# MECHANICAL ENGINEERING (B.S.M.E.)

This program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org.

Required course work includes the university requirements (see regulation J-3 (https://catalog.uidaho.edu/general-requirements-academic-procedures/j-general-requirements-baccalaureate-degrees/)), completion of the Fundamentals of Engineering (FE) examination and:

| Code | Title | Hours |
|---|---|---|
| CHEM 111 | General Chemistry I | 3 |
| CHEM 111L | General Chemistry I Laboratory | 1 |
| COMM 101 | Fundamentals of Oral Communication | 3 |
| ENGR 123 | First Year Engineering | 2 |
| ENGR 210 | Engineering Statics | 3 |
| ENGR 212 | Python Programming Essentials | 3 |
| ENGR 215 | Elements of Materials Science | 3 |
| ENGR 220 | Engineering Dynamics | 3 |
| ENGR 240 | Introduction to Electrical Circuits | 3 |
| ENGR 335 | Engineering Fluid Mechanics | 3 |
| ENGR 350 | Engineering Mechanics of Materials | 3 |
| MATH 170 | Calculus I | 4 |
| MATH 175 | Calculus II | 4 |
| MATH 275 | Calculus III | 3 |
| MATH 310 | Ordinary Differential Equations | 3 |
| MATH 330 | Linear Algebra | 3 |
| ME 223 | Mechanical Design Analysis | 3 |
| ME 290 | Computer Aided Design Methods | 3 |
| ME 313 | Dynamic Modeling of Engineering Systems | 3 |
| ME 322 | Mechanical Engineering Thermodynamics | 3 |
| ME 325 | Machine Component Design I | 3 |
| ME 330 | Experimental Methods for Engineers | 3 |
| ME 341 | Intermediate Mechanics of Materials | 3 |
| ME 345 | Heat Transfer | 3 |
| ME 416 | FE Exam Review | 1 |
| ME 424 | Mechanical Systems Design I | 3 |
| ME 426 | Mechanical Systems Design II | 3 |
| ME 430 | Senior Lab | 3 |
| ME 435 | Thermal Energy Systems Design | 3 |
| PHIL 103 | Introduction to Ethics | 3 |
| PHYS 211 | Engineering Physics I | 3 |
| PHYS 211L | Laboratory Physics I | 1 |
| PHYS 212 | Engineering Physics II | 3 |
| PHYS 212L | Laboratory Physics II | 1 |
| Select one from the following: | | 3-4 |
| ECON 201 | Principles of Macroeconomics | |
| ECON 202 | Principles of Microeconomics | |
| ECON 272 | Foundations of Economic Analysis | |
| **Technical Elective requirements for Mechanical Engineering** | | |
| Select 15 credits from the following: [1] | | 15 |
| BE 421 | Image Processing and Computer Vision | |
| BE 462 | Electric Power and Controls | |
| ENGR 360 | Engineering Economy | |
| ENGR 428 | Numerical Methods | |
| ENGR 466 | PLC Programming for Automation | |
| ENTR 414 | Entrepreneurship | |
| ENTR 415 | New Venture Creation | |
| MATH 371 | Mathematical Physics | |
| MATH 420 | Complex Variables | |
| MATH 428 | Numerical Methods | |
| MATH 432 | Numerical Linear Algebra | |
| MATH 437 | Mathematical Biology | |
| MATH 451 | Probability Theory | |
| MATH 452 | Mathematical Statistics | |
| MATH 453 | Stochastic Models | |
| MATH 471 | Introduction to Analysis I | |
| MATH 472 | Introduction to Analysis II | |
| MATH 480 | Partial Differential Equations | |
| ME 401 | Engineering Team Projects | |
| ME 404 | Special Topics | |
| ME 410 | Principles of Lean Manufacturing | |
| ME 412 | Gas Dynamics | |
| ME 413 | Engineering Acoustics | |
| ME 414 | HVAC Systems | |
| ME 415 | Materials Selection and Design | |
| ME 417 | Turbomachinery | |
| ME 420 | Fluid Dynamics | |
| ME 421 | Advanced Computer Aided Design | |
| ME 433 | Combustion Engine Systems | |
| ME 436 | Sustainable Energy Sources and Systems | |
| ME 438 | Sustainability and Green Design | |
| ME 450 | Fundamentals of Computational Fluid Dynamics | |
| ME 451 | Experimental Methods in Fluid Dynamics | |
| ME 454 | Assistive Technologies for Physical Impairment | |
| ME 455 | Biomechanics: Genome to Phenome | |
| ME 458 | Finite Element Applications in Engineering | |
| ME 459 | Robotic Systems Engineering I | |
| ME 461 | Fatigue and Fracture Mechanics | |
| ME 464 | Robotics: Kinematics, Dynamics, and Control | |
| ME 466 | Compliant Mechanism Design | |
| ME 472 | Mechanical Vibrations | |
| ME 480 | Introduction to Programming for Engineers | |
| ME 481 | Control Systems | |
| ME 490 | Solid Modeling, Simulation and Manufacturing Capstone | |
| ME 495 | Mechanics in Design and Manufacturing | |
| ME 513 | Engineering Acoustics | |
| ME 517 | Turbomachinery | |
| ME 520 | Fluid Dynamics | |
| ME 524 | Sustainable Food-Energy-Water Systems | |
| ME 527 | Thermodynamics | |
| ME 529 | Combustion and Aeropropulsion | |
| ME 538 | Sustainability and Green Design | |

