

Note: No Major, Support or Concentration courses may be selected as credit/no credit.

<b>MAJOR COURSES</b>		
ME 128	Introduction to Mechanical Engineering I <sup>1</sup>	1
ME 129	Introduction to Mechanical Engineering II <sup>1</sup>	1
ME 130	Introduction to Mechanical Engineering III <sup>1</sup>	1
ME 163	Freshmen Orientation to Mechanical Engr <sup>1</sup>	1
ME 211	Engineering Statics	3
ME 212	Engineering Dynamics	3
ME 234	Philosophy of Design	3
ME 236	Measurement and Engineering Data Analysis	3
ME 251	Intro to Detailed Design with Solid Modeling	2
ME 302	Thermodynamics I	3
ME 303	Thermodynamics II	3
ME 318	Mechanical Vibrations	4
ME 322	Introduction to System Dynamics	4
ME 328	Design for Strength and Stiffness	4
ME 329	Mechanical Systems Design	4
ME 341	Fluid Mechanics I	3
ME 343	Heat Transfer	4
ME 347	Fluid Mechanics II	4
ME 448	Thermal System Design	4
Concentration or General Curriculum in Mechanical Engineering (See list of Concs & Gen Curric in Mechanical Engr below)		25/27
<b>Total Major Units</b>		<b>80-82</b>
<b>SUPPORT COURSES</b>		
CE 204	Mechanics of Materials I <sup>2</sup>	3
CE 207	Mechanics of Materials II <sup>2</sup>	2
CHEM 124	Gen Chem for Physical Sci & Engr I (B1 & B3) <sup>3</sup>	4
CHEM 125	Gen Chem for Physical Science & Engr II	4
CSC 231	Programming for Engineering Students	2/3
or CSC 234	C and Unix	
EE 201	Electric Circuit Theory	3
EE 251	Electric Circuits Laboratory	1
EE 321	Electronics	3
EE 361	Electronics Laboratory	1
IME 142	Manufacturing Processes: Materials Joining	2
Select from the following: <sup>4</sup>		2
IME 145	Subtractive Mfg Processes for Mech Designs I	
& IME 146	<b>and</b> Subtractive Mfg Proc for Mech Designs II	
or IME 143	Manufacturing Processes: Material Removal	
MATE 210	Materials Engineering	4
& MATE 215	<b>and</b> Materials Laboratory I	
MATH 141	Calculus I (B4) <sup>3</sup>	4
MATH 142	Calculus II (B4) <sup>3</sup>	4
MATH 143	Calculus III (Area B Electives) <sup>3</sup>	4
MATH 241	Calculus IV	4
MATH 244	Linear Analysis I	4
MATH 344	Linear Analysis II (Upper-Division B) <sup>3</sup>	4
PHYS 141	General Physics IA (Area B Electives) <sup>3</sup>	4
PHYS 132	General Physics II	4
PHYS 133	General Physics III	4
<b>Manufacturing Processes Elective</b>		
Select from the following:		1/4
IME 141	Manufacturing Processes: Net Shape	
ITP 341	Packaging Polymers and Processing	
ME 161	Intro to Composite Materials Manufacturing	
<b>Total Support Units</b>		<b>68-72</b>

<b>GENERAL EDUCATION</b>		
<b>Area A English Language Communication and Critical Thinking</b>		
A1	Oral Communication	4
A2	Written Communication	4
A3	Critical Thinking	4
<b>Area B Scientific Inquiry and Quantitative Reasoning</b>		
B1	Physical Science (4 units in Support) <sup>3</sup>	0
B2	Life Science	4
B3	One lab taken with either a B1 or B2 course	
B4	Mathematics/Quantitative Reasoning (8 units in Support) <sup>3</sup>	0
Upper-Division B (4 units in Support) <sup>3</sup>		0
Area B Electives (8 units in Support) <sup>3</sup>		0
<b>Area C Arts and Humanities</b>		
<b>Lower-division courses in Area C must come from three different subject prefixes.</b>		
C1	Arts	4
C2	Humanities	4
Lower-Division C Elective - Select a course from either C1 or C2.		4
Upper-Division C		4
<b>Area D Social Sciences</b>		
D1	American Institutions (Title 5, Section 40404 Requirement)	4
Area D Elective - Select either a lower-division D2 or upper-division D course.		4
<b>Area E Lifelong Learning and Self-Development</b>		
Lower-Division E		4
<b>Area F Ethnic Studies</b>		
Lower-Division F		4
<b>Total GE Units</b>		<b>48</b>
<b>FREE ELECTIVES</b>		<b>0</b>
<b>TOTAL DEGREE UNITS</b>		<b>196-202</b>

<b>FOOTNOTES</b>	
1	ME 228, ME 263 and ME 264 are required in lieu of ME 128, ME 129, ME 130, and ME 163 for change of major and transfer students.
2	May take CE 208 in place of CE 204 and CE 207.
3	Required in Major or Support; also satisfies General Education (GE) requirement.
4	IME 143 is required in lieu of IME 145 and IME 146 for change of major and transfer students.

