# Department of Electrical and Electronic Engineering

# Program of Optoelectronic Information Science and Engineering for International Students (2022)

## I. Introduction

Optoelectronic Information Science and Engineering is a comprehensive technology, which is composed of optics, optoelectronics, microelectronics and other technologies. It is a new cross-subject with strong practical application, and is widely used in the national economy and defense. The professional training includes the theoretical knowledge of optoelectronics, flat panel display, lighting, solar energy, optical design and optical communication technology. At the same time, English and computer application training are important. Graduated students will be engaged in the field of optoelectronic information, optical communication, photoelectric detection, optoelectronic devices, new display and lighting technology, new energy, and new technology research and development. They are also suitable for the research and development of optoelectronic devices and related high-tech disciplines, scientific research institutions, universities and institutions engaged in scientific research, development, teaching and management.

Academic subject area: Electronic Information; Program code: 080705

## II. Objectives and Learning Outcomes

1. Objectives

Attributes that alumni of Optoelectronic Information Science and Engineering should demonstrate 3-5 years after graduation include 4 aspects. Alumni are:

Technical Skills: technically competent to conduct research and development in the industry and universities in the broad fields of Electronics and Information Engineering in general, and Communication Engineering in particular.

Engineering Ethos: able to think critically and creatively, able to use engineering principles to embrace challenging engineering and non-engineering problems encountered at work, able to

apply an analytic mindset, make informed decisions and able to provide innovative solutions.

Attitude: self-motivated with a desire for lifelong learning to adapt to the fast changing environment, able to operate with integrity and responsibility, having optimism and composure under tight schedule, and committed to make a positive impact on society locally and globally.

Leadership: effective communicators, well-prepared to advance towards leadership positions, able to capitalize the individual strengths of team members, and able to nurture the team to achieve goals.

2. Learning Outcomes

Student Outcomes (SOs) that prepare graduates to enter the professional practice of engineering:

SO 1: an ability to identify, formulate, and solve complex engineering problems1 by applying principles of engineering, science, and mathematics.

SO 2: an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

SO 3: an ability to communicate effectively with a range of audiences.

SO 4: an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

SO 5: an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

SO 6: an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

SO 7: an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

SO 8: knowledge of probability and statistics including applications, differential and integral calculus, sciences, engineering sciences, and computing science and application to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components.

SO 9: knowledge and application of advanced mathematics, such as differential equations, linear algebra, and complex variables.

SO 10: knowledge and application of and appropriate laboratory experience in: geometrical

optics, physical optics, optical materials, and optical and/or photonic devices and systems.

## III. Study Length, Degree, and Graduation Requirements

1. Study length: 4 years. The academic credit system of SUSTech allows flexible study years, but not less than 3 years or more than 6 years

2. Degree conferred: Students who complete and meet the degree requirements of the undergraduate program will be awarded a bachelor's degree in Engineering

3. The minimum credit requirement for graduation: 157 credits. The specific requirements are as follows.

<table>
<tr><th colspan="2">Module</th><th>Category</th><th>Minimum Credit Requirement</th></tr>
<tr><td rowspan="13">General Education Courses</td><td>Chinese Language and Culture Module</td><td>Chinese Language and Culture</td><td>16</td></tr>
<tr><td rowspan="2">Arts and Physical Education Module</td><td>Physical Education</td><td>4</td></tr>
<tr><td>Arts</td><td>2</td></tr>
<tr><td rowspan="4">Competence Development Module</td><td>Computer Programming</td><td>3</td></tr>
<tr><td>Writing</td><td>2</td></tr>
<tr><td>Chinese Studies</td><td>2</td></tr>
<tr><td>Foreign Languages</td><td>14</td></tr>
<tr><td rowspan="2">Humanities and Social Sciences Module</td><td>Humanities</td><td rowspan="2">6</td></tr>
<tr><td>Social Sciences</td></tr>
<tr><td rowspan="4">Mathematics and Natural Sciences Module</td><td>Mathematics</td><td>12</td></tr>
<tr><td>Physics</td><td>10</td></tr>
<tr><td>Chemistry</td><td>3</td></tr>
<tr><td>Biology</td><td>3</td></tr>
<tr><td>Introduction to Majors Module</td><td>Introduction to Majors</td><td>2</td></tr>
<tr><td rowspan="4">Major Courses</td><td rowspan="3">Major Required Courses</td><td>Major Foundational Courses</td><td>26</td></tr>
<tr><td>Major Core Courses</td><td>15</td></tr>
<tr><td>Practice-based Learning (Undergraduate Thesis, Internships.)</td><td>14</td></tr>
<tr><td>Major Elective Courses</td><td>Major Elective Courses</td><td>23</td></tr>
<tr><td colspan="3">Total</td><td>157</td></tr>
<tr><td colspan="4">Note: please see the General Education Requirement for more details on Chinese Language and Culture Module, Arts and Physical Education Module, Competence Development Module（Foreign Languages & Chinese Studies & Writing）, Humanities and Social Sciences Module, and Introduction to Majors Module.</td></tr>
</table>