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|---|---|
| ME 539 | Advanced Mechanics of Materials |
| ME 540 | Continuum Mechanics |
| ME 541 | Mechanical Engineering Analysis |
| ME 544 | Conduction Heat Transfer |
| ME 546 | Convective Heat Transfer |
| ME 547 | Thermal Radiation Processes |
| ME 549 | Finite Element Analysis |
| ME 550 | Advanced Computational Fluid Dynamics |
| ME 551 | Experimental Methods in Fluid Dynamics |
| ME 554 | Assistive Technologies for Physical Impairment |
| ME 555 | Biomechanics: Genome to Phenome |
| ME 558 | Finite Element Applications |
| ME 559 | Robotic Systems Engineering I |
| ME 564 | Robotics: Kinematics, Dynamics, and Control |
| ME 566 | Compliant Mechanism Design |
| ME 569 | Heat Exchanger Design |
| ME 571 | Building Performance Simulation for Integrated Design |
| ME 583 | Reliability of Engineering Systems |
| NE 438 | Fundamentals of Nuclear Materials |
| NE 450 | Principles of Nuclear Engineering |
| NE 530 | Two-Phase Flow |
| OM 378 | Project Management |
| OM 439 | Systems and Simulation |
| OM 456 | Enterprise Quality Management |
| PHYS 305 | Modern Physics |
| PHYS 351 | Introductory Quantum Mechanics I |
| PHYS 411 | Advanced Physics Lab |
| PHYS 428 | Numerical Methods |
| PHYS 443 | Optics |
| PHYS 464 | Solid State Physics |
| PHYS 465 | Nuclear and Particle Physics |
| PHYS 484 | Astrophysics of Stars and Planets |
| STAT 301 | Probability and Statistics |
| STAT 431 | Statistical Analysis |
| Any Approved 400/500 Level Course in another Engineering Discipline | |
| A maximum of 3 credits of the following may be selected: | |
| ME 307 | Group Mentoring I |
| ME 308 | Group Mentoring II |
| ME 401 | Engineering Team Projects |
| ME 407 | Group Mentoring III |
| **Total Hours** | **113-114** |

**1**

Fifteen credits of technical electives are required from the list. The breakdown of credits will be as follows: six credits must be an ME upper division course, three credits must be an upper division Math, Statistics or Physics course, the remaining six credits may be any course listed.

**Courses to total 128 credits for this degree, not counting ENGL 101 , MATH 143 , and other courses that might be required to remove deficiencies.**

To advance to upper-division courses, a student majoring in mechanical engineering must earn certification: the student may accumulate no more than three grades of D or F in the mathematics, science or engineering courses used to satisfy certification requirements. Included in this number are courses transferred from other institutions, multiple repeats of a single course, and single repeats in multiple courses.

