The University of Dayton engineering technology programs prepare competent professionals for future growth; and (3) education to prepare students to effectively utilize technological problems; (2) courses in applied mathematics and science to support the technical courses and to prepare the student for the practical solution of engineering and scientific principles to the needs of industry and problem solving skills to the needs of industry. The engineering technology programs provide: (1) specialized technical programs necessary to support any future career studies or development as dictated by changing technology or career roles. The curricula provide the strong foundation in the basic principles necessary to support any future career studies or development as dictated by changing technology or career roles.

### Minors:
- Automotive Systems (p. 9)
- Electronic and Computer Engineering Technology (p. 3)
- Engineering Management (p. 10)
- Engineering Technology (p. 9)
- Global Manufacturing Systems Engineering Technology (p. 7)
- Industrial Automation and Applied Robotic Systems (p. 9)
- Industrial Engineering Technology (p. 4)
- Integrated Arts and Technology (p. 9)
- Mechanical Engineering Technology (p. 8)
- Operations Engineering (p. 5)
- Quality Assurance (p. 5)
- Sustainable Manufacturing (p. 10)

The School of Engineering also offers a Bachelor of Science in Engineering Technology. The programs in which the degree is offered are electronic and computer engineering technology, global manufacturing systems engineering technology, industrial engineering technology, and mechanical engineering technology. Graduates from engineering technology are usually involved in the design, performance evaluation, service and sales of products, equipment, and manufacturing systems, or the management of these activities. The management of process operations and plant facilities are also important career paths.

The engineering technology programs provide: (1) specialized technical courses that emphasize rational thinking and the application of engineering and scientific principles to the practical solution of technological problems; (2) courses in applied mathematics and science sufficient to support the technical courses and to prepare the student for future growth; and (3) education to prepare students to effectively communicate and to take places in society as responsible, humane, competent professionals.

The University of Dayton engineering technology programs prepare graduates who:
- are experienced and competent in applying engineering knowledge and problem solving skills to the needs of industry
- are effective communicators for varied audiences
- demonstrate a commitment to ethical and professional standards of conduct
- are engaged in continuing professional development and increasing professional responsibility within their field

### Bachelor of Science in Engineering Technology, Electronic and Computer Engineering Technology (ECT) minimum 132 hours

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HST 103</td>
<td>The West &amp; the World</td>
<td>3</td>
</tr>
<tr>
<td>REL 103</td>
<td>Introduction to Religious and Theological Studies</td>
<td>3</td>
</tr>
<tr>
<td>PHL 103</td>
<td>Introduction to Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>ENG 100</td>
<td>Writing Seminar I</td>
<td>0-3</td>
</tr>
<tr>
<td>ENG 200</td>
<td>Writing Seminar II</td>
<td>3</td>
</tr>
<tr>
<td>CMM 100</td>
<td>Principles of Oral Communication</td>
<td>3</td>
</tr>
<tr>
<td>Mathematics</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Social Science</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

**Electronic and Computer Engineering Technology**

The Electronic and Computer Engineering Technology Program (ECT) prepares students for careers in the electronics and computer fields. The ECT curriculum, while including a strong emphasis on computers, centers on applied engineering topics in circuit analysis, analog and digital electronic design, digital communications, digital circuits, microprocessors, software, and data acquisition and instrumentation. The graduate is prepared to work in industry at a variety of tasks including analog and digital design, microprocessor hardware and software applications, electronic controls, automation, engineering sales and support, product design and development, and data communications.

The curricula provide the strong foundation in the basic principles necessary to support any future career studies or development as dictated by changing technology or career roles.

**Faculty**
Sandra Futerer, Department Chairperson
Professor Emeriti: Farren, Globig, Hanneman, Hazen
Professor: Segalewitz
Associate Professor: S. Schneider

### Bachelor of Science in Engineering Technology, Electronic and Computer Engineering Technology (ECT) minimum 132 hours

<table>
<thead>
<tr>
<th>Common Academic Program (CAP)</th>
<th>Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>First-Year Humanities Commons</td>
<td>12</td>
</tr>
<tr>
<td>HST 103</td>
<td>3</td>
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<tr>
<td>REL 103</td>
<td>3</td>
</tr>
<tr>
<td>PHL 103</td>
<td>3</td>
</tr>
<tr>
<td>ENG 100</td>
<td>0-3</td>
</tr>
<tr>
<td>Second-Year Writing Seminar</td>
<td>3</td>
</tr>
<tr>
<td>Oral Communication</td>
<td>3</td>
</tr>
<tr>
<td>CMM 100</td>
<td>3</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Name</td>
</tr>
<tr>
<td>------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>SSC 200</td>
<td>Social Science Integrated</td>
</tr>
<tr>
<td></td>
<td>Arts</td>
</tr>
<tr>
<td></td>
<td>Natural Sciences</td>
</tr>
<tr>
<td></td>
<td>Crossing Boundaries</td>
</tr>
<tr>
<td></td>
<td>Faith Traditions</td>
</tr>
<tr>
<td></td>
<td>Practical Ethical Action</td>
</tr>
<tr>
<td></td>
<td>Integrative</td>
</tr>
<tr>
<td></td>
<td>Advanced Study</td>
</tr>
<tr>
<td></td>
<td>Philosophy and/or Religious Studies (6 cr. hrs.)</td>
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<tr>
<td></td>
<td>Historical Studies (3 cr. hrs.)</td>
</tr>
<tr>
<td></td>
<td>Diversity and Social Justice</td>
</tr>
<tr>
<td></td>
<td>Major Capstone</td>
</tr>
</tbody>
</table>

1 The credit hours listed reflect what is needed to complete each CAP component. However, they should not be viewed as a cumulative addition to a student's degree requirements because many CAP courses are designed to satisfy more than one CAP component (e.g., Crossing Boundaries and Advanced Studies) and may also satisfy requirements in the student's major.

2 May be completed with ASI 110 and ASI 120 through the Core Program.

3 May be completed with ENG 100A and ENG 100B, by placement.

4 May be completed with ENG 114 or ENG 198 or ASI 120.

5 Must include two different disciplines and at least one accompanying lab.

6 U.S. History AP and CLEP credit will not satisfy this requirement.

7 May be completed with ASI 110 and ASI 120 through the Core Program. U.S. History AP and CLEP credit will not satisfy this requirement.

8 May not double count with First-Year Humanities Commons, Second-Year Writing, Oral Communication, Social Science, Arts, or Natural Sciences CAP components, but may double count with courses taken to satisfy other CAP components and/or courses taken in the student's major.

9 The course or experience is designed by faculty in each major; it may, or may not, be assigned credit hours.

**Major Requirements**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHM 123</td>
<td>General Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 123L</td>
<td>and General Chemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>ECT 110</td>
<td>Electrical Circuits I</td>
<td>3</td>
</tr>
<tr>
<td>ECT 110L</td>
<td>Electrical Circuits I Laboratory</td>
<td>1</td>
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<tr>
<td>ECT 120</td>
<td>Electrical Circuits II</td>
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</table>

**Electives**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECT 206</td>
<td>Electron Devices I and Electron Devices I Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>ECT 224</td>
<td>Digital Computer Fundamentals and Digital Computer Fundamentals Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>ECT 306</td>
<td>Electronic Devices II and Electronic Devices II Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>ECT 357</td>
<td>Microprocessors I</td>
<td>3</td>
</tr>
<tr>
<td>ECT 358</td>
<td>Microprocessors II and Microprocessors II Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>ECT 361</td>
<td>Programming Structures</td>
<td>3</td>
</tr>
<tr>
<td>ECT 362</td>
<td>Concepts &amp; Applications of Computer Operating Systems</td>
<td>3</td>
</tr>
<tr>
<td>ECT 408</td>
<td>Data Acquisition &amp; Measurements</td>
<td>2</td>
</tr>
<tr>
<td>ECT 452</td>
<td>Feedback Controls</td>
<td>3</td>
</tr>
<tr>
<td>ECT 465</td>
<td>Digital Data Communications</td>
<td>3</td>
</tr>
<tr>
<td>ECT 466</td>
<td>Microcomputer Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ECT 490</td>
<td>Senior Project</td>
<td>3</td>
</tr>
<tr>
<td>EGR 102</td>
<td>Introduction to the University Experience for Engineers</td>
<td>0</td>
</tr>
<tr>
<td>EGR 103</td>
<td>Engineering Innovation</td>
<td>2</td>
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<tr>
<td>EGR 150</td>
<td>Enrichment Workshop I</td>
<td>0</td>
</tr>
<tr>
<td>EGR 151</td>
<td>Enrichment Workshop II</td>
<td>0</td>
</tr>
<tr>
<td>EGR 200</td>
<td>Professional Development Seminar</td>
<td>0</td>
</tr>
<tr>
<td>or COP 200</td>
<td>Introduction to Engineering Cooperative Education</td>
<td>0</td>
</tr>
<tr>
<td>IET 317</td>
<td>Industrial Economic &amp; Financial Analysis</td>
<td>3</td>
</tr>
<tr>
<td>IET 323</td>
<td>Project Management</td>
<td>3</td>
</tr>
<tr>
<td>MCT 110L</td>
<td>Technical Drawing &amp; CAD Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>MCT 215</td>
<td>Statics</td>
<td>3</td>
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<tr>
<td>MFG 431</td>
<td>Controls for Industrial Automation</td>
<td>3</td>
</tr>
<tr>
<td>MTH 168</td>
<td>Analytic Geometry &amp; Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MTH 169</td>
<td>Analytic Geometry &amp; Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>MTH 207</td>
<td>Introduction to Statistics</td>
<td>3</td>
</tr>
<tr>
<td>PHY 201</td>
<td>College Physics I</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 201L</td>
<td>and College Physics Laboratory</td>
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<tr>
<td>SET 101</td>
<td>Introduction to Engineering Technology II</td>
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<tr>
<td>SET 150</td>
<td>Engineering Analysis I</td>
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<tr>
<td>SET 153L</td>
<td>Technical Computation Laboratory</td>
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<tr>
<td>SET 250</td>
<td>Engineering Analysis II</td>
<td>2</td>
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<tr>
<td>SET 300</td>
<td>Professional Development for Juniors</td>
<td>0</td>
</tr>
<tr>
<td>SET 400</td>
<td>Professional Development for Seniors</td>
<td>1</td>
</tr>
<tr>
<td>Total Hours</td>
<td></td>
<td>99</td>
</tr>
</tbody>
</table>

1 The University's general reading and writing competency requirements are satisfied by completing ENG 100 and ENG 200, ENG 114, or ENG 198 with a grade of C- or higher. Students admitted to the University Honors program and/or students with sufficiently high verbal scores on the SAT and ACT are placed in ENG 114 or ENG 198. ENG 114 and 198 are one-semester courses which satisfy the University requirement. Students who are placed in ENG 114 or ENG 198 do not receive credit for ENG 100 but are free to take elective course work in place of the waived first semester of composition.