## IV. Course Requirements for the Mathematics and Natural Sciences Module and Computer Programming

| Course Category | Course Code | Course Name | Credits | Terms | Prerequisite | Dept. |
|---|---|---|---|---|---|---|
| Mathematics | MA117 | Calculus I | 4 | 1 Fall | None | MA |
| | MA127 | Calculus II | 4 | 1 Spring | MA117 | |
| | MA113 | Linear Algebra | 4 | 1 Spring & Fall | None | |
| Physics | PHY105 | College Physics I | 4 | 1 Fall | None | PHY |
| | PHY106 | College Physics II | 4 | 1 Spring | PHY105 | |
| | PHY104B | Experiments of Fundamental Physics | 2 | 1-2 Spring & Fall | None | |
| Chemistry | CH105 | Chemistry: The Central Science | 3 | 1-2 Spring & Fall | None | CH |
| Biology | BIO102B | Introduction to Life Science | 3 | 1-2 Spring & Fall | None | BIO |
| Computer Programming | CS111 | Introduction to C programming | 3 | 1-2 Spring & Fall | None | CS |

Note:

1. The course of Calculus I and II can be replaced by Mathematical Analysis I and II.
2. The course of College Physics I and II can be replaced by General Physics I and II
3. The course of Linear Algebra can be replaced by Advanced Linear Algebra I.
4. The course of Introduction to C programming can be replaced by Introduction to Computer Programming.
5. The above alternatives are also applicable to "Prerequisites for Major Declaration."

## V. Prerequisites for Major Declaration

| Major Declaration Time | Course Code | Course Name | Prerequisite |
|---|---|---|---|
| Declare major at the end of the first academic year | MA117 | Calculus I | None |
| | MA127 | Calculus II | MA117 |
| | MA113 | Linear Algebra | None |
| | PHY105 | College Physics I | None |
| | PHY106 | College Physics II | PHY105 |
| | PHY104B | Experiments of Fundamental Physics | None |
| | CS111 | Introduction to C programming | None |
| Declare major at the end of the second academic year | MA117 | Calculus I | None |
| | MA127 | Calculus II | MA117 |
| | MA113 | Linear Algebra | None |
| | PHY105 | College Physics I | None |
| | PHY106 | College Physics II | PHY105 |
| | PHY104B | Experiments of Fundamental Physics | None |
| | CS111 | Introduction to C programming | None |
| | CH105 | Chemistry: The Central Science | None |
| | BIO102B | Introduction to Life Science | None |
| | EE101 | Electronic and Information Technology for Metaverse | None |