In addition, students must also earn at least five grades of B or better in these mathematics, science, or engineering courses:

| Code | Title | Hours |
|---|---|---|
| CHEM 111 | General Chemistry I | 3 |
| COMM 101 | Fundamentals of Oral Communication | 3 |
| ENGL 102 | Writing and Rhetoric II | 3 |
| ENGR 123 | First Year Engineering | 2 |
| ENGR 210 | Engineering Statics | 3 |
| ENGR 212 | Python Programming Essentials | 3 |
| ENGR 215 | Elements of Materials Science | 3 |
| ENGR 220 | Engineering Dynamics | 3 |
| ENGR 240 | Introduction to Electrical Circuits | 3 |
| ENGR 350 | Engineering Mechanics of Materials | 3 |
| MATH 170 | Calculus I | 4 |
| MATH 175 | Calculus II | 4 |
| MATH 275 | Calculus III | 3 |
| MATH 310 | Ordinary Differential Equations | 3 |
| ME 223 | Mechanical Design Analysis | 3 |
| ME 290 | Computer Aided Design Methods | 3 |
| PHYS 211 | Engineering Physics I | 3 |
| PHYS 212 | Engineering Physics II | 3 |

A grade of P (Pass) in any of these courses is considered as a C grade in satisfying this certification requirement.

To graduate in this program, a student may accumulate no more than five grades of D or F in the mathematics, science, or engineering courses used to satisfy graduation requirements. Included in this number are multiple repeats of a single course or single repeats in multiple courses and courses transferred from other institutions.

# Four-Year Plan

| **Fall Term 1** | | **Hours** |
|---|---|---|
| CHEM 111 | General Chemistry I | 3 |
| CHEM 111L | General Chemistry I Laboratory | 1 |
| COMM 101 | Fundamentals of Oral Communication | 3 |
| ENGL 101 | Writing and Rhetoric I | 3 |
| MATH 170 | Calculus I | 4 |
| ENGR 123 | First Year Engineering | 2 |
| | **Hours** | **16** |
| **Spring Term 1** | | |
| ENGL 102 | Writing and Rhetoric II | 3 |
| ENGR 210 | Engineering Statics | 3 |
| MATH 175 | Calculus II | 4 |
| ENGR 212 | Python Programming Essentials | 3 |
| PHYS 211 | Engineering Physics I | 3 |
| PHYS 211L | Laboratory Physics I | 1 |
| | **Hours** | **17** |
| **Fall Term 2** | | |
| ENGR 350 | Engineering Mechanics of Materials | 3 |
| ENGR 215 | Elements of Materials Science | 3 |

| | | |
|---|---|---|
| MATH 310 | Ordinary Differential Equations | 3 |
| ME 223 | Mechanical Design Analysis | 3 |
| PHYS 212 | Engineering Physics II | 3 |
| PHYS 212L | Laboratory Physics II | 1 |
| | **Hours** | **16** |
| **Spring Term 2** | | |
| ENGR 240 | Introduction to Electrical Circuits | 3 |
| MATH 275 | Calculus III | 3 |
| ME 290 | Computer Aided Design Methods | 3 |
| ENGR 220 | Engineering Dynamics | 3 |
| ME 322 | Mechanical Engineering Thermodynamics | 3 |
| International Course | | 3 |
| | **Hours** | **18** |
| **Fall Term 3** | | |
| ENGR 335 | Engineering Fluid Mechanics | 3 |
| MATH 330 | Linear Algebra | 3 |
| ME 313 | Dynamic Modeling of Engineering Systems | 3 |
| ME 341 | Intermediate Mechanics of Materials | 3 |
| STAT/PHYS/MATH Technical, Major Elective Course | | 3 |
| ECON 201 OR ECON 202 OR ECON 272 | | 3 |
| | **Hours** | **18** |
| **Spring Term 3** | | |
| ME 325 | Machine Component Design I | 3 |
| ME 330 | Experimental Methods for Engineers | 3 |
| ME 345 | Heat Transfer | 3 |
| PHIL 103 | Introduction to Ethics | 3 |
| UPDV ME Technical, Major Elective Course | | 3 |
| Technical, Major Elective Course | | 3 |
| | **Hours** | **18** |
| **Fall Term 4** | | |
| ME 416 | FE Exam Review | 1 |
| ME 424 | Mechanical Systems Design I | 3 |
| ME 430 | Senior Lab | 3 |
| ME 435 | Thermal Energy Systems Design | 3 |
| Humanistic and Artistic Ways of Knowing Course | | 3 |
| | **Hours** | **13** |
| **Spring Term 4** | | |
| ME 426 | Mechanical Systems Design II | 3 |
| UPDV ME Technical, Major Elective Course | | 3 |
| Technical, Major Elective Course | | 3 |
| Social and Behavioral Ways of Knowing Course | | 3 |
| American Diversity Course | | 3 |
| | **Hours** | **15** |
| | **Total Hours** | **131** |

