BS in Manufacturing Engineering (396541) MAP Sheet

Engineering, Manufacturing Engineering
For students entering the degree program during the 2019-2020 curricular year.

Students are taught how to be leaders in the manufacturing industry. A large majority of graduates are offered management positions within 5 years of graduation, and these managers are best prepared by a combination of a technology background in manufacturing and a solid business education. This double emphasis is inherent in the manufacturing engineering technology program.

Manufacturing graduates receive an accredited, professional, four-year BS degree in Engineering and can opt to take the classes required for a minor in Business.

<table>
<thead>
<tr>
<th>University Core and Graduation Requirements</th>
<th>Suggested Sequence of Courses</th>
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<tbody>
<tr>
<td><strong>University Core Requirements:</strong></td>
<td></td>
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<tr>
<td>Requirements</td>
<td>#Classes</td>
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<tr>
<td><strong>Religion Cornerstones</strong></td>
<td>[teachings and doctrine of the book of mormon, jesus christ and the everlasting gospel, foundations of the restoration, the eternal family]</td>
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<td><strong>The Individual and Society</strong></td>
<td>[american heritage, global and cultural awareness]</td>
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<tr>
<td><strong>Skills</strong></td>
<td>[first year writing, advanced written and oral communications, quantitative reasoning, languages of learning (math or language)]</td>
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<tr>
<td><strong>Arts, Letters, and Sciences</strong></td>
<td>[civilization 1, civilization 2, arts, letters, biological science, physical science, social science]</td>
</tr>
<tr>
<td><strong>Core Enrichment: Electives</strong></td>
<td>[religion electives, open electives]</td>
</tr>
</tbody>
</table>

FOR UNIVERSITY CORE QUESTIONS CONTACT THE ADVISEMENT CENTER IN 246 EB
FOR PROGRAM QUESTIONS, CONTACT ADVISOR IN 250 SNLB

*These classes fill both university core and program requirements (17 hours overlap)

**Graduation Requirements:**
- Minimum residence hours required: 30.0
- Minimum hours needed to graduate: 120.0

**FRESHMAN YEAR**
1st Semester
- MGEN 130: 3.0
- MATH 112: 4.0
- PHSCS 121: 3.0
- First-year Writing or A HTG 100: 3.0
- Religion Cornerstone course: 2.0
- Total Hours: 15.0

2nd Semester
- First-year Writing or A HTG 100: 3.0
- ME EN 272: 3.0
- CE EN 203: 3.0
- TECH 212: 3.0
- REL 200: 2.0
- Religion Cornerstone course: 1.0
- Total Hours: 15.5

**SOPHOMORE YEAR**
3rd Semester
- CE EN 203: 3.0
- CHEM 105: 4.0
- STAT 201: 3.0
- MGEN 220: 3.0
- Religion Cornerstone course: 2.0
- Total Hours: 15.0

4th Semester
- MATH 313: 3.0
- ME EN 250: 3.0
- MGEN 230: 3.0
- C S 142: 3.0
- Religion Elective: 2.0
- Religion Cornerstone course: 2.0
- Total Hours: 16.0

**JUNIOR YEAR**
5th Semester
- ENGL 316: 3.0
- MGEN 331: 4.0
- MGEN 340: 3.0
- MGEN 333: 3.0
- MGEN 391: 0.5
- Religion Elective: 2.0
- Total Hours: 15.5

6th Semester
- First-year Writing or A HTG 100: 3.0
- MFGEN 391: 3.0
- MFGEN 395: 3.0
- MATH/Science Elective: 3.0-4.0
- Civilization I: 3.0
- TECH 231: 3.0
- Total Hours: 15.0-16.0

7th Semester
- MFGEN 399R: 1.0
- Total Hours: 1.0

8th Semester
- MFEN 399R: 1.0
- Total Hours: 1.0

9th Semester
- MFGEN 399R: 1.0
- Total Hours: 1.0

**SUGGESTED SEQUENCE OF COURSES**

*Your faculty advisor can assist you in choosing technical electives

Note: Students are encouraged to complete an average of 15-16 credit hours each semester or 30-31 credit hours each year, which could include spring and/or summer terms. Taking fewer credits substantially increases the cost and the number of semesters to graduate.

Note: 123 credit hours are required to graduate with this degree.
**BS in Manufacturing Engineering (396541)**
2019-2020 Program Requirements (94 - 95 Credit Hours)

**REQUIREMENT 1 Complete 12 courses**
- MFGEN 130 - Modern Manufacturing 3.0
- MFGEN 220 - Material Removal 3.0
- MFGEN 230 - Computer-Aided Manufacturing 3.0
- MFGEN 291 - Manufacturing Leadership 1.0
- MFGEN 331 - Metals Processes 4.0
- MFGEN 333 - Industrial Automation 3.0
- MFGEN 340 - Quality Systems in Manufacturing 3.0
- MFGEN 355 - Plastics Materials and Processing 3.0
- MFGEN 381 - Lean Manufacturing & System Design 3.0
- MFGEN 391 - Senior Seminar 0.5
- MFGEN 392 - Internship 3.0
- MFGEN 399R - Academic Internship 3.0v