2 Select from list approved by the Department.
Minor in Electronic and Computer Engineering Technology (ECT)

This minor provides a concentration in the electronic and computer field that will complement the student's major program of study. It is open to all majors except electronic and computer engineering technology, electrical engineering and computer engineering. All prerequisites and corequisites must be followed.

ECT 120  Electrical Circuits II  3
ECT 224  Digital Computer Fundamentals and Digital Computer Fundamentals Laboratory  4
Select one emphasis from:  6-8

**Analog Devices Emphasis**

ECT 206  Electron Devices I
ECT 206L  and Electron Devices I Laboratory

**Microprocessor Emphasis**

ECT 357  Microprocessors I
ECT 358  Microprocessors II
ECT 358L  and Microprocessors II Laboratory

**Software Emphasis**

ECT 361  Programming Structures
ECT 362  Concepts & Applications of Computer Operating Systems

Total Hours  13-15

1 Courses cannot be already required for student's major.
2 Accompanying laboratories are recommended but not required.

Industrial Engineering Technology

The Industrial Engineering Technology Program has as its objective providing specialized education to prepare students for management and technical staff positions in manufacturing and service organizations such as health care, banking, transportation, food service, and government. Graduates may be involved in the economic selection and location of equipment, the planning of work methods and expected output, quality assurance, facilities layout, and scheduling and controlling the flow of materials. The curriculum emphasizes courses in work measurement, planning and control of lean processes, human factors, safety, facilities layout design and simulation, economic and financial analysis, statistical process control, management of projects and global technical organizations, cost estimating and control, supply chain management and mathematical decision-making.

**Faculty**

Sandra Furterer, Department Chairperson
Professor Emeritus: Edmonson
Professor: Mykytka
Associate Professors: Blust, Furterer, K. Schneider
Assistant Professors: Appiah-Kubi, Bommer, Mowrey, Lee
Lecturer: Salehi

Bachelor of Science in Engineering Technology, Industrial Engineering Technology (IET) minimum 133 hours

<table>
<thead>
<tr>
<th>Common Academic Program (CAP)</th>
<th>12 cr. hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HST 103  The West &amp; the World</td>
<td>12 cr. hrs.</td>
</tr>
<tr>
<td>REL 103  Introduction to Religious and Theological Studies</td>
<td>12 cr. hrs.</td>
</tr>
<tr>
<td>PHL 103  Introduction to Philosophy</td>
<td>12 cr. hrs.</td>
</tr>
<tr>
<td>ENG 100  Writing Seminar I</td>
<td>12 cr. hrs.</td>
</tr>
</tbody>
</table>

Second-Year Writing Seminar  0-3 cr. hrs.

ENG 200  Writing Seminar II  3 cr. hrs.

**Oral Communication**

CMM 100  Principles of Oral Communication  3 cr. hrs.

**Mathematics**

Social Science  3 cr. hrs.

SSC 200  Social Science Integrated  3 cr. hrs.

**Arts**

Natural Sciences  7 cr. hrs.

**Crossing Boundaries**

Faith Traditions  3 cr. hrs.

Practical Ethical Action  3 cr. hrs.

Inquiry  3 cr. hrs.

Advanced Study  12 cr. hrs.

Historical Studies (3 cr. hrs.)  7 cr. hrs.

Diversity and Social Justice  3 cr. hrs.

Major Capstone  0-6 cr. hrs.
Major Requirements

CHM 123  General Chemistry  4
& 123L  and General Chemistry Laboratory  4
ECT 110  Electrical Circuits I  4
& 110L  and Electrical Circuits I Laboratory  4
EGR 102  Introduction to the University Experience for Engineers  4
EGR 103  Engineering Innovation  4
EGR 150  Enrichment Workshop I  4
EGR 151  Enrichment Workshop II  4
EGR 200  Professional Development Seminar  4
or COP 200  Introduction to Engineering Cooperative Education  4
IET 230  Work Measurement  4
IET 316  Quantitative Analysis  4
IET 317  Industrial Economic & Financial Analysis  4
IET 318  Statistical Process Control  4
IET 323  Project Management  4
IET 330  Cost Estimating and Control  4
IET 332  Facilities Layout Design  4
IET 335  Process Simulation and Analysis  4
IET 408  Lean Management and Six Sigma  4
IET 409  Lean Management  4
IET 415  Global Supply Chain Management  4
IET 420  Industrial & Environmental Safety  4
IET 435  Human Factors  4
IET 490  Senior Project  4
MCT 110L  Technical Drawing & CAD Laboratory  4
MCT 112L  Introduction to Mechanical Design  4
MCT 215  Statics  4
MFG 108L  Manufacturing Processes Laboratory  4

3 The credit hours listed reflect what is needed to complete each CAP component. However, they should not be viewed as a cumulative addition to a student’s degree requirements because many CAP courses are designed to satisfy more than one CAP component (e.g., Crossing Boundaries and Advanced Studies) and may also satisfy requirements in the student’s major.

5 May be completed with ASI 110 and ASI 120 through the Core Program.

6 U.S. History AP and CLEP credit will not satisfy this requirement.

8 May not double count with First-Year Humanities Commons, Second-Year Writing, Oral Communication, Social Science, Arts, or Natural Sciences CAP components, but may double count with courses taken to satisfy other CAP components and/or courses taken in the student’s major.

9 The course or experience is designed by faculty in each major; it may, or may not, be assigned credit hours.

Minor in Industrial Engineering Technology (IET)

This minor is open to all majors except industrial engineering technology. The program provides a concentration in the industrial field that will complement the student’s major field of study. All prerequisites and corequisites must be followed.

Choose four courses from:  12

IET 230  Work Measurement  4
IET 317  Industrial Economic & Financial Analysis  4
IET 318  Statistical Process Control  4
IET 319  Quality Improvement Methods  4
IET 320  Design and Analysis of Experiments  4
IET 321  Quality Management  4
IET 322  Data Analytics  4
IET 330  Cost Estimating and Control  4
IET 332  Facilities Layout Design  4
IET 335  Process Simulation and Analysis  4
IET 408  Lean Management and Six Sigma  4
IET 415  Global Supply Chain Management  4
IET 420  Industrial & Environmental Safety  4
IET 435  Human Factors  4

IET - Human Performance Emphasis  12

IET 230  Work Measurement  4
IET 415  Global Supply Chain Management  4
IET 420  Industrial & Environmental Safety  4
## Minor in Operations Engineering (OPE)

This twelve hour minor is open to all engineering and engineering technology majors. Completion of this minor will provide the student with a strong foundation in the analytical tools needed to plan, design, optimize, and manage complex engineering operations. Students who anticipate moving into problem-solving and decision-support roles during their engineering careers may wish to consider this minor.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENM 500</td>
<td>Probability &amp; Statistics for Engineers</td>
<td>3</td>
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<tr>
<td>or ISE 300</td>
<td>Probability &amp; Statistics for Engineers</td>
<td></td>
</tr>
<tr>
<td>ISE 421</td>
<td>Introduction to Operations Research</td>
<td>3</td>
</tr>
<tr>
<td>or MSC 521</td>
<td>Introduction to Operations Research</td>
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</tr>
<tr>
<td>MTH 367</td>
<td>Statistical Methods I</td>
<td>3</td>
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</table>

Select one course from:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>ENM 560</td>
<td>Quality Assurance 2</td>
<td>3</td>
</tr>
<tr>
<td>ENM 561</td>
<td>Design &amp; Analysis of Experiments</td>
<td>3</td>
</tr>
<tr>
<td>ENM 566</td>
<td>Reliability Engineering I</td>
<td>3</td>
</tr>
<tr>
<td>ISE 460</td>
<td>Quality Assurance</td>
<td>3</td>
</tr>
<tr>
<td>MSC 572</td>
<td>System Simulation</td>
<td>3</td>
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</tbody>
</table>

Total Hours: 12

1. ENM 500 (or ISE 300 or MTH 367) is a corequisite.
2. ENM 500 (or ISE 300 or MTH 367) is a prerequisite.

## Minor in Quality Assurance (QUA)

This minor is open to all majors. The program provides a concentration in the field of quality control, quality assurance, and quality management. Upon successful completion of this minor, the student will have command of statistical quality tools as well as the breadth of quality management concepts and experience in practical application of the tools. All prerequisites and corequisites must be followed.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>IET 318</td>
<td>Statistical Process Control</td>
<td>3</td>
</tr>
<tr>
<td>IET 320</td>
<td>Design and Analysis of Experiments</td>
<td>3</td>
</tr>
<tr>
<td>IET 321</td>
<td>Quality Management</td>
<td>3</td>
</tr>
<tr>
<td>IET 322</td>
<td>Data Analytics</td>
<td>3</td>
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</tbody>
</table>

Total Hours: 12

## Global Manufacturing Systems Engineering Technology

Today's global economy has increasingly become borderless and is dominated by multinational companies. This requires tomorrow’s engineers to be able to work efficiently in multicultural teams. The Global Manufacturing Systems Engineering Technology program is creating a new type of global engineer both answering industry's demand and giving the upcoming engineer a competitive advantage in today's market place.

In the Global Manufacturing Systems Engineering Technology program, state-of-the-art technology is used to plan, design, and implement the tools and machines needed to produce high quality products at competitive prices. Throughout the program, important concepts of lean enterprise, global competitiveness, green engineering concepts, and customer satisfaction will be applied.

The curriculum is highly interdisciplinary since the manufacturing professional must possess extensive technical skills and excellent humanistic skills in communications, computers, teamwork, information technology, globalism, and multiculturalism. The technical courses emphasize engineering materials and manufacturing processes; mechanical, hydraulic, and pneumatic automation and electronic controls; computer integrated manufacturing; manufacturing planning and control; extensive laboratory experiences; the technical sciences and applied mathematics from college algebra, probability, statistics, calculus, and linear programming. The curriculum contains strong components from the humanities, social sciences, and communications, plus foreign language and multicultural requirements. The technical electives allow the student versatility in developing technical breadth or depth. The program is designed to prepare graduates for challenging careers in manufacturing and serves as an excellent foundation for a variety of advanced degree options.

