Engineering Technology, B.S.

Degree Offered
• Bachelor of Science in Engineering Technology (B.S.)

Nature of the Program
This general Engineering Technology program provides graduates with instruction in technical and leadership skills necessary for manufacturing and industrial competitiveness and to enter careers in manufacturing process and systems design, operations, quality, continuous improvement, lean manufacturing and sustainability. It prepares graduates with knowledge, problem-solving ability and hands-on skills and to enter careers related to preparation of engineering drawings, design, installation, manufacturing, testing, technical sales, maintenance, improvement of integrated processes, their resulting products (including mechanical components and complex systems) and services within an organization. It draws upon specialized knowledge and skill in the mathematical, natural, physical and social sciences together with the principles and methods of engineering analysis and design, to design and fabricate products and specify, predict and evaluate the results to be obtained from integrated processes and systems. The B.S. Engineering Technology degree curriculum provides a multi-disciplinary overview of engineering technology with a general focus on manufacturing and requires the completion of two Areas of Emphasis.

Program Educational Objectives
It is expected that, within a few years of graduation, graduates will attain the following Program Educational Objectives (PEOs):
• PEO-1. Graduates will be engaged in their professional careers, have consolidated professional proficiency as practitioners in an area of engineering technology as reflected by their responsibilities and accomplishments of their professional practice, and engage in lifelong learning and service opportunities.
• PEO-2. Graduates will be able to work competitively and collaboratively in diverse professional environments as demonstrated by their abilities to work on teams and independently, to provide leadership, and to communicate effectively to a variety of audiences.
• PEO-3. Graduates will behave professionally and ethically, be committed to responsible safety practices, and articulate the societal impact of their work.

FACULTY
TEACHING PROFESSOR
• Robin A. M. Hensel - Ed.D (West Virginia University)

TEACHING ASSISTANT PROFESSOR
• Emily Spayde - Ph.D. (Mississippi State University)

Degree Requirements
Students must meet the following criteria to qualify for a Bachelor of Science in Engineering Technology degree:
• Complete a minimum of 120 credit hours
• Satisfy WVU's undergraduate degree requirements
• Satisfy Statler College's undergraduate degree requirements
• Complete all courses listed in the curriculum requirements with the required minimum grades
• Attain an overall grade point average of 2.00 or better
• Attain a WVU grade point average of 2.00 or better
• Attain a Statler grade point average of 2.00 or better
• A maximum of one math or science courses with a grade of D+, D, or D- may apply towards a Statler College degree
• Complete a survey regarding their academic and professional experiences at WVU, as well as post-graduation job placement or continuing education plans.

The Statler GPA is computed based on all work taken at WVU with a subject code within Statler College (BIOM, BMEG, CE, CHE, CPE, CS, CSEE, CYBE, EE, ENGR, ETEC, IENG, IH&S, MAE, MINE, PDA, PGE, SAFM, SENG) excluding ENGR 140, ENGR 150, and CS 101. The WVU GPA is computed based on all work taken at WVU. The Overall GPA is computed based on all work taken at WVU and transfer work.
## Curriculum Requirements

<table>
<thead>
<tr>
<th>Component</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Requirements</td>
<td>25</td>
</tr>
<tr>
<td>Fundamentals of Engineering Requirements</td>
<td>5</td>
</tr>
<tr>
<td>Math and Science Requirements</td>
<td>21</td>
</tr>
<tr>
<td>Engineering Technology Program Requirements</td>
<td>69</td>
</tr>
<tr>
<td>Total Hours</td>
<td>120</td>
</tr>
</tbody>
</table>

### University Requirements

- General Education Foundations (GEF) 1, 2, 3, 4, 5, 6, 7, and 8 (31-37 Credits)
- Outstanding GEF Requirements 1, 4, 6, 7
- ENGR 191 First-Year Seminar
- General Electives
- Total Hours

### Fundamentals of Engineering Requirements

A minimum grade of C- is required in all Fundamentals of Engineering courses.