**Note:**

1. **If the number of students entering a major at the end of the first academic year in the department is greater than or equal to the total number of the teaching-research faculty (PI)*2*60%, all majors in the department may implement the prerequisites for major declaration at the end of the second academic year.**
2. **If the number of students entering a major at the end of the first academic year in the department is less than the total number of the teaching-research faculty (PI)*2*60%, all majors in the department do not implement the prerequisites for major declaration at the end of the second academic year.**
3. **Suppose the number of students applying for a major at the end of the first academic year exceeds four times the total number of the teaching-research faculty (PI), then the department may select students according to predetermined rules. In principle, the rules set by the department shall examine the students' suitability for the major and not based on weighted GPA (Specific rules shall be set by the department and announced in advance).**
4. **For departments that do not implement prerequisites for major declaration at end of the second academic year, if the cumulative number of students applying for a major at the end of the second academic year and the number of students who have entered a major at the end of the first academic year exceeds four times the total number of the teaching-research faculty (PI), the department may select students according to predetermined rules. In principle, the rules set by the department shall examine the students' suitability for the major and not based on weighted GPA (Specific rules shall be set by the department and announced in advance).**

## VI: Major Course Arrangement

**Table 1: Major Required Courses**

**Program of Optoelectronic Information Science and Engineering**

| Course Category | Course Code | Course Name | Credits | Practice-based Learning Credits | Terms | Prerequisite | Dept. |
|---|---|---|---|---|---|---|---|
| Major Foundational Courses | EE104 | Fundamentals of Electric Circuits | 2 | 0 | 1 Spring | MA117<br>MA113 | EE |
| | EE201-17 | Analog Circuits | 3 | 0 | 2 Fall | PHY106<br>EE104 | EE |
| | EE201-17L | Analog Circuits Laboratory | 1 | 1 | 2 Fall | EE201-17 | EE |
| | EE205 | Signals and Systems | 3 | 1 | 2 Fall | MA117 | EE |
| | EE207 | Engineering Mathematics | 4 | 0 | 2 Fall | MA127<br>PHY106<br>MA113 | EE |
| | EE202-17 | Digital Circuits | 3 | 0 | 2 Spring | PHY106 | EE |
| | EE202-17L | Digital Circuits Laboratory | 1 | 1 | 2 Spring | EE202-17 | EE |
| | EE208 | Engineering Electromagnetics | 3 | 1 | 2 Spring | MA113<br>EE104 | EE |
| | MA212 | Probability and Statistics | 3 | 0 | 2 Spring | MA127 | MA |
| | EE351 | Microprocessors and Microsystems | 3 | 1 | 3 Fall | EE201-17<br>EE202-17 | EE |
| | **Total** | | 26 | 5 | | | |
| Major Core Courses | EE204 | Introduction to Semiconductor Devices | 3 | 1 | 2 Spring | EE203 | EE |
| | EE210 | Fundamentals of Optics | 3 | 0 | 2 Spring | None | EE |
| | EE317 | Advanced Electronic Science Experiment I | 1 | 1 | 2 Spring | EE201-17 or EE202-17 | EE |
| | EE309 | Introduction to Semiconductor Optics | 3 | 0 | 3 Fall | None | EE |
| | EE318 | Advanced Electronic Science Experiment II | 1 | 1 | 3 Fall | EE317 | EE |
| | EE310 | Principles and Technologies of Lasers | 3 | 0 | 3 Spring | None | EE |
| | EE405 | Advanced Electronic Science Experiment III | 1 | 1 | 3 Spring | EE317 | EE |
| | **Total** | | 15 | 4 | | | |
| Practice-based Courses | EE470 | Internship | 2 | 2 | 3 Summer | None | EE |
| | EE492 | Undergraduate Thesis/Projects | 12 | 12 | 4 Spring | None | EE |
| | **Total** | | 14 | 14 | | | |
| **Total** | | | 55 | 23 | | | |
| Note: Students who have completed Comprehensive Design I&II are not required to take the Graduation Projects/Thesis. | | | | | | | |

