

# Engineering (BS)

To see more about what you will learn in this program, visit the Learning Outcomes website (<https://apps.oirp.ncsu.edu/pgas/>)!

## Plan Requirements

### First Year

Fall Semester		Hours
CH 101	Chemistry - A Molecular Science <sup>1</sup>	3
CH 102	General Chemistry Laboratory <sup>1</sup>	1
E 101	Introduction to Engineering & Problem Solving <sup>2</sup>	1
E 115	Introduction to Computing Environments	1
ENG 101	Academic Writing and Research <sup>2</sup>	4
MA 141	Calculus I <sup>1</sup>	4
<b>Hours</b>		<b>14</b>

### Spring Semester

Select one of the following Economics courses:		3
ARE 201	Introduction to Agricultural & Resource Economics	
ARE 201A	Introduction to Agricultural & Resource Economics	
EC 201	Principles of Microeconomics	
EC 205	Fundamentals of Economics	
MA 241	Calculus II <sup>1</sup>	4
PY 205 & PY 206	Physics for Engineers and Scientists I and Physics for Engineers and Scientists I Laboratory <sup>1</sup>	4
Engineering Topics Elective (p. 2)		3
<b>Hours</b>		<b>14</b>

### Second Year

Fall Semester		Hours
MA 242	Calculus III	4
PY 208 & PY 209	Physics for Engineers and Scientists II and Physics for Engineers and Scientists II Laboratory	4
Engineering Topics II Elective (p. 2)		3
Engineering Elective 200-Level (p. 2)		3
<b>Hours</b>		<b>14</b>

### Spring Semester

Select one of the following Math Electives:		3
MA 303	Linear Analysis	
MA 341	Applied Differential Equations I	
MA 405	Introduction to Linear Algebra	
Basic Science Elective (p. 4)		4
Engineering Topics II Elective (p. 2)		3
Engineering Elective 200-Level (p. 2)		3
<b>Hours</b>		<b>13</b>

### Third Year

Fall Semester		Hours
Engineering Topics III Elective (p. 4)		3
Engineering Elective 300 or 400 Level (p. 16)		3

Engineering Elective 300 or 400 Level (p. 16)	3
Engineering Elective 300 or 400 Level (p. 16)	3

**Hours 12**

### Spring Semester

Communication Elective (p. 27)	3
Engineering Topics III Elective (p. 4)	3
Engineering Elective 300 or 400 Level (p. 16)	3
Engineering Elective 300 or 400 Level (p. 16)	3

**Hours 12**

### Fourth Year

#### Fall Semester

Engineering Elective 300 or 400 Level (p. 16)	3
Engineering Elective 400 Level (p. 16)	3
BSE Topic Elective (p. 4) <sup>3</sup>	3
BSE Topic Elective (p. 4) <sup>3</sup>	3

**Hours 12**

#### Spring Semester

Engineering Topics IV Elective (p. 27)	3
Engineering Elective 300 or 400 Level Elective 400-Level (p. 16)	3
BSE Topic Elective (p. 4) <sup>3</sup>	3
BSE Topic Elective (p. 4) <sup>3</sup>	3

**Hours 12**

**Total Hours 103**

<sup>1</sup> A grade of C or higher is required.

<sup>2</sup> A grade of C- or higher is required.

<sup>3</sup> Students should consult their academic advisors to determine how to complete this requirement.

Code	Title	Hours	Counts towards
<b>GEP Courses</b>			
	GEP Humanities ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/</a> )	6	
	GEP Social Sciences ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/</a> )	3	
	GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )	2	
	GEP Additional Breadth ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/</a> ) (Humanities/Social Sciences/Visual and Performing Arts)	3	
	GEP Interdisciplinary Perspectives ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/</a> )	5	

GEP U.S. Diversity (<http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-us-diversity/>) (verify requirement)

GEP Global Knowledge (<http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/>) (verify requirement)

Foreign Language Proficiency (<http://catalog.ncsu.edu/undergraduate/gep-category-requirements/foreign-language-proficiency/>) (verify requirement)

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**Total Hours** **19**

### Engineering Topics Electives

Code	Title	Hours	Counts towards
CSC 112	Introduction to Computing-FORTRAN	3	
CSC 116	Introduction to Computing - Java	3	
ECE 109	Introduction to Computer Systems	3	
GC 120	Foundations of Graphics	3	
ST 370	Probability and Statistics for Engineers	3	
ST 371	Introduction to Probability and Distribution Theory	3	
TE 110	Computer-Based Modeling for Engineers	3	

### Engineering Topics II Electives

Code	Title	Hours	Counts towards
CE 214	Engineering Mechanics-Statics	3	
CE 215	Engineering Mechanics-Dynamics	3	
CE 225	Mechanics of Solids	3	
CE 282	Hydraulics	3	
ECE 331	Principles of Electrical Engineering	3	
ISE 311	Engineering Economic Analysis	3	

MAE 201	Engineering Thermodynamics I	3
MAE 206	Engineering Statics	3
MAE 208	Engineering Dynamics	3
MAE 214	Solid Mechanics	3
MAE 308	Fluid Mechanics	3
MSE 200	Mechanical Properties of Structural Materials	3
MSE 201	Structure and Properties of Engineering Materials	3

### Engineering Electives 200-Level

Code	Title	Hours	Counts towards
BAE 200	Computer Methods in Biological Engineering		
BAE 202	Introduction to Biological and Agricultural Engineering Methods		
BAE 203	Introduction to AutoCAD Civil 3D for Environmental & Ecological Engineers		
BAE 204	Introduction to Environmental and Ecological Engineering		
BAET 201	Shop Processes and Management		
BME 201	Computer Methods in Biomedical Engineering		
BME 203	Introduction to the Materials Science of Biomaterials		
BME 204	Biomedical Measurements		
BME 205	Introduction to Biomedical Mechanics		
BME 207	Biomedical Electronics		

BME 209	Introduction to the Materials Science of Biomaterials	CSC 226	Discrete Mathematics for Computer Scientists
BME 215	Biomedical Mechanics Laboratory	CSC 236	Computer Organization and Assembly Language for Computer Scientists
BME 217	Biomedical Electronics Laboratory	CSC 246	Concepts and Facilities of Operating Systems for Computer Scientists
BME 219	Materials Science of Biomaterials Lab	CSC 251	Web Page Development
BME 295	Research in Biomedical Engineering for Undergraduates	CSC 255	String Processing Languages
BME 298	Biomedical Engineering Design and Manufacturing I	CSC 281	Foundations of Interactive Game Design
BME 299	BME Design and Manufacturing I Lab	CSC 295	Special Topics in Computer Science
CE 214	Engineering Mechanics-Statics	E 201	Engineering Transfer to Success
CE 215	Engineering Mechanics-Dynamics	E 298	Special Topics Engineering
CE 225	Mechanics of Solids	ECE 200	Introduction to Signals, Circuits and Systems
CE 250	Introduction to Sustainable Infrastructure	ECE 209	Computer Systems Programming
CE 263	Introduction to Construction Engineering	ECE 211	Electric Circuits
CE 282	Hydraulics	ECE 212	Fundamentals of Logic Design
CE 297	Current Topics in Civil Engineering	ECE 220	Analytical Foundations of Electrical and Computer Engineering
CHE 205	Chemical Process Principles	ISE 215	Foundations of Design & 3D Modeling for Engineers
CHE 225	Introduction to Chemical Engineering Analysis	ISE 216	Product Development and Rapid Prototyping
CSC 200		MAE 200	Introduction to Mechanical Engineering Design
CSC 216	Software Development Fundamentals		
CSC 217	Software Development Fundamentals Lab		

MAE 201	Engineering Thermodynamics I	
MAE 206	Engineering Statics	
MAE 208	Engineering Dynamics	
MAE 214	Solid Mechanics	
MAE 250	Introduction to Aerospace Engineering	
MAE 251	Aerospace Vehicle Performance	
MAE 252	Aerodynamics I	
MAE 253	Experimental Aerodynamics I	
MAE 308	Fluid Mechanics	
MSE 200	Mechanical Properties of Structural Materials	
MSE 201	Structure and Properties of Engineering Materials	
MSE 203	Introduction to the Materials Science of Biomaterials	
MSE 255	Experimental Methods for Structural Analysis of Materials	
MSE 260	Mathematical Methods for Materials Engineers	
MSE 270	Materials Science and Engineering Seminar	
NE 201	Introduction to Nuclear Engineering	
NE 202	Radiation Sources, Interaction and Detection	
NE 235	Nuclear Reactor Operations Training	
NE 290	Introduction to Health Physics	
PSE 201	Pulping and Papermaking Technology	3

PSE 211	Pulp and Paper Internship	
PSE 212	Paper Properties	
PSE 220	From Papyrus to Plasma Screens: Paper and Society	
PSE 293	Independent Study in Paper Science & Engineering	
PSE 294	Independent Study in Paper Science & Engineering	
PSE 295	Special Topics in Paper Science & Engineering	
TE 200	Introduction to Polymer Science and Engineering	
TE 201	Fiber Science	
TE 205	Analog and Digital Circuits	

### Basic Science Electives

Code	Title	Hours	Counts towards
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4	
BIO 183	Introductory Biology: Cellular and Molecular Biology	4	
CH 201	Chemistry - A Quantitative Science	3	
CH 202	Quantitative Chemistry Laboratory	1	
MEA 101	Geology I: Physical	3	
MEA 110	Geology I Laboratory	1	

### Engineering Topics III Elective

Code	Title	Hours	Counts towards
BAE 302	Transport Phenomena		
BAE 305	Biological Engineering Circuits		
BAE 321	Bioprocessing Engineering Fundamentals		

