

The University of Connecticut

School of Engineering

# **ENGINEERING PHYSICS**

## **EE track**

**GUIDE TO COURSE SELECTION**

**AY 2021-2022**

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for

Engineering Physics (EngPhys) Majors

in the School of Engineering and College of Liberal Arts and Sciences

Prepared by the  
Electrical & Computer Engineering Curricula & Courses Committee  
School of Engineering, University of Connecticut.

<http://www.ee.uconn.edu/epcourseguide.php>

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## 1. INTRODUCTION

The objective of this Guide is to outline courses offered by the School of Engineering and the College of Liberal Arts and Sciences leading toward a degree in **Engineering Physics** (EngPhys) which will prepare the student for a career in the chosen field, meet the curricular requirements of the Departments, the School of Engineering and the College of Liberal Arts and Sciences, and the University. This Guide is intended to be used in conjunction with the University of Connecticut General Catalog as a source of information regarding degree requirements in Engineering Physics.

This Guide describes the Engineering Physics (EngPhys) curriculum, which is intended to provide the core of knowledge expected of a professional engineer working in this field. In addition to the required core courses, there are many senior year Professional Requirement courses which are chosen based on the desired area of concentration. The suggested professional requirement courses for the Engineering Physics program allow students to align themselves with either Electrical Engineering, Mechanical Engineering, or Materials Engineering. This guide has been tailored to the Electrical Engineering concentration in Engineering Physics; other guides are available for the other concentrations. The choice of the Professional Requirement courses, subject to the rules noted below, is up to the student and his or her advisor. Finally, all plans of study developed by the student must satisfy the curriculum requirements in EngPhys. and the minimum requirements for engineering science and design established by the School of Engineering.

### 1.1 Preparation of Plans of Study

Prior to registration during the first semester of the Junior year [typically when a student is taking ECE 3101 and/or ECE 3201], or for transfer students in the second semester at UConn, whichever is later, each student must complete a Plan of Study form documenting the program he/she intends to follow to satisfy the degree requirements of the chosen major in engineering. In order to help students in developing a suitable Plan of Study form that meets graduation requirements, a student should meet with your academic advisor to understand the curriculum requirements and make a plan based on the course availability and your interest. Details about the process of filling out a Plan of Study form are provided later in Section 4.

## 2. ENGINEERING PHYSICS CURRICULUM

The Engineering Physics program of study is designed to give sound knowledge of basic principles in mathematics, physics, and chemistry; to offer training in the theory, principles, and practices of engineering; and to present the opportunity to obtain additional instruction and experience in one of the major engineering fields. Throughout the four-year curricula, opportunities are available to study general cultural and scientific topics. In addition, elective credits are available which can be used by those interested in professional schools or management and administration to supplement the required courses outlined in this Guide for the EngPhys curriculum.

For students in the School of Engineering, the engineering requirements which must be met are stated in detail in the Plan of Study current at the time of the student's entry into the junior year program or the time of the student's admission or readmission to the School, whichever is later. Thus, this Guide provides the details omitted from the University Catalog. Note that a student must have earned at least a 2.0 grade point average for all calculable Upper Division course work to receive the degree.

## 2.1 General Education Requirements (University Core Curriculum)

As part of all baccalaureate degree programs at the University, students are required to satisfy a common core of coursework known as the General Education Requirements. These are described in what follows.

### *Foreign Languages*

The minimum requirement is met if the student is admitted to the University with **three years of a single foreign language in high school**, or the equivalent. If the student has not met the minimum requirement through high school coursework, he or she must **pass the second semester course of the introductory year-long course sequence** in a language at the University.

### *Expository Writing*

All students must take ENGL 1010 Seminar in Academic Writing or ENGL 1011 Seminar in Writing through Literature. In addition to these courses, all students must complete **two Writing (W) courses**. As shown in the following pages, two Writing courses are specified in the required coursework for the Electrical Engineering concentration in Engineering Physics.

### *Arts and Humanities (Content Area One)*

All students must take **two** Arts and Humanities courses. These courses must be **from two different departments**. All students in the School of Engineering are required to take PHIL 1104, which satisfies one of these requirements.

### *Social Sciences (Content Area Two)*

All students must take **two** Social Sciences courses. These courses must be **from two different departments**.

