# BACHELOR OF ENGINEERING IN MANUFACTURING ENGINEERING

The Bachelor of Engineering degree in Manufacturing Engineering provides students with expertise that focuses on the processes needed to produce physical goods and materials. Students will gain a strong foundation in materials, mechanical engineering, and design to support their understanding of the mechanics of processes. They will also gain foundational understanding of industrial engineering concepts to support their ability to optimize production systems for maximum efficiency. Topics will include traditional manufacturing as well as modern digital manufacturing (additive manufacturing / 3D printing) processes and automation. Graduates from this program will be well prepared for careers in a wide range of industries including: traditional manufacturers, primary materials producers, and high-tech manufacturing (including defense, aerospace, and biomedical).

| Course | Title | S.H. |
|---|---|---|
| **Year 1** | | |
| **Fall** | | |
| CHEM 1515 | General Chemistry 1 | 3 |
| ENGL 1550 | Writing 1 | 3 |
| ENGR 1500 | Engineering Orientation | 1 |
| ENGR 1550 | Engineering Concepts | 2 |
| MATH 1571 | Calculus 1 | 4 |
| GER Elective (SPA) | | 3 |
| | **Semester Hours** | **16** |
| **Spring** | | |
| CMST 1545 | Communication Foundations | 3 |
| ENGL 1551 | Writing 2 | 3 |
| MATH 1572 | Calculus 2 | 4 |
| MECH 1560 | Engineering Communication with CAD | 2 |
| PHYS 2610 | General Physics 1 | 4 |
| | **Semester Hours** | **16** |
| **Year 2** | | |
| **Fall** | | |
| CEEN 2601 | Statics | 3 |
| MATH 2673 | Calculus 3 | 4 |
| MECH 2606 | Engineering Materials | 3 |
| PHYS 2611 | General Physics 2 | 4 |
| ISEN 3723 | Manufacturing Processes | 3 |
| MFG 3723L | Manufacturing Processes Laboratory | 1 |
| | **Semester Hours** | **18** |
| **Spring** | | |
| ECEN 2614 | Basics of Electrical Engineering | 3 |
| ISEN 3716 | Systems Analysis and Design | 3 |
| MATH 3705 | Differential Equations | 3 |
| MECH 2603 | Thermodynamics 1 | 3 |
| MECH 2641 | Dynamics | 3 |
| | **Semester Hours** | **15** |
| **Year 3** | | |
| **Fall** | | |
| MFG 3771 | Additive and Digital Manufacturing | 3 |
| ISEN 3724 | Engineering Economy | 3 |
| ISEN 3710 | Engineering Statistics | 3 |
| MECH 3720 | Fluid Dynamics | 3 |
| MECH 3762 | Design of Machine Elements | 3 |
| MECH 3762L | Design of Machine Elements Laboratory | 1 |
| | **Semester Hours** | **16** |
| **Spring** | | |
| ISEN 3720 | Statistical Quality Control | 3 |
| GER Elective (SPA) | | 2 |
| GER Elective (SS) | | 3 |
| GER Elective (SS) | | 3 |
| | **Semester Hours** | **11** |
| **Year 4** | | |
| **Fall** | | |
| GER Elective (AH) | | 3 |
| PHIL 2625 | Introduction to Professional Ethics | 3 |
| MFG 4823 | Manufacturing Processes 2 | 3 |
| MFG 4823L | Manufacturing Processes 2 Laboratory | 1 |
| MFG 4871 | Stress Plasticity and Deformation with FEA for Manufacturing | 3 |
| MFG 4861 | Design for Manufacturability | 3 |
| | **Semester Hours** | **16** |
| **Spring** | | |
| GER Elective (AH) | | 3 |
| ISEN 5823 | Automation | 3 |
| MECH 5836 | Fluid Power and Control | 3 |
| ENT 3700 | Entrepreneurship New Venture Creation | 3 |
| MFG 4821 | Manufacturing Capstone | 3 |
| MFG Technical Elective (select from list) | | |
| | **Semester Hours** | **15** |
| | **Total Semester Hours** | **123** |

## Learning Outcomes

The goal of the B.E. in Manufacturing Engineering degree program at YSU is to provide our graduates with strong foundation of theoretical and applied skills equipping them for success to pursue careers in manufacturing or to continue on to advanced study in related field.

The learning objective for the major in Manufacturing Engineering include:

1. Students will demonstrate an understanding of the fundamentals of manufacturing engineering, including significant elements from Mechanical Engineering, Industrial Engineering, and manufacturing process design and analysis.
2. Students will demonstrate independent and critical thinking.
3. Students will demonstrate competency in the use of modern engineering computational tools, including solid modeling and finite element analysis software.
4. Students will be able to acquire and interpret experimental data using appropriate instrumentation, sensing, data acquisition, and computational tools.
5. Students will demonstrate the ability to effectively communicate information orally and in writing.