BS in Mechanical Engineering (394950) MAP Sheet

Engineering, Mechanical Engineering

For students entering the degree program during the 2020-2021 curricular year.

This is a limited-enrollment program requiring departmental approval. Please contact the College of Engineering Advisement Center or see the Department of Mechancial Engineering website at: http://me.byu.edu/ for information regarding requirements for admission to this major.

University Core and Graduation Requirements

University Core Requirements:

Requirements	#Classes	Hours	Classes
Religion Cornerstones			
Teachings and Doctrine of The Book of Mormon	1	2.0	REL A 275
Jesus Christ and the Everlasting Gospel	1	2.0	REL A 250
Foundations of the Restoration	1	2.0	REL C 225
The Eternal Family	1	2.0	REL C 200
The Individual and Society			
American Heritage	1-2	3-6.0	from approved list
Global and Cultural Awareness	1	3.0	ME EN 231*
Skills			
First Year Writing	1	3.0	from approved list
Advanced Written and Oral Communications	1	3.0	WRTG 316*
Quantitative Reasoning	1	3-4.0	MATH 112*
Languages of Learning (Math or Language)	1	4.0	MATH 113*
Arts, Letters, and Sciences			
Civilization 1	1	3.0	from approved list
Civilization 2	1	3.0	from approved list
Arts	1	3.0	from approved list
Letters	1	3.0	from approved list
Biological Science	1	3-4.0	BIO 100* or MMBIO 221* or PDBIO 120*
Physical Science	1	3.0	PHSCS 121*
Social Science	1	3.0	ME EN 231*
Core Enrichment: Electives			
Religion Electives	3-4	6.0	from approved list
Open Electives	Variable	Variable	personal choice

FOR UNIVERSITY CORE QUESTIONS CONTACT THE COLLEGE ADVISEMENT CENTER — FOR PROGRAM QUESTIONS SEE THE ME DEPARTMENT ADVISOR.
*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (16 hours overlap).

Graduation Requirements:

Minimum residence hours required	30.0
Minimum hours needed to graduate	120.0

Suggested Sequence of Courses

FRESHMAN YEAR

1st Semester

First-Year Writing Elective	3.0
BIO 100	3.0
PHSCS 121	3.0
MATH 112	4.0
ME EN 191	0.5
Religion Cornerstone Elective	2.0
Total Hours	**15.5**

2nd Semester

CHEM 105	4.0
MATH 113	4.0
ME EN 101	3.0
American Heritage Elective	3.0
Religion Cornerstone Elective	2.0
Total Hours	**16.0**

SOPHOMORE YEAR

3rd Semester

CE EN 203	3.0
CE EN 204	3.0
ME 231	3.0
PHSCS 123	3.0
MATH 302	4.0
Religion Cornerstone Elective	2.0
Total Hours	**18.0**

4th Semester

EC EN 301	3.0
ME EN 250	3.0
ME EN 272	3.0
ME EN 273	3.0
MATH 303	4.0
Total Hours	**16.0**

JUNIOR YEAR

5th Semester

STAT 201	3.0
ME EN 321	3.0
ME EN 330	3.0
ME EN 335	3.0
ME EN 382	3.0
Religion Cornerstone Elective	2.0
Total Hours	**17.0**

6th Semester

WRTG 316	3.0
ME EN 312	3.0
ME EN 362	3.0
ME EN 372	3.0
Civilization 1 Elective	3.0
Religion Elective	2.0
Total Hours	**17.0**

SENIOR YEAR

7th Semester

ME EN 340	3.0
ME EN 475	3.0
Technical Elective	3.0
Technical Elective	3.0
Civilization 2/Letters Electives	3.0
Religion Elective	2.0
Total Hours	**17.0**

8th Semester

ME EN 476	3.0
Technical Elective	3.0
Technical Elective	3.0
Arts Elective	3.0
Religion Elective	2.0
Total Hours	**14.0**

Note: Students are encouraged to complete between 15–17 credit hours each semester or 30–34 credit hours each year, which could include spring and/or summer terms. Taking fewer credits increases the cost and the number of semesters to graduate.

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2020-2021 Program Requirements (101.5 Credit Hours)

On gaining acceptance into the professional program, students must maintain a minimum university cumulative grade point average of 2.0.

No more than 6 credit hours or two courses of grades below C- in required program courses (including pre-professional and professional courses) may be applied toward graduation.

A professional program course may not be retaken more than once.

At least 30 of the 51.5 credit hours of Mechanical Engineering (ME EN) courses must be earned at BYU.