BAE 322	Introduction to Food Process Engineering		
BAE 325	Introductory Geomatics	3	
BAE 361	Analytical Methods in Engineering Design		
BAE 371	Fundamentals of Hydrology for Engineers		
BAE 376	Watershed Assessment and Water Quality Protection		
BAE 401	Sensors and Controls		
BAE 425	Industrial Microbiology and Bioprocessing		
BAE 435	Precision Agriculture Technology		
BAE 451	Engineering Design I		
BAE 452	Engineering Design II		
BAE 462	Machinery Design and Applications		
BAE 472	Irrigation and Drainage		
BAE 473	Introduction to Hydrologic and Water Quality Modeling		
BAE 474	Principles and Applications of Ecological Engineering		
BAE 481	Structures & Environment		
BAE 488	Postharvest Engineering		
BAE 492	External Learning Experience		
BAE 493	Special Problems in Biological and Agricultural Engineering		
BAE 495	Special Topics in Biological and Agricultural Engineering		
BAE 501	Sensors and Controls		
BAE 525	Industrial Microbiology and Bioprocessing		
BAE 535	Precision Agriculture Technology		
BAE 572	Irrigation and Drainage		
BAE 573	Introduction to Hydrologic and Water Quality Modeling		
BAE 578	Agricultural Waste Management		
BAET 332	Management of Animal Environments		
BAET 333	Processing Agricultural Products		
BAET 343	Agricultural Electrification		
BAET 411	Agricultural Machinery and Power Units		
BAET 432	Agricultural and Environmental Safety and Health		
BEC 462	Fundamentals of Bio-Nanotechnology		
BEC 463	Fermentation of Recombinant Microorganisms		
BEC 483	Tissue Engineering Technologies		
BEC 488	Animal Cell Culture Engineering	2	
BEC 562	Fundamentals of Bio-Nanotechnology		
BEC 563	Fermentation of Recombinant Microorganisms		
BEC 583	Tissue Engineering Technologies		
BIT 463	Fermentation of Recombinant Microorganisms		
BIT 464	Protein Purification		

BIT 563	Fermentation of Recombinant Microorganisms	BME 466	Polymeric Biomaterials Engineering
BIT 564	Protein Purification	BME 467	Mechanics of Tissues & Implants Requirements
BME 217	Biomedical Electronics Laboratory	BME 481	Quality Management Systems for Engineers
BME 301	Human Physiology : Electrical Analysis	BME 483	Tissue Engineering Technologies
BME 302	Human Physiology: Mechanical Analysis	BME 484	Fundamentals of Tissue Engineering
BME 315	Biotransport	BME 490	Special Topics in Biomedical Engineering
BME 325	Biochemistry for Biomedical Engineers	BME 498	Undergraduate Research in Biomedical Engineering
BME 335	Biomaterials	BME 518	Wearable Biosensors and Microsystems
BME 342	Analytical and Experimental Methods for Biomedical Engineers	BME 525	Bioelectricity
BME 345	Biomedical Solid Mechanics	BME 544	Orthopaedic Biomechanics
BME 355	Biocontrols	BME 566	Polymeric Biomaterials Engineering
BME 365	Linear Systems in Biomedical Engineering	BME 583	Tissue Engineering Technologies
BME 375	Biomedical Microcontroller Applications	BME 584	Fundamentals of Tissue Engineering
BME 385	Bioinstrumentation	BUS 340	Information Systems Management
BME 398	Biomedical Engineering Design and Manufacturing II	CE 225	Mechanics of Solids
BME 412	Biomedical Signal Processing	CE 282	Hydraulics
BME 418	Wearable Biosensors and Microsystems	CE 301	Civil Engineering Surveying and Geomatics
BME 425	Bioelectricity	CE 305	Introduction to Transportation Engineering
BME 444	Orthopaedic Biomechanics	CE 324	Structural Behavior Measurement
BME 451	BME Senior Design: Product Development	CE 325	Structural Analysis I
BME 452	BME Senior Design: Product Implementation and Strategy	CE 327	Reinforced Concrete Design
BME 462	Biomaterials Characterization		

CE 332	Civil Engineering Materials		CE 440	Geotechnical Engineering Project
CE 339	Civil Engineering Systems		CE 443	Seepage, Earth Embankments and Retaining Structures
CE 342	Engineering Behavior of Soils and Foundations		CE 444	An Introduction to Foundation Engineering
CE 365	Construction Equipment and Methods		CE 450	Civil Engineering Project
CE 367	Mechanical and Electrical Systems in Buildings		CE 463	Construction Estimating, Planning, and Control
CE 373	Fundamentals of Environmental Engineering		CE 464	Legal Aspects of Contracting
CE 378	Environmental Chemistry and Microbiology		CE 466	Building Construction Engineering
CE 381	Hydraulics Systems Measurements Lab		CE 468	Construction Engineering Laboratory
CE 383	Hydrology and Urban Water Systems		CE 469	Construction Engineering Project
CE 390	Engineering Economics		CE 476	Air Pollution Control
CE 400	Transportation Engineering Project		CE 477	Principles of Solid Waste Engineering
CE 401	Transportation Systems Engineering		CE 478	Energy and Climate
CE 402	Traffic Operations		CE 479	Air Quality
CE 403	Highway Design		CE 480	Water Resources Engineering Project
CE 405	Railroad System Planning, Design, and Operation	3	CE 481	Environmental Engineering Project
CE 413	Principles of Pavement Design		CE 484	Water Supply and Waste Water Systems
CE 420	Structural Engineering Project		CE 487	Introduction to Coastal and Ocean Engineering
CE 421	Structural Engineering Senior Project - Bridge Design		CE 488	Water Resources Engineering
CE 425	Structural Analysis II		CE 499	Undergraduate Research Thesis in Civil, Construction and Environmental Engineering
CE 426	Structural Steel Design			
CE 435	Engineering Geology			
CE 437	Civil Engineering Computing			

CE 501	Transportation Systems Engineering	CHE 460	Chemical Processing of Electronic Materials
CE 502	Traffic Operations	CHE 461	Polymer Sciences and Technology
CE 503	Highway Design	CHE 462	Fundamentals of Bio-Nanotechnology
CE 505	Railroad System Planning, Design, and Operation	CHE 463	Fermentation of Recombinant Microorganisms
CE 525	Advanced Structural Analysis	CHE 465	Colloidal and Nanoscale Engineering
CE 564	Legal Aspects of Contracting	CHE 467	Polymer Rheology
CE 568	Building Information Modeling in Construction	CHE 468	Conventional and Emerging Nanomanufacturing Techniques and Their Applications in Nanosystems
CE 578	Energy and Climate	CHE 488	Animal Cell Culture Engineering
CE 588	Water Resources Engineering	CHE 495	Honors Thesis Preparation
CH 335	Principles of Green Chemistry	CHE 497	Chemical Engineering Projects I
CHE 311	Transport Processes I	CHE 498	Chemical Engineering Projects II
CHE 312	Transport Processes II	CHE 562	Fundamentals of Bio-Nanotechnology
CHE 315	Chemical Process Thermodynamics	CHE 563	Fermentation of Recombinant Microorganisms
CHE 316	Thermodynamics of Chemical and Phase Equilibria	CHE 568	Conventional and Emerging Nanomanufacturing Techniques and Their Applications in Nanosystems
CHE 330	Chemical Engineering Lab I	CHE 575	Advances in Pollution Prevention: Environmental Management for the Future
CHE 331	Chemical Engineering Lab II	CSC 302	Introduction to Numerical Methods
CHE 395	Professional Development Seminar		
CHE 435	Process Systems Analysis and Control		
CHE 446	Design and Analysis of Chemical Reactors		
CHE 447	Bioreactor Engineering		
CHE 450	Chemical Engineering Design I		
CHE 451	Chemical Engineering Design II		

CSC 316	Data Structures and Algorithms	CSC 455	Social Computing and Decentralized Artificial Intelligence
CSC 326	Software Engineering	CSC 456	Computer Architecture and Multiprocessors
CSC 333	Automata, Grammars, and Computability	CSC 461	Computer Graphics
CSC 342	Applied Web-based Client-Server Computing	CSC 462	Advanced Computer Graphics Projects
CSC 379	Ethics in Computing	CSC 467	Multimedia Technology
CSC 401	Data and Computer Communications Networks	CSC 472	Cybersecurity Projects
CSC 402	Networking Projects	CSC 474	Network Security
CSC 405	Computer Security	CSC 481	Game Engine Foundations
CSC 406	Architecture Of Parallel Computers	CSC 482	Advanced Computer Game Projects
CSC 411	Introduction to Artificial Intelligence	CSC 484	Building Game AI
CSC 414	Foundations of Cryptography	CSC 492	Senior Design Project
CSC 415	Software Security	CSC 495	Special Topics in Computer Science
CSC 417	Theory of Programming Languages	CSC 499	Independent Research in Computer Science
CSC 422	Automated Learning and Data Analysis	CSC 506	Architecture Of Parallel Computers
CSC 427	Introduction to Numerical Analysis I	CSC 512	Compiler Construction
CSC 428	Introduction to Numerical Analysis II	CSC 514	Foundations of Cryptography
CSC 431	File Organization and Processing	CSC 522	Automated Learning and Data Analysis
CSC 433	Privacy in the Digital Age	CSC 584	Building Game AI
CSC 440	Database Management Systems	E 101	Introduction to Engineering & Problem Solving
CSC 442	Introduction to Data Science	E 304	Introduction to Nano Science and Technology
CSC 450	Web Services	E 480	Namibia Wildlife Aerial Observatory
CSC 453	Introduction to Internet of Things (IoT) Systems	E 490	Fundamentals of Engineering(FE) Exam Preparation