- ENGR 101 Engineering Problem Solving 1
- Engineering Problem Solving (Select one of the following):
  - CHE 102 Introduction to Chemical Engineering
  - CS 110 Introduction to Computer Science
  - ENGR 102 Engineering Problem-Solving 2
  - ENGR 103 Introduction to Nanotechnology Design
  - MAE 102 Introduction to Mechanical and Aerospace Engineering Design
- Total Hours

### Math and Science Requirements

A minimum grade of C- is required in all Math and Science courses.

- Chemistry:
  - CHEM 111 & 111L Survey of Chemistry 1 and Survey of Chemistry 1 Laboratory
  - CHEM 115 & 115L Fundamentals of Chemistry 1 and Fundamentals of Chemistry 1 Laboratory

- Calculus 1 (GEF 3):
  - MATH 150 Applied Calculus
  - MATH 153 & MATH 154 Calculus 1a with Precalculus and Calculus 1b with Precalculus
  - MATH 155 Calculus 1

- Calculus 2:
  - MATH 151 Applied Calculus 2
  - MATH 156 Calculus 2

- Physics 1:
  - PHYS 101 & 101L Introductory Physics 1 and Introductory Physics 1 Laboratory
  - PHYS 111 & 111L General Physics 1 and General Physics 1 Laboratory

- Physics 2:
  - PHYS 102 & 102L Introductory Physics 2 and Introductory Physics 2 Laboratory
  - PHYS 112 & 112L General Physics 2 and General Physics 2 Laboratory

- Statistics

- Total Hours

Engineering Technology Program Requirements

Computer Applications

<table>
<thead>
<tr>
<th>Course</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCOR 121</td>
<td>Introduction to Business Applications</td>
<td>2</td>
</tr>
<tr>
<td>CS 101 &amp; CS 110L</td>
<td>Intro to Computer Applications and Introduction to Computer Science Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>WRIT 305</td>
<td>Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 140</td>
<td>Engineering in History (also meets GEF 5)</td>
<td>3</td>
</tr>
<tr>
<td>ETEC 199</td>
<td>Introduction to Engineering Technology</td>
<td>1</td>
</tr>
<tr>
<td>ETEC 130 &amp; 130L</td>
<td>Manufacturing Processes 1 and Manufacturing Processes 1 Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>ETEC 210 &amp; 210L</td>
<td>Engineering Graphics and Descriptive Geometry and Engineering Graphics and Descriptive Geometry Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>ETEC 220 &amp; 220L</td>
<td>Applications of Technology and Applications of Technology Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>ETEC 310 &amp; 310L</td>
<td>Material Science with Applications and Material Science with Applications Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>ETEC 330 &amp; 330L</td>
<td>Manufacturing Processes 2 and Manufacturing Processes 2 Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>ETEC 340 &amp; 340L</td>
<td>Electronic Circuits and Electronic Circuits Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>ETEC 350</td>
<td>Analysis for Engineering Technology</td>
<td>3</td>
</tr>
<tr>
<td>ETEC 401</td>
<td>Science, Technology, &amp; Society</td>
<td>2</td>
</tr>
<tr>
<td>ETEC 440 &amp; 440L</td>
<td>Industrial Automation PLC 1 and Industrial Automation PLC 1 Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>ETEC 475S</td>
<td>Engineering Technology Capstone Experience</td>
<td>3</td>
</tr>
<tr>
<td>IENG 377</td>
<td>Engineering Economy</td>
<td>3</td>
</tr>
<tr>
<td>IENG 445</td>
<td>Project Management for Engineers</td>
<td>3</td>
</tr>
<tr>
<td>Area of Emphasis 1</td>
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<td>12</td>
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<tr>
<td>Area of Emphasis 2 *</td>
<td></td>
<td>12</td>
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</table>

Total Hours 69

* For the second Area of Emphasis, three credits will be replaced with one of the Application requirement choices.

