Engineering Physics
Sample Curriculum for Computer Science and Engineering Specialization

Student Information

Name:_____ OSU Email: _____

Suggested Curriculum

This should be used as a **guide** only. Semester offerings are subject to change.

Year	Autumn	Spring
1	___ Physics 1270[1] *(Into Physics I)* ..... 5 hr ___ Math 1151 *(Calculus I)* ..... 5 hr ___ Engineering 1181 *(Intro Engineering I)* ..... 2 hr ___ Engineering 1100 *(Engineering Survey)* ..... 1 hr ___ Writing & Info Literacy GE ..... 3 hr	___ Physics 1271[1] *(Intro Physics II)* ..... 5 hr ___ Math 1172 (*Eng Mathematics A)* ..... 5 hr ___ Engineering 1182 *(Intro Engineering II)* ..... 2 hr ___ CSE 1222[2] *(C++ Programming)* ..... 3 hr ___ GenEd 1201[3] ..... 1 hr
2	___ Physics 2300 *(Mechanics I)* ..... 4 hr ___ **Physics 2095** *(Physics Seminar)* ..... 1 hr ___ Math 2173 *(Eng Mathematics B)* ..... 3 hr ___ Physics 3700 *(Data Analysis Lab)* ..... 3 hr ___ CSE 2221 *(Software I)* ..... 4 hr ___ Literary, Visual and Performing Arts GE ..... 3 hr	___ Physics 2301 *(Mechanics II)* ..... 4 hr ___ Math 2174[4] *(Differential Eq./Linear Algebra)* ..... 3 hr ___ CSE 2231 *(Software II)* ..... 4 hr ___ CSE 2321 *(Foundations I)* ..... 3 hr ___ Social and Behavioral Sciences GE ..... 3 hr
3	___ **Physics 5500** *(Quantum Mechanics)* ..... 4 hr ___ CSE 2421 *(Systems I)* ..... 4 hr ___ CSE Elective ..... 3 hr ___ CSE Elective ..... 3 hr ___ Citizenship Theme GE[7] ..... 3 hr	___ **Physics 5400** *(Electromagnetism)* ..... 4 hr ___ Physics 4700 *(Electronics Lab)* ..... 3 hr ___ CSE Elective ..... 3 hr ___ Targeted Elective[6] ..... 3 hr ___ Race, Ethnicity, Gender Diversity GE ..... 3 hr
4	___ **Physics 5800**[8] *(Eng Phy Capstone I)* ..... 3 hr ___ CSE Elective ..... 3 hr ___ Targeted Elective[6] ..... 3 hr ___ Citizenship Theme GE[7] ..... 3 hr ___ Student Choice Theme GE[7] ..... 3 hr	___ **Physics 5801**[8] *(Eng Phy Capstone II)* ..... 3 hr ___ Targeted Elective[6] ..... 3 hr ___ Physics Elective[5] ..... 4 hr ___ Student Choice Theme GE[7] ..... 3 hr ___ Historical and Cultural Studies GE ..... 3 hr

Total Hours to complete the degree program = 131; Courses printed in **bold** are offered only during the term shown.

[1] Students can take Physics 1250-1251, 1250H-1251H, 1260-1261, or 1270-1271

[2] Students can take CSE 1222, CSE 1223, CSE 1224, Engr 1221, or Engr 1281H as their programming course

[3] GenEd 1201 must be taken within the first three semesters

[4] Or (Math 2415 and 2568) or (Math 2255 and 2568) or (Math 5520H) can be completed in place of Math 2174. Those pursuing the ECE concentration should take Math 2415 and 2568.

[5] Physics Elective options are Physics 3470, 5300, 5401H, 5501, 5600, 5680, and 5810

[6] A list of Targeted Electives options is available at go.osu.edu/targeted-electives

[7] Take either two 3-credit hour classes or one 4-credit hour class for each of the two GE Thematic Pathways requirements. If two 3-hour courses are taken, they must be from different subjects.

[8] Students can take the College of Engineering Multidisciplinary Capstone Design sequence, Engineering 5901.01-5902.01 in place of

Physics 5800-5801. Enrollment in ENGR 5901.01 requires approval. More information about ENGR 5901.01, including the enrollment request details, can be found on the Department of Engineering Education website.

Engineering Specializations

Engineering Physics students are required to take at least 27 hours from one of the following engineering specializations. Note: this document outlines the requirements for the **Computer Science and Engineering** specialization.

Aerospace Engineering
Chemical Engineering
Computer Science & Engineering
Electrical Engineering
Industrial & Systems Engineering
Materials Science & Engineering
Mechanical Engineering
Nuclear Engineering

Requirements for each specialization can be found below and at physics.osu.edu/engineering-physics-program/engineering-physics-degree-requirements

Computer Science and Engineering Specialization

Required courses (15 hours)

Course	Course title	Credits	Term	Prerequisites
CSE 2221	Software I: Components	4	Au, Sp, Su	CSE 1222, 1223, 1224, Engr 1221, or 1281H. Prereq or concur: Math 1151
CSE 2231	Software II: Software Development and Design	4	Au, Sp, Su	CSE 2221. Concur: 2321
CSE 2321	Foundations I: Discrete Structures	3	Au, Sp, Su	CSE 2221. Concur: 2231
CSE 2421	Systems I: Introduction to Low-Level Programming and Computer Organization	4	Au, Sp, Su	CSE 2231, 2321

