Plan of Study for the Mechanical Engineering SB Concentration

Effective for Students Declaring the Concentration after August 1, 2024

NAME: _____ CLASS: _____

EMAIL: _____ DATE: _____

This Plan of Study Form is for a (*Circle One*): DECLARATION REVISION

The S.B. Program in Mechanical Engineering must contain at least 20 half courses: 4 half-courses in mathematics, 4 half-courses in basic sciences, and 12 half-courses in engineering topics. Plans of Study will not be considered final until this form has been signed. The signature of this form ensures that the proposed plan meets the ABET distribution requirements.

Please list your selected concentration courses in the schedule below:

Fall 1	Spring 1	Fall 2	Spring 2	Fall 3	Spring 3	Fall 4	Spring 4

REQUIRED COURSES	Selected Courses
Mathematics (2-4 courses) *Begin according to placement:* • Math 1a – Intro to Calculus 1(or Math Ma & Mb) • Math 1b – Intro to Calculus 2 • Math 21a – Multivariable Calculus • Math 21b – Linear Algebra & Differential Equations	• • • •
Applied Mathematics (if starting in Math 1b or later) • AM 105 - Ordinary & Partial Differential Equations	•
Probability & Statistics (if starting in AM/Math 21a or later) *Select one:* • AM 101 - Statistical Inference for Scientists & Engineers • ES 150 – Intro to Probability with Engineering Applications • STAT 110 - Introduction to Probability	•
Physics (2 courses) • PS 12a – Mechanics and Statistical Physics (or Physics 15a or 16, or AP 50a) • PS 12b – Electromagnetism and Quantum Physics (or Physics 15b or AP50b)	• •
Chemistry/Advanced Science (2 courses – see list on page 4)	• •

REQUIRED COURSES	Selected Courses
Computer Science (1 course) *Select one:* • AM 10 – Computing w/Python for Scientists & Engineers • SCI 5 – Intro to Computation for Contemporary Science • CS 32 – Computational Thinking and Problem Solving • CS 50 – Intro to Computer Science 1	•
Electronics (1 course) *Select one:* ES 50 – Intro to Electrical Engineering or ES 152 **and** CS 141	•
Mechanical Engineering Core (7 courses) *Select either the Mechanical or the Thermal Systems Track*	
Mechanical Systems Track *Required* • ES 51 – Computer Aided Machine Design • ES 120 – Introduction to Mechanics of Solids • ES 125 – Mechanical Systems • ES 123 – Introduction to Fluid Mechanics • ES 181 – Engineering Thermodynamics *Track Elective* *Choose **2** from* *ES 128, 155, 159, 183, 190 **or** 192, 231, 220, 240*	• • • • • • •
Thermal Systems Track *Required* • ES 181 – Engineering Thermodynamics • ES 183 – Introduction to Heat Transfer • ES 120 – Introduction to Mechanics of Solids • ES 123 – Introduction to Fluid Mechanics • ES 125 – Mechanical Systems *Track Elective* *Choose **2** from* *ES 51, 128, 155, 190 **or** 192, 231, 220, 240*	• • • • • • •
General Engineering Elective † (1 course - see list on page 4)	•
Engineering Design (2 courses) • ES 96 – Engineering Problem Solving & Design Project* or ES 227 – Medical Device Design - *must be taken in the junior year, prior to taking ES 100hf* • ES 100hf – Engineering Design Projects	• •

† ES 6, 50, 51, and 53: No more than three of these courses may count towards concentration credit. ES 6 and 53 can only count as an engineering elective when taken during the freshman or sophomore year. See handbook.

Required Signatures:

Student	Date
Associate/Director of Undergraduate Studies	Date

This plan *does* / *does not* meet the ABET distribution requirements.

Associate Dean for Education	Date

Chemistry/Advanced Science

Introductory Courses

- LS 1a - Intro to the Life Sciences: ***or*** LPS A – Foundational Chem & Bio
- PS 11 - Found & Frontiers of Modern Chem ***or*** PS 1 - Chem Bonding, Energy, & Reactivity
- PS 10 - Quantum & Stat Found of Chem
- Physics 15c – Wave Phenomena

Upper-Level Courses

- CHEM 160 - Quantum Chemistry
- PHYS 19 – Intro to Theoretical Physics
- PHYS 125 – Widely Applied Physics
- PHYS 143a - Quantum Mechanics I
- PHYS 151 – Mechanics
- PHYS 153 – Electrodynamics

General Engineering Electives (*Incomplete List***)**

- ESE 6 – Environmental Science & Technology
- ES 53 – Quantitative Physiology as a Basis for Bioengineering
- AP 195 - Intro to Solid State Physics
- BE 110 - Physiological Systems Analysis
- BE 128 – Intro to Biomedical Imaging & Systems
- CS 51 – Intro to Computer Science 2
- CS 61 – System Programming & Machine Organization
- CS 141 – Computing Hardware
- ES 105hfr – Humanitarian Design Projects (*must be taken twice*)
- ES 111 – Intro to Scientific Computing
- ES 115 – Mathematical Modeling
- ES 121 – Intro to Optimization: Models & Methods
- ES 128 - Computational Solid and Structural Mechanics
- ES 151 – Applied Electromagnetism
- ES 155 – System and Control
- ES 156 - Signals and Communications
- ES 159 – Introduction to Robotics
- ESE 160 - Space Science and Engineering
- ESE 166 – State of the Art Instrumentation in Environmental Sciences
- ES 170 – Engineering Quantum Mechanics
- ES 173 - Introduction to Electronic and Photonic Devices
- ES 175 – Photovoltaic Devices
- ES 177 – Microfabrication Laboratory
- ES 190 – Intro to Material Science & Engineering
- ES 192 – Material Selection & Design
- ES 231 – Energy Technology

Prerequisite Planning Table for the Mechanical Engineering SB

	Typically Offered	Math	Physics	Other
Required Courses				
ES 51	Fall & Spring			
ES 120	Spring	**21a, Co: 21b**	**A**	
ES 123	Spring	**21a, 21b**	**A**	
ES 125	Fall	**21a, 21b**	**A**	
ES 181	Fall		**A**	
ES 183	Spring	*21a,* **21b**	**A**	*ES 181*
ES 190	Fall	**21a, 21b**	**A, B**	
ES 192	Fall			
ES 96	Fall & Spring			**Junior Year**
ES 100HF	Fall-Spring			**ES 96 or 227**
Selected Electives				
ES 50	Spring			
ES 128				ES 120
ES 159	Fall		**A**	CS 50
ES 152	Fall	**1a, 1b**	**Co: B**	
ES 173	Fall	**1b**	**A, B**	
ES 227	Spring			*ES 50 or 51*
CS 141	Spring			
ES 155	Fall	*21a, 21b*		*CS 50*

[1]Courses listed as Recommended Preparation, and not an enforced prerequisite, are shown in italics

[2]Courses marked with a "Co:" may be taken as a co-requisite

[3]Equivalent courses are accepted for prerequisites (e.g., Phys 15a, PS 12a, or AP50a all count for Physics A)