REQUIREMENT 1 Complete 1 course

BIO 100 - Principles of Biology	3.0
MMBIO 221 - General Microbiology	3.0
MMBIO 240 - Molecular Biology	3.0
PDBIO 120 - Science of Biology	3.0

REQUIREMENT 2 Complete 3 courses

CHEM 105 - General College Chemistry 1 with Lab (Integrated)	4.0
*PHSCS 121 - Introduction to Newtonian Mechanics	3.0
PHSCS 123 - Introduction to Waves, Optics, and Thermodynamics	3.0

REQUIREMENT 3 Complete 1 option

MATHEMATICS CORE SEQUENCES:

OPTION 3.1 Complete 4 courses

*MATH 112 - Calculus 1	4.0
*MATH 113 - Calculus 2	4.0
MATH 302 - Mathematics for Engineering 1	4.0
MATH 303 - Mathematics for Engineering 2	4.0

OPTION 3.2 Complete 2 groups

GROUP 3.2.1 Complete 4 courses

*MATH 112 - Calculus 1	4.0
*MATH 113 - Calculus 2	4.0
MATH 314 - Calculus of Several Variables	3.0
MATH 334 - Ordinary Differential Equations	3.0

GROUP 3.2.2 Complete 1 course

MATH 213 - Elementary Linear Algebra	2.0
MATH 313 - (Not currently offered)	

REQUIREMENT 4 Complete 5 courses

PREPROFESSIONAL ENGINEERING COURSES:

CE EN 203 - Engineering Mechanics--Mechanics of Materials	3.0
CE EN 204 - Engineering Mechanic--Dynamics	3.0
EC EN 301 - Elements of Electrical Engineering	3.0
ME EN 101 - Static Systems in Mechanical Engineering	3.0
ME EN 191 - New Student Seminar	0.5

REQUIREMENT 5 Complete 13 courses

PROFESSIONAL MECHANICAL ENGINEERING CORE:

ME EN 250 - Science of Engineering Materials	3.0
ME EN 272 - Engineering Graphics--Principles and Applications	3.0
ME EN 273 - Introduction to Scientific Computing and Computer-Aided En	3.0
ME EN 312 - Fluid Mechanics	3.0
ME EN 321 - Thermodynamics	3.0
ME EN 330 - Design of Mechatronic Systems	3.0
ME EN 335 - Dynamic System Modeling and Analysis	3.0
ME EN 340 - Heat Transfer	3.0
ME EN 362 - Engineering Measurements	3.0
ME EN 372 - Mechanical System Design Fundamentals	3.0
ME EN 382 - Manufacturing Processes	3.0
ME EN 475 - Integrated Product and Process Design 1	3.0
ME EN 476 - Product Development 2 - Capstone	3.0

REQUIREMENT 6 Complete 2 courses

SUPPORTING COURSES:

STAT 201 - Statistics for Engineers and Scientists	3.0
*WRTG 316 - Technical Communication	3.0

REQUIREMENT 7 Complete 1 course

ENG T 231 - (Not currently offered)	
*ME EN 231 - Leadership in a Global Context	3.0

REQUIREMENT 8 Complete 12.0 hours from the following option(s)

COMPLETE 12.0 HOURS FROM THE FOLLOWING OPTIONS:

The purpose of these courses is to strengthen the engineering education of the student by a) deepening the student's understanding of engineering and/or science fundamentals, b) helping the student learn to apply engineering fundamentals in specific areas of interest, and/or c) helping the student to develop critical skills related to engineering practice.

The technical electives are normally 400-level or higher mechanical engineering courses, but other courses may be used as long as the following requirements are met:

At least two courses (6 credit hours) must be in mechanical engineering

No courses may be below the 300 level.

A maximum of 3 credit hours in ME EN 497R or other project courses may be applied to meet technical elective requirements.

All courses must be selected from the following list. If a student wishes to count a course outside these areas as an elective, approval must be granted before the course is taken. Approval is requested by submitting a petition to the department undergraduate committee that lists all of the proposed electives and demonstrates how the proposed exception meets the purposes described above.

No course used to satisfy other major requirements for graduation may be used as an elective.