# Five-Year Plan

| | | |
|---|---|---|
| **Fall Term 1** | | **Hours** |
| ENGL 101 | Writing and Rhetoric I | 3 |
| MATH 143 | College Algebra | 3 |
| MATH 144 | Precalculus II: Trigonometry | 1 |
| COMM 101 | Fundamentals of Oral Communication | 3 |
| ENGR 123 | First Year Engineering | 2 |
| | **Hours** | **12** |
| **Spring Term 1** | | |
| CHEM 111 | General Chemistry I | 3 |
| CHEM 111L | General Chemistry I Laboratory | 1 |
| ENGL 102 | Writing and Rhetoric II | 3 |
| MATH 170 | Calculus I | 4 |
| American Diversity Course | | 3 |
| | **Hours** | **14** |
| **Fall Term 2** | | |
| ENGR 210 | Engineering Statics | 3 |
| MATH 175 | Calculus II | 4 |
| ENGR 212 | Python Programming Essentials | 3 |
| PHYS 211 | Engineering Physics I | 3 |
| PHYS 211L | Laboratory Physics I | 1 |
| | **Hours** | **14** |
| **Spring Term 2** | | |
| MATH 275 | Calculus III | 3 |
| ENGR 215 | Elements of Materials Science | 3 |
| ME 223 | Mechanical Design Analysis | 3 |
| PHIL 103 | Introduction to Ethics | 3 |
| Social and Behavioral Ways of Knowing Course | | 3 |
| | **Hours** | **15** |
| **Fall Term 3** | | |
| ENGR 350 | Engineering Mechanics of Materials | 3 |
| ENGR 220 | Engineering Dynamics | 3 |
| MATH 310 | Ordinary Differential Equations | 3 |
| PHYS 212 | Engineering Physics II | 3 |
| PHYS 212L | Laboratory Physics II | 1 |
| Humanistic and Artistic Ways of Knowing Course | | 3 |
| | **Hours** | **16** |
| **Spring Term 3** | | |
| ME 290 | Computer Aided Design Methods | 3 |
| ME 322 | Mechanical Engineering Thermodynamics | 3 |
| Social and Behavioral Ways of Knowing Course | | 3 |
| ENGR 240 | Introduction to Electrical Circuits | 3 |
| ECON 201 OR ECON 202 OR ECON 272 | | |
| | **Hours** | **12** |
| **Fall Term 4** | | |
| ENGR 335 | Engineering Fluid Mechanics | 3 |
| MATH 330 | Linear Algebra | 3 |
| ME 341 | Intermediate Mechanics of Materials | 3 |
| ME 313 | Dynamic Modeling of Engineering Systems | 3 |
| | **Hours** | **12** |
| **Spring Term 4** | | |
| ME 325 | Machine Component Design I | 3 |
| ME 330 | Experimental Methods for Engineers | 3 |
| ME 345 | Heat Transfer | 3 |
| Technical, Major Elective Course | | 3 |
| UPDV ME Technical, Major Elective Course | | 3 |
| | **Hours** | **15** |
| **Fall Term 5** | | |
| ME 416 | FE Exam Review | 1 |
| ME 424 | Mechanical Systems Design I | 3 |
| ME 430 | Senior Lab | 3 |
| ME 435 | Thermal Energy Systems Design | 3 |
| UPDV ME Technical, Major Elective Course | | 3 |
| | **Hours** | **13** |
| **Spring Term 5** | | |
| ME 426 | Mechanical Systems Design II | 3 |
| MATH/STAT/PHYS TECHNICAL, Major Elective Course | | 3 |
| Technical, Major Elective Course | | 3 |
| International Course | | 3 |
| | **Hours** | **12** |
| | **Total Hours** | **135** |

The degree map is a guide for the timely completion of your curricular requirements. Your academic advisor or department may be contacted for assistance in interpreting this map. This map is not reflective of your academic history or transcript and it is not official notification of

completion of degree or certificate requirements. Please contact the Registrar's Office regarding your official degree/certificate completion status.

1. Students will develop an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. Students will develop an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. Students will develop an ability to communicate effectively with a range of audiences.
4. Students will develop an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
5. Students will develop an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
6. Students will develop an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.
7. Students will develop an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.