

# 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> Course Credits			<u>SPRING SEMESTER</u> 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	3
CHY 123	Introduction to Chemistry Lab.	1	MAT 127	Course <sup>2</sup> 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> Course Credits			<u>SPRING SEMESTER</u> 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	3
PHY 261	Physical Measurements	2	PHY 241	Physics <sup>4</sup> Computational	3
MAT 228	Laboratory Calculus III	4	PHY 262	Physics <sup>5</sup>	2
	Engineering Sequence II	3	MAT 259	Electronics	3
	HV/SC & E Elective II <sup>1</sup>	3		Differential Equations	3
	<b>Total Credits</b>	<b>16</b>		Engineering Sequence III	
				<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**

<u>FALL SEMESTER</u> Course Credits			<u>SPRING SEMESTER</u> Course Credits		
PHY 364	Modern Experimental Physics	2	PHY 365	Mechanics Laboratory	2
PHY 451	Lab. 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
	<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**

<u>FALL SEMESTER</u> Course Credits			<u>SPRING SEMESTER</u> 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>15</b>
	<b>Total Credits</b>	<b>16</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 Field Experience in Physics	3 1-6	PHY 447	Molecular Biophysics Statistical Mechanics	3 3
PHY 496	Mechanics Methods of Mathematical	3 3	PHY 463	Nuclear Physics Nuclear Physics Laboratory	2 1
PHY 501	Physics Astrophysics I (typically offered spring semester)	1-3	PHY 470	Engineering Physics Practice Field Experience	1-6 1-6
PHY 574			PHY 471	in Physics Astrophysics I	1-3
AST 451			PHY 495	(typically offered spring semester)	
			PHY 496		
			AST 451		

### 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.

## 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: 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 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	1
MAT 126	Calculus I	4	MAT 127	Lab 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

<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	3
PHY 261	Physical Measurements	2	PHY 241	Physics Computational	3
MAT 228	Laboratory Calculus III	4	PHY 262	Physics	2
CHE 200	Fundamentals of Process Eng. HV/SC & E Elective II	4 3	BIO 100	Electronics	4
			MAT 259	Biology	3
				Differential Equations	
	<b>Total Credits</b>	<b>1 6</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

<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		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	1
MAT 126	Calculus I	4	MAT 127	Lab Calculus II	4
	HV/SC & E Elective I	3	ENG 101	College Composition	3
	<b>Total Credits</b>	<b>1 6</b>		<b>Total Credits</b>	<b>1 8</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	3
PHY 261	Physical Measurements	2	PHY 241	Physics Computational	3
MAT 228	Laboratory Calculus III	4	PHY 262	Physics	2
CHE 200	Fundamentals of Process	4	MAT 259	Electronics	3
	Eng. HV/SC & E Elective II	3	CHE 385	Differential Equations	3
				Chem. Eng. Thermodynamics I	
	<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 &	1	PHY 223	Special Relativity	1
PHY 236	EP I Introductory Quantum	3	PHY 231	Mathematical Methods in	3
PHY 261	Physics	2	PHY 241	Physics Computational	3
MAT 228	Physical Measurements	4	MAT 259	Physics	3
MEE 230	Laboratory Calculus III	3	MEE 251	Differential Equations	3
	Thermodynamics I	3		Strength of Materials	3
	HV/SC & E Elective II			HV/SC & E Elective III	
	<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** ECE 331 Intro to Unix Systems Admin

**Computing Networking** 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**

<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
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	1 3			
	<b>Total Credits</b>	<b>1 6</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	3
PHY 261	Physical Measurements	2	PHY 241	Physics Computational	3
MAT 228	Laboratory Calculus III	4	PHY 262	Physics	2
ECE 210	Electrical Networks I	4	MAT 259	Electronics	3
	HV/SC & E Elective III	3	ECE 271	Differential Equations	3
				Microcomputer Architecture &	
	<b>Total Credits</b>	<b>17</b>		<b>Applic. 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** ECE 323 Electric Power Conversion

**Energy** ECE 427 Electric Power Systems

ECE 467 Solar Cells and Their Applications

**Microelectronics &** ECE 444 Analog Integrated Circuit Design

**Circuits** 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: Credits Offered Prerequisites**

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 3 F ECE 342

Digital Integrated Circuits

ECE 453 Microwave Engineering 4 S ECE 351

ECE 462 Introduction to Basic 3 Variable CHY 121 and PHY 122, Coreq: MAT 258 Semiconductor Devices

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**

<u>FALL SEMESTER</u> Course Credits			<u>SPRING SEMESTER</u> 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	1 3			3
<b>Total Credits</b>		<b>1 6</b>	<b>Total Credits</b>		<b>17</b>