## Table 2: Major Elective Courses

### Program of Optoelectronic Information Science and Engineering

| Course Category | Course Code | Course Name | Credits | Practice-based Learning Credits | Terms | Prerequisite | Dept. |
|---|---|---|---|---|---|---|---|
| Module A | EE108 | Optoelectronics Intellisense | 3 | 0 | 1 Spring | None | EE |
| | EE203 | Solid-state Electronics | 3 | 0 | 2 Fall | PHY106 | EE |
| | EE303 | Fundamentals of Optoelectronic Technology | 3 | 1 | 3 Fall | PHY106 | EE |
| | EE311 | Optical Design | 3 | 1 | 3 Fall | None | EE |
| | EE335 | Liquid crystal optoelectronics | 3 | 1 | 3 Fall | EE210 | EE |
| | EE345 | Introduction of Wide Bandgap Semiconductors | 3 | 0 | 3 Fall | EE203 or EE204 | EE |
| | EE322 | Optoelectronics Devices Fabrication Laboratory | 2 | 1 | 3 Spring | EE204 | EE |
| | EE336 | Fundamentals of Photovoltaics | 3 | 1 | 3 Spring | EE204 | EE |
| | EE435 | Semiconductor Information Display Technologies | 3 | 0 | 4 Fall | EE203 EE204 | EE |
| | EE404 | Organic Electronics | 2 | 0 | 4 Spring | None | EE |
| Module B | EE271 | Artificial Intelligence and Machine Learning | 3 | 0 | 2 Fall | MA127 MA113 | EE |
| | CS203B | Data Structures and Algorithm Analysis B | 3 | 1 | 2 Fall | CS109 | CS |
| | EE206 | Communication Principles | 3 | 1 | 2 Spring | EE205 | EE |
| | EE270 | System Modeling and Simulation | 3 | 1 | 2 Spring | EE207 | EE |
| | EE272 | Intelligent Sensing and Signal Processing | 3 | 1 | 2 Spring | None | EE |
| | CS208 | Algorithm Design and Analysis | 3 | 1 | 2 Spring | CS109 CS203B | CS |
| | EE305 | Introduction to VLSI Technology | 3 | 1 | 3 Fall | EE203 | EE |
| | EE313 | Wireless Communications | 3 | 1 | 3 Fall | EE206 | EE |
| | EE315 | Data communications and networking | 3 | 1 | 3 Fall | None | EE |
| | EE316 | Microwave Engineering | 3 | 1 | 3 Fall | EE201-17 EE208 | EE |
| | EE323 | Digital Signal Processing | 3 | 1 | 3 Fall | EE205 | EE |
| | EE342 | Sensors and Applications | 3 | 0 | 3 Fall | None | EE |
| | EE346 | Mobile Robot Navigation and Control | 3 | 1 | 3 Fall | EE205 MA212 | EE |
| | EE371 | Automatic Control Theory | 3 | 0 | 3 Fall | EE104 | EE |
| | CS303B | Artificial Intelligence B | 3 | 1 | 3 Fall | CS203B CS109 MA212 | CS |
| | CS307 | Principles of Database Systems | 3 | 1 | 3 Fall | None | CS |
| | MA305 | Numerical Analysis | 3 | 0 | 3 Fall | MA203A 或 MA213 | MA |
| | MEE5105 | Fundamentals of Engineering Optimization | 3 | 0 | 3 Fall | MA113 MA117 | ME |
| | EE307 | Antennas and Radio Propagation | 3 | 1 | 3 Spring | EE208 EE104 | EE |
| | EE308 | Fiber Communication Principles and Techniques | 3 | 1 | 3 Spring | None | EE |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | EE312 | Design of Modern Communication Systems | 3 | 1 | 3 Spring | EE206<br>EE313 | EE |
| | EE326 | Digital Image Processing | 3 | 1 | 3 Spring | EE205 | EE |
| | EE328 | Speech Signal Processing | 3 | 1 | 3 Spring | EE323 | EE |
| | EE332 | Digital System Design | 3 | 1 | 3 Spring | EE202-17 | EE |
| | EE340 | Statistical Learning for Data Science | 3 | 0 | 3 Spring | MA113 | EE |
| | EE368 | Robotic Motion and Control | 3 | 1 | 3 Spring | EE205 | EE |
| | EE370 | Design and Practice of Computer Control System | 3 | 1 | 3 Spring | EE270<br>EE371 | EE |
| | EE372 | System Identification and Adaptive Control | 3 | 0 | 3 Spring | EE371 | EE |
| | EE411 | Information Theory and Coding | 2 | 0 | 4 Fall | MA212 | EE |
| | EE417 | Communications System Design II | 2 | 2 | 4 Fall | EE316<br>EE206<br>EE307 | EE |
| | EE433 | Modern Electric Vehicle Technologies | 2 | 0 | 4 Fall | EE208 | EE |
| | EE471 | Advanced Control Theory | 3 | 0 | 4 Fall | EE371 | EE |
| | CS405 | Machine Learning | 3 | 1 | 4 Fall | MA212<br>MA113 | CS |
| | ME424 | Modern Control and Estimation | 3 | 0 | 4 Fall | EE371 | ME |
| **Total** | | | 127 | 29 | | | |
| Note: At least 23 credits are required , and at least three courses from Module A are required. | | | | | | | |