### Faculty
- Sandra Furterer, Department Chairperson
- Professors Emeriti: Simon, Untener, Wolff
- Associate Professor: Falkowski
- Lecturer: Salehi

### Bachelor of Science in Engineering Technology, Global Manufacturing Systems Engineering Technology (GMT) minimum 134 hours

**Common Academic Program (CAP) 1**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>HST 103</td>
<td>The West &amp; the World</td>
<td></td>
</tr>
<tr>
<td>REL 103</td>
<td>Introduction to Religious and Theological Studies</td>
<td></td>
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<tr>
<td>PHL 103</td>
<td>Introduction to Philosophy</td>
<td></td>
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<tr>
<td>ENG 100</td>
<td>Writing Seminar I</td>
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</table>

| Second-Year Writing Seminar 4 | 0-3 |

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>ENG 200</td>
<td>Writing Seminar II</td>
<td></td>
</tr>
</tbody>
</table>

1. ENM 500 (or ISE 300 or MTH 367) is a corequisite.
2. ENM 500 (or ISE 300 or MTH 367) is a prerequisite.
Oral Communication

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMM 100</td>
<td>Principles of Oral Communication</td>
<td>3 cr. hrs.</td>
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Mathematics

<table>
<thead>
<tr>
<th>Course</th>
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<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td>MTH 168</td>
<td>Analytic Geometry &amp; Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MTH 169</td>
<td>Analytic Geometry &amp; Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>MTH 207</td>
<td>Introduction to Statistics</td>
<td>3</td>
</tr>
<tr>
<td>CHM 123</td>
<td>General Chemistry &amp; 123L and General Chemistry Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>PHY 201</td>
<td>College Physics I &amp; 201L and College Physics Laboratory I</td>
<td>4</td>
</tr>
</tbody>
</table>

Social Science

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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</thead>
<tbody>
<tr>
<td>SSC 200</td>
<td>Social Science Integrated</td>
<td>3 cr. hrs.</td>
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</table>

Arts

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
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<tbody>
<tr>
<td>EGR 102</td>
<td>Introduction to the University Experience for Engineers</td>
<td>0</td>
</tr>
<tr>
<td>EGR 103</td>
<td>Engineering Innovation</td>
<td>2</td>
</tr>
<tr>
<td>EGR 150</td>
<td>Enrichment Workshop I</td>
<td>0</td>
</tr>
<tr>
<td>EGR 151</td>
<td>Enrichment Workshop II</td>
<td>0</td>
</tr>
<tr>
<td>EGR 200</td>
<td>Professional Development Seminar or COP 200 Introduction to Engineering Cooperative Education</td>
<td>0</td>
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</table>

Natural Sciences

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGR 102</td>
<td>Introduction to the University Experience for Engineers</td>
<td>0</td>
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</table>

Crossing Boundaries

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SET 101</td>
<td>Introduction to Engineering Technology II</td>
<td>0</td>
</tr>
<tr>
<td>SET 300</td>
<td>Professional Development for Juniors</td>
<td>0</td>
</tr>
<tr>
<td>SET 150</td>
<td>Engineering Analysis I</td>
<td>2</td>
</tr>
<tr>
<td>SET 400</td>
<td>Professional Development for Seniors</td>
<td>1</td>
</tr>
<tr>
<td>ECT 110</td>
<td>Electrical Circuits I &amp; 110L and Electrical Circuits Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>ECT 408</td>
<td>Data Acquisition &amp; Measurements</td>
<td>2</td>
</tr>
<tr>
<td>ECT 316</td>
<td>Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ECT 317</td>
<td>Industrial Economic &amp; Financial Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ECT 318</td>
<td>Statistical Process Control</td>
<td>3</td>
</tr>
<tr>
<td>IET 323</td>
<td>Project Management</td>
<td>3</td>
</tr>
<tr>
<td>IET 408</td>
<td>Lean Management and Six Sigma</td>
<td>3</td>
</tr>
<tr>
<td>MCT 110L</td>
<td>Technical Drawing &amp; CAD Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>MCT 112L</td>
<td>Introduction to Mechanical Design</td>
<td>3</td>
</tr>
<tr>
<td>MCT 215</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>MCT 221</td>
<td>Strength of Materials</td>
<td>3</td>
</tr>
<tr>
<td>MCT 315</td>
<td>Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>MCT 336</td>
<td>Fluid Power &amp; 336L and Fluid Power Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>MFG 108L</td>
<td>Manufacturing Processes Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>MFG 204</td>
<td>Materials &amp; Processes &amp; 204L and Materials &amp; Processes Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>MFG 206L</td>
<td>Dimensional Metrology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>MFG 240</td>
<td>Manufacturing &amp; Product Design</td>
<td>3</td>
</tr>
<tr>
<td>MFG 427</td>
<td>Computer Integrated Manufacturing &amp; Global Manufacturing</td>
<td>3</td>
</tr>
<tr>
<td>MFG 431</td>
<td>Controls for Industrial Automation</td>
<td>3</td>
</tr>
<tr>
<td>MFG 432</td>
<td>Plastics, Composites &amp; Nano Materials &amp; Processes</td>
<td>3</td>
</tr>
<tr>
<td>MFG 434</td>
<td>Robotics &amp; Computer Numerical Control</td>
<td>3</td>
</tr>
<tr>
<td>MFG 438</td>
<td>Sustainable Manufacturing &amp; Product Design</td>
<td>3</td>
</tr>
<tr>
<td>MFG 490</td>
<td>Senior Project</td>
<td>3</td>
</tr>
<tr>
<td>Language requirements</td>
<td>2</td>
<td>8</td>
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<tr>
<td>Technical elective</td>
<td>3</td>
<td>3</td>
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</table>

Total Hours 101
The University's general reading and writing competency requirements are satisfied by completing ENG 100 and ENG 200, ENG 114, or ENG 198 with a grade of C- or higher. Students admitted to the University Honors program and/or students with sufficiently high verbal scores on the SAT and ACT are placed in ENG 114 or ENG 198. ENG 114 and 198 are one-semester courses which satisfy the University requirement. Students who are placed in ENG 114 or ENG 198 do not receive credit for ENG 100 but are free to take elective coursework in place of the waived first semester of composition.

Students who have no or limited experience in a foreign language will be required to complete a two-course language sequence either LNG 101/LNG 141 (6 sem. hours) depending on their beginning proficiency. Students entering the University of Dayton and enrolled in the program will fulfill this requirement. Students passing the proficiency examination of one or both foreign language course requirements will be required to complete additional Technical electives to fulfill program credits requirements.

Select from list approved by the Department.

Minor in Global Manufacturing Systems Engineering Technology (GMT)

This minor is open to all engineering technology majors except global manufacturing systems. The program provides a concentration in manufacturing that will complement the student's major field of study. All prerequisites and corequisites must be followed.

Select four courses from: \(^1\)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFG 204 &amp; 204L</td>
<td>Materials &amp; Processes and Materials &amp; Processes Laboratory</td>
</tr>
<tr>
<td>MFG 240</td>
<td>Manufacturing &amp; Product Design</td>
</tr>
<tr>
<td>MFG 424</td>
<td>Robotics</td>
</tr>
<tr>
<td>MFG 427</td>
<td>Computer Integrated Manufacturing &amp; Global Manufacturing</td>
</tr>
<tr>
<td>MFG 431</td>
<td>Controls for Industrial Automation</td>
</tr>
<tr>
<td>MFG 432</td>
<td>Plastics, Composites &amp; Nano Materials &amp; Processes</td>
</tr>
<tr>
<td>MFG 434</td>
<td>Robotics &amp; Computer Numerical Control</td>
</tr>
<tr>
<td>MFG 438</td>
<td>Sustainable Manufacturing &amp; Product Design</td>
</tr>
</tbody>
</table>

Total Hours: 12

Courses selected may not be those already required for student's major.

Mechanical Engineering Technology

The Mechanical Engineering Technology Program emphasizes the practical application of the principles of the mechanical engineering field. Career opportunities are in mechanical design, computer-aided design, product evaluation and development, manufacturing engineering, computer-aided manufacturing, plant engineering, technical sales, technical service, fluid power, automation, and supervision. A significant portion of the graduates are in technical management. The curriculum includes a core of technical sciences; applied courses in design, thermodynamics, fluid mechanics, and manufacturing; extensive laboratory experiences; and mathematics from college algebra through probability, statistics, calculus, and differential equations. Courses are required in oral and written communication, with components in the humanities and social sciences to provide insight into the impact of technology on society. Concepts from basic education are stressed in technical courses. The curriculum is broad to prepare graduates for employment and provide a foundation on which to base continued study of changing technology.

Faculty
Sandra Furterer, Department Chairperson
Professors Emeriti: Mott, Untener, Wolff
Associate Professors: Blust, Falkowski
Assistant Professors: Cress, Zouhri
Faculty of Practice: Obermeyer
Lecturer: Salehi

Bachelor of Science in Engineering Technology, Mechanical Engineering Technology (MCT) minimum 133 hours

Common Academic Program (CAP) \(^1\)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>HST 103</td>
<td>The West &amp; the World</td>
</tr>
<tr>
<td>REL 103</td>
<td>Introduction to Religious and Theological Studies</td>
</tr>
<tr>
<td>PHL 103</td>
<td>Introduction to Philosophy</td>
</tr>
<tr>
<td>ENG 100</td>
<td>Writing Seminar I (^3)</td>
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<tr>
<td>ENG 200</td>
<td>Writing Seminar II</td>
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Oral Communication

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>CMM 100</td>
<td>Principles of Oral Communication</td>
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Mathematics

<table>
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<th>Course Title</th>
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<tbody>
<tr>
<td>Mathematics</td>
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Social Science

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>Social Science Integrated</td>
<td>3 cr. hrs.</td>
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Arts

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tr>
<td>Arts</td>
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Natural Sciences \(^5\)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>Natural Sciences</td>
<td>7 cr. hrs.</td>
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Crossing Boundaries

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>Social Science Integrated</td>
<td>up to 12 cr. hrs.</td>
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Faith Traditions

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faith Traditions</td>
<td></td>
</tr>
</tbody>
</table>

Practical Ethical Action

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>Inquiry</td>
<td></td>
</tr>
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</table>

Integrative

Advanced Study

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philosophy and/or Religious Studies</td>
<td>(6 cr. hrs.)</td>
</tr>
<tr>
<td>Historical Studies</td>
<td>(3 cr. hrs.)</td>
</tr>
</tbody>
</table>
Diversity and Social Justice 8

Major Capstone 9

1 The credit hours listed reflect what is needed to complete each CAP component. However, they should not be viewed as a cumulative addition to a student’s degree requirements because many CAP courses are designed to satisfy more than one CAP component (e.g., Crossing Boundaries and Advanced Studies) and may also satisfy requirements in the student’s major.

