

## ENGINEERING PHYSICS CURRICULUM GUIDE

*Requirements effective for Fall 2020*

The following course schedule represents the suggested curriculum for a typical student in the Engineering Physics Program. Substitutions may be made for some courses on approval of the Chair of the Department of Physics and Astronomy. Students desiring to transfer from another engineering program in their First Year or Second Year may do so without loss of credit or delays in graduation. The considerable flexibility in the Engineering Physics Program allows a student to design an individualized curriculum, with the assistance of her/his advisor.

### FIRST YEAR

<u>FALL SEMESTER</u>			<u>SPRING SEMESTER</u>		
Course		Credits	Course		Credits
PHY 100	Intro to Physics & Astronomy	1	PHY 122	Physics for Engineers & Physical Scientists II	4
PHY 121	Physics for Engineers & Physical Scientists I	4	ENG 101	College Composition	3
CHY 121	Introduction to Chemistry	3		Computer Programming Course <sup>2</sup>	3
CHY 123	Introduction to Chemistry Lab.	1	MAT 127	Calculus II	4
MAT 126	Calculus I	4		Engineering Sequence I <sup>3</sup>	3
	HV/SC & E Elective I <sup>1</sup>	3			
	<b>Total Credits</b>	<b>16</b>		<b>Total Credits</b>	<b>17</b>

1. *Human Values/ Social Context and Ethics (HV/SC & E), part of the University General Education Requirement, can be satisfied by a careful selection of at least six three credit courses.*
2. *Students are required to take a computer programming course. The list of acceptable courses includes: COS 125, COS 220, MEE 125 (Mechanical Engineering concentration), CIE 115 (Civil Engineering concentration), and ECE 177 (Electrical or Computer Engineering concentration). Other course substitutions require the permission of the engineering concentration advisor and approval of the Chair.*
3. *For students who have not chosen an engineering concentration during their first year, it is recommended they discuss possible courses with their advisors. Otherwise, students can follow the suggested options for specific concentrations that follow in this guide.*

### SECOND YEAR

<u>FALL SEMESTER</u>			<u>SPRING SEMESTER</u>		
Course		Credits	Course		Credits
PHY 200	Career Prep in Physics & EP I	1	PHY 223	Special Relativity	1
PHY 236	Introductory Quantum Physics	3	PHY 231	Mathematical Methods in Physics <sup>4</sup>	3
PHY 261	Physical Measurements Laboratory	2	PHY 241	Computational Physics <sup>5</sup>	3
MAT 228	Calculus III	4	PHY 262	Electronics	2
	Engineering Sequence II	3	MAT 259	Differential Equations	3
	HV/SC & E Elective II <sup>1</sup>	3		Engineering Sequence III	3
	<b>Total Credits</b>	<b>16</b>		<b>Total Credits</b>	<b>15</b>

4. *PHY 231 can be used as one of the courses needed to obtain a minor in mathematics provided it is the only non-MAT course used for the minor.*
5. *Subject to approval of the University of Maine Board of Trustees in Spring 2020.*

**THIRD YEAR**

FALL SEMESTER			SPRING SEMESTER		
Course		Credits	Course		Credits
PHY 364	Modern Experimental Physics Lab.	2	PHY 365	Mechanics Laboratory	2
PHY 451	Mechanics	3	PHY 455	Electricity & Magnetism II	3
PHY 454	Electricity & Magnetism I	3		MAT Elective <sup>6</sup>	3
	Engineering Sequence IV	3		Engineering Sequence V	3
	HV/SC & E Elective III <sup>1</sup>	3		HV/SC & E Elective IV <sup>1</sup>	3
				HV/SC & E Elective V <sup>1</sup>	3
	<b>Total Credits</b>	<b>14</b>		<b>Total Credits</b>	<b>17</b>

6. Choose from MAT 262, MAT 332, MAT 434, MAT 452, MAT 454, MAT 459, MAT 471, PHY 574, or approved similar mathematics course. PHY 574 may be counted as either a mathematics elective or a physics elective, but not both.

