Mechanical Engineering programs\(^1\) teach individuals how to apply mathematical and scientific principles to the design, development and operational evaluation of physical systems in manufacturing, and end-product systems for specific uses. This includes machine tools, jigs and other manufacturing equipment; stationary power units and appliances; engines; self-propelled vehicles; housings and containers; hydraulic and electric systems for controlling movement; and the integration of computers and remote control with operating systems. Some specialties include applied mechanics; computer-aided design and manufacturing; energy systems; heat transfer; power plant engineering; pressure vessels and piping; and heating, refrigeration, and air-conditioning systems. Other specialties include motor vehicles; underwater technology; energy conversion systems; instrumentation; and special machinery for the petroleum, rubber, and plastics industries.

Programs at Montana State University\(^2\) teach individuals to design, build, develop, maintain, and modify the tools of our technological society. In the broadest terms, mechanical engineering is concerned with the conversion, transmission, and use of energy. Of the four basic forms of energy - thermal, mechanical, chemical and electromagnetic - the mechanical engineer is primarily concerned with thermal and mechanical energy. These "tracks" of mechanical engineering - thermal sciences and mechanics - make mechanical engineering one of the most diverse fields of engineering, with a tremendously wide variety of career opportunities.

This program is principally oriented toward career preparation, providing students with the engineering and technical education appropriate to the challenges presented by today's technologically complex and difficult problems. The coursework in mechanical engineering provides four years of study in mathematics, basic sciences, humanities, social sciences, and engineering topics. The overall curriculum provides an integrated educational experience directed toward the development of an ability to apply pertinent knowledge to the identification and solution of practical problems in mechanical engineering. Finally, "hands on" experience is distributed throughout the curriculum in laboratory courses like Chemistry, Physics, Measurements and Instrumentation, and the senior-level mechanical engineering laboratory.

Characteristics associated with success\(^1\) in this major include a strong desire to understand how things, especially machines, work.

You should\(^1\):
- be able to think logically
- be able to work in a team
- have excellent organizational skills
- have leadership potential
- have good computer skills

Occupations in this field require ability to\(^1\): be creative; be a good problem solver and have good oral and written communication skills.

Related occupations include\(^1\):
- Automotive Engineer
- Tool Designer
- Utilization Engineer
- Stress Analyst
- Solar-Energy-Systems Designer
- Plant Engineer
- Drawings Checker, Engineering
- Aerospace Engineer
- Industrial Engineer
- Marine Engineer
- Mechanical Engineering Tech
- Sales Engineer
- Quality Assurance Engineer
- Development Engineer
- Design Engineer
- Systems Engineer
- Product Engineer
Montana State University Department of Engineering
Montana State University Career & Internship Services
O*Net: online.onetcenter.org

Number of graduates/number of respondents: 2012:41/32 ; 2011: 62/38; 2010: 45/27; 2009: 73/49

MSU graduates (Bachelor’s degree) were hired in the following selected fields:

Adjunct Professor– MSU-Mechanical Engineering Department
Associate Technical Professional– Halliburton
Core-Tech Immigration Engineer– The Boeing Company
Designer– CDI Corporation
Design Engineer– HDR Engineering; ConocoPhillips; Genie Industries; Display Devices, Inc.; CDI-Aerospace
Detailer– Rosco Steel
Developmental Engineer– US Air Force
Dewater Engineer– Kiewit Pacific Company
Director of Infrastructure and Renewable Energy– Sun Ranch Group
Directional Drilling Coordinator– Baker Hughes INTEQ
District Engineer– Conoco Phillips
Draftsman– Summit Drafting and Design
Engineer– Salt River Project
Engineer/Engineer Design Development– Honda Research & Design Americas Inc.
Engineering Staff– Kennedy Jenks Consultants
Entry Level Laser Engineer– Naval Undersea Warfare Center
Equipment Engineer– IM Flash Technologies
Fabrication Engineer– Micron Technology, Inc.
Field Engineer– Halliburton; Kiewit Power Engineers; CHN America, LLC
Field Supervisor– Boart Longyear
Junior Field Engineer– Weatherford
Manufacturing Engineer– Genie Industries; Photon Dynamics Inc.
Mechanical Design Engineer– JE Engineering; Northwest Aerospace Technologies, Inc.; Three Rivers Engineering; Xerox Corporation
Mechanical Engineer– Autopilot Inc.; DC Engineering; GE Energy; Hewlett Packard; Hypertherm, Inc.; Northwest Arrow Space Technologies; SSOE Inc.; U.S. Department of Energy; U.S. Air Force; U.S. Navy; Boeing; Godwin; Itron; MKK Consulting Engineers; MSU; Schlumberger; Vemko Inc.; Scientific Materials Corporation;Fluor
Mechanical Engineering Consultant- Great Northern Engineering
Mechanical Manufacturing Engineer– S&A Electronics
Navigator– Air Force
Nuclear Engineer– Puget Sound Naval Shipyards
Office Engineer– Harris and Associates
Product Enhancement Fluid Specialist—Halliburton
Project Coordinator/Mechanical Engineer– Arcmac Surface Engineering
Project Engineer– BP; WET Design
Project Management– Mobile Communication Systems
Quality Assurance Engineer– Black Diamond Equipment, Ltd.
Reliability Engineer– BP
Researcher– Leonardo Technologies Inc
School Super Attendant– Sidney Public Schools
Solar Technician– Allwest Energy, Inc
Staff Engineer– Kennedy Jenks Consultants
Structural Engineer– The Boeing Company
System Application Engineer– Godwin Pumps of America; Microsat Systems
Transmission Design Engineer in Training—HDR Engineering

Salary averages of survey respondents: (# of respondents in parentheses)

<table>
<thead>
<tr>
<th>Year</th>
<th>MT Salary</th>
<th>Out of State Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>$39,547 (3)</td>
<td>$59,130 (10)</td>
</tr>
<tr>
<td>2011</td>
<td>$43,349 (11)</td>
<td>$53,161 (16)</td>
</tr>
<tr>
<td>2010</td>
<td>$35,811 (9)</td>
<td>$59,659 (12)</td>
</tr>
<tr>
<td>2009</td>
<td>$33,804 (10)</td>
<td>$51,654 (12)</td>
</tr>
</tbody>
</table>

In the field for “Mechanical Engineer” the lowest 10% of salaries for 2012 (comparable to new college graduate starting salaries) was $52,000 annually. In 2012 there were 258,100 positions nationally with an expected growth forecast of +5% through 2022. In 2012 the 10% of salaries for 2012 (comparable to new college graduate starting salaries) was $43,600 annually in the State of Montana. In 2012 there were 410 positions in Montana with an expected growth forecast of +22% through 2022. Job openings in Montana and nationally are due to both growth and net replacement.

Other Sources of Information:

SAE International: www.sae.org
American Society of Mechanical Engineers: www.asme.org
International Federation of Professional and Technical Engineers: www.ifpte.org
Department of Engineering—Montana State University: www.coe.montana.edu/mie/

For more information contact: Montana State University
Career, Internship & Student Employment Services
177 Strand Union Building
Bozeman, MT 59717
(406) 994-4353
www.montana.edu/careers

2 Montana State University Department of Engineering
3 Montana State University Career & Internship Services
4 O*Net: online.onetcenter.org
Number of graduates/number of respondents: 2012:41/32 ; 2011: 62/38; 2010: 45/27; 2009: 73/49