2 May be completed with ASI 110 and ASI 120 through the Core Program.

3 May be completed with ENG 100A and ENG 100B, by placement.

4 May be completed with ENG 114 or ENG 198 or ASI 120.

5 Must include two different disciplines and at least one accompanying lab.

6 U.S. History AP and CLEP credit will not satisfy this requirement.

7 May be completed with ASI 110 and ASI 120 through the Core Program. U.S. History AP and CLEP credit will not satisfy this requirement.

8 May not double count with First-Year Humanities Commons, Second-Year Writing, Oral Communication, Social Science, Arts, or Natural Sciences CAP components, but may double count with courses taken to satisfy other CAP components and/or courses taken in the student’s major.

9 The course or experience is designed by faculty in each major; it may, or may not, be assigned credit hours.

Major Requirements

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHM 123 &amp; 123L</td>
<td>General Chemistry and General Chemistry Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>ECT 110 &amp; 110L</td>
<td>Electrical Circuits I and Electrical Circuits I Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>ECT 408</td>
<td>Data Acquisition &amp; Measurements</td>
<td>2</td>
</tr>
<tr>
<td>EGR 102</td>
<td>Introduction to the University Experience for Engineers</td>
<td>0</td>
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<tr>
<td>EGR 103</td>
<td>Engineering Innovation</td>
<td>2</td>
</tr>
<tr>
<td>EGR 150</td>
<td>Enrichment Workshop I</td>
<td>0</td>
</tr>
<tr>
<td>EGR 151</td>
<td>Enrichment Workshop II</td>
<td>0</td>
</tr>
<tr>
<td>EGR 200 or COP 200</td>
<td>Professional Development Seminar or Introduction to Engineering Cooperative Education</td>
<td>0</td>
</tr>
<tr>
<td>IET 317</td>
<td>Industrial Economic &amp; Financial Analysis</td>
<td>3</td>
</tr>
<tr>
<td>IET 323</td>
<td>Project Management</td>
<td>3</td>
</tr>
<tr>
<td>MCT 110L</td>
<td>Technical Drawing &amp; CAD Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>MCT 112L</td>
<td>Introduction to Mechanical Design</td>
<td>3</td>
</tr>
<tr>
<td>MCT 215</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>MCT 221</td>
<td>Strength of Materials</td>
<td>3</td>
</tr>
<tr>
<td>MCT 231</td>
<td>Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>MCT 315</td>
<td>Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>MCT 320</td>
<td>Design of Machine Elements I</td>
<td>3</td>
</tr>
<tr>
<td>MCT 336 &amp; 336L</td>
<td>Fluid Power and Fluid Power Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>MCT 342</td>
<td>Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>MCT 420</td>
<td>Design of Machine Elements II</td>
<td>3</td>
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<tr>
<td>MCT 490</td>
<td>Senior Project</td>
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</tr>
<tr>
<td>MFG 108L</td>
<td>Manufacturing Processes Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>MFG 204 &amp; 204L</td>
<td>Materials &amp; Processes and Materials &amp; Processes Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>MFG 206L</td>
<td>Dimensional Metrology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>MFG 240</td>
<td>Manufacturing &amp; Product Design</td>
<td>3</td>
</tr>
<tr>
<td>MTH 168</td>
<td>Analytic Geometry &amp; Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MTH 169</td>
<td>Analytic Geometry &amp; Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>MTH 207</td>
<td>Introduction to Statistics</td>
<td>3</td>
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<tr>
<td>PHY 201 &amp; 201L</td>
<td>College Physics I and College Physics Laboratory</td>
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<td>PHY 202 &amp; 202L</td>
<td>College Physics II and General Physics Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>SET 101</td>
<td>Introduction to Engineering Technology II</td>
<td>0</td>
</tr>
<tr>
<td>SET 150</td>
<td>Engineering Analysis I</td>
<td>2</td>
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<tr>
<td>SET 153L</td>
<td>Technical Computation Laboratory</td>
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<td>SET 250</td>
<td>Engineering Analysis II</td>
<td>2</td>
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<tr>
<td>SET 300</td>
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</tr>
<tr>
<td>SET 400</td>
<td>Professional Development for Seniors</td>
<td>1</td>
</tr>
</tbody>
</table>

Electrical Elective 3
Technical Electives 2

Total Hours 100

Minor in Mechanical Engineering Technology (MCT)

This minor is open to all majors except mechanical engineering technology and mechanical engineering. The program provides a concentration in the mechanical field that will complement the student’s major field of study. All prerequisites and corequisites must be followed.

Select four courses: 1

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>MCT 221</td>
<td>Strength of Materials</td>
<td>3</td>
</tr>
<tr>
<td>MCT 231</td>
<td>Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>MCT 313</td>
<td>Industrial Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>MCT 330</td>
<td>Design of Machine Elements</td>
<td>3</td>
</tr>
<tr>
<td>MCT 336 &amp; 336L</td>
<td>Fluid Power and Fluid Power Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>MCT 342</td>
<td>Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>MCT 423</td>
<td>Product Development</td>
<td>3</td>
</tr>
<tr>
<td>MCT 430</td>
<td>Design of Fluid Power Systems</td>
<td>3</td>
</tr>
<tr>
<td>MCT 432</td>
<td>Heat Power</td>
<td>3</td>
</tr>
<tr>
<td>MCT 438</td>
<td>Heat Transfer</td>
<td>3</td>
</tr>
<tr>
<td>MCT 440</td>
<td>Applied Vibrations</td>
<td>3</td>
</tr>
</tbody>
</table>
### Minor in Automotive Systems (AST)

This minor is open to all majors. The program provides a concentration in the automotive field that will complement the student’s major program of study. All prerequisites and corequisites must be followed.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>ECT 456</td>
<td>Automotive Electrical &amp; Safety Systems</td>
<td>3</td>
</tr>
<tr>
<td>MCT 456</td>
<td>Automotive Powertrain &amp; Chassis Systems</td>
<td>3</td>
</tr>
<tr>
<td>Select two courses from: 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECT 224</td>
<td>Digital Computer Fundamentals</td>
<td></td>
</tr>
<tr>
<td>ECT 357</td>
<td>Microprocessors I</td>
<td></td>
</tr>
<tr>
<td>IET 408</td>
<td>Lean Management and Six Sigma</td>
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</tr>
<tr>
<td>IET 415</td>
<td>Global Supply Chain Management</td>
<td></td>
</tr>
<tr>
<td>MCT 231</td>
<td>Fluid Mechanics</td>
<td></td>
</tr>
<tr>
<td>MCT 342</td>
<td>Thermodynamics</td>
<td></td>
</tr>
<tr>
<td>MCT 446</td>
<td>Applied Finite Element Modeling</td>
<td></td>
</tr>
<tr>
<td>MEE 417</td>
<td>Internal Combustion Engines</td>
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</tr>
<tr>
<td>MFG 204</td>
<td>Materials &amp; Processes</td>
<td></td>
</tr>
<tr>
<td>MFG 432</td>
<td>Plastics, Composites &amp; Nano Materials &amp; Processes</td>
<td></td>
</tr>
<tr>
<td>MCT 438</td>
<td>Heat Transfer</td>
<td></td>
</tr>
<tr>
<td>MCT 440</td>
<td>Applied Vibrations</td>
<td></td>
</tr>
</tbody>
</table>

Total Hours: 12

Courses selected may not be those already required for student’s major.

### Minor in Industrial Automation and Applied Robotic Systems (ARS)

This minor is open to all majors in the School of Engineering. The program provides a concentration in the industrial automation and applied robotic systems field that will complement the student’s major field of study. All prerequisites and corequisites must be followed.

#### Industrial Automation and Applied Robotic Systems

Choose 4 courses for 12 credit hours

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>ECT 452</td>
<td>Feedback Controls</td>
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</tr>
<tr>
<td>MFG 424</td>
<td>Robotics</td>
<td></td>
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<td>MFG 431</td>
<td>Controls for Industrial Automation</td>
<td></td>
</tr>
<tr>
<td>MFG 434</td>
<td>Robotics &amp; Computer Numerical Control</td>
<td></td>
</tr>
<tr>
<td>MFG 427</td>
<td>Computer Integrated Manufacturing &amp; Global</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Manufacturing</td>
<td></td>
</tr>
<tr>
<td>MFG 435</td>
<td>Advanced Numerical Control</td>
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</tbody>
</table>

Total Hours: 12

If the minor’s required courses are already required by the student’s major, the student may select ECT 224/ECT 224L or MCT 313 to complete a total of at least twelve semester hours. Students in Engineering programs may not select courses with content similar to courses offered in their major.

### Minor in Integrated Arts and Technology (IAT)

The Integrated Arts and Technology minor allows students to connect their aptitude for technical discipline with their passion for the arts. Students select one arts program (graphic design, music or theatre) and take at least 12 credits of coursework in that program. To put their knowledge to work in a practical and beneficial setting, students will also complete a service-learning project related to their arts program, which may provide academic credit.

This minor is open to all students enrolled in School of Engineering programs. All prerequisites and corequisites must be followed.