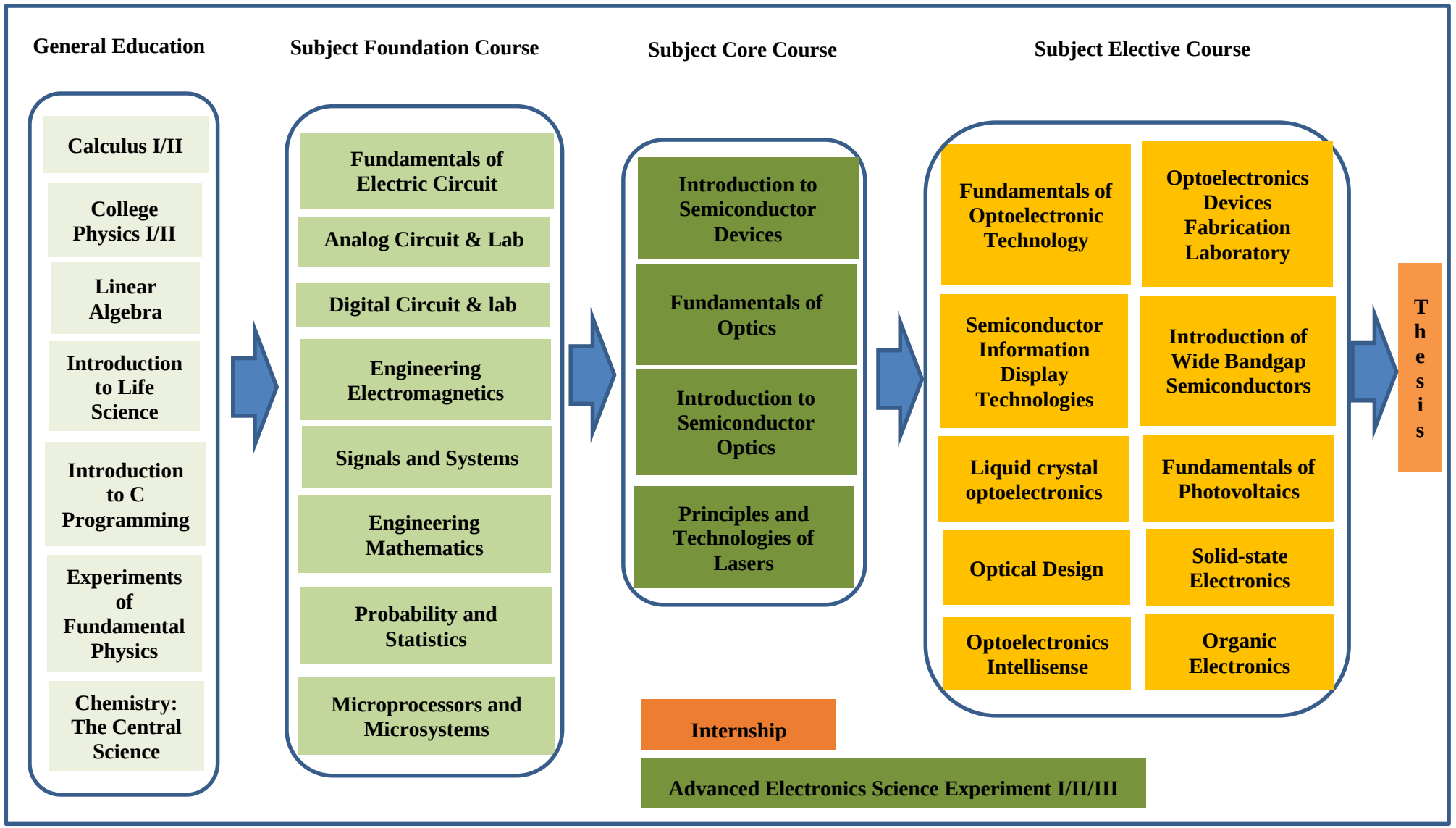
**Table 3: Overview of Practice-based Learning**