Plan of Study

First Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 101 (or GEF 4)</td>
<td></td>
<td>3 BCOR 121</td>
</tr>
<tr>
<td>ENGR 191</td>
<td>Engineering in History (also meets GEF 5)</td>
<td>1 ENGL 101 (or GEF 4)</td>
</tr>
<tr>
<td>ETEC 199</td>
<td></td>
<td>1 ETEC 210 &amp; 210L</td>
</tr>
<tr>
<td>ETEC 130 &amp; 130L</td>
<td>Manufacturing Processes 1 and Manufacturing Processes 1 Laboratory</td>
<td>3 MATH 151</td>
</tr>
<tr>
<td>MATH 150</td>
<td></td>
<td>3 PHYS 102 &amp; 102L</td>
</tr>
<tr>
<td>PHYS 101 &amp; 101L</td>
<td></td>
<td>4</td>
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</table>

Total 15
## Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
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<tbody>
<tr>
<td>CHEM 111 &amp; 111L</td>
<td>4</td>
<td>ENGL 102</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 101</td>
<td>2</td>
<td>ENGR 102</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 140</td>
<td>3</td>
<td>ETEC 310 &amp; 310L</td>
<td>3</td>
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<tr>
<td>ETEC 220 &amp; 220L</td>
<td>3</td>
<td>AoE 1 Elective (#1)</td>
<td>3</td>
</tr>
<tr>
<td>STAT 211</td>
<td>3</td>
<td>AoE 2 Elective (#1)</td>
<td>3</td>
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<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td><strong>15</strong></td>
<td><strong>15</strong></td>
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</tbody>
</table>

## Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETEC 330 &amp; 330L</td>
<td>3</td>
<td>WRIT 305</td>
<td>3</td>
</tr>
<tr>
<td>ETEC 340 &amp; 340L</td>
<td>4</td>
<td>ETEC 370 (Applied Workshop (#2))</td>
<td>1</td>
</tr>
<tr>
<td>ETEC 350</td>
<td>3</td>
<td>ETEC 440 &amp; 440L</td>
<td>3</td>
</tr>
<tr>
<td>ETEC 370 (Applied Workshop (#1)) AoE 1 Elective (#2)</td>
<td>1</td>
<td>IENG 377</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>AoE 2 Elective (#2)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GEF 6</td>
<td>3</td>
</tr>
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<td><strong>Total</strong></td>
<td><strong>14</strong></td>
<td><strong>16</strong></td>
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</tbody>
</table>

## Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETEC 401</td>
<td>2</td>
<td>ETEC 475S</td>
<td>3</td>
</tr>
<tr>
<td>ETEC 370 (Applied Workshop (#3))</td>
<td>1</td>
<td>IENG 445</td>
<td>3</td>
</tr>
<tr>
<td>AoE 1 Elective (#3)</td>
<td>3</td>
<td>AoE 1 Elective (#4)</td>
<td>3</td>
</tr>
<tr>
<td>AoE 2 Elective (#3)</td>
<td>3</td>
<td>General Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Elective</td>
<td>3</td>
<td>GEF 7</td>
<td>3</td>
</tr>
<tr>
<td>General Elective</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td><strong>15</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

Total credit hours: 120

### Areas of Emphasis

- Engineering Technology
- Engineering Management and Entrepreneurship
- Industrial Engineering Technology
- Mechanical Engineering Technology
- Multi-Disciplinary Engineering Technology

### Energy Technology Area of Emphasis

A minimum grade of C- is required in each course.