**FOURTH YEAR**

FALL SEMESTER			SPRING SEMESTER		
Course		Credits	Course		Credits
PHY 400	Career Prep in Physics & EP II	1	PHY 482	Project Lab in Phys. II	3
PHY 469	Quantum & Atomic Physics	3		Technical Elective <sup>7</sup>	3
PHY 472	Geometric and Fourier Optics	3		Engineering Sequence VII	3
PHY 481	Project Lab in Phys. I	3		Engineering Sequence VIII	3
	Engineering Sequence VI	3		Physics Elective <sup>8</sup>	3
	HV/SC & E Elective VI <sup>1</sup>	3			
	<b>Total Credits</b>	<b>16</b>		<b>Total Credits</b>	<b>15</b>

7. A Technical Elective can be an Engineering, Physics, Astronomy, Chemistry, Mathematics, Computer Science, or approved science course, generally at the 300 level or higher.
8. Any physics or astronomy course at the 400 level or higher is appropriate.

**NOTE:** All Engineering Physics students must take a thermodynamics course, typically MEE 230 or CHE 385.

**Minimum Total Credits in the Engineering Physics Program: 125****PHYSICS ELECTIVES**

FALL SEMESTER			SPRING SEMESTER		
PHY 480	Physics of Materials	3	PHY 447	Molecular Biophysics	3
PHY 496	Field Experience in Physics	1-6	PHY 463	Statistical Mechanics	3
PHY 501	Mechanics	3	PHY 470	Nuclear Physics	2
PHY 574	Methods of Mathematical Physics	3	PHY 471	Nuclear Physics Laboratory	1
AST 451	Astrophysics I (typically offered spring semester)	1-3	PHY 495	Engineering Physics Practice	1-6
			PHY 496	Field Experience in Physics	1-6
			AST 451	Astrophysics I (typically offered spring semester)	1-3

**Engineering Sequence**

The Engineering Sequence consists of at least eight three-credit engineering courses, of which a minimum of five courses are from the engineering concentration: biomedical, chemical, civil, computer, electrical, environmental, or mechanical. Included with the eight courses is at least one course from an area other than the engineering concentration.

**All students must take ECE 209, Fundamentals of Electric Circuits, or ECE 210, Electrical Networks I (for electrical or computer engineering concentrations).**

Engineering sequence courses cannot be used for either the computer programming elective or the technical elective. Engineering Technology courses cannot be used for the Engineering Sequence, or the technical electives.

Students, together with their advisor, should use the Undergraduate Catalog to determine the engineering sequence courses in their area of concentration. In the second year particular attention should be made to the prerequisites for the courses likely to be taken in the junior or senior year.

### Technical Writing

Engineering Physics students receive instruction and evaluation in technical writing as part of the junior laboratory sequence (PHY 364 and PHY 365). Students not evaluated as satisfactory may be required to take an additional course, such as ENG 317.

Listed below are the core and elective courses and typical engineering course sequence options for different concentrations chosen by students during their first and second year. The sequence may be tailored to fit the needs and interests of the individual student. The sequence must be approved by the student's advisor.

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### Plan of Study for Biomedical Engineering Concentration

(This program has very limited flexibility in course selection because of the additional chemistry and biology courses.)

#### Core Courses:

	<b>Credits</b>	<b>Offered</b>	<b>Prerequisites</b>
CHY 122 The Molecular Basis of Chemical Change	3	S/Su	C- or better in CHY 121/123
CHY 124 Introduction to Chemistry Laboratory	1	S/Su	Coreq. CHY 122
BEN 201 Fundamentals of Bioengineering	4	F	CHY 121/122, MAT 126/127
BEN 202 Fundamentals of Bioengineering	4		BLE 201

In addition to the core courses above, the student must take the following 14 credits of courses plus take at least 2 credits from another engineering discipline area (or substitute up to 4 credits from another engineering discipline area for one of the courses below):

BEN 401 - Applications of Bioengineering	4	F	BLE 201/202
BEN 403 - Instrumentation in Bioengineering	4	Not regular	BLE 201/202
CHE 350 - Statistical Process Control and Analysis	3	F/S	MAT 127 or permission
CHE 361 - Chemical Engin. & Biomed Engin. Lab I	3	S/Su	BLE 201/202 or permission (or CHE 352/360 or perm.)