### *Science and Technology (Content Area Three)*

All students must take two Science and Technology courses. These courses must be from two different departments. All engineering students satisfy this requirement automatically with required courses.

### *Diversity and Multiculturalism (Content Area Four)*

All students must take **two** Diversity and Multiculturalism courses. **One of these courses may also count toward the Content Area One or Content Area Two**. One of these courses must be an international course.

The list of approved courses has been furnished by the General Education Oversight Committee. It is available at <http://geoc.uconn.edu/Approved%20Courses.htm>.



## 2.2 Overview of the Freshman and Sophomore years

The lower division or freshman and sophomore years of the Engineering Physics curriculum are similar to the other engineering curricula and are described in the Engineering Section of the University of Connecticut General Catalog. The required program includes courses in Mathematics, Physics, Chemistry and Engineering with additional coursework in English and the Humanities and Social Sciences.

### FRESHMAN YEAR

First Semester	Credits	Second Semester	Credits
MATH 1131Q - Calculus I	4	MATH 1132Q - Calculus II	4
CHEM 1127Q - Gen. Chem. I	4	CHEM 1128Q – General Chemistry II	4
PHYS 1501Q – Physics for Engineers I	4	PHYS 1502Q – Physics for Engineers II	4
ENGL 1010 or ENGL 1011 - Acad. Writing	4	Arts and Humanities Course <sup>1</sup>	3
ENGR 1000 - Orientation to Engr.	<u>1</u>	CSE 1010 – Intro. to Computing for Engr.	<u>3</u>
	17		18

### SOPHOMORE YEAR

First Semester	Credits	Second Semester	Credits
MATH 2110Q - Multivariable Calculus	4	MATH 2410Q - Differential Equations	3
PHYS 3101Q – Mechanics I	3	ECE 2001 - Electric Circuits	4
PHYS 2501W – Lab. in Electricity, Magnetism, and Mechanics	3	PHYS 2300 – Quantum Physics	3
CSE 2301 - Logic Design	<u>4</u>	PHIL 1104 - Phil. and Social Ethics	3
	14	STAT 3345Q – Prob. Mod. For Engr.	<u>3</u>
			16

<sup>1</sup> The courses from content areas one (Arts and Humanities) and two (Social Sciences) must be from four different departments. One course from either content area one (Arts and Humanities) or content area two (Social Sciences) may also be used to fulfill one of the requirements from content area four (Diversity and Multiculturalism). One course from content area four must be an international course.

## 2.3 Overview of the Junior and Senior years

The Engineering Physics upper division curriculum, as described below, includes required courses and a number of professional requirements. The professional requirements allow a student to align with one of the other engineering disciplines (Electrical Engineering, Mechanical Engineering, or Materials Engineering). The suggested plan below includes professional requirements for the Electrical Engineering option.

### JUNIOR YEAR

First Semester	Credits	Second Semester	Credits
ECE 3201 - Elec. Circuit Design & Analysis	4	ECE 3111 - Systems Analysis	3
ECE 3101 - Signals and Systems	3	PHYS 3202 – Electricity and Magnetism II	3
PHYS 3201 – Electricity & Magnetism I	3	ECE 4111 – Communication Systems or ECE 4112 – Digital Comm. and Networks	3
MATH 2210Q - Linear Algebra	3	Social Sciences course <sup>1</sup>	3
MATH 3410 – Diff. Eqns. Appl.	<u>3</u>	Diversity and Multiculturalism course <sup>1</sup>	<u>3</u>
	16		15

## SENIOR YEAR

First Semester	Credits	Second Semester	Credits
ECE 4901 - Elec. & Comp. Engr. Design I	2	ECE 4902 - Elec. & Comp. Engr. Design II	3
ECE 3223 – Optical Engineering	3	ECE 4211 – Micro/Optoelectronic Devices	3
PHYS 3401 – Quantum Mechanics <sup>2</sup>	3	ECE 3225 – Optical Engineering Laboratory	3
PHYS 3300 – Stat. & Therm. Phys.	3	Diversity and Multiculturalism course <sup>1</sup>	3
Social Sciences course <sup>1</sup>	3	Elective	<u>3</u>
Elective	<u>3</u>		
	17		15

<sup>1</sup>The courses from content areas one (Arts and Humanities) and two (Social Sciences) must be from four different departments. One course from either content area one (Arts and Humanities) or content area two (Social Sciences) may also be used to fulfill one of the requirements from content area four (Diversity and Multiculturalism). One course from content area four must be an international course.