E 497	Engineering Research Projects	
ECE 301	Linear Systems	3
ECE 302	Microelectronics	
ECE 303	Electromagnetic Fields	
ECE 305	Principles of Electromechanical Energy Conversion	
ECE 306	Introduction to Embedded Systems	3
ECE 308	Elements of Control Systems	3
ECE 309	Data Structures and Object-Oriented Programming for Electrical and Computer Engineers	3
ECE 310	Design of Complex Digital Systems	3
ECE 331	Principles of Electrical Engineering	3
ECE 380	Engineering Profession for Electrical Engineers	1
ECE 381	Engineering Profession for Computer Engineers	1
ECE 383	Introduction to Entrepreneurship and New Product Development	1
ECE 384	Practical Engineering Prototyping	3
ECE 402	Communications Engineering	3
ECE 403	Electronics Engineering	3
ECE 404	Introduction to Solid-State Devices	3
ECE 406	Architecture Of Parallel Computers	3
ECE 407	Introduction to Computer Networking	3
ECE 418	Wearable Biosensors and Microsystems	3
ECE 420	Wireless Communication Systems	3
ECE 421	Introduction to Signal Processing	3
ECE 422	Transmission Lines and Antennas for Wireless	3
ECE 423	Introduction to Photonics and Optical Communications	3
ECE 424	Radio System Design	3
ECE 426	Analog Electronics Laboratory	3
ECE 434	Fundamentals of Power Electronics	3
ECE 436	Digital Control Systems	3
ECE 442	Introduction to Integrated Circuit Technology and Fabrication	3
ECE 451	Power System Analysis	3
ECE 452	Renewable Electric Energy Systems	3
ECE 453	Electric Motor Drives	3
ECE 455	Industrial Robot Systems	3
ECE 456	Mechatronics	3
ECE 460	Embedded System Architectures	3
ECE 461	Embedded System Design	3
ECE 463	Microprocessor Architecture	3
ECE 464	ASIC and FPGA Design with Verilog	3
ECE 466	Compiler Optimization and Scheduling	3

ECE 468	Conventional and Emerging Nanomanufacturing Techniques and Their Applications in Nanosystems	3	ECE 563	Microprocessor Architecture	3
ECE 470	Internetworking	3	ECE 564	ASIC and FPGA Design with Verilog	3
ECE 482	Engineering Entrepreneurship and New Product Development I	3	ECE 566	Compiler Optimization and Scheduling	3
ECE 483	Engineering Entrepreneurship and New Product Development II	3	ECE 568	Conventional and Emerging Nanomanufacturing Techniques and Their Applications in Nanosystems	3
ECE 484	Electrical and Computer Engineering Senior Design Project I	3	ECE 588	Systems Biology Modeling of Plant Regulation	3
ECE 485	Electrical and Computer Engineering Senior Design Project II	3	ECE 589	Solid State Solar and Thermal Energy Harvesting	3
ECE 488	Systems Biology Modeling of Plant Regulation	3	FB 576	Environmental Life Cycle Analysis	
ECE 489	Solid State Solar and Thermal Energy Harvesting	3	ISE 311	Engineering Economic Analysis	3
ECE 492	Special Topics in Electrical and Computer Engineering	1-4	ISE 315	Introduction to Computer-Aided Manufacturing	1
ECE 495	Individual Study in ECE	1-3	ISE 316	Manufacturing Engineering I - Processes	3
ECE 498	Special Projects in ECE	1-3	ISE 352	Fundamentals of Human-Machine Systems Design	3
ECE 506	Architecture Of Parallel Computers	3	ISE 361	Deterministic Models in Industrial Engineering	3
ECE 518	Wearable Biosensors and Microsystems	3	ISE 362	Stochastic Models in Industrial Engineering	3
ECE 524	Radio System Design	3	ISE 408	Design and Control of Production and Service Systems	3
ECE 552	Renewable Electric Energy Systems	3	ISE 411	Supply Chain Economics and Decision Making	3
ECE 556	Mechatronics	3	ISE 413	Humanitarian Logistics	3
ECE 560	Embedded System Architectures	3	ISE 416	Manufacturing Engineering II - Automation	3
ECE 561	Embedded System Design	3			

ISE 417	Database Applications in Industrial & Systems Engineering	3	MA 427	Introduction to Numerical Analysis I	3
ISE 435	Python Programming for Industrial & Systems Engineers	3	MA 428	Introduction to Numerical Analysis II	3
ISE 437	Data Analytics for Industrial Engineering	3	MA 514	Foundations of Cryptography	3
ISE 441	Introduction to Simulation	3	MAE 201	Engineering Thermodynamics I	3
ISE 443	Quality Design and Control	3	MAE 214	Solid Mechanics	3
ISE 447	Applications of Data Science in Healthcare	3	MAE 252	Aerodynamics I	3
ISE 452	Advanced Human-Machine Systems Design	3	MAE 253	Experimental Aerodynamics I	1
ISE 453	Modeling and Analysis of Supply Chains	3	MAE 302	Engineering Thermodynamics II	3
ISE 462	Advanced Stochastic Models in Industrial Engineering	3	MAE 305	Mechanical Engineering Laboratory I	1
ISE 489	Special Topics in Industrial and Systems Engineering	1-3	MAE 306	Mechanical Engineering Laboratory II	1
ISE 495	Project Work in Industrial Engineering	1-3	MAE 308	Fluid Mechanics	3
ISE 498	Senior Design Project	3	MAE 310	Heat Transfer Fundamentals	3
ISE 511	Supply Chain Economics and Decision Making	3	MAE 315	Dynamics of Machines	3
ISE 513	Humanitarian Logistics	3	MAE 316	Strength of Mechanical Components	3
ISE 535	Python Programming for Industrial & Systems Engineers	3	MAE 342	Introduction to Automotive Engineering	3
ISE 547	Applications of Data Science in Healthcare	3	MAE 351	Aerodynamics II	3
MA 414	Foundations of Cryptography	3	MAE 352	Experimental Aerodynamics II	1
MA 416	Introduction to Combinatorics	3	MAE 361	Dynamics & Controls	3
			MAE 371	Aerospace Structures I	3
			MAE 372	Aerospace Vehicle Structures Lab	1
			MAE 403	Air Conditioning	3
			MAE 405	Controls Lab	1
			MAE 406	Energy Conservation in Industry	3
			MAE 407	Steam and Gas Turbines	3
			MAE 408	Internal Combustion Engine Fundamentals	3

MAE 410	Modern Manufacturing Processes	3	MAE 483	Engineering Entrepreneurship and New Product Development II	3
MAE 412	Design of Thermal System	3	MAE 484	Engineering Entrepreneurship Senior Design Lab	1
MAE 413	Design of Mechanical Systems	3	MAE 495	Special Topics in Mechanical and Aerospace Engineering	1-3
MAE 415	Mechanical Engineering Design I	3	MAE 496	Undergraduate Project Work in Mechanical and Aerospace Engineering	1-6
MAE 416	Mechanical Engineering Design	4	MAE 520	Dynamic Analysis of Human Movement	3
MAE 420	Dynamic Analysis of Human Movement	3	MAE 526	Fundamentals of Product Design	3
MAE 421	Design of Solar Energy Systems	3	MEA 479	Air Quality	
MAE 426	Fundamentals of Product Design	3	MSE 260	Mathematical Methods for Materials Engineers	3
MAE 430	Applied Finite Element Analysis	3	MSE 300	Structure of Materials at the Nanoscale	3
MAE 435	Principles of Automatic Control	3	MSE 301	Introduction to Thermodynamics of Materials	3
MAE 440	Non-Destructive Testing and Evaluation	3	MSE 320	Introduction to Defects in Solids	3
MAE 451	Experimental Aerodynamics III	1	MSE 335	Experimental Methods for Analysis of Material Properties	2
MAE 452	Aerodynamics of V/STOL Vehicles	3	MSE 355	Electrical, Magnetic and Optical Properties of Materials	3
MAE 455	Boundary Layer Theory	3	MSE 360	Kinetic Processes in Materials	3
MAE 456	Computational Methods in Aerodynamics	3	MSE 370	Microstructure of Inorganic Materials	3
MAE 457	Flight Vehicle Stability and Control	3	MSE 380	Microstructure of Organic Materials	3
MAE 458	Propulsion	3	MSE 409	Nuclear Materials	3
MAE 459	Rocket Propulsion	3	MSE 420	Mechanical Properties of Materials	3
MAE 467	Introduction to Space Flight	3			
MAE 472	Aerospace Structures II	3			
MAE 480	Aerospace Vehicle Design I	3			
MAE 481	Aerospace Vehicle Design II	3			
MAE 482	Engineering Entrepreneurship and New Product Development I	3			

MSE 423	Introduction to Materials Engineering Design	1	NE 401	Reactor Analysis and Design	3
MSE 440	Processing of Metallic Materials	3	NE 402	Reactor Engineering	4
MSE 445	Ceramic Processing	3	NE 403	Nuclear Reactor Laboratory	2
MSE 455	Polymer Technology and Engineering	3	NE 404	Radiation Safety and Shielding	3
MSE 456	Composite Materials	3	NE 405	Reactor Systems	3
MSE 460	Microelectronic Materials	3	NE 406	Nuclear Engineering Senior Design Preparation	1
MSE 465	Introduction to Nanomaterials	3	NE 408	Nuclear Engineering Design Project	3
MSE 470	Materials Science and Engineering Senior Design Project	3	NE 409	Nuclear Materials	3
MSE 480	Materials Forensics and Degradation	3	NE 412	Nuclear Fuel Cycles	3
MSE 485	Biomaterials	3	NE 418	Nuclear Power Plant Instrumentation	3
MSE 489	Solid State Solar and Thermal Energy Harvesting	3	NE 419	Introduction to Nuclear Energy	3
MSE 490	Special Topics in Materials Engineering	1-4	NE 431	Nuclear Waste Management	3
MSE 495	Materials Engineering Projects	1-6	NE 490	Health Physics and Radiological Emergency Response	3
MSE 509	Nuclear Materials	3	NE 491	Special Topics in Nuclear Engineering	1-4
MSE 540	Processing of Metallic Materials	3	NE 501	Reactor Analysis and Design	3
MSE 545	Ceramic Processing	3	NE 509	Nuclear Materials	3
MSE 556	Composite Materials	3	NE 531	Nuclear Waste Management	3
MSE 565	Introduction to Nanomaterials	3	NE 590	Health Physics and Radiological Emergency Response	3
MSE 580	Materials Forensics and Degradation	3	PB 488/588	Systems Biology Modeling of Plant Regulation	
MSE 589	Solid State Solar and Thermal Energy Harvesting	3	PSE 322	Wet End and Polymer Chemistry	
NE 301	Fundamentals of Nuclear Engineering		PSE 332	Wood and Pulping Chemistry	
NE 400	Nuclear Reactor Energy Conversion		PSE 335	Principles of Green Chemistry	
			PSE 355	Pulp and Paper Unit Processes I	
			PSE 360	Pulp and Paper Unit Processes II	