## Typical Biomedical Engineering Sequence

### FIRST YEAR

FALL SEMESTER			SPRING SEMESTER		
Course		Credits	Course		Credits
PHY 100	Intro to Physics & Astronomy	1	PHY 122	Physics for Engineers & Physical Scientists II	4
PHY 121	Physics for Engineers & Physical Scientists I	4	ENG 101	College Composition	3
CHY 121	Intro. to Chemistry	3	CHY 122	Molecular Basis of Chem. Change	3
CHY 123	Intro. to Chemistry Lab.	1	CHY 124	Molecular Basis of Chem. Change Lab	1
MAT 126	Calculus I	4	MAT 127	Calculus II	4
	HV/SC & E Elective I	3		Computer Programming Course	3
	<b>Total Credits</b>	<b>16</b>		<b>Total Credits</b>	<b>18</b>

### SECOND YEAR

FALL SEMESTER			SPRING SEMESTER		
Course		Credits	Course		Credits
PHY 200	Career Prep in Physics & EP I	1	PHY 223	Special Relativity	1
PHY 236	Introductory Quantum Physics	3	PHY 231	Mathematical Methods in Physics	3
PHY 261	Physical Measurements Laboratory	2	PHY 241	Computational Physics	3
MAT 228	Calculus III	4	PHY 262	Electronics	2
CHE 200	Fundamentals of Process Eng.	4	BIO 100	Biology	4
	HV/SC & E Elective II	3	MAT 259	Differential Equations	3
	<b>Total Credits</b>	<b>16</b>		<b>Total Credits</b>	<b>16</b>

## Plan of Study for Chemical Engineering Concentration

Core Courses:	Credits	Offered	Prerequisites
CHY 122 The Molecular Basis of Chemical Change	3	S/Su	C- or better in CHY 121/123
CHY 124 Introduction to Chemistry Laboratory	1	S/Su	Coreq. CHY 122
CHE 200 Fundamentals of Process Engineering*	4	F	CHY 122, MAT 126, PHY 121 or perm.
CHE 385 Chemical Engineering Thermodynamics I*	3	S	CHB 200, MAT 228 or perm.

In addition to these initial four core courses, the student must take the following 16 credits of courses (or substitute up to 6 credits from another engineering discipline area):

CHE 352 Process Control*	3	F/Su	MAT 258 or 259 or permission
CHE 360 Elements of Chemical Engineering I*	4	F/Su	CHE 200 or permission
CHE 362 Elements of Chemical Engineering II*	3	S/Su	CHE 360 or permission
CHE 368 Kinetics & Reactor Design*	3	S/Su	CHE 200 or permission
CHE 410 Advanced Materials	3	F	CHY 122, MAT 126, PHY 121, perm.

**Note: A Minor in Process Engineering** can be obtained by taking the courses marked with an asterisk. The student, however, must still formally declare if they wish to obtain the minor.

## Typical Chemical Engineering Sequence

### FIRST YEAR

FALL SEMESTER			SPRING SEMESTER		
Course		Credits	Course		Credits
PHY 100	Intro to Physics & Astronomy	1	PHY 122	Physics for Engineers & Physical Scientists II	4
PHY 121	Physics for Engineers & Physical Scientists I	4		Computer Science Course	3
CHY 121	Intro. to Chemistry	3	CHY 122	Molecular Basis of Chem. Change	3
CHY 123	Intro. to Chemistry Lab.	1	CHY 124	Molecular Basis of Chem. Change Lab	1
MAT 126	Calculus I	4	MAT 127	Calculus II	4
	HV/SC & E Elective I	3	ENG 101	College Composition	3
	<b>Total Credits</b>	<b>16</b>		<b>Total Credits</b>	<b>18</b>

### SECOND YEAR

FALL SEMESTER			SPRING SEMESTER		
Course		Credits	Course		Credits
PHY 200	Career Prep in Physics & EP I	1	PHY 223	Special Relativity	1
PHY 236	Introductory Quantum Physics	3	PHY 231	Mathematical Methods in Physics	3
PHY 261	Physical Measurements Laboratory	2	PHY 241	Computational Physics	3
MAT 228	Calculus III	4	PHY 262	Electronics	2
CHE 200	Fundamentals of Process Eng.	4	MAT 259	Differential Equations	3
	HV/SC & E Elective II	3	CHE 385	Chem. Eng. Thermodynamics I	3
	<b>Total Credits</b>	<b>16</b>		<b>Total Credits</b>	<b>15</b>