OPTION 8.1 Complete up to 12.0 hours from the following course(s)

ME EN 494R - Global Engineering Outreach Projects	3.0v
ME EN 497R - Mentored Learning for Undergraduate Projects in Mecha	3.0v
ME EN 412 - Applications of Fluid Dynamics	3.0
ME EN 415 - Flight Vehicle Design	3.0
ME EN 422 - Applied Thermodynamics	3.0
ME EN 425 - Internal Combustion Engines	3.0
ME EN 426 - Gas Turbine and Jet Engine Design	3.0
ME EN 431 - (Me En-EC En 483) Design of Control Systems	4.0
ME EN 437 - Kinematics	3.0
ME EN 450 - Engineering Materials: Selection for Design	3.0
ME EN 456 - Composite Material Design	3.0
ME EN 472 - Mechanical Systems Design Applications	3.0
ME EN 479 - Singapore International Product Design and Developmen	3.0v
ME EN 494R - Global Engineering Outreach Projects	3.0v
ME EN 495R - Mentored Learning for Undergraduate Coursework in M	6.0v
ME EN 497R - Mentored Learning for Undergraduate Projects in Mecha	3.0v
ME EN 500 - (MeEn-CEEn) Design and Materials Applications	3.0
ME EN 501 - (MeEn-CEEn) Stress Analysis and Design of Mechanical Stru	3.0
ME EN 503 - (MeEn-CEEn) Plasticity and Fracture	3.0
ME EN 504 - (Me En-CE En) Computer Structural Analysis and Optimizat	3.0
ME EN 505 - Applied Engineering Math	3.0
ME EN 507 - (Me En-CE En) Linear Finite Element Methods	3.0
ME EN 508 - (Me En-CE En) Structural Vibrations	3.0
ME EN 510 - Compressible Fluid Flow	3.0
ME EN 512 - Intermediate Fluid Dynamics	3.0
ME EN 515 - Aerodynamics	3.0
ME EN 521 - Intermediate Thermodynamics	3.0
ME EN 522 - Combustion	3.0
ME EN 523 - (Me En-CE En) Aircraft Structures	3.0
ME EN 533 - Autonomous Systems	3.0
ME EN 534 - Dynamics of Mechanical Systems	3.0
ME EN 535 - Mechanical Vibrations	3.0
ME EN 537 - Robotics - Kinematics, Dynamics, and Control	3.0
ME EN 538 - Compliant Mechanisms	3.0
ME EN 540 - Intermediate Heat and Mass Transfer	3.0
ME EN 541 - Computational Fluid Dynamics and Heat Transfer	3.0
ME EN 550 - (Me En-EC En) Microelectromechanical Systems (MEMS)	3.0
ME EN 552 - Neuromechanics of Movement	3.0
ME EN 555 - Introduction to Biomechanical Engineering	3.0
ME EN 556 - Materials Modeling: Methods in Atomistic, Mesoscale, and	3.0
ME EN 558 - Metallurgy	3.0
ME EN 561 - (Me En-Phscs) Fundamentals of Acoustics	3.0
ME EN 570 - (Me En-CE En) Computer-Aided Engineering Software Deve	3.0
ME EN 575 - (Me En-CE En) Optimization Techniques in Engineering	3.0
ME EN 576 - Product Design	3.0

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2020-2021 Program Requirements Cont...

ME EN 578 - Systems Engineering and CAD Applications	3.0
ME EN 579 - Global Product Development	3.0
ME EN 585 - Manufacturing Competitiveness: Quality and Productivity	3.0
ME EN 595R - Advanced Dynamics	18.0v
ME EN 595R - Topics in Mechanical Design	18.0v
ME EN 595R - Topics in Materials	18.0v
ME EN 595R - Special Topics in Mechanical Engineering	18.0v

OPTION 8.2 Complete up to 6.0 hours from the following course(s)