PSE 370	Pulp and Paper Products and Markets	SSC 473	Introduction to Hydrologic and Water Quality Modeling
PSE 371	Pulping Process Analysis	SSC 540	Geographic Information Systems (GIS) in Soil Science and Agriculture
PSE 415	Paper Industry Strategic Project Analysis	SSC 573	Introduction to Hydrologic and Water Quality Modeling
PSE 416	Process Design and Analysis	ST 442	Introduction to Data Science
PSE 417	Modeling & Simulation of Pulp & Paper Processes	TE 301	Engineering Textile Structures I: Linear Assemblies
PSE 425	Bioenergy & Biomaterials Engineering	TE 302	Textile Manufacturing Processes and Systems II
PSE 465	Process Engineering	TE 303	Thermodynamics for Textile Engineers
PSE 472	Paper Process Analysis	TE 401	Textile Engineering Design I
PSE 475	Process Control in Pulp and Paper	TE 402	Textile Engineering Design II
PSE 476	Environmental Life Cycle Analysis	TE 404	Textile Engineering Lean SixSigma Quality
PSE 493	Independent Study in Paper Science & Engineering	TE 424	Textile Engineering Quality Improvement Laboratory
PSE 494	Independent Study in Paper Science & Engineering	TE 435	Process Systems Analysis and Control
PY 414	Electromagnetism I	TE 440	Textile Information Systems Design
PY 415	Electromagnetism II	TE 463	Polymer Engineering
PY 489	Solid State Solar and Thermal Energy Harvesting	TE 466	Polymeric Biomaterials Engineering
PY 514	Electromagnetism I	TE 467	Mechanics of Tissues & Implants Requirements
PY 515	Electromagnetism II	TE 492	Special Topics in Textile Engineering
PY 589	Solid State Solar and Thermal Energy Harvesting		
SSC 440	Geographic Information Systems (GIS) in Soil Science and Agriculture		

TE 540 Textile  
Information  
Systems Design

TE 566 Polymeric  
Biomaterials  
Engineering

## Engineering Electives 300- or 400-Level

Code	Title	Hours	Counts towards
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BAE 302 Transport  
Phenomena

BAE 305 Biological  
Engineering  
Circuits

BAE 321 Bioprocessing  
Engineering  
Fundamentals

BAE 322 Introduction to  
Food Process  
Engineering

BAE 325 Introductory  
Geomatics 3

BAE 361 Analytical  
Methods in  
Engineering  
Design

BAE 371 Fundamentals  
of Hydrology for  
Engineers

BAE 376 Watershed  
Assessment and  
Water Quality  
Protection

BAE 401 Sensors and  
Controls

BAE 425 Industrial  
Microbiology and  
Bioprocessing

BAE 435 Precision  
Agriculture  
Technology

BAE 451 Engineering  
Design I

BAE 452 Engineering  
Design II

BAE 462 Machinery  
Design and  
Applications

BAE 472 Irrigation and  
Drainage

BAE 473 Introduction to  
Hydrologic and  
Water Quality  
Modeling

BAE 474 Principles and  
Applications  
of Ecological  
Engineering

BAE 478 Agricultural  
Waste  
Management

BAE 481 Structures &  
Environment

BAE 488 Postharvest  
Engineering

BAE 492 External Learning  
Experience

BAE 493 Special Problems  
in Biological  
and Agricultural  
Engineering

BAE 495 Special Topics  
in Biological  
and Agricultural  
Engineering

BAE 501 Sensors and  
Controls

BAE 535 Precision  
Agriculture  
Technology

BAE 572 Irrigation and  
Drainage

BAE 573 Introduction to  
Hydrologic and  
Water Quality  
Modeling

BAE 578 Agricultural  
Waste  
Management

BAET 323 Water  
Management

BAET 332 Management  
of Animal  
Environments

BAET 333 Processing  
Agricultural  
Products

BAET 343 Agricultural  
Electrification

BAET 411 Agricultural  
Machinery and  
Power Units

BAET 432 Agricultural and  
Environmental  
Safety and  
Health

BEC 462 Fundamentals  
of Bio-  
Nanotechnology

BEC 463 Fermentation  
of Recombinant  
Microorganisms

BEC 483 Tissue  
Engineering  
Technologies

BEC 488	Animal Cell Culture Engineering			BME 412	Biomedical Signal Processing		3
BEC 562	Fundamentals of Bio-Nanotechnology			BME 418	Wearable Biosensors and Microsystems		3
BEC 563	Fermentation of Recombinant Microorganisms			BME 425	Bioelectricity		3
BEC 583	Tissue Engineering Technologies			BME 444	Orthopaedic Biomechanics		3
BIT 463	Fermentation of Recombinant Microorganisms			BME 451	BME Senior Design: Product Development		3
BIT 464	Protein Purification			BME 452	BME Senior Design: Product Implementation and Strategy		3
BIT 563	Fermentation of Recombinant Microorganisms			BME 462	Biomaterials Characterization		3
BIT 564	Protein Purification			BME 466	Polymeric Biomaterials Engineering		3
BME 217	Biomedical Electronics Laboratory			BME 467	Mechanics of Tissues & Implants Requirements		3
BME 301	Human Physiology : Electrical Analysis			BME 481	Quality Management Systems for Engineers		3
BME 302	Human Physiology: Mechanical Analysis			BME 483	Tissue Engineering Technologies		2
BME 315	Biotransport			BME 484	Fundamentals of Tissue Engineering		3
BME 325	Biochemistry for Biomedical Engineers			BME 490	Special Topics in Biomedical Engineering		1-4
BME 335	Biomaterials			BME 498	Undergraduate Research in Biomedical Engineering		3
BME 342	Analytical and Experimental Methods for Biomedical Engineers			BME 518	Wearable Biosensors and Microsystems		3
BME 345	Biomedical Solid Mechanics		3	BME 525	Bioelectricity		3
BME 355	Biocontrols		3	BME 544	Orthopaedic Biomechanics		3
BME 365	Linear Systems in Biomedical Engineering		3	BME 566	Polymeric Biomaterials Engineering		3
BME 375	Biomedical Microcontroller Applications		3	BME 583	Tissue Engineering Technologies		2
BME 385	Bioinstrumentation		3	BME 584	Fundamentals of Tissue Engineering		3
BME 398	Biomedical Engineering Design and Manufacturing II		2				

BUS 340	Information Systems Management		CE 405	Railroad System Planning, Design, and Operation	3
CE 225	Mechanics of Solids	3	CE 413	Principles of Pavement Design	3
CE 282	Hydraulics	3	CE 420	Structural Engineering Project	3
CE 301	Civil Engineering Surveying and Geomatics	3	CE 421	Structural Engineering Senior Project - Bridge Design	3
CE 305	Introduction to Transportation Engineering	3	CE 425	Structural Analysis II	3
CE 324	Structural Behavior Measurement	1	CE 426	Structural Steel Design	3
CE 325	Structural Analysis I	3	CE 435	Engineering Geology	3
CE 327	Reinforced Concrete Design	3	CE 437	Civil Engineering Computing	3
CE 332	Civil Engineering Materials	3	CE 440	Geotechnical Engineering Project	3
CE 339	Civil Engineering Systems	3	CE 443	Seepage, Earth Embankments and Retaining Structures	3
CE 342	Engineering Behavior of Soils and Foundations	4	CE 444	An Introduction to Foundation Engineering	3
CE 365	Construction Equipment and Methods	3	CE 450	Civil Engineering Project	3
CE 367	Mechanical and Electrical Systems in Buildings	3	CE 463	Construction Estimating, Planning, and Control	3
CE 373	Fundamentals of Environmental Engineering	3	CE 464	Legal Aspects of Contracting	3
CE 378	Environmental Chemistry and Microbiology	4	CE 466	Building Construction Engineering	3
CE 381	Hydraulics Systems Measurements Lab	1	CE 468	Construction Engineering Laboratory	1
CE 383	Hydrology and Urban Water Systems	3	CE 469	Construction Engineering Project	3
CE 390	Engineering Economics	1	CE 476	Air Pollution Control	3
CE 400	Transportation Engineering Project	3	CE 477	Principles of Solid Waste Engineering	3
CE 401	Transportation Systems Engineering	3	CE 478	Energy and Climate	3
CE 402	Traffic Operations	3	CE 479	Air Quality	3
CE 403	Highway Design	3	CE 480	Water Resources Engineering Project	3