## Plan of Study for Civil/Environmental Engineering Concentration

Core Courses:	Credits	Offered	Prerequisites
MEE 150 Applied Mechanics: Statics	3	F/S	MAT 126
MEE 251 Strength of Materials	3	F/S	MAT 127 & grade of C or better in MEE 150
CIE 340 Introduction to Structural Analysis	4	F	C or better in MEE 150 & MEE 251
CIE 350 Hydraulics	3	F	C or better in MEE 150, MAT 258/MAT 259* (*corequisite acceptable)

The required advanced CIE courses cover the technical areas of transportation, environmental engineering, and hydraulics/fluids. Following the initial four core courses, students must choose at a minimum 3 advanced courses. The student is encouraged to take courses from the technical areas listed below, but this is not a requirement. These technical areas will not appear on the students' degree but are intended to provide a level of focus for completion of the degree.

**Transportation** CIE 424 Urban Transportation Planning  
CIE 425 Transportation Safety  
CIE 426 Advanced Roadway Design

**Structures** CIE 440 Structural Analysis I  
CIE 442 Reinforced Concrete Design  
CIE 443 Structural Steel Design

**Environmental Engineering** CIE 430 Water Treatment  
CIE 431 Pollutant Fate and Transport  
CIE 434 Wastewater Process Design  
CIE 439 Solid Waste and Air Pollution

**Water resources** CIE 450 Open Channel Hydraulics  
 CIE 455 Hydrology  
 CIE 456 Groundwater Hydrology and Hydraulics

Optional Courses:	Credits	Offered	Prerequisites
CIE 365 Soil Mechanics	3	S	MEE 251 or concurrently
CIE 424 Urban Transportation Planning	3	S	C or better in CIE 225
CIE 425 Transportation Safety	3	F	C or better in CIE 225
CIE 426 Advanced Roadway Design	3	F	C or better in CIE 225
CIE 430 Water Treatment	4	F	C or better in CIE 331& CIE 350
CIE 431 Pollutant Fate and Transport	4	Variable	C or better in CIE 350 & MAT 258/259
CIE 434 Wastewater Process Design	4	S	C or better in CIE 331& CIE 350
CIE 439 Solid Waste and Air Pollution	3	S	C or better in CIE 331
CIE 440 Structural Analysis I	4	S	C or better in CIE 340
CIE 442 Structural Design I	4	F	C or better in CIE 340
CIE 443 Structural Steel Design	4	S	CIE 442
CIE 450 Open Channel Hydraulics	3	Variable	C or better in CIE 350
CIE 455 Hydrology	3	F	C or better in CIE 350
CIE 456 Groundwater Hydrology/Hydraulics	3	S	C or better in CIE 350 & MAT 258/259
CIE 460 Geotechnical Engineering	3	F	C or better in CIE 365
CIE 480 Wind Energy Engineering	3	S	MAT 258 & C or better in MEE 251 Corequisite: CIE 350 or MEE 360

Typical [Civil And Environmental Engineering](#) Sequence

**FIRST YEAR**

<u>FALL SEMESTER</u>			<u>SPRING SEMESTER</u>		
Course		Credits	Course		Credits
PHY 100	Intro to Physics & Astronomy	1	PHY 122	Physics for Engineers & Physical Scientists II	4
PHY 121	Physics for Engineers & Physical Scientists I	4	ENG 101	College Composition	3
CHY 121	Intro. to Chemistry	3		Computer Programming Course	3
CHY 123	Intro. to Chemistry Lab.	1	MAT 127	Calculus II	4
MAT 126	Calculus I	4	MEE 150	Statics	3
	HV/SC & E Elective I	3			
	<b>Total Credits</b>	<b>16</b>		<b>Credits</b>	<b>17</b>

**SECOND YEAR**

<u>FALL SEMESTER</u>			<u>SPRING SEMESTER</u>		
Course		Credits	Course		Credits
PHY 200	Career Prep in Physics & EP I	1	PHY 223	Special Relativity	1
PHY 236	Introductory Quantum Physics	3	PHY 231	Mathematical Methods in Physics	3
PHY 261	Physical Measurements Laboratory	2	PHY 241	Computational Physics	3
MAT 228	Calculus III	4	MAT 259	Differential Equations	3
MEE 230	Thermodynamics I	3	MEE 251	Strength of Materials	3
	HV/SC & E Elective II	3		HV/SC & E Elective III	3
	<b>Total Credits</b>	<b>16</b>		<b>Total Credits</b>	<b>16</b>