<sup>2</sup>Quantum mechanics for Engineers offered by the ECE department can be substituted.

### 3. DOUBLE MAJORS, MINORS, AND ADDITIONAL DEGREES

It is possible to pursue a double major program in Engineering Physics and one of the other undergraduate engineering curricula, to pursue a minor degree program in conjunction with the Engineering Physics degree, or to pursue an additional degree within the University. Any student pursuing a second baccalaureate degree must i) submit an Additional Degree Petition (which requires the consent signature from the Dean of the School of Engineering) and ii) meet the course requirements of both degrees; and iii) earn at least 30 credits more than the requirements of the degree with the higher credit minimum.

#### *Double Major with another Engineering program*

Opportunities exist to pursue a double major program in Electrical Engineering and one of the other undergraduate engineering curricula. Of the other curricula, the Computer Engineering (CMPE) and the Computer Science and Engineering (CSE) majors have the most overlap with the EE curriculum and are the most popular double majors for EE students. If a student wishes to be a double major within Engineering, he or she should notify the Dean. Careful planning of course selection should be done each semester in consultation with the student's advisor. **A separate Plan of Study for each major** must be prepared and submitted for approval.

#### *Minors*

Several minors are available within the University that may be attractive to students pursuing the Electrical Engineering degree. Examples include minors in Mathematics and Statistics, within the College of Liberal Arts & Sciences, as well as the Biomedical Engineering minor within the School of Engineering.

#### *Additional Degree with another major outside of Engineering*

From time to time students wish to obtain an additional degree in a field outside of the School of Engineering. One example of an additional degree would be that found in the EUROTECH program in which the completion of a degree in German Studies within the College of Liberal Arts & Sciences is achieved at the same time the student completes the primary degree in a major within the School of Engineering. Students who have such an interest should discuss the procedure for pursuing the additional degree with the Director of Undergraduate Advising, (486-5462).

## 4. SUBMITTING THE PLAN OF STUDY

All students in the first semester of their Junior year in the Engineering curriculum must prepare a preliminary Plan of Study (POS) through StudentAdmin. These students should work with their advisors to determine a POS that meets the degree requirements of the School of Engineering and the University. The preliminary POS allows students to map out the entirety of their degree coursework to assist them in conversations with their advisor about meeting all degree requirements prior to graduation. A preliminary POS is filed after a student has reached junior credit standing (54 credits or more) and outlines the student's plan for the remainder of their coursework until graduation. Submitting an approved preliminary POS is required in the School of Engineering.

A final POS is filed after you have registered for your final semester of coursework. The final POS must demonstrate that the student meets all requirements to graduate. The final POS is a UConn graduation requirement.

Once the PoS has been submitted it will be routed to three places – the academic advisor > the academic department head > the UG SoE Dean. Students will have an enrollment hold on their account until the PoS has been approved at all levels.

**Changes:** Changes to a previously submitted preliminary POS should be made in consultation with the advisor to make sure all graduation requirements are still met after the changes. A new preliminary POS submission is not necessary, but the changes should be reflected in the student's last semester on the final POS submission which will accurately list all the courses that were taken to satisfy degree requirements.

It is the **student's responsibility** to fill out and file both the preliminary and final POS. However, students should do so with the guidance of their Academic Advisor. It is ideal to start this process at least one semester ahead of time, that is, in the spring of your sophomore year.

More information about Plan of Study, including an official step-by-step instruction, can be found at: <https://undergrad.engr.uconn.edu/advising/plan-of-study>

### **How do I submit a preliminary POS?**

First, you must access your academic planner in Student Administration.

*SA Self Service > Student Center > Academic Planner*

Then you can select "Plan by Requirements" to review your remaining unsatisfied requirements for your degree. You may also add courses to your planner using the "Browse Course Catalog" component.

Once you understand which courses you still need to take, review what semester those courses are offered and enter them into your Academic Planner accordingly. When you have completed this, you can select "Submit Plan of Study" and the document will be sent electronically to your faculty advisor for their review.