Select 12 credit hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARE 445</td>
<td>Energy Economics</td>
</tr>
<tr>
<td>DSGN 280</td>
<td>Sustainable Design and Development *</td>
</tr>
<tr>
<td>DSGN 340</td>
<td>Design for Energy Efficiency</td>
</tr>
<tr>
<td>DSGN 470</td>
<td>Leadership in Energy and Environmental Design Green Building Systems</td>
</tr>
<tr>
<td>ENGR 310</td>
<td>Energy Engineering</td>
</tr>
<tr>
<td>ENLM 200</td>
<td>Principles of Energy Land Management *</td>
</tr>
<tr>
<td>ENLM 220</td>
<td>Energy Production &amp; Operations *</td>
</tr>
<tr>
<td>ENLM 250</td>
<td>Managing Non-Technical Risks *</td>
</tr>
<tr>
<td>ENLM 300</td>
<td>Ethics and Negotiations for Energy Land Managers</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Name</td>
</tr>
<tr>
<td>------------</td>
<td>-------------</td>
</tr>
<tr>
<td>ENLM 415</td>
<td>Midstream Energy Planning and Development</td>
</tr>
<tr>
<td>ENLM 442</td>
<td>GIS Skills for Energy Land Management</td>
</tr>
<tr>
<td>IENG 433</td>
<td>Energy Efficiency and Sustainability</td>
</tr>
<tr>
<td>MAE 320 or ETEC 320</td>
<td>Thermodynamics or Thermodynamics for Engineering Technology</td>
</tr>
<tr>
<td>RESM 405L</td>
<td>Drones in Resource Management</td>
</tr>
<tr>
<td>RESM 440 &amp; 440L</td>
<td>Foundations of Applied Geographic Information Systems and Foundations of Applied Geographic Information Systems Laboratory</td>
</tr>
<tr>
<td>RESM 460</td>
<td>Energy Project and Program Management</td>
</tr>
</tbody>
</table>

Any 200- or 300- or 400-level Chemical Engineering (CHE), Civil Engineering (CE), Mining Engineering (MINE), or Petroleum and Natural Gas Engineering (PNGE) courses

**Total Hours** 12

* A maximum of 3 credit hours may be selected at the 200-level.

** If this is the second Area of Emphasis selected, three credits will be replaced with one of the following courses:
  - ETEC 370
  - ETEC 450
  - ETEC 491

## Energy Management and Entrepreneurship Area of Emphasis

A minimum grade of C- is required in each course.

Select 12 credit hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCOR 320</td>
<td>Legal Environment of Business</td>
</tr>
<tr>
<td>BCOR 330</td>
<td>Information Systems and Technology</td>
</tr>
<tr>
<td>BCOR 340</td>
<td>Principles of Finance</td>
</tr>
<tr>
<td>BCOR 350</td>
<td>Principles of Marketing</td>
</tr>
<tr>
<td>BCOR 360</td>
<td>Supply Chain Management</td>
</tr>
<tr>
<td>BCOR 370</td>
<td>Principles of Management</td>
</tr>
<tr>
<td>BCOR 380</td>
<td>Business Ethics</td>
</tr>
<tr>
<td>COMM 404 or COMM 335</td>
<td>Persuasion or Social Media in the Workplace</td>
</tr>
<tr>
<td>ENGR 450</td>
<td>Technology Entrepreneurship and Enterprise Development</td>
</tr>
<tr>
<td>ENTR 400</td>
<td>Fundamentals of Entrepreneurship</td>
</tr>
<tr>
<td>ENTR 405</td>
<td>Entrepreneurial Creativity &amp; Innovation</td>
</tr>
<tr>
<td>ENTR 420</td>
<td>Entrepreneurial Finance</td>
</tr>
<tr>
<td>ENTR 430</td>
<td>Business Analysis and Planning</td>
</tr>
<tr>
<td>ENTR 436</td>
<td>Family Business</td>
</tr>
<tr>
<td>ENTR 440</td>
<td>Small Business Consulting</td>
</tr>
<tr>
<td>ENTR 455</td>
<td>Entrepreneurial Opportunity Identification</td>
</tr>
<tr>
<td>ENTR 460</td>
<td>Entrepreneurial Opportunity Commercialization</td>
</tr>
<tr>
<td>HRMG 470</td>
<td>Conflict Management</td>
</tr>
<tr>
<td>IENG 474</td>
<td>Technology Entrepreneurship</td>
</tr>
</tbody>
</table>

**Total Hours** 12

* A maximum of 3 credit hours may be selected at the 200-level.