## Plan of Study for Computer Engineering Concentration

Core Courses:	Credits	Offered	Prerequisites
ECE 210 Electric Circuits	4	F/S	MAT 127; Coreq. PHY 122
ECE 271 Microcomp. Architecture and App.	3	S	ECE 177
ECE 275 Sequential Logic Systems	3	F	ECE 177
ECE 471 Embedded Systems	3	F	ECE 271

Following the initial 4 courses, students must choose 4 more Engineering courses, with one of these courses from outside the ECE department (i.e. a non-ECE course). The student is encouraged to take courses from the technical areas listed below, but this is not a requirement. These technical areas will not appear on the students' degree but are intended to provide a level of focus for completion of the degree.

**Embedded Control**            ECE 477 Hardware Applications Using C  
ECE 478 Industrial Computer Control

**High-Performance  
Computing Networking**    ECE 331 Intro to Unix Systems Admin  
ECE 435 Network Engineering  
ECE 473 Computer Architecture & Org.  
ECE 477 Hardware Applications Using C

*\*Note: Of these five courses, ECE 473 and ECE 477 are strongly recommended by the ECE department.*

**Robotics**                    ECE 314 Signals and Systems  
ECE 414 Feedback Control Systems  
ECE 417 Introduction to Robotics  
ECE 477 Hardware Applications Using C

*\*Note: The College of Engineering offers a Minor in Robotics. The student can acquire the minor in Robotics by careful selection of courses taken. Please refer to the Course Catalog for exact minor requirements ([Robotics minor](#)).*

Optional Courses:	Credits	Offered	Prerequisites
ECE 314 Signals and Systems	3	S	MAT 258, at least a C- in ECE 210
ECE 331 Intro to Unix Syst Admin	3	S	COS 220 or ECE 177
ECE 414 Feedback Control Systems	3	S	ECE 314
ECE 417 Introduction to Robotics	3	F	ECE 177 or COS 220, MAT 228
ECE 435 Network Engineering	3	F	COS 331 or ECE 331 or ECE 471
ECE 473 Computer Architecture & Org.	4	F	ECE 275
ECE 477 Hardware App. Using C	3	S	ECE 271
ECE 478 Industrial Comp. Control	3	Variable	ECE 271
ECE 486 Digital Signal Processing	4	S	ECE 177 and ECE 314

## Typical [Computer Engineering](#) Sequence

### FIRST YEAR

FALL SEMESTER			SPRING SEMESTER		
Course		Credits	Course		Credits
PHY 100	Intro to Physics & Astronomy	1	PHY 122	Physics for Engineers & Physical Scientists II	4
PHY 121	Physics for Engineers & Physical Scientists I	4	ENG 101	College Composition	3
MAT 126	Calculus I	4	MAT 127	Calculus II	4
CHY 121	Intro. to Chemistry	3	ECE 177	Intro. To Programming for Eng. HV/SC & E Elective II	3
CHY 123	Intro. to Chemistry Lab. HV/SC & E Elective I	3			
	<b>Total Credits</b>	<b>16</b>		<b>Total Credits</b>	<b>17</b>

### SECOND YEAR

FALL SEMESTER			SPRING SEMESTER		
Course		Credits	Course		Credits
PHY 200	Career Prep in Physics & EP I	1	PHY 223	Special Relativity	1
PHY 236	Introductory Quantum Physics	3	PHY 231	Mathematical Methods in Physics	3
PHY 261	Physical Measurements Laboratory	2	PHY 241	Computational Physics	3
MAT 228	Calculus III	4	PHY 262	Electronics	2
ECE 210	Electrical Networks I	4	MAT 259	Differential Equations	3
	HV/SC & E Elective III	3	ECE 271	Microcomputer Architecture & Applic.	3
	<b>Total Credits</b>	<b>17</b>		<b>Total Credits</b>	<b>15</b>