General Concentration		
ME 326	Intermediate Dynamics	4
ME 418 or ME 419	Implementation of Mechanical Controls Advanced Control Systems	4
ME 428	Senior Design Project I 1	2
ME 429	Senior Design Project II 1	2
ME 430	Senior Design Project III 1	2
Technical Electives <sup>2,3,4</sup>		
Select from the following:		11/12
Select 8-12 units from the following ME courses:		
ME 305	Introduction to Mechatronics	
ME 359	Fundamentals of HVAC Systems	
ME 401	Stress Analysis	
ME 402	Orthopedic Biomechanics	
ME 403	Access by Design: Intro to Rehab Engineering	
ME/CE 404	Applied Finite Element Analysis	
ME 405	Mechatronics	
ME 410	Experimental Methods in Mechanical Design I	
ME 412	Composite Materials Analysis and Design	
ME 415	Energy Conversion	
ME 416	Ground Vehicle Dynamics and Design	
ME 423	Robotics: Fundamentals and Applications	
ME 434	Enhanced Oil Recovery	
ME 435	Drilling Engineering	
ME 436	Petroleum Production Engineering	
ME 437	Nuclear Energy Power Generation	
ME 438	Nuclear Power Plant Design	
ME 439	Nuclear Power Plant Operations	
ME 441	Single Track Vehicle Design	
ME 442	Design of Machinery	
ME 443	Turbomachinery	
ME 444	Combustion Engine Design	
ME 450	Solar Thermal Power Systems	
ME 453	Trends and Opportunities in HVAC&R	
ME 454	Benchmarking & Assess of Build Energy Perfor	
ME 455	Introduction to Building Energy Modeling	
ME 456	HVAC Air & Water Distribution System Design	
ME 457	Refrigeration Principles and Design	
ME 458	Building Heating and Cooling Loads	
ME 488	Wind Energy Engineering	
ME 501/CE 511	Continuum Mechanics and Elasticity	
ME 503/CE 513	Inelastic Stress Analysis	
ME/CE 504	Finite Element Analysis	
ME 506	System Dynamics	
ME 507	Mechanical Control System Design	
ME 517	Advanced Vibrations	
ME 518	Machinery Vibration and Rotor Dynamics	
ME 540	Viscous Flow	
ME 541	Advanced Thermodynamics	
ME 542	Dynamics & Thermodynam of Compress Flow	
ME 552	Advanced Heat Transfer I	
ME 553	Advanced Heat Transfer II	
ME 554	Computational Heat Transfer	
ME 556	Advanced Heat Transfer III	
ME 579	Fluid Power Control	
Select 0 - 4 units from:		
Any upper-division or graduate level course in the College of Engineering with the exception of GE Upper-Division B, ENGR 301, senior project, thesis, special problems and co-op courses.		
<b>Total Units</b>		<b>25-26</b>

Energy Resources Concentration		
ME 415	Energy Conversion	4
ME 418 or ME 419	Implementation of Mechanical Controls Advanced Control Systems	4
ME 428	Senior Design Project I	2
ME 429	Senior Design Project II	2
ME 430	Senior Design Project III	2
Select from the following:		11/12
EE 255 & EE 295	Energy Conversion Electromagnetics <b>and</b> Energy Conversion Electromagnetics Lab	
EE 420	Sustainable Electric Energy Conversion	
EE 423	Micro/Nano Fabrication	
MATE 430	Micro/Nano Fabrication	
ME 434	Enhanced Oil Recovery	
ME 435	Drilling Engineering	
ME 436	Petroleum Production Engineering	
ME 437	Nuclear Energy Power Generation	
ME 438	Nuclear Power Plant Design	
ME 439	Nuclear Power Plant Operations	
ME 443	Turbomachinery	
ME 444	Combustion Engine Design	
ME 450	Solar Thermal Power Systems	
ME 455	Introduction to Building Energy Modeling	
ME 488	Wind Energy Engineering	
ME 541	Advanced Thermodynamics	
<b>Total units</b>		<b>25-26</b>