**
  - ETEC 370
  - ETEC 450
  - ETEC 491
Industrial Engineering Technology Area of Emphasis

A minimum grade of C- is required in each course.
Select 12 credit hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 306</td>
<td>Organizational Communication</td>
</tr>
<tr>
<td>DSGN 270</td>
<td>Product Design Foundations</td>
</tr>
<tr>
<td>GSCM 450</td>
<td>Supply Chain Quality Management</td>
</tr>
<tr>
<td>IENG 220</td>
<td>Re-Engineering Management Systems</td>
</tr>
<tr>
<td>IENG 331</td>
<td>Computer Applications in Industrial Engineering</td>
</tr>
<tr>
<td>IENG 461</td>
<td>System Safety Engineering</td>
</tr>
<tr>
<td>IENG 473</td>
<td>Team Facilitation</td>
</tr>
<tr>
<td>SAFM 470</td>
<td>Managing Construction Safety</td>
</tr>
<tr>
<td>SAFM 471</td>
<td>Motor Fleet Safety</td>
</tr>
<tr>
<td></td>
<td>Any 200- or 300- or 400-level Industrial Engineering course (except for IENG 377 and IENG 445)</td>
</tr>
</tbody>
</table>

Total Hours: 12

* A maximum of 3 credit hours may be selected at the 200-level.

**
- ETEC 370
- ETEC 450
- ETEC 491

Mechanical Engineering Technology Area of Emphasis

A minimum grade of C- is required in each course.
Select 12 credit hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE 303</td>
<td>Small Engines and Hydraulics</td>
</tr>
<tr>
<td>FNRS 333</td>
<td>Wood Machining</td>
</tr>
<tr>
<td>FNRS 337</td>
<td>Wood Adhesion and Finishing</td>
</tr>
<tr>
<td>&amp; 337L</td>
<td>and Wood Adhesion and Finishing Laboratory</td>
</tr>
<tr>
<td>FNRS 341</td>
<td>Wood Mechanics</td>
</tr>
<tr>
<td>&amp; 341L</td>
<td>and Wood Mechanics Laboratory</td>
</tr>
<tr>
<td>MAE 211</td>
<td>Mechatronics</td>
</tr>
<tr>
<td>MAE 241</td>
<td>Statics</td>
</tr>
<tr>
<td>MAE 459</td>
<td>Hybrid Electric Vehicle Propulsion and Control</td>
</tr>
<tr>
<td></td>
<td>Any 300- or 400-level MAE course (except for MAE 312)</td>
</tr>
</tbody>
</table>

Total Hours: 12

* A maximum of 3 credit hours may be selected at the 200-level.

**
- ETEC 370
- ETEC 450
- ETEC 491

Multi-Disciplinary Engineering Technology Area of Emphasis

Students work with their assigned Academic Advisor to create a proposed AoE course plan designed to meet the student's stated career goals or interests. The plan is submitted to the Director/Chair of the B.S. Engineering Technology program/department for review and approval.

A minimum grade of C- is required in each course.
Select 12 credits from the following:

Select courses from Energy Technology Area of Emphasis
Select courses from Engineering Management and Entrepreneurship Area of Emphasis
Select courses from Industrial Engineering Technology Area of Emphasis
Select courses from Mechanical Engineering Technology Area of Emphasis
Any 200- or 300- or 400- level Statler College Course (except IENG 377 IENG 445, and MAE 312)

Total Hours 12

* Only 3 credits may be selected at the 200-level.
** The plan must be approved in writing by the Director/Chair of the B.S. Engineering Technology program/department.
*** If this is the second Area of Emphasis selected, three credits will be replaced with one of the following courses:

- ETEC 370
- ETEC 450
- ETEC 491

**Major Learning Outcomes**

**ENGINEERING TECHNOLOGY**

Engineering technology graduates develop, design, and implement engineering and technology solutions, typically pursuing engineering careers in manufacturing firms on design, construction, and product improvement.

Skills and outcomes include:

- Solve technical mathematical problems
- Utilize basic engineering graphics with 2D CAD
- Create multi-view drawings using 2D and 3D CAD
- Create assembly drawings from 3D models
- Create complex surfaced part models using 3D CAD
- Design for predictability and manufacturing ease
- Document technical activities in written and verbal reports
- Be prepared for successful employment