#### Graphic Design Emphasis

Select 12 hours from:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMM 344</td>
<td>Multimedia Design &amp; Production I</td>
<td>3</td>
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<tr>
<td>CMM 449</td>
<td>Topics in Electronic Media</td>
<td>3</td>
</tr>
<tr>
<td>VAD 220</td>
<td>Design Processes I</td>
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<td>VAD 240</td>
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<td>VAD 320</td>
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<td>VAD 355</td>
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**Technical Music Emphasis**

Select 12 hours from:

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<tr>
<td>CMM 340</td>
<td>Fundamentals of Broadcasting</td>
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<td>CMM 341</td>
<td>Audio Production</td>
<td>3</td>
</tr>
<tr>
<td>MUS 205</td>
<td>Music, Technology and Culture</td>
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<td>MUS 223</td>
<td>Introduction to Music Technology</td>
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<td>MUS 323</td>
<td>Experiments in Digital Sound and Media</td>
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**Television and Stage Production Emphasis**

Select 12 hours from:

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<tr>
<td>CMM 341</td>
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<td>CMM 342</td>
<td>Fundamentals of Video Production</td>
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<td>CMM 442</td>
<td>Advanced Television Production</td>
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<td>CMM 445</td>
<td>Media Performance</td>
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<td>THR 300</td>
<td>Performance Practicum</td>
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<td>THR 307</td>
<td>Lighting Design</td>
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<td>THR 308</td>
<td>Engineering for the Performing Arts</td>
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<td>THR 309</td>
<td>Sound Design</td>
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<td>THR 311</td>
<td>Design Concepts</td>
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<td>THR 330</td>
<td>Scenic Design</td>
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<td>MFG 400</td>
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<tr>
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**Minor in Sustainable Manufacturing (SMF)**

This minor is open to all majors in the School of Engineering. The program provides a concentration in sustainable manufacturing that will complement the student’s major field of study. All prerequisites and corequisites must be followed.

**Sustainable Manufacturing**

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<tr>
<th>Course Code</th>
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<td>ECT 461</td>
<td>Power Distribution &amp; Control</td>
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<td>MFG 204</td>
<td>Materials &amp; Processes</td>
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<td>MFG 204L</td>
<td>Materials &amp; Processes Laboratory</td>
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<td>MFG 432</td>
<td>Plastics, Composites &amp; Nano Materials &amp; Processes</td>
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<td>MFG 438</td>
<td>Sustainable Manufacturing &amp; Product Design</td>
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Total Hours 13

1 If the minor's required courses are already required by the student's major, the student may select IET 420, MEE 472, MEE 473, MEE 478, and/ or SEE 250 to complete a total of at least twelve semester hours. Students in Engineering programs may not select courses with content similar to courses offered in their major.

**Minor in Engineering Management (ENM)**

This twelve credit hour minor is open to all engineering and engineering technology majors. Completion of this minor will provide the student with understanding of basic concepts relevant to the management of engineering operations. Students who anticipate moving from technical to managerial positions during their careers may wish to consider this minor.

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<td>ENM 505</td>
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<td>ENM 530</td>
<td>Engineering Economy</td>
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<td>or ISE 430</td>
<td>Engineering Economy</td>
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<td>ENM 500</td>
<td>Probability &amp; Statistics for Engineers</td>
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<td>ENM 515</td>
<td>Human Factors Engineering</td>
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<td>ENM 534</td>
<td>Decision Analysis</td>
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<td>ENM 539</td>
<td>Project Management</td>
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<td>ENM 560</td>
<td>Quality Assurance</td>
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<td>ENM 565</td>
<td>Reliability Engineering I</td>
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<td>ENM 582</td>
<td>Engineering Organizational Development</td>
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<tr>
<td>ISE 300</td>
<td>Probability &amp; Statistics for Engineers</td>
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<td>ISE 421</td>
<td>Introduction to Operations Research</td>
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<td>ISE 455</td>
<td>System Dynamics</td>
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<td>ISE 465</td>
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<td>MSC 572</td>
<td>System Simulation</td>
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Total Hours 12

1 ENM 500 (or ISE 300 or MTH 367) is a prerequisite.

**Electronic and Computer Engineering Technology**

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**Global Manufacturing Systems Engineering Technology**

**First Year**

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**Second Year**

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**Second Year**

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**Global Manufacturing Systems Engineering Technology**
MCT 215  3ECT 110L  1
IET 408  3MFG 240  3
MFG 204  3IET 316  3
MFG 204L  1PHY 201  3
MFG 206L  1PHY 201L  1
MTH 207  3ENG 200  3
(Satisfies CAP Second Year Writing Seminar)

CMM 100 (Satisfies CAP Communication)  3

Third Year
Fall  Hours  Spring  Hours
SET 300  0IET 323  3
MCT 315  3MFG 431  3
MCT 336  3Language Requirement  4
MCT 336L  1IET 318  3
MFG 432  3MCT 221  3
MFG 434  3
SSC 200  3

16  16

Fourth Year
Fall  Hours  Spring  Hours
SET 400  1MFG 490  3
(Satisfies CAP Capstone Requirement)
IET 317  3ECT 408  2
MFG 438  3MFG 427  3
TECH EL  3Advanced HST  3
(Satisfies CAP Crossing Boundaries)

Language Requirement  4Advanced PHL/REL (Ethics)  3

Advanced PHL/REL  3CAP Arts Study  3

17  17

Total credit hours: 134

Mechanical Engineering Technology

First Year
Fall  Hours  Spring  Hours
ENG 100 (Satisfies CAP Writing Seminar)  3HST 103  3
(Satisfies CAP First-Year Humanities Common)
REL 103 (Satisfies CAP First-Year Humanities Common)  3PHL 103  3
(Satisfies CAP First-Year Humanities Common)
MFG 108L  1MCT 112L  3
SET 150  2OHM 123  3
MTH 168  4OHM 123L  1
MCT 110L  2MTH 169  4
EGR 103  2EGR 151  0

17  17

Total credit hours: 133

Electronic Computer Tech Courses
ECT 110. Electrical Circuits I. 3 Hours
Practical concepts of single voltage source DC and AC circuits: current, voltage, resistance, power, series and parallel circuits, capacitance, magnetic circuits, and inductance. Corequisites: SET 150 or MTH 168; ECT 110L.

ECT 110L. Electrical Circuits I Laboratory. 1 Hour
Experiments in single voltage source DC and AC circuits to accompany ECT 110. Three laboratory hours per week. Corequisite(s): ECT 110.
ECT 120. Electrical Circuits II. 3 Hours
Practical concepts of multiple voltage and current source DC and AC circuits: reactance, impedance, phase, circuit analysis, power factor, resonance, filters, and transformers. Circuit calculations using vectors, complex algebra, and simultaneous equations. Prerequisite(s): ECT 110; MTH 168.

ECT 206. Electron Devices I. 3 Hours
Fundamentals of semiconductor diodes, transistors (bipolar and field effect), amplifiers, biasing and small signal analysis. Prerequisite(s): ECT 120. Corequisite(s): ECT 206L.

ECT 206L. Electron Devices I Laboratory. 1 Hour
To accompany ECT 206. Three hours of laboratory a week. Corequisite(s): ECT 206.

ECT 224. Digital Computer Fundamentals. 3 Hours
Fundamental theory and techniques of electronic data processing to include binary arithmetic, switching theory (Boolean algebra), and basic circuitry (gates, adders, registers, and memory). Prerequisite(s): ECT 110. Corequisite(s): ECT 224L.

ECT 224L. Digital Computer Fundamentals Laboratory. 1 Hour
To accompany ECT 224. Three hours of laboratory a week. Corequisite(s): ECT 224.

ECT 306. Electronic Devices II. 3 Hours
Fundamentals of integrated circuits, operational amplifiers, transistors, photoelectric devices, silicon-controlled rectifiers, and their associated circuits. Prerequisite(s): ECT 206; MTH 169. Corequisite(s): ECT 306L.

ECT 306L. Electronic Devices II Laboratory. 1 Hour
To accompany ECT 306. Three hours of laboratory a week. Corequisite(s): ECT 306.

ECT 357. Microprocessors I. 3 Hours
Study of microprocessor architecture, hardware, software, applications, and development tools. Prerequisite(s): ECT 224.

ECT 358. Microprocessors II. 3 Hours
Advanced microprocessors study including development tools and software with regards to interfacing equipment in applications. Prerequisite(s): ECT 224, ECT 361. Corequisite(s): ECT 358L.

ECT 358L. Microprocessors II Laboratory. 1 Hour
To accompany ECT 358. Emphasis on microcomputer programming. Three hours of laboratory a week. Corequisite(s): ECT 358.

ECT 361. Programming Structures. 3 Hours
The study of programming language concepts. Emphasis on the C language and its application to microcomputer hardware and software development. Prerequisites: SET 153L.

ECT 362. Concepts & Applications of Computer Operating Systems. 3 Hours
Introduction to the fundamentals and applications of computer operating systems and the interaction of hardware and software. Operating systems for large-scale, mini-, and microcomputers introduced through case studies. Prerequisite(s): ECT 361.

ECT 400. Selected Topics. 1-4 Hours
Investigation and discussion of current technical topics in electronic and computer engineering technology. May be taken more than once. Prerequisite(s): Permission of department chairperson.

ECT 408. Data Acquisition & Measurements. 2 Hours
Measurement and evaluation of the characteristics of engineering materials, structural mechanics, electromechanical systems, and physical systems. Emphasis on data acquisition, signal conditioning and manipulation, and virtual instrumentation. Prerequisites: ECT 110L; SET 250.

ECT 452. Feedback Controls. 3 Hours
Study of principles of control including Nyquist criteria, Bode plots, PID loops, motor control virtual instrumentation, and advanced concepts. Laplace transform analysis is utilized. Prerequisite(s): ECT 306, ECT 408.

ECT 456. Automotive Electrical & Safety Systems. 3 Hours
Theory and design of charging systems, batteries, control systems, safety systems, and various sensor technologies. Overview of manufacturing and commercial aspects of the automotive industry. Prerequisite(s): ECT 110 or EGR 203.

ECT 461. Power Distribution & Control. 3 Hours
Study of power distribution systems including components, basic operation, polyphase circuits, characteristics, and application. Emphasis on the generation of electric power, its transmission, and its application to high power systems. Prerequisite(s): ECT 110.

ECT 465. Digital Data Communications. 3 Hours
Study of communication methods and protocols. Applications to networks, satellite communication, phone systems, fiber optics, modems, and other data transmission. A special emphasis is placed on digital networks. Prerequisite(s): ECT 224.

ECT 466. Microcomputer Architecture. 3 Hours
To develop an understanding of the basic hardware architecture of industry standard microcomputers including CPUs, standard busses, memory, mass storage devices, Systems-on-a-Chip and their implementation, I/O devices, and network interfaces. Study of architecture of recent microprocessors. Prerequisite(s): ECT 224, ECT 361.