## Plan of Study for [Electrical Engineering](#) Concentration

Core Courses:	Credits	Offered	Prerequisites
ECE 210 Electric Circuits	4	F/S	MAT 127; coreq. PHY 122
ECE 214 Electrical Circuits Lab.	3	S	ECE 210
ECE 314 Signals and Systems	3	S	MAT 258, at least a C- in ECE 210
ECE 342 Electronics I	4	F	ECE 214, at least a C- in ECE 210

**\*Note:** Taking ECE 342 will satisfy the electronics requirement; students should NOT take PHY 262.

Following the initial 4 courses, students must choose 4 more Engineering courses, with one of these courses from outside the ECE department (i.e. a non-ECE course). The student is encouraged to take courses from the technical areas listed below, but this is not a requirement. These technical areas will not appear on the students' degree but are intended to provide a level of focus for completion of the degree.

### Power & Alternative Energy

ECE 323 Electric Power Conversion  
 ECE 427 Electric Power Systems  
 ECE 467 Solar Cells and Their Applications



**Microelectronics & Circuits**

ECE 444 Analog Integrated Circuit Design  
 ECE 445 Analysis & Design of Digital Integrated Circuits  
 ECE 462 Introduction to Basic Semiconductor Devices  
 ECE 464 Microelectronics Science and Engineering  
 ECE 484 Communications Engineering

**State & Sensor**

ECE 453 Microwave Engineering  
 ECE 462 Introduction to Basic Semiconductor Devices  
 ECE 464 Microelectronics Science and Engineering  
 ECE 465 Introduction to Sensors  
 ECE 466 Sensor Technology and Instrumentation

**Optional Courses:**

	<b>Credits</b>	<b>Offered</b>	<b>Prerequisites</b>
ECE 316 Random Signal Analysis	3	F	MAT 228
ECE 323 Electric Power Conversion	3	F	ECE 214, at least a C- in ECE 210
ECE 427 Electric Power Systems	3	S	At least a C- in ECE 210
ECE 343 Electronics II	4	S	ECE 342
ECE 351 Fields and Waves	3	S	MAT 228 and C- or better in ECE 210.
ECE 427 Electric Power Systems	3	S	at least a C- in ECE 210
ECE 444 Analog Integrated Circuits	3	S	ECE 314 and ECE 343
ECE 445 Analysis & Design of Digital Integrated Circuits	3	F	ECE 342
ECE 453 Microwave Engineering	4	S	ECE 351
ECE 462 Introduction to Basic Semiconductor Devices	3	Variable	CHY 121 and PHY 122, Coreq: MAT 258
ECE 464 Microelectronics Sci. & Engineering	3	Not regular	CHY 121, PHY 122, Coreq: MAT 258
ECE 465 Introduction to Sensors	3	S/Su	Jr. standing
ECE 466 Sensor Technology & Instrumentation	4	Not regular	ECE 465
ECE 467 Solar Cells & Their Applications	3	Variable	ECE 209 or ECE 210 or permission
ECE 484 Communications Engineering	3	F	ECE 314 and ECE 316

Typical [Electrical Engineering](#) Sequence**FIRST YEAR**

<b>FALL SEMESTER</b>			<b>SPRING SEMESTER</b>		
Course		Credits	Course		Credits
PHY 100	Intro to Physics & Astronomy	1	PHY 122	Physics for Engineers & Physical Scientists II	4
PHY 121	Physics for Engineers & Physical Scientists I	4	ENG 101	College Composition	3
MAT 126	Calculus I	4	MAT 127	Calculus II	4
CHY 121	Intro. to Chemistry	3	ECE 177	Intro. To Programming for Eng. HV/SC & E Elective II	3
CHY 123	Intro. to Chemistry Lab. HV/SC & E Elective I	3			
	<b>Total Credits</b>	<b>16</b>		<b>Total Credits</b>	<b>17</b>

**SECOND YEAR**

<u>FALL SEMESTER</u>			<u>SPRING SEMESTER</u>		
Course		Credits	Course		Credits
PHY 200	Career Prep in Physics & EP I	1	PHY 223	Special Relativity	1
PHY 236	Introductory Quantum Physics	3	PHY 231	Mathematical Methods in Physics	3
PHY 261	Physical Measurements Laboratory	2	PHY 241	Computational Physics	3
MAT 228	Calculus III	4	MAT 259	Differential Equations	3
ECE 210	Electric Circuits	4	ECE 214	Electrical Networks Laboratory	3
	HV/SC & E Elective III	3	ECE 314	Signals & Systems	3
	<b>Total Credits</b>	<b>17</b>		<b>Total Credits</b>	<b>16</b>