**SECOND YEAR**

<u>FALL SEMESTER</u> Course Credits			<u>SPRING SEMESTER</u> 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	3
PHY 261	Physical Measurements	2	PHY 241	Physics Computational	3
MAT 228	Laboratory Calculus III	4	MAT 259	Physics	3
ECE 210	Electric Circuits HV/SC & E Elective III	4 3	ECE 214	Differential Equations	3
			ECE 314	Electrical Networks Laboratory Signals & Systems	3
<b>Total Credits</b>		<b>1 7</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**

<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	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**

<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	3
PHY 261	Physical Measurements	2	PHY 241	Physics Computational	3
MAT 228	Laboratory Calculus III	4	PHY 262	Physics	2
MEE 251	Strength of Materials	3	MAT 259	Electronics	3
	HV/SC & E Elective II	3	MEE 230	Differential Equations	3
	<b>Total Credits</b>	<b>16</b>		Thermodynamics I	<b>15</b>
				<b>Total Credits</b>	

University of Maine Engineering Physics Curriculum Guide Fall 2020

**ENGINEERING PHYSICS STUDENT SUMMARY RECORD**

**PHYSICS COURSES MATH COURSES**

**CR DATE GRADE CR DATE GRADE**

PHY 100 1 \_\_\_\_\_ MAT 126 4 \_\_\_\_\_ PHY 121 4 \_\_\_\_\_ MAT 127 4 \_\_\_\_\_  
 \_\_\_\_\_ PHY 122 4 \_\_\_\_\_ MAT 228 4 \_\_\_\_\_ PHY 200 1 \_\_\_\_\_ MAT 259 3 \_\_\_\_\_  
 \_\_\_\_\_ PHY 223 1 \_\_\_\_\_ MAT \_\_\_\_\_ PHY 231 3 \_\_\_\_\_ MAT \_\_\_\_\_  
 \_\_\_\_\_ PHY 236 3 \_\_\_\_\_ (or PHY 574 3 \_\_\_\_\_)  
 PHY 241 3 \_\_\_\_\_  
 PHY 261 2 \_\_\_\_\_ **SUBTOTAL (18 required)** PHY 262 2 \_\_\_\_\_  
 PHY 364 2 \_\_\_\_\_  
 PHY 365 2 \_\_\_\_\_ **GEN ED HV&SC REQUIREMENTS (AREA)** PHY 400 1 \_\_\_\_\_ **CR DATE**  
**GRADE** PHY 451 3 \_\_\_\_\_ 1 \_\_\_\_\_ PHY 454 3 \_\_\_\_\_ 2 \_\_\_\_\_  
 \_\_\_\_\_ PHY 455 3 \_\_\_\_\_ 3 \_\_\_\_\_ PHY 469 3 \_\_\_\_\_  
 4 \_\_\_\_\_ PHY 472 3 \_\_\_\_\_ 5 \_\_\_\_\_ PHY 481 3 \_\_\_\_\_  
 \_\_\_\_\_ 6 \_\_\_\_\_ PHY 482 3 \_\_\_\_\_ 7 \_\_\_\_\_  
 PHY \_\_\_\_\_

**(52 required SUBTOTAL (18 required))**

**SUBTOTAL without PHY 100)**

**GEN ED HV & SC AREAS**

**ENGINEERING SEQUENCE COURSES** a. Western Cultural Tradition

(at least 5 courses from the same engineering b. Social Contexts & Institutions concentration and at least one course from c. Cultural Diversity & International Perspectives outside the engineering concentration) d.

Population & the Environment **CR DATE GRADE** e. Artistic and Creative Expression

1 ECE 209 (or 210) 3 \_\_\_\_\_ f. Ethics

2 \_\_\_\_\_

3 \_\_\_\_\_

4 \_\_\_\_\_ **ELECTIVES**

5 \_\_\_\_\_ **CR DATE GRADE** 6 \_\_\_\_\_ Tech Elective

7 \_\_\_\_\_ 8 \_\_\_\_\_  
Free Elective (not required)

**SUBTOTAL (24 required)** \_\_\_\_\_

**OTHER COURSES** \_\_\_\_\_ **CR DATE GRADE** \_\_\_\_\_ ENG 101 3 \_\_\_\_\_

CHY 121 3 \_\_\_\_\_ **SUBTOTAL (3 required)** CHY 123 1 \_\_\_\_\_

Programming Course

\_\_\_\_\_ 3 \_\_\_\_\_ **DEGREE REQUIREMENTS**

**SUBTOTAL (10 required)** Total credits must be 125 or greater.

Course taken to satisfy thermodynamics requirement

\_\_\_\_\_ **TOTAL OF ALL = (CR)**

**FINAL GPA IN MAJOR**

(all physics plus eight engineering **FINAL GPA**

sequence courses require a **(2.00 MINIMUM) = 2.00 minimum) =**