Electives courses (choose 12 hours)

Course	Course title	Credits	Term	Prerequisites
CSE 2331	Foundations II: Data Structures and Algorithms	3	Au, Sp, Su	CSE 2231, 2321, and Stat 3460 or 3470; Prereq or concur: Math 3345
CSE 2371	Quantum Circuits and Algorithms	3	Au, Sp	Rank 2 (sophomore) or above
CSE 2431	Systems II: Introduction to Operating Systems	3	Au, Sp, Su	CSE 2421 and ECE 2560
CSE 3231	Software Engineering Techniques	3	Au, Sp	CSE 3901 or 3902 or 3903
CSE 3232	Software Requirement Analysis	3	Au, Sp	CSE 3241, 3901, 3902, 3903, or 5241
CSE 3241	Introduction to Database Systems	3	Au, Sp, Su	CSE 2123 or 2231; and 2321

CSE 3244	Data Management in the Cloud	3	Au, Sp	CSE 3241 and 2421
CSE 3321	Automata and Formal Languages	3	Au, Sp	CSE 2231, 2421, 2331, and Math 3345
CSE 3341	Principles of Programming Languages	3	Au, Sp	CSE 2231, 2331, and 2421, and (3901, 3902, or 3903)
CSE 3421	Introduction to Computer Architecture	3	Au, Sp	CSE 2231, and CSE 2421, and ECE 2060
CSE 3430	Overview of Computer Systems for Non-majors	4	Au, Sp	CSE 2122, 2123; and 2321
CSE 3461	Computer Networking and Internet Technologies	3	Au	CSE 2421
CSE 3521	Survey of Artificial Intelligence I: Basic Techniques	3	Au, Sp	CSE 2331; and Math 2174 or 2568 or 5520H; and Stat 3201 or 3450 or 3460 or 3470 or 4201 or Math 4530 or 5530H
CSE 3541	Computer Game and Animation Techniques	3	Au, Sp	CSE 3901, 3902, or 3903
CSE 3901	Project: Design, Development, and Documentation of Web Applications	4	Au, Sp	CSE 2231; and 2321; and 2421
CSE 3902	Project: Design, Development, and Documentation of Interactive Systems	4	Au, Sp	CSE 2231; and 2321; and 2421
CSE 3903	Project: Design, Development, and Documentation of System Software	4	Au	CSE 2231; and 2321; and 2421
CSE 4251	The UNIX Programming Environment	1	Au, Sp	CSE 2122, 2123, or 2231; and 2321
CSE 4252	Programming in C++	1	Au, Sp	CSE 2123 or 2231; and 2321
CSE 4253	Programming in C#	1	Au, Sp	CSE 2122, 2123, or 2231; and 2321
CSE 4256	Programming in Python	1	Au, Sp	CSE 2122, 2123, or 2231; and 2321
CSE 4471	Information Security	3	TBA	CSE 2231 and 2321
CSE 5234	Distributed Enterprise Computing	3	Au	CSE 2431
CSE 5236	Mobile Application Development	3	Au, Sp	CSE 3901 or 3902 or 3903
CSE 5242	Advanced Database Management Systems	3	Au	CSE 3241 and CSE 2421
CSE 5243	Introduction to Data Mining	3	Sp	CSE 3241 and CSE 2331
CSE 5245	Introduction to Network Science	3	Au, Sp	CSE 2331
CSE 5343	Compiler Design and Implementation	3	Sp	CSE 390x and CSE 3341
CSE 5351	Introduction to Cryptography	3	Sp	CSE 2331; and Statistics 3460 or 3470
CSE 5361	Numerical Methods	3	Sp	CSE 2231 and Math 2568
CSE 5441	Introduction to Parallel Computing	3	Au, Sp	CSE 2231, 2321, and 2421
CSE 5462	Network Programming	3	Sp	CSE 3461
CSE 5463	Introduction to Wireless Networking	3	Sp	CSE 3461 and (Statistics 3450 or 3470)
CSE 5471	Introduction to Cybersecurity	3	Au, Sp	Junior standing (rank 3) or higher

CSE 5472	Information Security Projects	3	Au	CSE 390x; and (CSE 3461, 5461, or 4471)
CSE 5473	Network Security	3	Sp	CSE 3461
CSE 5474	Software Security	3	Sp	CSE 2431
CSE 5523	Machine Learning and Statistical Pattern Recognition	3	Au, Sp	CSE 3521; and (CSE 5522, Stat 3460, or Stat 3470); and (Math 2568, 2174, or 5520H)
CSE 5524	Computer Vision for Human-Computer Interaction	3	Au, Sp	CSE 2331
CSE 5525	Foundations of Speech and Language Processing	3	Au, Sp	CSE 3521; and (CSE 5522 Stat 3460, or Stat 3470)
CSE 5526	Introduction to Neural Networks	3	Au, Sp	CSE 3521
CSE 5542	Real-Time Rendering	3	Au, Sp	CSE 390x; and Math 2568
CSE 5544	Introduction to Data Visualization	3	Au, Sp	CSE 5361

General Education Requirement

A list of approved general education courses can be found at advising.engineering.osu.edu/current-students/curriculum/general-education