**Plan of Study for *Mechanical Engineering* Concentration**

Core Courses:	Credits	Offered	Prerequisites
MEE 150 Applied Mechanics: Statics	3	S	MAT 126
MEE 230 Thermodynamics I	3	F/S	MAT 127
MEE 251 Strength of Materials	3	F/S	MAT 127 & MEE 150
MEE 270 Applied Mechanics: Dynamics	3	F/S	MEE 150/251, Coreq. MAT 228
MEE 360 Fluid Mechanics	3	F	MEE 230 & 270; Coreq. MAT 258/259

**\*Note:** The computer programming requirement may be satisfied by COS 220 or MEE 125. Also, all MEE prerequisites require a C or better.

Following the initial 5 courses, students must choose 2 or more advanced classes. The student is encouraged to take courses from the technical areas listed below, but this is not a requirement. These technical areas will not appear on the students' degree but are intended to provide a level of focus for completion of the degree.

**Energy Systems** MEE 432 Heat Transfer  
MEE 433 Solar Thermal Engineering  
MEE 462 Fluid Mechanics II  
MEE 483 Design of Turbomachinery  
MEE 484 Power Plant Design

**Mechanical Design** MEE 320 Materials Engineering and Science  
MEE 450 Intro Mechanics of Comp Materials  
MEE 455 Advanced Strength of Materials  
MEE 471 Mechanical Vibrations

**Mechanical Robotics** MEE 380 Design I  
MEE 381 Design II  
MEE 370 Modeling, Analysis and Control of Mechanical Systems  
MEE 444 Robot Dynamics and Control

Optional Courses	Credits	Offered	Prerequisites
MEE 320 Materials Engineering and Science	3	S	MEE 230 & 251
MEE 330 Manufacturing Engineering	3	S	MEE 120
MEE 348 Intro to Flight	3	S	MAT 258, PHY 121, & MEE 125
MEE 370 Modeling, Anal. & Ctrl. of Mech Sys	3	F	ECE 209, MAT 258/259, MEE 270
MEE 380 Design I	3	F	MEE 270

MEE 381 Design II	3	S	MEE 120, MEE 251
MEE 432 Heat Transfer	3	F	MAT 258/259, MEE 360
MEE 433 Solar-Thermal Engineering	3	Not regular	MEE 230
MEE 444 Robot Dynamics and Control	3	F/S	MEE 270 & 380
MEE 448 Fixed Wing Aircraft Design	3	S (odd yrs)	MEE 120, MEE 251, MEE 270, & MEE 360
MEE 450 Mechanics of Comp Materials	3	S (even yrs)	MEE 251
MEE 452 Aircraft and Automobile Structures	3	S	
MEE 455 Advanced Strength of Materials	3	F	MEE 251
MEE 459 Engineering Optimization	3	S	MAT 228 & MAT 258
MEE 456 Intro to Finite Element Method	3	S	MAT 258/259, MEE 251
MEE 462 Fluid Mechanics II	3	S (odd yrs)	MEE 360
MEE 463 Applied Computational Fluid Dynamics	3	S	MEE 360 or equivalent
MEE 471 Mechanical Vibrations	3	S	MAT 258/259, MEE 270
MEE 483 Turbomachine Design	3	Not regular	MEE 230 & 360
MEE 484 Power Plant Design & Engineering	3	Not regular	MEE 230 & 231
MEE 490 Modern Control Theory and Applications	3	S	MEE 370

### Typical [Mechanical Engineering](#) Sequence

#### FIRST YEAR

FALL SEMESTER			SPRING SEMESTER		
Course		Credits	Course		Credits
PHY 100	Intro to Physics & Astronomy	1	PHY 122	Physics for Engineers & Physical Scientists II	4
PHY 121	Physics for Engineers & Physical Scientists I	4	ENG 101	College Composition	3
CHY 121	Intro. to Chemistry	3	MEE 125	Computational Tools in Mechanical Engineering	3
CHY 123	Intro. to Chemistry Lab.	1	MAT 127	Calculus II	4
MAT 126	Calculus I	4	MEE 150	Statics	3
	HV/SC & E Elective I	3		<b>Total Credits</b>	<b>17</b>
	<b>Total Credits</b>	<b>16</b>			