ECT 490. Senior Project. 3 Hours
Advanced study and research of the product realization process focusing on conceptual design, embodiment design, final design, and prototyping or other design verification. Students work on externally sponsored engineering projects in multidisciplinary teams that perform engineering analysis that includes safety, ergonomics, environmental, cost and sociological impact of their designs. Prerequisite(s): CMM 100; ECT 306, ECT 358, ECT 408; IET 323.

ECT 493. Honors Thesis. 3 Hours
HONORS THESIS Selection, design, investigation, and completion of an independent, original research study resulting in a document prepared for submission as a potential publication and a completed undergraduate thesis. Restricted to students in University Honors Program.

ECT 494. Honors Thesis. 3 Hours
Selection, design, investigation, and completion of an independent, original research study resulting in a document prepared for submission as a potential publication and a completed undergraduate thesis. Restricted to students in University Honors Program. Prerequisite(s): ECT 493.
Engineering Technology Courses

SET 100. Introduction to Engineering Technology I. 0 Hours
First semester of introduction to Engineering Technology seminar for all engineering technology majors. Introduction to the University of Dayton, the School of Engineering, the Department of Engineering Technology, engineering technology programs and careers. Emphasizes professional ethics, critical thinking and communications, and team dynamics. Academic policies, academic planning, registration procedures, counseling and career placement services.

SET 101. Introduction to Engineering Technology II. 0 Hours
Second semester of introduction to Engineering Technology seminar for all engineering technology majors. Introduction to the University of Dayton, the School of Engineering, the Department of Engineering Technology, engineering technology programs and careers. Emphasizes professional ethics, critical thinking and communication, and team dynamics. Academic policies, academic planning, registration procedures, counseling and career placement services.

SET 102. Engineering Technology Transfer Seminar. 0 Hours
A seminar for Engineering Technology majors who transferred from another academic institution. Introduction to the University of Dayton, the School of Engineering, the Department of Engineering Technology, Engineering Technology programs, and careers. Emphasizes professional ethics, critical thinking and communication, and team dynamics. Academic policies, academic planning, registration procedures, counseling and career placement services.

SET 150. Engineering Analysis I. 2 Hours
Overview of the mathematics topics heavily used in sophomore-level engineering technology courses. Topics include algebraic analysis, trigonometry, vectors and complex number, sinusoids and harmonic signals, systems of equations and matrices, differentiation, and integration. All topics are motivated by engineering applications.

SET 153L. Technical Computation Laboratory. 1 Hour
Introduction to applications and use of computers for engineers with concentration on spreadsheets, electronic communications, and object oriented programming using Visual Basic.

SET 198. Research & Innovation Laboratory. 1-6 Hours
Students participate in 1) selection and design, 2) investigation and data collection, 3) analysis and 4) presentation of a research project. Research can include, but is not limited to, developing an experiment, collecting and analyzing data, surveying and evaluating literature, developing new tools and techniques including software, and surveying, brainstorming and evaluating engineering solutions and engineering designs. Proposals from teams of students will be considered. Prerequisite(s): Permission of department chairperson.

SET 200. Professional Development for Sophomores. 0 Hours
Presentations on contemporary and professional engineering subjects by students, faculty, and engineers in active practice. The seminar addresses topics in key areas that complement traditional courses and prepare distinctive graduates, ready for life and work. Registration required for all Engineering Technology sophomore students. Required of all engineering technology majors in the junior or senior year. Prerequisites: SET 100.

SET 201. Professional Development for Juniors. 0 Hours
Presentations on contemporary and professional engineering subjects by students, faculty, and engineers in active practice. The seminar addresses topics in key areas that complement traditional courses and prepare distinctive graduates, ready for life and work. Registration required for all Engineering Technology sophomore students. Required of all engineering technology majors in the junior or senior year. Prerequisites: SET 100.

SET 250. Engineering Analysis II. 2 Hours
Integration of mathematical skills learned in calculus and statistics with engineering applications and analyses. Advanced engineering analysis methods will be introduced. Topics to be covered will include: engineering applications and solution methods in the areas of linear algebra, numerical methods, Fourier transforms, Laplace transforms, differential equations, and statistics. Engineering math tools will be utilized. Prerequisites: MTH 169 and MTH 207. Corequisites: SET 153L.

SET 298. Research & Innovation Laboratory. 1-6 Hours
Students participate in 1) selection and design, 2) investigation and data collection, 3) analysis and 4) presentation of a research project. Research can include, but is not limited to, developing an experiment, collecting and analyzing data, surveying and evaluating literature, developing new tools and techniques including software, and surveying, brainstorming and evaluating engineering solutions and engineering designs. Proposals from teams of students will be considered. Prerequisite(s): Permission of department chairperson.

SET 300. Professional Development for Juniors. 0 Hours
Presentations on contemporary and professional engineering subjects by students, faculty, and engineers in active practice. The seminar addresses topics in key areas that complement traditional courses and prepare distinctive graduates, ready for life and work. Registration required for all Engineering Technology sophomore students. Required of all engineering technology majors in the junior or senior year. Prerequisites: SET 100.

SET 398. Research & Innovation Laboratory. 1-6 Hours
Students participate in 1) selection and design, 2) investigation and data collection, 3) analysis and 4) presentation of a research project. Research can include, but is not limited to, developing an experiment, collecting and analyzing data, surveying and evaluating literature, developing new tools and techniques including software, and surveying, brainstorming and evaluating engineering solutions and engineering designs. Proposals from teams of students will be considered. Prerequisite(s): Permission of department chairperson.

SET 400. Professional Development for Seniors. 1 Hour
Career planning for engineering technology majors. The job search process, resume preparation, the job interview, professional development. Required of all engineering technology majors in the junior or senior year. Prerequisites: SET 300.

SET 498. Research & Innovation Laboratory. 1-6 Hours
Students participate in 1) selection and design, 2) investigation and data collection, 3) analysis and 4) presentation of a research project. Research can include, but is not limited to, developing an experiment, collecting and analyzing data, surveying and evaluating literature, developing new tools and techniques including software, and surveying, brainstorming and evaluating engineering solutions and engineering designs. Proposals from teams of students will be considered. Prerequisite(s): Permission of department chairperson.

Global Manufact Sys Egr Tech Courses

MFG 108L. Manufacturing Processes Laboratory. 1 Hour
Application of metal-cutting theory using single- and multiple-point cutting tools, basic metal removal process of toolroom and production machines. Experience on conventional milling machines, shapers, lathes, surface grinders, and drill presses. Three hours of laboratory a week.

MFG 204. Materials & Processes. 3 Hours
Chemical and physical properties of metals, ceramics, and polymers; casting processes; powdered metallurgy; metal forming; plastics processes. Oral and written presentation of a team case study. Corequisite(s): MFG 204L.

MFG 204L. Materials & Processes Laboratory. 1 Hour
Testing of materials for tensile strength, impact and hardness properties, cooling curves and equilibrium diagram development, heat treating and Hardenability curve determination, cold forming, plastics materials processing, micro polishing and metallography; visits to local industries. Three hours of laboratory a week. Corequisite(s): MFG 204.
MFG 206L. Dimensional Metrology Laboratory. 1 Hour
Theory and practice of precision measurement including the surface plate, angle and sine plates; surface texture and roundness; optical microscope and profile projector; mechanical and electronic gages; coordinate measuring machine; length standards and height gages; fixed and functional gages; sources of measurement error. Three hours of laboratory a week. Prerequisite(s): MCT 110L.

MFG 208L. Geometric Dimensioning & Tolerancing Laboratory. 1 Hour
Study of the use of ANSI Y14.5M-1994, the engineering standard for geometric dimensioning and tolerancing. Includes the proper use of GD&T symbols, reading and interpretation of engineering drawings, techniques for determining part adherence to design requirements and workmanship standards. Prerequisite(s): MCT 110L.

MFG 240. Manufacturing & Product Design. 3 Hours
Manufacturing planning; process planning; advanced cutting tools; workholders; power presses-blanking, forming, draw dies, fine blanking; group technology, gage, jig, and fixture design. Prerequisite(s): MCT 110L; MFG 108L, MFG 204.

MFG 400. Selected Manufacturing Topics. 1-4 Hours
Investigation and discussion of current topics in manufacturing engineering technology. May be taken more than once. Prerequisite(s): Permission of department chairperson.

MFG 424. Robotics. 3 Hours
Study of robotics including history, robot geometry, cost justification, end-effector (types, use, and design), sensors, and programming. Application of robots in industries. Robot programming and operation projects and end-effector design projects. Prerequisite(s): MCT 220, MCT 313.

MFG 427. Computer Integrated Manufacturing & Global Manufacturing. 3 Hours
Computer Integrated Manufacturing (CIM) systems and interrelationships: group technology, computer-aided process planning, expert systems, local area networks, automated flow lines, data collection, and material handling. Also covered are global manufacturing issues and specific country concerns. Prerequisites: MFG 204; SET 153L.

MFG 431. Controls for Industrial Automation. 3 Hours
Topics include: fundamentals of digital logic, pneumatic power, electromechanical sensors and actuators, pneumatic and electrical control circuit analysis and design, industry safety and design standards, concepts of mechatronics, programmable logic controllers, and networking communications. Prerequisites: MFG 204; SET 153L.

MFG 432. Plastics, Composites & Nano Materials & Processes. 3 Hours
Introduction to the more common plastics, composites, and nano engineering materials and their properties. Study of processes including extrusion, injection molding, blow molding, compression and transfer molding, and forming. Topics on part and tooling design. Prerequisite(s): CHM 123, MFG 204.

MFG 434. Robotics & Computer Numerical Control. 3 Hours
Programming of CNC turning and machining centers and industrial robots; application of CAM software to design and edit CNC and robot programs, edit programs, and display tool and motion paths. Parametric part programming concepts to produce complex surfaces. Programming of robotic devices. Prerequisites: MCT 110L; MFG 108L; SET 153L.

MFG 435. Advanced Numerical Control. 3 Hours
Instruction in the programming of complex, multi-axis CNC machines. Extended parametric programming. Programming language techniques. Prerequisite(s): MFG 434.

MFG 438. Sustainable Manufacturing & Product Design. 3 Hours
Design for the environment, sustainable manufacturing processes and business practices to support these topics are developed. Prerequisite(s): MFG 108L, MFG 204.