GEOL 440 - Solid Earth Geophysics	3.0
MSB 430 - Introduction to International Business	3.0
PDBIO 305 - Human Physiology	4.0
C S 312 - Algorithm Design and Analysis	3.0
C S 324 - Systems Programming	3.0
C S 329 - Testing, Analysis, and Verification	3.0
C S 330 - Concepts of Programming Languages	3.0
C S 340 - Software Design	3.0
C S 345 - Operating Systems Design	3.0
C S 355 - Interactive Graphics and Image Processing	3.0
C S 356 - Designing the User Experience	3.0
C S 405 - Creating and Managing a Software Business	3.0
C S 412 - Linear Programming and Convex Optimization	3.0
C S 428 - Software Engineering	3.0
C S 431 - Algorithmic Languages and Compilers	3.0
C S 450 - Computer Vision	3.0
C S 452 - Database Modeling Concepts	3.0
C S 453 - Fundamentals of Information Retrieval	3.0
C S 455 - Computer Graphics	3.0
C S 456 - Introduction to User Interface Software	3.0
C S 460 - Computer Communications and Networking	3.0
C S 462 - Large-Scale Distributed System Design	3.0
C S 465 - Computer Security	3.0
C S 470 - Introduction to Artificial Intelligence	3.0
C S 472 - Introduction to Machine Learning	3.0
C S 474 - Introduction to Deep Learning	3.0
C S 480 - Software Engineering Capstone 1	3.0
C S 481 - Software Engineering Capstone 2	3.0
C S 482 - Data Science Capstone 1	3.0
C S 483 - Data Science Capstone 2	3.0
C S 486 - Verification and Validation	3.0
C S 493R - Computing Competitions	3.0
C S 502 - Job Search Strategies	1.0
C S 513 - Robust Control	3.0
GEOL 440 - Solid Earth Geophysics	3.0
MSB 430 - Introduction to International Business	3.0
PDBIO 305 - Human Physiology	4.0
CE EN 304 - Civil Engineering Materials: Metals, Woods, and Composite	1.5
CE EN 306 - Civil Engineering Materials: Concrete, Masonry, and Asphal	1.5
CE EN 321 - Structural Analysis	3.0
CE EN 341 - Elementary Soil Mechanics	3.0
CE EN 361 - Introduction to Transportation Engineering	3.0
CE EN 414 - Engineering Applications of GIS	3.0
CE EN 421 - Structural Steel Design	3.0
CE EN 424 - Reinforced Concrete Design	3.0
CE EN 427 - International Megastructures	3.0
CE EN 431 - Hydrology	3.0
CE EN 433 - Hydraulic Engineering	3.0
CE EN 439 - Water Resources Study Abroad	3.0
CE EN 442 - Foundation Engineering	3.0
CE EN 451 - Environmental Engineering Processes	3.0
CE EN 461 - Geometric Design of Highways	3.0
CE EN 467 - International Megacities	3.0
CE EN 472 - Civil Engineering Design	3.0
CE EN 495R - Global Engineering Outreach Projects	3.0v
CE EN 500 - (CE En-Me En) Design and Materials Applications	3.0
CE EN 501 - (CE En-MeEn) Stress Analysis and Design of Mechanical Stru	3.0
CE EN 503 - (CE En-Me En) Plasticity and Fracture	3.0
CE EN 504 - (CE En-Me En) Computer Structural Analysis and Optimizat	3.0
CE EN 505 - Portland Cement Concrete Mixture Design and Analysis	3.0
CE EN 507 - (CE En-Me En) Linear Finite Element Methods	3.0
CE EN 508 - (CE En-Me En) Structural Vibrations	3.0
CE EN 514 - Geospatial Environmental Engineering	3.0
CE EN 521 - Advanced Structural Steel Design	3.0
CE EN 523 - (CE En-Me En) Aircraft Structures	3.0
CE EN 525 - Bridge Structures	3.0
CE EN 526 - Bridge Preservation	1.5
CE EN 528 - Masonry Design	3.0
CE EN 529 - Structural Wood Design	3.0
CE EN 531 - Principles of Hydrologic Modeling	3.0
CE EN 533 - Advanced Hydraulic Routing	3.0
CE EN 534 - Hydroinformatics	3.0
CE EN 535 - Hydraulic Design of Channels and Control Structures	3.0
CE EN 540 - Geo-Environmental Engineering	3.0
CE EN 542 - Deep Foundations and Retaining Systems	3.0
CE EN 543 - Chemical Stabilization of Soils	1.5
CE EN 544 - Seepage and Slope Stability Analysis	3.0
CE EN 545 - Geotechnical Analysis of Earthquake Phenomena	3.0
CE EN 547 - Groundwater Modeling	3.0
CE EN 551 - Water Treatment Facilities Design	3.0
CE EN 555 - Environmental Chemistry	3.0
CE EN 562 - Traffic Engineering: Characteristics and Operations	3.0
CE EN 563 - Pavement Design	3.0
CE EN 565 - Urban Transportation Planning	3.0
CE EN 566 - Pavement Management	3.0
CE EN 568 - Asphalt Mixture Design and Analysis	1.5
CE EN 570 - (CE En-Me En) Computer-Aided Engineering Software Deve	3.0
CE EN 572 - Computer-Aided Geometric Design	3.0
CE EN 575 - (CE En-Me En) Optimization Techniques in Engineering	3.0
CE EN 580 - Technical Writing for Publication	1.5
GEOL 440 - Solid Earth Geophysics	3.0
MSB 430 - Introduction to International Business	3.0
PDBIO 305 - Human Physiology	4.0
CH EN 386 - Chemical Reaction Engineering	3.0
CH EN 410 - Principles of Reservoir Engineering	3.0
CH EN 412 - Introductory Nuclear Engineering	3.0
CH EN 433 - Energy Engineering	3.0
CH EN 436 - Process Control and Dynamics	3.0
CH EN 451 - Chemical Engineering Plant Design and Process Synthesis	4.0
CH EN 461 - Chemical Engineering Problem Solving through Experienti	3.0
CH EN 475 - Unit Operations Laboratory 1	2.0
CH EN 476 - Separations	3.0
CH EN 477 - Unit Operations Laboratory 2	2.0
CH EN 479 - Unit Operations Laboratory	2.0
CH EN 481 - Introduction to Semiconductor Processing	2.0
CH EN 491 - Job Finding	0.5
CH EN 495R - Global Engineering Outreach Projects	3.0v
CH EN 499 - Mentored Research and Thesis	3.0
CH EN 513 - Molecular Modeling	3.0
CH EN 518 - Biomedical Engineering Principles	3.0
CH EN 519 - Biochemical Engineering	3.0
CH EN 528 - Industrial Catalytic Processes	2.0
CH EN 531 - Thermodynamics of Multicomponent Systems	3.0
CH EN 533 - Transport Phenomena	3.0
CH EN 535 - Kinetics and Catalysis	3.0
CH EN 541 - Computer Design Methods	3.0
CH EN 578 - Polymer Science and Engineering	3.0
GEOL 440 - Solid Earth Geophysics	3.0
MSB 430 - Introduction to International Business	3.0
PDBIO 305 - Human Physiology	4.0
CHEM 351 - Organic Chemistry 1	3.0
CHEM 351M - Organic Chemistry 1 - Majors	3.0
CHEM 352 - Organic Chemistry 2	3.0
CHEM 353 - Organic Chemistry Laboratory--Nonmajors	2.0v