Ultimately, if the preliminary POS is **denied**, you must fix whatever errors are indicated and submit a new, correct POS that satisfies all degree requirements. If the POS is **approved**, you now have a complete and accurate plan to reach graduation. If you decide to deviate from this plan, it is your responsibility to discuss the changes with your academic advisor and ensure that you are still completing all degree requirements.

### **How do I submit a final POS?**

First, you must apply for graduation via Student Administration here:

*SA Self Service > Learner Services > Academics > Apply for Graduation*

Next, submit your final POS. You can do this by navigating the following path:

*SA Self Service > Student Center > Academic Requirements (under the drop down menu at the left) > "Submit Final Plan of Study" button*

All of your requirements must show as satisfied in StudentAdmin to have your final POS approved.

The final POS must be submitted as soon as possible after registering for your final semester of coursework. The latest a final POS can be submitted is by the end of the fourth week of the semester in which a student plans to graduate.

When preparing the POS, the following guidelines should be adhered to:

**Double Major**: If you plan to follow a double major, you will need to submit two plans of study.

**Catalog year and date of graduation**: It is extremely important that you accurately note what catalog year you are filing under and your intended date of graduation. The catalog year determines the set of requirements under which you will be graduating. If you need to change the catalog year, contact the Registrar. You can use any catalog year from the year you entered UConn to the year of your graduation.

**Courses taken**: The POS must show exactly the courses being used to satisfy degree requirements. Exemption from specific School of Engineering course requirements or substitution of alternative courses requires approval (see "Exemption and Substitution" below).

**Foreign Language Requirement**: The Foreign Language requirement calls for three years of a single foreign language in High School or passing the second semester course of the introductory year-long course sequence in a language at the University. The words "High School" should be circled if the student has met this requirement in High School. If not, the appropriate university courses should be listed.

**Expository Writing Requirement**: The General Education Requirement for Expository Writing is met through ENGL 1010 or ENGL 1011 and two "W" (writing) courses which are part of the engineering curriculum for each department (for Engineering Physics majors in the Electrical Engineering concentration, PHYS 2501W is required). Thus, the POS (and the student transcript)

must show this course. If, for some reason beyond the student's control, the major "W" course is not taken, the student will have to take the required "W" course outside the department curriculum.

**Arts and Humanities (Content Area One):** All students must take two Arts and Humanities courses. These courses must be from two different departments. All students in the School of Engineering are required to take PHIL 1104, which satisfies one of these requirements.

**Social Sciences (Content Area Two):** All students must take two Social Sciences courses. These courses must be from two different departments.

**Science and Technology (Content Area Three):** All students must take two Science and Technology courses. These courses must be from two different departments. All engineering students satisfy this requirement with required courses.

**Diversity and Multiculturalism (Content Area Four):** All students must take two Diversity and Multiculturalism courses. One of these courses may also count toward the Content Area One or Content Area Two. One of these courses must be an international course.

**Required courses:** Required courses are shown on the form. If there are alternatives listed, the course(s) that the student has taken or intends to take should be circled [e.g., ENGL 1010 or ENGL 1011, circle 1010 or 1011 depending on which one was taken].

**Restrictions:** The following courses may not be counted for credit toward graduation: MATH 1120Q and 1110Q along with other mathematics courses numbered below 1120Q; PHYS 1010Q; PHYS 1030Q; CSE 1000C; STAT 1000CQ; and courses labeled "independent study" or "variable topics" taken in departments outside of the School of Engineering. **No course taken on a Pass/Fail basis may be counted for credit toward graduation or used to meet any course requirement of the School of Engineering.** Many general University restrictions are shown in the Academic Regulations and Procedures section of the University Catalog.

**Exemption and Substitution:** Students who desire to be excused from any of the requirements, or to substitute other courses for those prescribed, must do so by getting approval from the department head and SoE Director of Undergraduate Advising. Some examples of this type of departure from a published regulation are as follows: exemption from MATH 1131Q for a student who had Calculus in high school and started in MATH 1132Q or substitution of transfer courses for UConn equivalents. Exceptions can be approved by submitting an exceptions form, which requires approval from your advisor, the department head (or associate department head), and the SoE Director of Undergraduate Advising.