MFG 490. Senior Project. 3 Hours
Advanced study and research of the product realization process focusing on conceptual design, embodiment design, final design, and prototyping or other design verification. Students work on externally sponsored engineering projects in multidisciplinary teams that perform engineering analysis that includes safety, ergonomics, environmental, cost and sociological impact of their designs. Prerequisites: CMM 100; IET 316, IET 323; MFG 240, MFG 431.

MFG 493. Honors Thesis. 3 Hours
Selection, design, investigation, and completion of an independent, original research study resulting in a document prepared for submission as a potential publication and a completed undergraduate thesis. Restricted to students in University Honors Program.

MFG 494. Honors Thesis. 3 Hours
Selection, design, investigation, and completion of an independent, original research study resulting in a document prepared for submission as a potential publication and a completed undergraduate thesis. Restricted to students in University Honors Program. Prerequisite(s): MFG 493.

Industrial Engineering Tech Courses

IET 230. Work Measurement. 3 Hours
Fundamentals of work simplification, motion economy, and productivity improvement using the techniques of time-and-motion study. Setting of labor standards using the techniques of stop watch, pre-determined time, standard data, and work sampling.

IET 230L. Work Measurement Laboratory. 1 Hour
The application of real-world time-and-motion-study techniques such as operation process, worker-machine, and assembly charts. Calculations for time standards, production efficiency, line balance, cost reduction, labor, and equipment. A written and oral report on a team project. Three hours of laboratory each week. Prerequisites: MTH 137. Corequisites: IET 230.

IET 316. Quantitative Analysis. 3 Hours
Introduction of the mathematical techniques used to support decision making and managerial analysis. Probability theory, decision theory, linear programming, queuing theory, matrix algebra, differential and integral calculus, and differential equations. Prerequisites: MTH 169; MTH 207 or MTH 367; SET 153L.

IET 317. Industrial Economic & Financial Analysis. 3 Hours
Comparison of manufacturing or service industry projects and investments based on their economic value. Quantification of costs and benefits; analysis using present worth, annual worth, and rate of return methods. Basic monetary concepts, including balance sheets, income statements, amortization charts, etc. The course will culminate in the development of a Business Plan for a new product designed by the student team. Prerequisites: SET 150 or MTH 168 or MTH 148.

IET 318. Statistical Process Control. 3 Hours
Statistics and probability theory applied to produce control charts (x-bar, R, s, p, u, and c) to monitor processes. Interpretation and application of these charts. Problem solving techniques, Pareto analysis, and modern quality management techniques. Prerequisites: MTH 168, MTH 207 or MTH 367.
IET 319. Quality Improvement Methods. 3 Hours
Study of problem-solving methodologies and techniques. Team development. Students will learn to use Pareto diagrams, force field analysis, cause and effect diagrams, process mapping, and other problem-solving tools. Quality costs, product liability, and ethics are also covered. Prerequisite(s): IET 318.

IET 320. Design and Analysis of Experiments. 3 Hours
This class introduces students to analytic methods for experimental design. It concerns the design, collection, and analysis of experiments both in manufacturing and service systems. Students will examine the proper analysis for a given experimental design and set of assumptions. Topics will include one-way and factorial designs, fractional factorial designs. Students will learn both computational and software-based analytic methods. Prerequisites: MTH 207 or MTH 367.

IET 321. Quality Management. 3 Hours
This course provides students with an understanding of managing a total quality environment to improve quality, increase productivity and reduce costs. The course covers Total Quality Management implementation strategies, requirements of ISO 9000, QS 9000, and the Malcolm Baldrige award. Prerequisites: IET 318; MTH 207 or MTH 367.

IET 322. Data Analytics. 3 Hours
Data analytics help to enhance productivity through the application of quantitative and qualitative techniques to extract and categorize data to identify and analyze data patterns. Data analytics demand an integrated set of skills such as statistics, machine learning, and mathematics. This course will introduce students to some of the tools and basic principles of data analytics. Among the techniques, tools, and concepts that students will be introduced to are data collection, analysis of exploratory data, descriptive modeling, predictive modeling, evaluation and effective communication of analytical outcomes. Prerequisite(s): IET 316.

IET 323. Project Management. 3 Hours
This course is intended to prepare students to understand and be able to apply the principles of project management to processes they encounter in their jobs. Topics include the role of project manager, planning the project, work breakdown structure, scheduling project, project control and evaluation, earned value analysis, study of the structure, techniques, and application of project management including mathematical models, decision-making, styles of management, ethics, and communications. Students will also work on a team project with written and oral presentations. Prerequisites: CMM 100, Junior or Senior status.

IET 330. Cost Estimating and Control. 3 Hours
Study of the fundamentals of cost estimating of labor, material, and overhead for products, projects, operations, and systems. Semester team projects, written and oral. Study of job order and process cost accounting, activity based costing, and cost-volume-profit relationships. Prerequisites: IET 317 and IET 332.

IET 332. Facilities Layout Design. 3 Hours
Design of manufacturing and service facilities for the most efficient flow of raw materials, work-in-process, and completed stock through a work place. Facilities layout, material handling, and warehousing in relation to trends toward reduced inventory, smaller lot sizes, and just-in-time. Prerequisite(s): MCT 110L.

IET 335. Process Simulation and Analysis. 3 Hours
Introduction to analysis of business, service and industry systems using a simulation software package. Topics covered include creation of simulation models in two and three dimensions that model processes and how to gather the appropriate input data and analyze the output data from the simulation software. Prerequisites: IET 316.

IET 335L. Process Simulation and Analysis Lab. 1 Hour
Introduction to analysis of business, service and industry systems using a simulation software package. Topics covered include creation of simulation models in two and three dimensions that model processes and how to gather the appropriate input data and analyze the output data from the simulation software. Prerequisite(s): SET153L and Junior or Senior status.

IET 400. Selected Topics. 1-4 Hours
Self-paced research course. Preparation of a documented written research project on an engineering technology subject. May not be taken more than once. Prerequisite(s): Permission of department chairperson.

IET 401. Global Regulatory and Legal Framework of Quality in Industry and Business. 3 Hours
This course is geared to students interested in broadening their understanding of the legal and regulatory framework established to ensure quality in the development of products in science and technology. This course will provide an overview of regulations for the pharmaceutical, medical device, biotech, animal health, and consumer goods industries. Students will be introduced to fundamental concepts in the regulations related to clinical trial development, management, ethics, data integrity, data security, privacy, change control and validation.

IET 402. Product Development and Validation in Life Sciences. 3 Hours
This course will give students an understanding of the processes used in the pharmaceutical, medical device, and pharmaceutical industries for the development of new products. Students will learn the scientific principles used in such developments that ensure that products meet quality standards. This course, the second in a series of courses which will better prepare students for employment in the quality health science areas. Instructors will explore how rigorous human factor engineering studies and clinical trials provide essential inputs into the product development process. The students will be introduced to concepts such as gap analysis, risk assessment, master plan, process characterization, installation qualification, operational qualification, measurement system analysis, repeatability and reproducibility (data collection / analysis), performance qualification/validation. In a world of innovative technology, it is critical that the students gain an understanding of computer system and software validation to ensure the quality of data generation, data storage, and digital processes used in manufacturing and products with digital components using technical and practical aspects expected in the regulated life science industries. Prerequisites: MED 401 or IET 401 or ISE 401.

IET 403. Risk and Failure Analysis in Quality Science. 3 Hours
This course will dive into the nuances of the life science industries related to the specific regulations that apply to consumer health products. Importantly, it is desired that students take this course while on internship at a life science company such that they can experience a failure while learning all that is required for acceptable resolution. Through the use of historical risk analysis techniques, such as FMEA, Fault Tree, and 5 Why’s, students will be able to analyze a holistic set of data (in-production, across product lines, across equipment, human variability, on-market, on-stability, validation studies, change control, etc.) that will lead to scientifically justified investigations supported by evidence, and the identification of effective corrective and preventative actions (CAPA). Prerequisites: MED 401 or IET 401 or ISE 401.
IET 408. Lean Management and Six Sigma. 3 Hours
This course reviews the tools used to improve business performance, such as increasing process efficiency and reducing variation and waste. The course is designed around the rigorous approach known as DMAIC and covers a wide variety of problem-solving strategies based on statistics, optimization, and project management. The course elegantly integrates Six Sigma methodologies with lean enterprise principles, such as Kaizen, poka-yoke, and pull-push systems. The topics covered in this course are used both in manufacturing and service industry including hospitals, banks, and retailers. At the end of this course, students will be equipped to help organizations achieve their operational excellence. Prerequisite(s): Junior or senior status.

IET 409. Lean Management. 3 Hours
Study of the principles and current practices of optimizing production using Lean Manufacturing concepts. Just-In-Time, Takt Time, Kaizen, setup reduction, pull systems, focused factories, standard operations, total productive maintenance, and defect-free manufacturing. Prerequisite(s): Junior or senior status.

IET 415. Global Supply Chain Management. 3 Hours
This course is intended to educate students on the fundamental roles played by supply chain management in the Global economy. Students will gain knowledge on the management of local and global supply chain functions and their impact on industries, customers, and suppliers. Students will learn to optimize supply chain resources to reduce cost and improve revenue. Students will learn to utilize data and contemporary tools to make informed decisions in a global supply chain environment. Prerequisite(s): Junior or Senior status.

IET 420. Industrial & Environmental Safety. 3 Hours
Application of safety techniques and principles to identify and correct unsafe situations and practices. Study of system safety, failure modes and effects analysis, fault tree analysis, preliminary hazard analysis, hazardous materials and practices, OSHA, health and personal protection.

IET 423. The IET in Service Organizations. 3 Hours
Case studies, articles, guest speakers, and projects to provide insight into how industrial engineering technology skills and training can be applied to service industries including hospitals, banks, and eating and retailing establishments. IET major; junior status. Prerequisite(s): Junior or Senior status.

IET 435. Human Factors. 3 Hours
Methods to improve the interface between humans and their environment. Human characteristics are studied to determine the best way to design the task, product, work station, or other environmental features to accommodate the human. Written and oral projects. Prerequisite(s): IET 230 and (Junior or Senior status).

IET 446. Six Sigma Green Belt. 3 Hours
Learn, practice, and use six-sigma tools in preparation of a final certification project in a commercial business situation. Use, analyze and solve an identified business variation problem to achieve industry recognized certification.