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2020-2021 Program Requirements Cont...

CHEM 354 - Organic Chemistry Laboratory--Majors	2.0
CHEM 355 - Organic Chemistry Laboratory 2 - Nonmajors	1.0
CHEM 357 - Industrial Organic Chemistry	3.0
CHEM 391 - Technical Writing Using Chemical Literature	3.0
CHEM 455 - Synthesis and Qualitative Organic Analysis	4.0
CHEM 460 - Mathematics for Physical Chemistry	1.0
CHEM 462 - Physical Chemistry 1	3.0
CHEM 463 - Physical Chemistry 2	3.0
CHEM 464 - Physical Chemistry Laboratory 1	1.0
CHEM 465 - Physical Chemistry Laboratory 2	1.0
CHEM 467 - Physical Chemistry for Engineers	3.0
CHEM 468 - Biophysical Chemistry	3.0
CHEM 481 - Biochemistry	3.0
CHEM 481M - Biochemistry--Majors	3.0
CHEM 482 - Mechanisms of Molecular Biology	3.0
CHEM 489 - Structural Biochemistry	3.0
CHEM 498R - Capstone Experience in Chemistry/Biochemistry	4.0v
CHEM 502 - Job Search Strategies	1.0
CHEM 514 - Inorganic Chemistry	3.0
CHEM 518 - Advanced Inorganic Laboratory	2.0
CHEM 521 - Instrumental Analysis Lecture	2.0
CHEM 523 - Instrumental Analysis Laboratory	2.0
CHEM 552 - Advanced Organic Chemistry	3.0
CHEM 553 - Advanced Organic Chemistry	3.0
CHEM 555 - Organic Spectroscopic Identification	2.0
CHEM 561 - Chemical Thermodynamics	3.0
CHEM 563 - Reaction Kinetics	3.0
CHEM 565 - Introduction to Quantum Chemistry	3.0
CHEM 567 - Statistical Mechanics	3.0
CHEM 569 - Fundamentals of Spectroscopy	3.0
CHEM 571 - Polymer and Materials Chemistry	3.0
CHEM 581 - Advanced Biochemical Methodology 1	3.0
CHEM 583 - Advanced Biochemical Methodology 2	3.0
CHEM 584 - Advanced Biochemistry Methods 1	3.0
CHEM 586 - Advanced Biochemistry Methods 2	3.0
GEOL 440 - Solid Earth Geophysics	3.0
MSB 430 - Introduction to International Business	3.0
PDBIO 305 - Human Physiology	4.0
EC EN 323 - Computer Organization	4.0
EC EN 330 - Introduction to Embedded System Programming	4.0
EC EN 340 - Electronic Circuit Design 1	4.0
EC EN 360 - Electromagnetic Fields and Waves	4.0
EC EN 380 - Signals and Systems	4.0
EC EN 424 - Computer Systems	4.0
EC EN 425 - Real-Time Operating Systems	4.0
EC EN 427 - Embedded Systems	4.0
EC EN 445 - Introduction to Mixed-Signal VLSI	4.0
EC EN 446 - Power Electronics	4.0
EC EN 450 - Introduction to Semiconductor Devices	3.0
EC EN 452 - Experiments in Integrated Circuit Development	1.0
EC EN 462 - Electromagnetic Radiation and Propagation	2.0
EC EN 464 - Wireless Communication Circuits	2.0
EC EN 466 - Introduction to Optical Engineering	2.0
EC EN 483 - (EC En-Me En 431) Design of Control Systems	4.0
EC EN 485 - Introduction to Digital Communication Theory	4.0
EC EN 487 - Introduction to Discrete-Time Signal Processing	4.0
EC EN 521 - Introduction to Algorithm Design	3.0
EC EN 523 - Computer System Reliability	3.0
EC EN 526 - Wireless Networking	3.0
EC EN 528 - Computer Architecture	3.0
EC EN 541 - Active and Passive Filter Design	3.0
EC EN 543 - CMOS Amplifier Design	3.0
EC EN 548 - Analog CMOS Circuit Design	3.0
EC EN 549 - VLSI Communication Circuit Design	3.0