Heating, Ventilating, Air-Conditioning and Refrigerating Concentration (HVAC&R)		
ME 418 or ME 419	Implementation of Mechanical Controls Advanced Control Systems	4
ME 456	HVAC Air and Water Distribution System Design	4
ME 459	HVAC Senior Design Project I	3
ME 460	HVAC Senior Design Project II	2
Select from the following:		12
ME 359	Fundamentals of HVAC Systems	
ME 453	Trends and Opportunities in HVAC&R	
ME 454	Benchmarking & Assess of Build Energy Perfor	
ME 455	Introduction to Building Energy Modeling	
ME 457	Refrigeration Principles and Design	
ME 458	Building Heating and Cooling Loads	
<b>Total Units</b>		<b>25</b>

Footnotes for General Concentration
<sup>1</sup> ENGR 459, ENGR 460 and ENGR 461 (6), or ENGR 463, ENGR 464 and ENGR 465 (6) may substitute for ME 428, ME 429 and ME 430 (6).
<sup>2</sup> Consultation with advisor is recommended prior to selecting Technical Electives. Note that 300-level Technical Electives cannot be used for graduate credit in the blended BS + MS Mechanical Engineering program.
<sup>3</sup> ME 470, ME 471, ME 570 and ME 571 are variable topics courses, and may or may not count as ME Electives. Please contact instructor for additional information. A course substitution form may be required.
<sup>4</sup> ME 400 and ME 500 are independent study classes and may be acceptable for Technical Elective credit. A course substitution form is required.

<b>Mechatronics Concentration</b>		
ME 305	Introduction to Mechatronics	4
ME 326	Intermediate Dynamics	4
ME 405	Mechatronics	4
ME 419	Advanced Control Systems	4
ME 428	Senior Design Project I <sup>1</sup>	2
ME 429	Senior Design Project II <sup>1</sup>	2
ME 430	Senior Design Project III <sup>1</sup>	2
Select from the following: <sup>2</sup>		3/4
IME 356	Manufacturing Automation	
IME 416	Automation of Industrial Systems	
ME 423	Robotics: Fundamentals and Applications	
ME 506	System Dynamics	
ME 507	Mechanical Control System Design	
<b>Total Units</b>		<b>25-26</b>

<sup>1</sup> ENGR 459, ENGR 460 and ENGR 461 (6) may substitute for ME 428, ME 429 and ME 430 (6).

<sup>2</sup> Elective based on interests of students.

<b>Manufacturing Concentration</b>		
IME 327	Test Design & Analysis in Manufacturing Engr	4
ME 418	Implementation of Mechanical Controls	4
or ME 419	Advanced Control Systems	
ME 428	Senior Design Project I <sup>1</sup>	2
ME 429	Senior Design Project II <sup>1</sup>	2
ME 430	Senior Design Project III <sup>1</sup>	2
Take all of the courses in one of the following emphasis areas:		8
<b>Mechanical Manufacturing Emphasis Area</b>		
IME 330	Fundamentals of Manufacturing Engineering	
IME 450	Manufacturing Process and Tool Engineering	
<b>Electronics Manufacturing Emphasis Area</b>		
IME/MATE 458	Microelectronics and Electronics Packaging	
MATE 430	Micro/Nano Fabrication	
& MATE 435	<b>and</b> Microfabrication Laboratory	
<b>Design and Manufacturing Elective</b>		
Select from the following:		3/5
IME 330	Fundamentals of Manufacturing Engineering <sup>2</sup>	
IME 335	Computer-Aided Manufacturing I	
IME 356	Manufacturing Automation	
IME 416	Automation of Industrial Systems	
IME 418	Product-Process Design	
IME 428	Engineering Metrology	
IME 430	Quality Engineering	
IME 432	Additive Manufacturing	
IME 457	Advanced Electronic Manufacturing	
IME/MATE 458	Microelectronics and Electronics Packaging <sup>2</sup>	
IME 527	Design of Experiments	
IME 543	Applied Human Factors	
MATE 430	Micro/Nano Fabrication	
& MATE 435	<b>and</b> Microfabrication Laboratory <sup>2</sup>	
MATE 440	Welding Metallurgy & Joining of Adv Materials	
& MATE 445	<b>and</b> Joining of Advanced Materials Laboratory	
ME 305	Introduction to Mechatronics	
ME 412	Composite Materials Analysis and Design	
<b>Total Units</b>		<b>25-27</b>

<sup>1</sup> ENGR 459, ENGR 460 and ENGR 461 (6) may substitute for ME 428, ME 429 and ME 430 (6).

<sup>2</sup> If a course is taken to meet a Emphasis Area requirement, it cannot be double-counted as a Design and Manufacturing Elective.