solving manufacturing problems.

### Requirements

#### Lower-Division General Education

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

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

#### Upper-Division General Education

Met in the major through a built-in minor in engineering management.

## 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.

## Manufacturing Engineering Technology Grade Requirement

Critical MFET course sequences within the Manufacturing Engineering Technology curriculum 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
MET 200	Materials and Manufacturing Processes	3
ENGT 435W	Senior Design Project	3

## Manufacturing Engineering Technology Major

Students completing this major will receive a minor in engineering management.

### General Education

Complete lower-division requirements	32-38
Complete upper-division requirements (met in the major through a built-in minor in engineering management)	12
<b>Manufacturing Engineering Technology</b>	
Complete the MFET departmental and major requirements as shown on the degree program guide	77
<b>Total Credit Hours</b>	<b>121-127</b>

## 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
<b>Freshman</b>		
<b>Fall</b>		
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
<b>Credit Hours</b>		<b>14</b>
<b>Spring</b>		
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
<b>Credit Hours</b>		<b>14</b>

### Sophomore

#### Fall

EET 120	Fundamentals of Logic Circuits	3
EET 125	Logic Circuits Laboratory	1
ENGT 230	Engineering Graphics and Computer Solid Modeling	3
ENGT 200	Statics	3
MATH 211	Calculus I (grade of C or better required)	4
COMM 101R	Public Speaking	3

<b>Credit Hours</b>		<b>17</b>
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#### Spring

MFET 235	Introduction to Robotics	3
MET 200	Materials and Manufacturing Processes (grade of C or better required)	3
ENGT 270 & ENGT 286	Automation and Controls and Automation and Controls Laboratory	4

Human Behavior (S)	3
Gen. Ed. Human Creativity (A)	3

<b>Credit Hours</b>		<b>16</b>
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### Junior

#### Fall

MFET 310	Design for Manufacturing	3
MET 310	Dynamics	3
ENGT 365	Geometric Dimensioning and Tolerancing	3

Approved ENMA Course	3
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STAT 330	An Introduction to Probability and Statistics	3
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<b>Credit Hours</b>		<b>15</b>
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#### Spring

MFET 320	Introduction to Mechatronics	3
MFET 330	Quality Systems in Manufacturing	3
MFET 340	Computer Integrated Manufacturing	3

Approved ENMA Course	3
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Gen Ed. Literature (L)	3
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<b>Credit Hours</b>		<b>15</b>
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<b>Senior</b>		
<b>Fall</b>		
ENGT 434	Introduction to Senior Design Project	3
Approved MFET Elective		3
Approved MFET Elective		3
ENMA 401	Project Management	3
Gen Ed. Interpreting the Past (H)		3
<b>Credit Hours</b>		<b>15</b>
<b>Spring</b>		
ENGT 435W	Senior Design Project (grade of C or better required)	3
Approved MFET Elective		3
Approved MFET Elective		3
EET 405	Data Communications and Computer Networks	3
ENMA 480	Ethics and Philosophy in Engineering Applications **	3
<b>Credit Hours</b>		<b>15</b>
<b>Total Credit Hours</b>		<b>121</b>

- \* Does not include the University's General Education language and culture requirement. Additional hours may be required.
- \*\* Meets philosophy and ethics general education requirement.

## Manufacturing Engineering Technology (MFET) Approved Electives

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
MET 427	Mechatronic System Design	3
MET 431	Modeling and Simulation of Mechatronic Systems	3
MET 485	Maintenance Engineering	3

## Engineering Management (ENMA) Approved Courses

Select two of the following:		6
ENMA 301	Introduction to Engineering Management	
ENMA 302	Engineering Economics	
ENMA 421	Decision Techniques in Engineering	
ENMA 424	Risk Analysis in Engineering Management	

Please see the full Engineering Management Minor overview and requirements here (<https://catalog.odu.edu/undergraduate/engineering-technology/engineering-management-systems/engineering-management-minor/#requirementtext>).

## 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.