CE 481	Environmental Engineering Project	3	CHE 316	Thermodynamics of Chemical and Phase Equilibria	3
CE 484	Water Supply and Waste Water Systems	3	CHE 330	Chemical Engineering Lab I	4
CE 487	Introduction to Coastal and Ocean Engineering	3	CHE 331	Chemical Engineering Lab II	2
CE 488	Water Resources Engineering	3	CHE 395	Professional Development Seminar	1
CE 493	Independent Study in Civil Engineering	1-4	CHE 435	Process Systems Analysis and Control	3
CE 497	Current Topics in Civil Engineering	1-4	CHE 446	Design and Analysis of Chemical Reactors	3
CE 498	Special Problems in Civil Engineering	1-4	CHE 447	Bioreactor Engineering	3
CE 499	Undergraduate Research Thesis in Civil, Construction and Environmental Engineering	1-3	CHE 450	Chemical Engineering Design I	3
CE 501	Transportation Systems Engineering	3	CHE 451	Chemical Engineering Design II	3
CE 502	Traffic Operations	3	CHE 460	Chemical Processing of Electronic Materials	3
CE 503	Highway Design	3	CHE 461	Polymer Sciences and Technology	3
CE 505	Railroad System Planning, Design, and Operation	3	CHE 462	Fundamentals of Bio-Nanotechnology	3
CE 525	Advanced Structural Analysis	3	CHE 463	Fermentation of Recombinant Microorganisms	2
CE 564	Legal Aspects of Contracting	3	CHE 465	Colloidal and Nanoscale Engineering	3
CE 568	Building Information Modeling in Construction	1	CHE 467	Polymer Rheology	3
CE 578	Energy and Climate	3	CHE 468	Conventional and Emerging Nanomanufacturing Techniques and Their Applications in Nanosystems	3
CE 588	Water Resources Engineering	3	CHE 475	Advances in Pollution Prevention: Environmental Management for the Future	3
CH 335	Principles of Green Chemistry				
CHE 311	Transport Processes I	3			
CHE 312	Transport Processes II	3			
CHE 315	Chemical Process Thermodynamics	3			

CHE 488	Animal Cell Culture Engineering	2	CSC 411	Introduction to Artificial Intelligence	3
CHE 495	Honors Thesis Preparation	1	CSC 412	Compiler Construction	3
CHE 497	Chemical Engineering Projects I	3	CSC 414	Foundations of Cryptography	3
CHE 498	Chemical Engineering Projects II	1-3	CSC 415	Software Security	3
CHE 562	Fundamentals of Bio-Nanotechnology	3	CSC 416	Introduction to Combinatorics	3
CHE 563	Fermentation of Recombinant Microorganisms	2	CSC 417	Theory of Programming Languages	3
CHE 568	Conventional and Emerging Nanomanufacturing Techniques and Their Applications in Nanosystems	3	CSC 422	Automated Learning and Data Analysis	3
CHE 575	Advances in Pollution Prevention: Environmental Management for the Future	3	CSC 427	Introduction to Numerical Analysis I	3
CSC 302	Introduction to Numerical Methods	3	CSC 428	Introduction to Numerical Analysis II	3
CSC 316	Data Structures and Algorithms	3	CSC 431	File Organization and Processing	3
CSC 326	Software Engineering	4	CSC 433	Privacy in the Digital Age	3
CSC 333	Automata, Grammars, and Computability	3	CSC 440	Database Management Systems	3
CSC 342	Applied Web-based Client-Server Computing	3	CSC 442	Introduction to Data Science	3
CSC 379	Ethics in Computing	1	CSC 450	Web Services	3
CSC 401	Data and Computer Communications Networks	3	CSC 453	Introduction to Internet of Things (IoT) Systems	3
CSC 402	Networking Projects	3	CSC 454	Human-Computer Interaction	3
CSC 405	Computer Security	3	CSC 455	Social Computing and Decentralized Artificial Intelligence	3
CSC 406	Architecture Of Parallel Computers	3	CSC 456	Computer Architecture and Multiprocessors	3
			CSC 461	Computer Graphics	3
			CSC 462	Advanced Computer Graphics Projects	3
			CSC 467	Multimedia Technology	3
			CSC 472	Cybersecurity Projects	3
			CSC 474	Network Security	3

CSC 481	Game Engine Foundations	3	ECE 309	Data Structures and Object-Oriented Programming for Electrical and Computer Engineers	3
CSC 482	Advanced Computer Game Projects	3	ECE 310	Design of Complex Digital Systems	3
CSC 484	Building Game AI	3	ECE 331	Principles of Electrical Engineering	3
CSC 492	Senior Design Project	3	ECE 380	Engineering Profession for Electrical Engineers	1
CSC 495	Special Topics in Computer Science	1-6	ECE 381	Engineering Profession for Computer Engineers	1
CSC 499	Independent Research in Computer Science	1-6	ECE 383	Introduction to Entrepreneurship and New Product Development	1
CSC 506	Architecture Of Parallel Computers	3	ECE 384	Practical Engineering Prototyping	3
CSC 512	Compiler Construction	3	ECE 402	Communications Engineering	3
CSC 514	Foundations of Cryptography	3	ECE 403	Electronics Engineering	3
CSC 522	Automated Learning and Data Analysis	3	ECE 404	Introduction to Solid-State Devices	3
CSC 584	Building Game AI	3	ECE 406	Architecture Of Parallel Computers	3
E 101	Introduction to Engineering & Problem Solving	1	ECE 407	Introduction to Computer Networking	3
E 304	Introduction to Nano Science and Technology	3	ECE 418	Wearable Biosensors and Microsystems	3
E 480	Namibia Wildlife Aerial Observatory	6	ECE 420	Wireless Communication Systems	3
E 490	Fundamentals of Engineering(FE) Exam Preparation	1	ECE 421	Introduction to Signal Processing	3
E 497	Engineering Research Projects	1-3	ECE 422	Transmission Lines and Antennas for Wireless	3
ECE 301	Linear Systems	3	ECE 423	Introduction to Photonics and Optical Communications	3
ECE 302	Microelectronics	4			
ECE 303	Electromagnetic Fields	3			
ECE 305	Principles of Electromechanical Energy Conversion	3			
ECE 306	Introduction to Embedded Systems	3			
ECE 308	Elements of Control Systems	3			

ECE 424	Radio System Design	3	ECE 485	Electrical and Computer Engineering Senior Design Project II	3
ECE 426	Analog Electronics Laboratory	3	ECE 488	Systems Biology Modeling of Plant Regulation	3
ECE 434	Fundamentals of Power Electronics	3	ECE 489	Solid State Solar and Thermal Energy Harvesting	3
ECE 436	Digital Control Systems	3	ECE 492	Special Topics in Electrical and Computer Engineering	1-4
ECE 442	Introduction to Integrated Circuit Technology and Fabrication	3	ECE 495	Individual Study in ECE	1-3
ECE 451	Power System Analysis	3	ECE 498	Special Projects in ECE	1-3
ECE 452	Renewable Electric Energy Systems	3	ECE 506	Architecture Of Parallel Computers	3
ECE 453	Electric Motor Drives	3	ECE 518	Wearable Biosensors and Microsystems	3
ECE 455	Industrial Robot Systems	3	ECE 524	Radio System Design	3
ECE 456	Mechatronics	3	ECE 552	Renewable Electric Energy Systems	3
ECE 460	Embedded System Architectures	3	ECE 556	Mechatronics	3
ECE 461	Embedded System Design	3	ECE 560	Embedded System Architectures	3
ECE 463	Microprocessor Architecture	3	ECE 561	Embedded System Design	3
ECE 464	ASIC and FPGA Design with Verilog	3	ECE 563	Microprocessor Architecture	3
ECE 466	Compiler Optimization and Scheduling	3	ECE 564	ASIC and FPGA Design with Verilog	3
ECE 468	Conventional and Emerging Nanomanufacturing Techniques and Their Applications in Nanosystems	3	ECE 566	Compiler Optimization and Scheduling	3
ECE 470	Internetworking	3	ECE 568	Conventional and Emerging Nanomanufacturing Techniques and Their Applications in Nanosystems	3
ECE 482	Engineering Entrepreneurship and New Product Development I	3	ECE 588	Systems Biology Modeling of Plant Regulation	3
ECE 483	Engineering Entrepreneurship and New Product Development II	3			
ECE 484	Electrical and Computer Engineering Senior Design Project I	3			

ECE 589	Solid State Solar and Thermal Energy Harvesting	3	ISE 447	Applications of Data Science in Healthcare	3
FB 576	Environmental Life Cycle Analysis		ISE 452	Advanced Human-Machine Systems Design	3
ISE 311	Engineering Economic Analysis	3	ISE 453	Modeling and Analysis of Supply Chains	3
ISE 315	Introduction to Computer-Aided Manufacturing	1	ISE 462	Advanced Stochastic Models in Industrial Engineering	3
ISE 316	Manufacturing Engineering I - Processes	3	ISE 489	Special Topics in Industrial and Systems Engineering	1-3
ISE 352	Fundamentals of Human-Machine Systems Design	3	ISE 495	Project Work in Industrial Engineering	1-3
ISE 361	Deterministic Models in Industrial Engineering	3	ISE 498	Senior Design Project	3
ISE 362	Stochastic Models in Industrial Engineering	3	ISE 511	Supply Chain Economics and Decision Making	3
ISE 408	Design and Control of Production and Service Systems	3	ISE 513	Humanitarian Logistics	3
ISE 411	Supply Chain Economics and Decision Making	3	ISE 535	Python Programming for Industrial & Systems Engineers	3
ISE 413	Humanitarian Logistics	3	ISE 547	Applications of Data Science in Healthcare	3
ISE 416	Manufacturing Engineering II - Automation	3	MA 414	Foundations of Cryptography	
ISE 417	Database Applications in Industrial & Systems Engineering	3	MA 416	Introduction to Combinatorics	
ISE 435	Python Programming for Industrial & Systems Engineers	3	MA 427	Introduction to Numerical Analysis I	
ISE 437	Data Analytics for Industrial Engineering	3	MA 428	Introduction to Numerical Analysis II	
ISE 441	Introduction to Simulation	3	MA 514	Foundations of Cryptography	
ISE 443	Quality Design and Control	3	MAE 201	Engineering Thermodynamics I	
			MAE 214	Solid Mechanics	
			MAE 253	Experimental Aerodynamics I	
			MAE 302	Engineering Thermodynamics II	