IET 490. Senior Project. 3 Hours
Advanced study and research of the product realization process focusing on conceptual design, embodiment design, final design, and prototyping or other design verification. Students work on externally sponsored engineering projects in multidisciplinary teams that perform engineering analysis that includes safety, ergonomics, environmental, cost and sociological impact of their designs. Prerequisite(s): CMM 100; IET 316, IET 317, IET 323, IET 332, IET 335, IET 408, IET 409, IET 435.

IET 493. Honors Thesis. 3 Hours
Selection, design, investigation, and completion of an independent, original research study resulting in a document prepared for submission as a potential publication and a completed undergraduate thesis. Restricted to students in University Honors Program.

IET 494. Honors Thesis. 3 Hours
Selection, design, investigation, and completion of an independent, original research study resulting in a document prepared for submission as a potential publication and a completed undergraduate thesis. Restricted to students in University Honors Program. Prerequisites: IET 493.

Mechanical Engineering Tech Courses

MCT 110L. Technical Drawing & CAD Laboratory. 2 Hours
Technical sketching and shape description, orthographic projection theory, multi-view drawings, necessary views, sectional views, working and shop drawings, dimensioning practices, tolerancing, thread and fastener representation and nomenclature, assembly and detail drawings. Six hours of laboratory a week using instruments and commercial computer-aided design (CAD) software.

MCT 111L. Introduction to Design Laboratory. 2 Hours
Advanced topics of Computer Aided Design using three-dimensional, parametric, solid modeling software. Laboratory assignments involving the CAD software are completed through a series of individual and team design projects. Introduction to design requirements, conceptualization, and design decisions. Computer drafting topics such as ANSI Y 14.5M-1994 geometric dimensioning and tolerancing standards, weld symbols, machining and surface finish symbols. Blueprint reading. Prerequisite(s): MCT 110L or MEE 104L and MEE 227L.

MCT 112L. Introduction to Mechanical Design. 3 Hours
Modern design techniques to develop a mechanical device are explored. This is achieved through the application of commercial parametric solid modeling software. Experience with such a system is gained through the completion of individual and team design projects. The application of Geometric Dimensioning & Tolerancing standards per ASME Y14.5M-2009 is integrated into the design process. Prerequisite(s): MCT 110L.

MCT 215. Statics. 3 Hours
Study of forces on bodies at rest. Vectors, force systems, components, reactions, resultants, free body diagrams, equilibrium, centroids, and moments of inertia. Prerequisites: SET 150 or MTH 168. Corequisites: MTH 168.

MCT 220. Statics & Dynamics. 3 Hours
Study of forces on bodies at rest and in motion using Newton’s three laws of motion. Vectors, force systems, components, reactions, resultants, free body diagrams, equilibrium, centroids, motion of inertia, kinetics, and kinematics. Corequisite(s): MTH 137 or MTH 168.

MCT 221. Strength of Materials. 3 Hours
Analysis and design of load-carrying members, considering stress, strain, and deflection. Study of direct tension, compression, and shear; torsion; shear and moment diagrams; bending; combined stress; analysis of columns; pressure vessels. Prerequisite(s): MCT 215; MFG 204, MFG 204L; MTH 168.

MCT 231. Fluid Mechanics. 3 Hours
Fluid properties, fluid statics including manometry, submerged surfaces, buoyancy and stability of floating bodies. The principles of fluid flow including Bernoulli’s and energy equations, energy losses, and pump power. Analysis and design of pipe line systems and open channels; pump selection. Prerequisite(s): MTH 168.
MCT 311. Industrial Mechanisms. 3 Hours
Design and analysis of linkages and cams. Graphical solutions to
kinematics problems including the concepts of instantaneous motion
and relative motion. Development and analysis of motion diagrams.
Study of geometric features of gears and gear transmission systems.
Prerequisite(s): MCT 110L, MCT 220; MTH 137 or MTH 168.

MCT 315. Dynamics. 3 Hours
Study of bodies in motion with a focus on machinery applications.
Kinematics of particles and rigid bodies including translation, rotation,
plane motion, and relative motion. Kinetics by the methods of force-
mass-acceleration, work-energy, and impulse-momentum. Introduction to
mechanical vibrations. Prerequisite(s): MCT 215; MTH 169; PHY 201.

MCT 317. Machine Dynamics. 3 Hours
Principles of applied engineering mechanics as they relate to machines;
static force analysis in both 2 and 3 dimensional systems, kinetics of
machine components by the methods of force-mass-acceleration, work-
energy, and impulse-momentum; machine balancing; introduction to
mechanical vibrations. Prerequisite(s): MCT 111L, MCT 313; MTH 138 or
MTH 168; SET 153L.

MCT 320. Design of Machine Elements I. 3 Hours
Analytical design techniques used to evaluate machine elements &
structures; stress analysis, working stress, failure theories, fatigue failure,
buckling failure. Design methods for gears. Original design project using
commercial 3D solid modeling software. Introduction to Finite Element
Analysis using commercial software. Prerequisites: MCT 112L, MCT 221,
SET 250.

MCT 330. Design of Machine Elements. 3 Hours
Analytical design techniques used to evaluate machine elements; stress
analysis, working stress, failure theories, fatigue failure; design methods for
spur gears, shafts, keys and couplings, roller and journal bearings,
and springs. Original design project. Prerequisite(s): MCT 215, MTH 168;
MFG 208L.

MCT 336. Fluid Power. 3 Hours
Study of hydraulic and pneumatic fluid power components and systems
used in industrial, mobile, and aerospace applications; standard symbols
in circuit design; circuit analysis; specification for pumps, valves,
cylinders, and circuits; hydraulic fluids; filtration; electric motors; system
efficiencies; proportional control and electrohydraulic servo control
systems; seals; fluid conductors; pneumatic components and systems.
Library research project. Corequisite(s): MCT 336L.

MCT 336L. Fluid Power Laboratory. 1 Hour
To accompany MCT 336. Evaluation of fluid power components:
pressure, flow, RPM, sound level, current, voltage, power, torque, and time.
Graphical design, computational analysis, assembly, and testing of typical
circuits and systems. Testing of hydraulic fluids for viscosity, pour point,
flash and fire point, specific gravity. Three hours of laboratory a week.
Corequisite(s): MCT 336.

MCT 342. Thermodynamics. 3 Hours
Energy analysis of engineering systems using the concepts and laws
of thermodynamics. The principle of the mechanical equivalent of heat,
behavior of pure substances, use of thermodynamic property tables,
and study of gas mixtures. Application of the Carnot cycle to both heat
engines and reversed heat engines. Prerequisites: MTH 168.

MCT 400. Selected Mechanical Topics. 1-4 Hours
Investigations and discussion of current technical topics in mechanical
engineering technology. Research report. May be taken more than once.
Prerequisite(s): Permission of department chairperson.

MCT 420. Design of Machine Elements II. 3 Hours
Design, analysis, and selection of basic machine components including:
belt & chain drives, gears, rolling contact & plain surface bearings, linear
motion elements, electric motors, and clutches/brakes. Design project(s)
using commercial 3D solid modeling software. Prerequisite(s): MCT 320;
MCT 315.

MCT 423. Product Development. 3 Hours
Synthesis of mechanical devices and systems. Emphasis on the
integration of various machine elements into a single unit. Activities
include design, scheduling, budgeting, purchasing, fabrication, assembly
and performance testing of an original team project. Prerequisite(s):
MCT 330.

MCT 430. Design of Fluid Power Systems. 3 Hours
Energy efficiency; pressure drop determinations, variable volume
pressure-compensated pumps, accumulators, proportional and
electrohydraulic valves, cylinder design, hydraulic motor selection; circuit
design, open and closed loop systems, power unit design; sizing of
electric motors; use of industrial data and National Fluid Power Assn.-JIC
design standards. Individual design project. Prerequisite(s): MCT 336.

MCT 437. Heat Transfer. 3 Hours
The principles of conduction, convection, and thermal radiation energy
transfer. Conduction through series and parallel walls, pipes, and
containers. Forced and free convection through films, thermal radiation of
energy between surfaces, and the overall transfer of heat. Prerequisites:
MCT 231; SET 250.

MCT 440. Applied Vibrations. 3 Hours
Free and forced vibration of single degree of freedom systems
with and without damping. Industrial applications including
reciprocating and rotating machinery, balancing, isolation, and noise
reduction. Demonstrations of vibration sensors and instrumentation.
Prerequisite(s): MCT 317; SET 153L.

MCT 445. Experimental Mechanics. 3 Hours
The selection, application, and use of strain gages and strain gage
rosettes. Transformation of stress and strain. Advanced mechanics of
materials topics with empirical verification of theoretical predictions.
Prerequisite(s): MCT 221. Corequisite(s): MCT 445L.

MCT 445L. Experimental Mechanics Laboratory. 1 Hour
Installation of strain gauge rosettes. Experiments to determine the state
of strain and stress in structures using strain gauges, photoelasticity,
and brittle coatings. Vibration measurement using strain gauges,
accelerometers, and motion transducers. Written and oral reports.
Corequisite(s): MCT 445.

MCT 446. Applied Finite Element Modeling. 3 Hours
Introduction to the fundamentals of structural finite element modeling.
Geometry creation, element types, material specification, problem
solution and results postprocessing. A focus is placed on modeling
techniques using commercially available software. Prerequisites:
MCT 221; SET 250.

MCT 456. Automotive Powertrain & Chassis Systems. 3 Hours
Theory and design of engines, transmissions, suspension, and chassis
systems. Overview of manufacturing and commercial aspects of the
automotive industry. Prerequisite(s): EGR 201 or MCT 220.
MCT 490. Senior Project. 3 Hours
Advanced study and research of the product realization process focusing on conceptual design, embodiment design, final design, and prototyping or other design verification. Students work on externally sponsored engineering projects in multidisciplinary teams that perform engineering analysis that includes safety, ergonomics, environmental, cost and sociological impact of their designs. Prerequisite(s): CMM 100; IET 323; MCT 320. Corequisite(s): MCT 420.

MCT 493. Honors Thesis. 3 Hours
Selection, design, investigation, and completion of an independent, original research study resulting in a document prepared for submission as a potential publication and a completed undergraduate thesis. Restricted to students in University Honors Program.

MCT 494. Honors Thesis. 3 Hours
Selection, design, investigation, and completion of an independent, original research study resulting in a document prepared for submission as a potential publication and a completed undergraduate thesis. Restricted to students in University Honors Program. Prerequisites: MCT 493.