EC EN 550 - (EC En-Me En) Microelectromechanical Systems (MEMS)	3.0
EC EN 551 - Introduction to Digital VLSI Circuits	3.0
EC EN 555 - Optoelectronic Devices	3.0
EC EN 560 - Electromagnetic Wave Theory	3.0
EC EN 562 - Integrated Quantum and Classical Photonics	3.0
EC EN 563 - Applied Computational Electromagnetics	3.0
EC EN 564 - Radar and Communication Systems	3.0
EC EN 567 - Physical Optics	3.0
EC EN 568 - Microwave Remote Sensing	3.0
EC EN 576 - Medical Imaging and Image Reconstruction	3.0
EC EN 595 - Fundamentals of Patents and Other Intellectual Property	1.0
GEOL 440 - Solid Earth Geophysics	3.0
MSB 430 - Introduction to International Business	3.0
PDBIO 305 - Human Physiology	4.0
MATH 402 - Modeling with Uncertainty and Data 1	3.0
MATH 403 - Modeling with Uncertainty and Data 1 Laboratory	1.0
MATH 404 - Modeling with Uncertainty and Data 2	3.0
MATH 405 - Modeling with Uncertainty and Data 2 Laboratory	1.0
MATH 410 - Introduction to Numerical Methods	3.0
MATH 411 - Numerical Methods	3.0
MATH 413 - Advanced Linear Algebra	3.0
MATH 431 - Probability Theory	3.0
MATH 436 - Modeling with Dynamics and Control 1	3.0
MATH 437 - Modeling with Dynamics and Control 1 Laboratory	1.0
MATH 438 - Modeling with Dynamics and Control 2	3.0
MATH 439 - Modeling with Dynamics and Control 2 Laboratory	1.0
MATH 447 - Introduction to Partial Differential Equations	3.0
MATH 450 - Combinatorics	3.0
MATH 451 - Introduction to Topology	3.0
MATH 465 - Differential Geometry	3.0
MATH 473 - Group Representation Theory	3.0
MATH 485 - Mathematical Cryptography	3.0
MATH 487 - Number Theory	3.0
MATH 502 - Job Search Strategies	1.0
MATH 510 - Numerical Methods for Linear Algebra	3.0
MATH 511 - Numerical Methods for Partial Differential Equations	3.0
MATH 521 - Methods of Applied Mathematics 1	3.0
MATH 522 - Methods of Applied Mathematics 2	3.0
MATH 525 - Network Theory	3.0
MATH 532 - Complex Analysis	3.0
MATH 534 - Introduction to Dynamical Systems 1	3.0
MATH 536 - Applied Discrete Probability	3.0
MATH 540 - Linear Analysis	3.0
MATH 541 - Real Analysis	3.0
MATH 547 - Modeling and Analysis of Partial Differential Equations	3.0
MATH 553 - Foundations of Topology 1	3.0
MATH 554 - Foundations of Topology 2	3.0
MATH 561 - Introduction to Algebraic Geometry 1	3.0
MATH 562 - Introduction to Algebraic Geometry 2	3.0
MATH 565 - Differential Geometry	3.0
MATH 570 - Matrix Analysis	3.0
MATH 571 - Algebra 1	3.0
MATH 572 - Algebra 2	3.0
MATH 586 - Introduction to Algebraic Number Theory	3.0
MATH 587 - Introduction to Analytic Number Theory	3.0
GEOL 440 - Solid Earth Geophysics	3.0
MSB 430 - Introduction to International Business	3.0
PDBIO 305 - Human Physiology	4.0
PHSCS 318 - Introduction to Mathematical Physics	3.0
PHSCS 321 - Mechanics	3.0
PHSCS 330 - Computational Physics Lab 2	1.0
PHSCS 360 - Statistical and Thermal Physics	3.0
PHSCS 416 - Writing in Physics	3.0
PHSCS 427 - Stellar Astrophysics	3.0
PHSCS 428 - Galaxies and Cosmology	3.0
PHSCS 430 - Computational Physics Lab 3	1.0
PHSCS 441 - Electricity and Magnetism	3.0
PHSCS 442 - Electrodynamics	3.0