MAE 305	Mechanical Engineering Laboratory I		
MAE 306	Mechanical Engineering Laboratory II	1	
MAE 308	Fluid Mechanics	3	
MAE 310	Heat Transfer Fundamentals	3	
MAE 315	Dynamics of Machines	3	
MAE 316	Strength of Mechanical Components	3	
MAE 342	Introduction to Automotive Engineering	3	
MAE 351	Aerodynamics II	3	
MAE 352	Experimental Aerodynamics II	1	
MAE 361	Dynamics & Controls	3	
MAE 371	Aerospace Structures I	3	
MAE 372	Aerospace Vehicle Structures Lab	1	
MAE 403	Air Conditioning	3	
MAE 405	Controls Lab	1	
MAE 406	Energy Conservation in Industry	3	
MAE 407	Steam and Gas Turbines	3	
MAE 408	Internal Combustion Engine Fundamentals	3	
MAE 410	Modern Manufacturing Processes	3	
MAE 412	Design of Thermal System	3	
MAE 413	Design of Mechanical Systems	3	
MAE 415	Mechanical Engineering Design I	3	
MAE 416	Mechanical Engineering Design	4	
MAE 420	Dynamic Analysis of Human Movement	3	
MAE 421	Design of Solar Energy Systems	3	
MAE 426	Fundamentals of Product Design	3	
MAE 430	Applied Finite Element Analysis	3	
MAE 435	Principles of Automatic Control	3	
MAE 440	Non-Destructive Testing and Evaluation	3	
MAE 451	Experimental Aerodynamics III	1	
MAE 452	Aerodynamics of V/STOL Vehicles	3	
MAE 455	Boundary Layer Theory	3	
MAE 456	Computational Methods in Aerodynamics	3	
MAE 457	Flight Vehicle Stability and Control	3	
MAE 458	Propulsion	3	
MAE 459	Rocket Propulsion	3	
MAE 467	Introduction to Space Flight	3	
MAE 472	Aerospace Structures II	3	
MAE 480	Aerospace Vehicle Design I	3	
MAE 481	Aerospace Vehicle Design II	3	
MAE 482	Engineering Entrepreneurship and New Product Development I	3	
MAE 483	Engineering Entrepreneurship and New Product Development II	3	
MAE 484	Engineering Entrepreneurship Senior Design Lab	1	
MAE 495	Special Topics in Mechanical and Aerospace Engineering	1-3	
MAE 496	Undergraduate Project Work in Mechanical and Aerospace Engineering	1-6	
MAE 520	Dynamic Analysis of Human Movement	3	

MAE 526	Fundamentals of Product Design	3	MSE 480	Materials Forensics and Degradation	3
MEA 479	Air Quality		MSE 485	Biomaterials	3
MSE 260	Mathematical Methods for Materials Engineers	3	MSE 489	Solid State Solar and Thermal Energy Harvesting	3
MSE 300	Structure of Materials at the Nanoscale	3	MSE 490	Special Topics in Materials Engineering	1-4
MSE 301	Introduction to Thermodynamics of Materials	3	MSE 495	Materials Engineering Projects	1-6
MSE 320	Introduction to Defects in Solids	3	MSE 509	Nuclear Materials	3
MSE 335	Experimental Methods for Analysis of Material Properties	2	MSE 540	Processing of Metallic Materials	3
MSE 355	Electrical, Magnetic and Optical Properties of Materials	3	MSE 545	Ceramic Processing	3
MSE 360	Kinetic Processes in Materials	3	MSE 556	Composite Materials	3
MSE 370	Microstructure of Inorganic Materials	3	MSE 565	Introduction to Nanomaterials	3
MSE 380	Microstructure of Organic Materials	3	MSE 580	Materials Forensics and Degradation	3
MSE 409	Nuclear Materials	3	MSE 589	Solid State Solar and Thermal Energy Harvesting	3
MSE 420	Mechanical Properties of Materials	3	NE 301	Fundamentals of Nuclear Engineering	3
MSE 423	Introduction to Materials Engineering Design	1	NE 400	Nuclear Reactor Energy Conversion	4
MSE 440	Processing of Metallic Materials	3	NE 401	Reactor Analysis and Design	3
MSE 445	Ceramic Processing	3	NE 402	Reactor Engineering	4
MSE 455	Polymer Technology and Engineering	3	NE 403	Nuclear Reactor Laboratory	2
MSE 456	Composite Materials	3	NE 404	Radiation Safety and Shielding	3
MSE 460	Microelectronic Materials	3	NE 405	Reactor Systems	3
MSE 465	Introduction to Nanomaterials	3	NE 406	Nuclear Engineering Senior Design Preparation	1
MSE 470	Materials Science and Engineering Senior Design Project	3	NE 408	Nuclear Engineering Design Project	3
			NE 409	Nuclear Materials	3
			NE 412	Nuclear Fuel Cycles	3

NE 418	Nuclear Power Plant Instrumentation	3	PSE 472	Paper Process Analysis	
NE 419	Introduction to Nuclear Energy	3	PSE 475	Process Control in Pulp and Paper	
NE 431	Nuclear Waste Management	3	PSE 476	Environmental Life Cycle Analysis	
NE 490	Health Physics and Radiological Emergency Response	3	PSE 493	Independent Study in Paper Science & Engineering	
NE 491	Special Topics in Nuclear Engineering	1-4	PSE 494	Independent Study in Paper Science & Engineering	
NE 501	Reactor Analysis and Design	3	PY 414/514	Electromagnetism I	
NE 509	Nuclear Materials	3	PY 415/515	Electromagnetism II	
NE 531	Nuclear Waste Management	3	PY 489/589	Solid State Solar and Thermal Energy Harvesting	
NE 590	Health Physics and Radiological Emergency Response	3	SSC 440/540	Geographic Information Systems (GIS) in Soil Science and Agriculture	3
PB 488/588	Systems Biology Modeling of Plant Regulation		SSC 473/573	Introduction to Hydrologic and Water Quality Modeling	3
PSE 322	Wet End and Polymer Chemistry	4	ST 442	Introduction to Data Science	3
PSE 332	Wood and Pulping Chemistry		TE 301	Engineering Textile Structures I: Linear Assemblies	3
PSE 335	Principles of Green Chemistry		TE 302	Textile Manufacturing Processes and Systems II	
PSE 355	Pulp and Paper Unit Processes I		TE 303	Thermodynamics for Textile Engineers	
PSE 360	Pulp and Paper Unit Processes II		TE 401	Textile Engineering Design I	
PSE 370	Pulp and Paper Products and Markets		TE 402	Textile Engineering Design II	
PSE 371	Pulping Process Analysis		TE 404	Textile Engineering Lean SixSigma Quality	
PSE 415	Paper Industry Strategic Project Analysis				
PSE 416	Process Design and Analysis				
PSE 417	Modeling & Simulation of Pulp & Paper Processes				
PSE 425	Bioenergy & Biomaterials Engineering				
PSE 465	Process Engineering				

TE 424	Textile Engineering Quality Improvement Laboratory
TE 435	Process Systems Analysis and Control
TE 440	Textile Information Systems Design
TE 463	Polymer Engineering
TE 466	Polymeric Biomaterials Engineering
TE 467	Mechanics of Tissues & Implants Requirements
TE 492	Special Topics in Textile Engineering
TE 540	Textile Information Systems Design
TE 566	Polymeric Biomaterials Engineering

## Communication Electives

Code	Title	Hours	Counts towards
COM 110	Public Speaking	3	
COM 112	Interpersonal Communication	3	
COM 201	Introduction to Persuasion Theory	3	
COM 202	Small Group Communication	3	
ENG 331	Communication for Engineering and Technology	3	
ENG 333	Communication for Science and Research	3	

## Engineering Topics IV Electives

Code	Title	Hours	Counts towards
BAE 302	Transport Phenomena		
BAE 322	Introduction to Food Process Engineering		
BAE 371	Fundamentals of Hydrology for Engineers		

BAE 401	Sensors and Controls
BAE 425	Industrial Microbiology and Bioprocessing
BAE 435	Precision Agriculture Technology
BAE 451	Engineering Design I
BAE 452	Engineering Design II
BAE 462	Machinery Design and Applications
BAE 472	Irrigation and Drainage
BAE 473	Introduction to Hydrologic and Water Quality Modeling
BAE 474	Principles and Applications of Ecological Engineering
BAE 478	Agricultural Waste Management
BAE 481	Structures & Environment
BAE 488	Postharvest Engineering
BAE 492	External Learning Experience
BAE 493	Special Problems in Biological and Agricultural Engineering
BAE 495	Special Topics in Biological and Agricultural Engineering
BAE 501	Sensors and Controls
BAE 535	Precision Agriculture Technology
BAE 572	Irrigation and Drainage
BAE 573	Introduction to Hydrologic and Water Quality Modeling
BAE 578	Agricultural Waste Management