#### SECOND YEAR

FALL SEMESTER			SPRING SEMESTER		
Course		Credits	Course		Credits
PHY 200	Career Prep in Physics & EP I	1	PHY 223	Special Relativity	1
PHY 236	Introductory Quantum Physics	3	PHY 231	Mathematical Methods in Physics	3
PHY 261	Physical Measurements Laboratory	2	PHY 241	Computational Physics	3
MAT 228	Calculus III	4	PHY 262	Electronics	2
MEE 251	Strength of Materials	3	MAT 259	Differential Equations	3
	HV/SC & E Elective II	3	MEE 230	Thermodynamics I	3
	<b>Total Credits</b>	<b>16</b>		<b>Total Credits</b>	<b>15</b>

# ENGINEERING PHYSICS STUDENT SUMMARY RECORD

## PHYSICS COURSES

	<u>CR</u>	<u>DATE</u>	<u>GRADE</u>
PHY 100	1	___	___
PHY 121	4	___	___
PHY 122	4	___	___
PHY 200	1	___	___
PHY 223	1	___	___
PHY 231	3	___	___
PHY 236	3	___	___
PHY 241	3	___	___
PHY 261	2	___	___
PHY 262	2	___	___
PHY 364	2	___	___
PHY 365	2	___	___
PHY 400	1	___	___
PHY 451	3	___	___
PHY 454	3	___	___
PHY 455	3	___	___
PHY 469	3	___	___
PHY 472	3	___	___
PHY 481	3	___	___
PHY 482	3	___	___
PHY ___	___	___	___

**SUBTOTAL**  (52 required without PHY 100)

## ENGINEERING SEQUENCE COURSES

(at least 5 courses from the same engineering concentration and at least one course from outside the engineering concentration)

	<u>CR</u>	<u>DATE</u>	<u>GRADE</u>
1 ECE 209 (or 210)	3	___	___
2 _____	___	___	___
3 _____	___	___	___
4 _____	___	___	___
5 _____	___	___	___
6 _____	___	___	___
7 _____	___	___	___
8 _____	___	___	___

**SUBTOTAL**  (24 required)

## OTHER COURSES

	<u>CR</u>	<u>DATE</u>	<u>GRADE</u>
ENG 101	3	___	___
CHY 121	3	___	___
CHY 123	1	___	___
Programming Course	3	___	___
_____	___	___	___

**SUBTOTAL**  (10 required)

Course taken to satisfy thermodynamics requirement  
\_\_\_\_\_

## FINAL GPA IN MAJOR

(all physics plus eight engineering sequence courses require a 2.00 minimum)

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## MATH COURSES

	<u>CR</u>	<u>DATE</u>	<u>GRADE</u>
MAT 126	4	___	___
MAT 127	4	___	___
MAT 228	4	___	___
MAT 259	3	___	___
MAT _____	___	___	___
MAT _____	___	___	___
(or PHY 574)	3	___	___

**SUBTOTAL**  (18 required)

## GEN ED HV&SC REQUIREMENTS (AREA)

	<u>CR</u>	<u>DATE</u>	<u>GRADE</u>
1 _____	___	___	___
2 _____	___	___	___
3 _____	___	___	___
4 _____	___	___	___
5 _____	___	___	___
6 _____	___	___	___
7 _____	___	___	___

**SUBTOTAL**  (18 required)

## GEN ED HV & SC AREAS

- Western Cultural Tradition
- Social Contexts & Institutions
- Cultural Diversity & International Perspectives
- Population & the Environment
- Artistic and Creative Expression
- Ethics

## ELECTIVES

	<u>CR</u>	<u>DATE</u>	<u>GRADE</u>
Tech Elective	___	___	___
_____	___	___	___
Free Elective (not required)	___	___	___
_____	___	___	___
_____	___	___	___
_____	___	___	___

**SUBTOTAL**  (3 required)

## DEGREE REQUIREMENTS

Total credits must be 125 or greater.

**TOTAL OF ALL**  =  (CR)

**FINAL GPA (2.00 MINIMUM)** =