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2020-2021 Program Requirements Cont...

PHSCS 451 - Quantum Mechanics	3.0
PHSCS 452 - Applications of Quantum Mechanics	3.0
PHSCS 461 - (Phscs-Me En) Introduction to Acoustics	3.0
PHSCS 471 - Principles of Optics	3.0
PHSCS 502 - Job Search Strategies	1.0
PHSCS 540 - Electrical Engineering Principles and Practices for Physici	2.0
PHSCS 545 - Introduction to Plasma Physics	3.0
PHSCS 561 - (Phscs-Me En) Fundamentals of Acoustics	3.0
PHSCS 571 - Lasers and Atoms	3.0
PHSCS 581 - Solid-State Physics	3.0
PHSCS 583 - Physics of Nanostructures, Surfaces, and Interfaces	3.0
PHSCS 585 - Thin-Film Physics	3.0
PHSCS 586 - Transmission Electron Microscopy for Physical Science an	3.0
PHSCS 587 - Physics of Semiconductor Devices	3.0
PHSCS 588 - Scanning Electron Microscopy (SEM) for Physical Science	3.0
GEOL 440 - Solid Earth Geophysics	3.0
MSB 430 - Introduction to International Business	3.0
PDBIO 305 - Human Physiology	4.0
STAT 330 - Introduction to Regression	3.0
STAT 340 - Probability and Inference 2	3.0
STAT 381 - Statistical Computing	3.0
STAT 420 - Big Data Science 1	3.0
STAT 421 - Big Data Science 2	3.0
STAT 426 - Data Science Methods and Applications in Statistics	3.0
STAT 435 - Nonparametric Statistical Methods	3.0
STAT 451 - Applied Bayesian Statistics	3.0
STAT 462 - Quality Control and Industrial Statistics	3.0
STAT 466 - Introduction to Reliability	3.0
STAT 469 - Analysis of Correlated Data	3.0
STAT 475 - Life Contingencies	3.0
STAT 502 - Job Search Strategies	1.0
STAT 511 - Statistical Methods for Research 1	3.0
STAT 512 - Statistical Methods for Research 2	3.0
STAT 531 - Experimental Design	3.0
STAT 535 - Linear Models	3.0
STAT 536 - Statistical Learning and Data Mining	3.0
STAT 537 - Mixed Model Methods	3.0
STAT 538 - Survival Analysis	3.0

THE DISCIPLINE:

Mechanical engineers work with concepts, ideas, and products that are primarily mechanical or energy related.
Mechanical engineering is a broad discipline that prepares a person to contribute in a wide range of fields such as aerospace, computer graphics, power generation, machine tools, petroleum, agricultural and construction equipment, medicine, robotics, government, and all types of transportation. A mechanical engineer may work in research, design, analysis, manufacturing, testing, operations, sales, or management. Engineers use critical problem-solving methods and basic principles of mathematics and science to creatively solve problems.

EDUCATIONAL OBJECTIVES:

The objectives of the undergraduate Bachelors of Science program in the Department of Mechanical Engineering at Brigham Young University are to:
1. Teach the fundamental concepts of math, science, and mechanical engineering in order to produce graduates who demonstrate technical excellence and provide service to their profession, community, family, and church.
2. Instill a desire and ability to learn continuously, both through study and faith, to enable graduates to meet the changing demands of their profession and personal life.
3. Provide practical and open-ended engineering experiences in order to develop graduates who think independently and demonstrate leadership and creativity.
4. Engage students in activities to produce graduates who communicate and work effectively and ethically with people of diverse backgrounds.