BAET 432	Agricultural and Environmental Safety and Health			BME 467	Mechanics of Tissues & Implants Requirements		3
BEC 462	Fundamentals of Bio-Nanotechnology			BME 481	Quality Management Systems for Engineers		3
BEC 463	Fermentation of Recombinant Microorganisms			BME 483	Tissue Engineering Technologies		2
BEC 483	Tissue Engineering Technologies			BME 484	Fundamentals of Tissue Engineering		3
BEC 488	Animal Cell Culture Engineering			BME 490	Special Topics in Biomedical Engineering		1-4
BEC 562	Fundamentals of Bio-Nanotechnology			BME 498	Undergraduate Research in Biomedical Engineering		3
BEC 563	Fermentation of Recombinant Microorganisms			BME 518	Wearable Biosensors and Microsystems		3
BIT 463	Fermentation of Recombinant Microorganisms			BME 525	Bioelectricity		3
BIT 464	Protein Purification			BME 544	Orthopaedic Biomechanics		3
BIT 563	Fermentation of Recombinant Microorganisms			BME 566	Polymeric Biomaterials Engineering		3
BIT 564	Protein Purification			BME 583	Tissue Engineering Technologies		2
BME 375	Biomedical Microcontroller Applications			BME 584	Fundamentals of Tissue Engineering		3
BME 385	Bioinstrumentation			CE 365	Construction Equipment and Methods		3
BME 412	Biomedical Signal Processing		3	CE 400	Transportation Engineering Project		3
BME 418	Wearable Biosensors and Microsystems		3	CE 401	Transportation Systems Engineering		3
BME 425	Bioelectricity		3	CE 402	Traffic Operations		3
BME 444	Orthopaedic Biomechanics		3	CE 403	Highway Design		3
BME 451	BME Senior Design: Product Development		3	CE 405	Railroad System Planning, Design, and Operation		3
BME 452	BME Senior Design: Product Implementation and Strategy		3	CE 413	Principles of Pavement Design		3
BME 462	Biomaterials Characterization		3	CE 420	Structural Engineering Project		3
BME 466	Polymeric Biomaterials Engineering		3				

CE 421	Structural Engineering Senior Project - Bridge Design	3	CE 487	Introduction to Coastal and Ocean Engineering	3
CE 425	Structural Analysis II	3	CE 488	Water Resources Engineering	3
CE 426	Structural Steel Design	3	CE 493	Independent Study in Civil Engineering	1-4
CE 435	Engineering Geology	3	CE 497	Current Topics in Civil Engineering	1-4
CE 437	Civil Engineering Computing	3	CE 498	Special Problems in Civil Engineering	1-4
CE 440	Geotechnical Engineering Project	3	CE 499	Undergraduate Research Thesis in Civil, Construction and Environmental Engineering	1-3
CE 443	Seepage, Earth Embankments and Retaining Structures	3	CE 501	Transportation Systems Engineering	3
CE 444	An Introduction to Foundation Engineering	3	CE 502	Traffic Operations	3
CE 450	Civil Engineering Project	3	CE 503	Highway Design	3
CE 463	Construction Estimating, Planning, and Control	3	CE 505	Railroad System Planning, Design, and Operation	3
CE 464	Legal Aspects of Contracting	3	CE 525	Advanced Structural Analysis	3
CE 466	Building Construction Engineering	3	CE 564	Legal Aspects of Contracting	3
CE 468	Construction Engineering Laboratory	1	CE 568	Building Information Modeling in Construction	1
CE 469	Construction Engineering Project	3	CE 578	Energy and Climate	3
CE 476	Air Pollution Control	3	CE 588	Water Resources Engineering	3
CE 477	Principles of Solid Waste Engineering	3	CHE 435	Process Systems Analysis and Control	3
CE 478	Energy and Climate	3	CHE 446	Design and Analysis of Chemical Reactors	3
CE 479	Air Quality	3	CHE 447	Bioreactor Engineering	3
CE 480	Water Resources Engineering Project	3	CHE 450	Chemical Engineering Design I	3
CE 481	Environmental Engineering Project	3	CHE 451	Chemical Engineering Design II	3
CE 484	Water Supply and Waste Water Systems	3			

CHE 460	Chemical Processing of Electronic Materials	3	CHE 575	Advances in Pollution Prevention: Environmental Management for the Future	3
CHE 461	Polymer Sciences and Technology	3	CSC 401	Data and Computer Communications Networks	3
CHE 462	Fundamentals of Bio-Nanotechnology	3	CSC 402	Networking Projects	3
CHE 463	Fermentation of Recombinant Microorganisms	2	CSC 405	Computer Security	3
CHE 465	Colloidal and Nanoscale Engineering	3	CSC 406	Architecture Of Parallel Computers	3
CHE 467	Polymer Rheology	3	CSC 411	Introduction to Artificial Intelligence	3
CHE 468	Conventional and Emerging Nanomanufacturing Techniques and Their Applications in Nanosystems	3	CSC 412	Compiler Construction	3
CHE 475	Advances in Pollution Prevention: Environmental Management for the Future	3	CSC 414	Foundations of Cryptography	3
CHE 488	Animal Cell Culture Engineering	2	CSC 415	Software Security	3
CHE 495	Honors Thesis Preparation	1	CSC 416	Introduction to Combinatorics	3
CHE 497	Chemical Engineering Projects I	3	CSC 417	Theory of Programming Languages	3
CHE 498	Chemical Engineering Projects II	1-3	CSC 422	Automated Learning and Data Analysis	3
CHE 562	Fundamentals of Bio-Nanotechnology	3	CSC 427	Introduction to Numerical Analysis I	3
CHE 563	Fermentation of Recombinant Microorganisms	2	CSC 428	Introduction to Numerical Analysis II	3
CHE 568	Conventional and Emerging Nanomanufacturing Techniques and Their Applications in Nanosystems	3	CSC 431	File Organization and Processing	3
			CSC 433	Privacy in the Digital Age	3
			CSC 440	Database Management Systems	3
			CSC 442	Introduction to Data Science	3
			CSC 450	Web Services	3
			CSC 453	Introduction to Internet of Things (IoT) Systems	3
			CSC 454	Human-Computer Interaction	3

CSC 455	Social Computing and Decentralized Artificial Intelligence	3	ECE 308	Elements of Control Systems	3
CSC 456	Computer Architecture and Multiprocessors	3	ECE 310	Design of Complex Digital Systems	3
CSC 461	Computer Graphics	3	ECE 402	Communications Engineering	3
CSC 462	Advanced Computer Graphics Projects	3	ECE 403	Electronics Engineering	3
CSC 467	Multimedia Technology	3	ECE 404	Introduction to Solid-State Devices	3
CSC 472	Cybersecurity Projects	3	ECE 406	Architecture Of Parallel Computers	3
CSC 474	Network Security	3	ECE 407	Introduction to Computer Networking	3
CSC 481	Game Engine Foundations	3	ECE 421	Introduction to Signal Processing	3
CSC 482	Advanced Computer Game Projects	3	ECE 422	Transmission Lines and Antennas for Wireless	3
CSC 484	Building Game AI	3	ECE 423	Introduction to Photonics and Optical Communications	3
CSC 492	Senior Design Project	3	ECE 424	Radio System Design	3
CSC 495	Special Topics in Computer Science	1-6	ECE 426	Analog Electronics Laboratory	3
CSC 499	Independent Research in Computer Science	1-6	ECE 434	Fundamentals of Power Electronics	3
CSC 506	Architecture Of Parallel Computers	3	ECE 436	Digital Control Systems	3
CSC 512	Compiler Construction	3	ECE 442	Introduction to Integrated Circuit Technology and Fabrication	3
CSC 514	Foundations of Cryptography	3	ECE 451	Power System Analysis	3
CSC 522	Automated Learning and Data Analysis	3	ECE 452	Renewable Electric Energy Systems	3
CSC 584	Building Game AI	3	ECE 453	Electric Motor Drives	3
E 101	Introduction to Engineering & Problem Solving		ECE 455	Industrial Robot Systems	3
E 480	Namibia Wildlife Aerial Observatory		ECE 456	Mechatronics	3
E 490	Fundamentals of Engineering(FE) Exam Preparation		ECE 460	Embedded System Architectures	3
E 497	Engineering Research Projects		ECE 461	Embedded System Design	3

ECE 463	Microprocessor Architecture	3	ECE 552	Renewable Electric Energy Systems	3
ECE 464	ASIC and FPGA Design with Verilog	3	ECE 556	Mechatronics	3
ECE 466	Compiler Optimization and Scheduling	3	ECE 560	Embedded System Architectures	3
ECE 468	Conventional and Emerging Nanomanufacturing Techniques and Their Applications in Nanosystems	3	ECE 561	Embedded System Design	3
ECE 470	Internetworking	3	ECE 563	Microprocessor Architecture	3
ECE 482	Engineering Entrepreneurship and New Product Development I	3	ECE 564	ASIC and FPGA Design with Verilog	3
ECE 483	Engineering Entrepreneurship and New Product Development II	3	ECE 566	Compiler Optimization and Scheduling	3
ECE 484	Electrical and Computer Engineering Senior Design Project I	3	ECE 568	Conventional and Emerging Nanomanufacturing Techniques and Their Applications in Nanosystems	3
ECE 485	Electrical and Computer Engineering Senior Design Project II	3	ECE 588	Systems Biology Modeling of Plant Regulation	3
ECE 488	Systems Biology Modeling of Plant Regulation	3	ECE 589	Solid State Solar and Thermal Energy Harvesting	3
ECE 489	Solid State Solar and Thermal Energy Harvesting	3	FB 576	Environmental Life Cycle Analysis	
ECE 492	Special Topics in Electrical and Computer Engineering	1-4	ISE 362	Stochastic Models in Industrial Engineering	
ECE 495	Individual Study in ECE	1-3	ISE 408	Design and Control of Production and Service Systems	
ECE 498	Special Projects in ECE	1-3	ISE 411	Supply Chain Economics and Decision Making	
ECE 506	Architecture Of Parallel Computers	3	ISE 413	Humanitarian Logistics	3
ECE 518	Wearable Biosensors and Microsystems	3	ISE 416	Manufacturing Engineering II - Automation	3
ECE 524	Radio System Design	3	ISE 417	Database Applications in Industrial & Systems Engineering	3