**REQUIREMENT 2 Complete 1 hour from the following course(s)**
- MFGEN 231 - Foundations of Global Leadership 3.0

**REQUIREMENT 3 Complete 12 courses**
- *BIO 100 - Principles of Biology 3.0
- C S 142 - Introduction to Computer Programming 3.0
- CE EN 103 - Engineering Mechanics--Statics 3.0
- CHEM 105 - General College Chemistry 1 with Lab (Integrated) 4.0
- *MATH 112 - Calculus 1 4.0
- ME EN 250 - Science of Engineering Materials 3.0
- ME EN 272 - Engineering Graphics--Principles and Applications 3.0
- PHSCS 121 - Introduction to Newtonian Mechanics 3.0
- STAT 201 - Statistics for Engineers and Scientists 3.0
- TECH 112 - Exploration in Innovation Design Techniques 1.0
- WRTG 316 - Writing Seminar 3.0

**REQUIREMENT 4 Complete 1 option**
- **OPTION 4.1 Complete 1 course**
  - MATH 313 - (Not currently offered) 3.0
- **OPTION 4.2 Complete 2 courses**
  - MATH 213 - Elementary Linear Algebra 2.0
  - MATH 215 - Computational Linear Algebra 1.0

**REQUIREMENT 5 Complete 1 course**
- ENG T 231 - Foundations of Global Leadership 3.0

**TECHNICAL ELECTIVE COURSES:**
- IT&T 318 - Electronics, Computers, and Manufacturing 3.0
- MFGEN 372 - Design for X 3.0
- MFGEN 431 - Tool Design 3.0
- MFGEN 433 - Introduction to Smart Manufacturing 3.0
- MFGEN 456 - Introduction to Composites 3.0
- MFGEN 479 - Innovation and Entrepreneurship 3.0
- MFGEN 481 - Manufacturing Systems and Simulation 3.0

**REQUIREMENT 7 Complete 3 courses**
- **MATH, SCIENCE, AND STATISTICS SUPPORTING COURSES:**
  - CHEM 106 - General College Chemistry 2 3.0
  - CHEM 351M - Organic Chemistry 1 - Majors 3.0
  - CHEM 357 - Industrial Organic Chemistry 3.0
  - MATH 113 - Calculus 2 4.0
  - MATH 334 - Ordinary Differential Equations 3.0
  - PHSCS 123 - Introduction to Waves, Optics, and Thermodynamics 3.0
  - STAT 462 - Quality Control and Industrial Statistics 3.0
  - STAT 466 - Introduction to Reliability 3.0
  - STAT 511 - Statistical Methods for Research 1 3.0
  - STAT 512 - Statistical Methods for Research 2 3.0
- **REQUIREMENT 8 Complete 2 courses**
  - ME EN 475 - Integrated Product and Process Design 1 3.0
  - ME EN 476 - Product Development 2 - Capstone 3.0

**REQUIREMENT 9 Complete department packet and exit interview.**

**THE DISCIPLINE:**
Manufacturing is an exciting and rewarding discipline that has significant impact on a society’s standard of living and economic independence. At BYU the manufacturing program is specifically oriented toward creating leaders in the industry. Students in manufacturing learn creative and analytical skills that will enable them to quickly diagnose and solve manufacturing problems with insight from both engineering and management perspectives. They also develop interpersonal and communication skills that will prepare them to work as part of an engineering team and effectively interact with vendors, management, and production personnel. In addition, they receive hands-on training in modern lab facilities and learn to use computers to design, analyze, implement, and control manufacturing operations.

Manufacturing professionals are knowledgeable and skilled in the management, methods, technologies, equipment, and tooling needed to produce affordable products of high quality. They are able to effectively coordinate the procurement, installation, and start-up of production equipment as well as improve the productivity of existing operations. They are also able to coordinate manufacturing and supply-chain operation in a global setting. Graduates may further their technical and managerial skills by pursuing either a master of science in technology or a master of business administration.

**RESEARCH OPPORTUNITIES:**
Students can work on a variety of industry-sponsored and related projects, often working directly with manufacturing engineers in industry. Manufacturing classes sometimes integrate these projects into the course work, but other industrial projects can be done outside of class, usually for pay. The excellent equipment and facilities in the department provide the resources where industry projects can be effectively accomplished.

**INTERNSHIPS:**
Professional training in actual companies is required and the advisor in the department can help students who desire to complete an internship. Both domestic and international internship opportunities are available for credit (and usually some pay). Many internships lead to permanent employment with the sponsoring company. Internships also offers a great chance for students to understand how their education is actually applied and to investigate further career directions and potential focus areas in their education.

**PROFESSIONAL AND HONOR SOCIETIES:**
The department sponsors strong student chapters of national societies associated with manufacturing and materials including the Society of Manufacturing Engineers (SME) and the Society of the Advancement of Materials and Process Engineering (SAMPE). Students may also participate in the national engineering technology honor society, Tau Alpha Pi and other honor societies.

**FINANCING:**
Many students can receive financial aid from department-sponsored scholarships or part time employment. The employment can be as teaching/lab assistants, apprentice engineers working on an industry-sponsored project, or research assistants under the direction of a faculty member.
CAREERS:
Career opportunities in manufacturing are plentiful and rewarding. Typical entry-level job titles include manufacturing engineer, quality manager, process engineer, tool engineer, product engineer, quality engineer, production supervisor, and account manager (technical sales). New graduates are typically hired into technical positions but have the opportunity to quickly move into management. The job outlook for manufacturing graduates is bright and should continue to be strong in the future. When one considers that everything that does not exist as part of nature is the product of some form of manufacturing, it is easy to see that manufacturing is an integral part of society and generates an ever-growing workforce. Progressive companies worldwide seek qualified individuals who can provide leadership in improving the quality and productivity of their manufacturing operations.

MAP DISCLAIMER
While every reasonable effort is made to ensure accuracy, there are some student populations that could have exceptions to listed requirements. Please refer to the university catalog and your college advisement center/department for complete guidelines.

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