PROGRAM LEARNING OUTCOMES:

To assure that these objectives are reached, the department has articulated twelve outcomes of the BS
program. Each student graduating from this program is expected to have:
1. A basic understanding of fundamental physical phenomena and governing principles.
2. The ability to develop and solve mathematical models of fundamental physical phenomena and apply them to predict the behavior of engineering systems.
3. The ability to use engineering principles to design an innovative system, component, or process to meet desired needs.
4. The expertise to plan and conduct an experimental program and evaluate the results.
5. The ability to use modern engineering tools and techniques in engineering practice.
6. An understanding of manufacturing processes and planning.
7. Effective oral and written communication skills.
8. The ability to work with and lead others to accomplish goals.
9. An appreciation of history, philosophy, literature, science, and the fine arts and how they influence the culture and behavior of societies.
10. Personal behavior demonstrating and practicing high moral and ethical standards.
11. The ability to practice engineering in a global environment.
12. A desire for and commitment to lifelong learning and service.
All courses in the curriculum are designed to help achieve these outcomes.
The curriculum in mechanical engineering is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc. (ABET).

CAREER OPPORTUNITIES:

A bachelor of science degree in mechanical engineering provides widely recognized professional training for careers in industry, government, and other areas. Most industrial companies hire some mechanical engineers.

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Companies that make mechanical or energy-related products may hire mostly mechanical engineers. As a result, many mechanical engineering positions are available worldwide. Mechanical engineers have job opportunities in companies involved in such areas as aircraft and spacecraft design; manufacturing processes; product safety and reliability; solar energy; electronic equipment packaging and cooling; power plant design; jet, train, truck, and automobile engines; environmental protection; artificial intelligence; robotics; medical and hospital equipment; new material development and applications; and technical writing. Increasing numbers of positions utilize foreign language experience. A graduate in mechanical engineering is prepared for advanced studies in the field as well as in a variety of other disciplines, including law, medicine, and business administration. Perhaps most important to graduates are the problem-solving strategies and thinking processes acquired in the study of mechanical engineering that help one to succeed in any area of endeavor.

UNDERGRADUATE ADMITTANCE REQUIREMENTS:

Any student may choose to major in Mechanical Engineering, and to enroll in any of the preprofessional program courses, meeting the necessary prerequisites.

PROFESSIONAL PROGRAM ACCEPTANCE:

Students must be accepted into the professional program before they may take the professional Me En core courses. To apply, students must receive a grade in the courses outlined below. They must also be in good academic standing. Admissions decisions are made by equally weighting the GPA from these courses. (See policies below regarding AP courses and transfer courses.)

- The first physics course taken at BYU from the sequence: PHSCS 121, PHSCS 123
- The first math course taken at BYU from the sequence: MATH 112, 113, 302, 303, 313, 314, 334
- The first mechanics course taken at BYU from the sequence: ME EN 101, CE EN 203, CE EN 204
- ME EN 191 at BYU (PASS Grade required)

AP Courses. These courses can fulfill graduation requirements; however, since there is no grade assigned to AP courses, students must take the next course in the physics, math, or mechanics sequence OR repeat the AP equivalent course for application to the professional program.

Transfer Courses. If students have transferred equivalent courses from an ABET-accredited school, the grades from the transferred courses can be used in calculating the *Application GPA*. Alternatively, transfer students may retake the BYU equivalent course. Non-ABET- accredited courses can fulfill graduation requirements; but cannot be used to calculate the *Application GPA.* Students must either (a) take the BYU equivalent course or (b) take the next course in the physics, math, or mechanics sequence.

Acceptance Criteria. 220 students are granted acceptance to the professional program each year based on the *Application GPA*. Students may apply for admission more than once, however, each course may be retaken only ONE time (includes withdraws). When a course is retaken, the higher grade will be used to calculate the *Application GPA*. Please see our website: http://me.byu.edu/content/applying-professional-program, for further information and recent admission data.

ACADEMIC STANDARDS AND CONTINUANCE:

On gaining acceptance into the ME professional program, students must maintain a minimum university cumulative GPA of 2.0. No more than 6 credit hours or two courses of passing grades below C– in required program courses (including preprofessional and professional courses) may be applied toward graduation. A professional program course may not be retaken more than once. At least 30 of the 48.5 credit hours of Mechanical Engineering courses (ME EN) must be earned at BYU.

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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