ISE 435	Python Programming for Industrial & Systems Engineers	3	MA 514	Foundations of Cryptography	
ISE 437	Data Analytics for Industrial Engineering	3	MAE 342	Introduction to Automotive Engineering	
ISE 441	Introduction to Simulation	3	MAE 361	Dynamics & Controls	3
ISE 443	Quality Design and Control	3	MAE 372	Aerospace Vehicle Structures Lab	1
ISE 447	Applications of Data Science in Healthcare	3	MAE 403	Air Conditioning	3
ISE 452	Advanced Human-Machine Systems Design	3	MAE 405	Controls Lab	1
ISE 453	Modeling and Analysis of Supply Chains	3	MAE 406	Energy Conservation in Industry	3
ISE 462	Advanced Stochastic Models in Industrial Engineering	3	MAE 407	Steam and Gas Turbines	3
ISE 489	Special Topics in Industrial and Systems Engineering	1-3	MAE 408	Internal Combustion Engine Fundamentals	3
ISE 495	Project Work in Industrial Engineering	1-3	MAE 410	Modern Manufacturing Processes	3
ISE 498	Senior Design Project	3	MAE 412	Design of Thermal System	3
ISE 511	Supply Chain Economics and Decision Making	3	MAE 413	Design of Mechanical Systems	3
ISE 513	Humanitarian Logistics	3	MAE 415	Mechanical Engineering Design I	3
ISE 535	Python Programming for Industrial & Systems Engineers	3	MAE 416	Mechanical Engineering Design	4
ISE 547	Applications of Data Science in Healthcare	3	MAE 420	Dynamic Analysis of Human Movement	3
MA 414	Foundations of Cryptography		MAE 421	Design of Solar Energy Systems	3
MA 416	Introduction to Combinatorics		MAE 426	Fundamentals of Product Design	3
MA 427	Introduction to Numerical Analysis I		MAE 430	Applied Finite Element Analysis	3
MA 428	Introduction to Numerical Analysis II		MAE 435	Principles of Automatic Control	3
			MAE 440	Non-Destructive Testing and Evaluation	3
			MAE 451	Experimental Aerodynamics III	1
			MAE 452	Aerodynamics of V/STOL Vehicles	3
			MAE 455	Boundary Layer Theory	3

MAE 456	Computational Methods in Aerodynamics	3	MSE 455	Polymer Technology and Engineering
MAE 457	Flight Vehicle Stability and Control	3	MSE 456	Composite Materials
MAE 458	Propulsion	3	MSE 460	Microelectronic Materials
MAE 459	Rocket Propulsion	3	MSE 465	Introduction to Nanomaterials
MAE 467	Introduction to Space Flight	3	MSE 470	Materials Science and Engineering Senior Design Project
MAE 472	Aerospace Structures II	3	MSE 480	Materials Forensics and Degradation
MAE 480	Aerospace Vehicle Design I	3	MSE 485	Biomaterials
MAE 481	Aerospace Vehicle Design II	3	MSE 489	Solid State Solar and Thermal Energy Harvesting
MAE 482	Engineering Entrepreneurship and New Product Development I	3	MSE 490	Special Topics in Materials Engineering
MAE 483	Engineering Entrepreneurship and New Product Development II	3	MSE 509	Nuclear Materials
MAE 484	Engineering Entrepreneurship Senior Design Lab	1	MSE 540	Processing of Metallic Materials
MAE 495	Special Topics in Mechanical and Aerospace Engineering	1-3	MSE 545	Ceramic Processing
MAE 496	Undergraduate Project Work in Mechanical and Aerospace Engineering	1-6	MSE 556	Composite Materials
MAE 520	Dynamic Analysis of Human Movement	3	MSE 565	Introduction to Nanomaterials
MAE 526	Fundamentals of Product Design	3	MSE 580	Materials Forensics and Degradation
MEA 479	Air Quality		MSE 589	Solid State Solar and Thermal Energy Harvesting
MSE 409	Nuclear Materials		NE 400	Nuclear Reactor Energy Conversion
MSE 420	Mechanical Properties of Materials		NE 401	Reactor Analysis and Design
MSE 423	Introduction to Materials Engineering Design		NE 402	Reactor Engineering
MSE 440	Processing of Metallic Materials		NE 403	Nuclear Reactor Laboratory
MSE 445	Ceramic Processing		NE 404	Radiation Safety and Shielding
			NE 405	Reactor Systems
			NE 406	Nuclear Engineering Senior Design Preparation

NE 408	Nuclear Engineering Design Project		PSE 494	Independent Study in Paper Science & Engineering	
NE 409	Nuclear Materials		PY 414	Electromagnetism I	
NE 412	Nuclear Fuel Cycles		PY 415	Electromagnetism II	
NE 418	Nuclear Power Plant Instrumentation		PY 489	Solid State Solar and Thermal Energy Harvesting	
NE 419	Introduction to Nuclear Energy		PY 514	Electromagnetism I	
NE 431	Nuclear Waste Management		PY 515	Electromagnetism II	
NE 490	Health Physics and Radiological Emergency Response		PY 589	Solid State Solar and Thermal Energy Harvesting	
NE 491	Special Topics in Nuclear Engineering		SSC 440/540	Geographic Information Systems (GIS) in Soil Science and Agriculture	
NE 501	Reactor Analysis and Design		SSC 473/573	Introduction to Hydrologic and Water Quality Modeling	
NE 509	Nuclear Materials		ST 442	Introduction to Data Science	
NE 531	Nuclear Waste Management		TE 401	Textile Engineering Design I	
NE 590	Health Physics and Radiological Emergency Response	3	TE 402	Textile Engineering Design II	
PB 488/588	Systems Biology Modeling of Plant Regulation		TE 404	Textile Engineering Lean SixSigma Quality	
PSE 415	Paper Industry Strategic Project Analysis		TE 424	Textile Engineering Quality Improvement Laboratory	
PSE 416	Process Design and Analysis		TE 435	Process Systems Analysis and Control	
PSE 417	Modeling & Simulation of Pulp & Paper Processes		TE 440/540	Textile Information Systems Design	
PSE 425	Bioenergy & Biomaterials Engineering		TE 463	Polymer Engineering	
PSE 465	Process Engineering		TE 466/566	Polymeric Biomaterials Engineering	3
PSE 472	Paper Process Analysis				
PSE 475	Process Control in Pulp and Paper				
PSE 476	Environmental Life Cycle Analysis				
PSE 493	Independent Study in Paper Science & Engineering				

TE 467	Mechanics of Tissues & Implants Requirements	3
TE 492	Special Topics in Textile Engineering	1-3

## Semester Sequence

This is a sample.

### First Year

Fall Semester		Hours
CH 101	Chemistry - A Molecular Science <sup>1</sup>	3
CH 102	General Chemistry Laboratory <sup>1</sup>	1
E 101	Introduction to Engineering & Problem Solving <sup>2</sup>	1
E 115	Introduction to Computing Environments <sup>2</sup>	1
ENG 101	Academic Writing and Research <sup>2</sup>	4
MA 141	Calculus I <sup>1</sup>	4
<b>Hours</b>		<b>14</b>

### Spring Semester

Select one of the following Economics courses:		3
EC 205	Fundamentals of Economics	
EC 201	Principles of Microeconomics	
ARE 201	Introduction to Agricultural & Resource Economics	
MA 241	Calculus II <sup>1</sup>	4
PY 205	Physics for Engineers and Scientists I <sup>1</sup>	3
PY 206	Physics for Engineers and Scientists I Laboratory	1
Engineering Topics Elective (p. 2)		3
GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )		1
<b>Hours</b>		<b>15</b>

### Second Year

#### Fall Semester

MA 242	Calculus III	4
PY 208	Physics for Engineers and Scientists II	3
PY 209	Physics for Engineers and Scientists II Laboratory	1
Engineering Topics II Elective (p. 2)		3
Engineering Elective 200-Level (p. 2)		3
GEP Requirement ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/</a> )		3
<b>Hours</b>		<b>17</b>

#### Spring Semester

Select one of the following Math Electives:		3
MA 303	Linear Analysis	
MA 341	Applied Differential Equations I	
MA 405	Introduction to Linear Algebra	
Basic Science Elective (p. 4)		4
Engineering Topics II Elective (p. 2)		3

Engineering Elective 200-Level (p. 2)	3
GEP Requirement ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/</a> )	3
GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )	1

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**Hours** **17**

### Third Year

#### Fall Semester

Engineering Topics III Elective (p. 4)	3
Engineering Elective 300- or 400-Level (p. 16)	3
Engineering Elective 300- or 400-Level (p. 16)	3
Engineering Elective 300- or 400-Level (p. 16)	3
GEP Requirement ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/</a> )	3

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**Hours** **15**

#### Spring Semester

Communication Elective (p. 27)	3
Engineering Topics III Elective (p. 4)	3
Engineering Elective 300- or 400-Level (p. 16)	3
Engineering Elective 300- or 400-Level (p. 16)	3
GEP Requirement ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/</a> )	2-3

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**Hours** **14-15**

### Fourth Year

#### Fall Semester

Engineering Elective 300 or 400 Level (p. 16)	3
Engineering Elective 400-Level (p. 16)	3
BSE Topic Elective (p. 4)	3
BSE Topic Elective (p. 4)	3
GEP Requirement ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/</a> )	3

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**Hours** **15**

#### Spring Semester

Engineering Topics IV Elective (p. 27)	3
Engineering Elective 400-Level (p. 16)	3
BSE Topic Elective (p. 4)	3
BSE Topic Elective (p. 4)	3
GEP Requirement ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/</a> )	3

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**Hours** **15**

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**Total Hours** **122-123**

<sup>1</sup> A grade of C or higher is required.

<sup>2</sup> A grade of C- or higher is required.