**Program of Optoelectronic Information Science and Engineering**

| Course Code | Course Name | Credits | Practice-based Learning Credits | Terms | Prerequisite | Dept. |
|---|---|---|---|---|---|---|
| EE201-17L | Analog Circuits Laboratory | 1 | 1 | 2 Fall | EE201-17 | EE |
| EE205 | Signals and Systems | 3 | 1 | 2 Fall | MA117 | EE |
| CS203B | Data Structures and Algorithm Analysis B | 3 | 1 | 2 Fall | CS109 | CS |
| EE202-17L | Digital Circuits Laboratory | 1 | 1 | 2 Spring | EE202-17 | EE |
| EE204 | Introduction to Semiconductor Devices | 3 | 1 | 2 Spring | EE203 | EE |
| EE206 | Communication Principles | 3 | 1 | 2 Spring | EE205 | EE |
| EE208 | Engineering Electromagnetics | 3 | 1 | 2 Spring | MA113<br>EE104 | EE |
| EE270 | System Modeling and Simulation | 3 | 1 | 2 Spring | EE207 | EE |
| EE272 | Intelligent Sensing and Signal Processing | 3 | 1 | 2 Spring | None | EE |
| EE317 | Advanced Electronic Science Experiment I | 1 | 1 | 2 Spring | EE201-17 or EE202-17 | EE |
| CS208 | Algorithm Design and Analysis | 3 | 1 | 2 Spring | CS109<br>CS203B | CS |
| EE303 | Fundamentals of Optoelectronic Technology | 3 | 1 | 3 Fall | PHY106 | EE |
| EE305 | Introduction to VLSI Technology | 3 | 1 | 3 Fall | EE203 | EE |
| EE311 | Optical Design | 3 | 1 | 3 Fall | None | EE |
| EE313 | Wireless Communications | 3 | 1 | 3 Fall | EE206 | EE |
| EE315 | Data communications and networking | 3 | 1 | 3 Fall | None | EE |
| EE316 | Microwave Engineering | 3 | 1 | 3 Fall | EE201-17<br>EE208 | EE |
| EE318 | Advanced Electronic Science Experiment II | 1 | 1 | 3 Fall | EE317 | EE |
| EE323 | Digital Signal Processing | 3 | 1 | 3 Fall | EE205 | EE |
| EE335 | Liquid crystal optoelectronics | 3 | 1 | 3 Fall | EE210 | EE |
| EE346 | Mobile Robot Navigation and Control | 3 | 1 | 3 Fall | EE205<br>MA212 | EE |
| EE351 | Microprocessors and Microsystems | 3 | 1 | 3 Fall | EE201-17<br>EE202-17 | EE |
| CS303B | Artificial Intelligence B | 3 | 1 | 3 Fall | CS203B<br>CS109<br>MA212 | CS |
| CS307 | Principles of Database Systems | 3 | 1 | 3 Fall | None | CS |
| EE307 | Antennas and Radio Propagation | 3 | 1 | 3 Spring | EE208<br>EE104 | EE |
| EE308 | Fiber Communication Principles and Techniques | 3 | 1 | 3 Spring | None | EE |
| EE312 | Design of Modern Communication Systems | 3 | 1 | 3 Spring | EE206<br>EE313 | EE |
| EE322 | Optoelectronics Devices Fabrication Laboratory | 2 | 1 | 3 Spring | EE204 | EE |
| EE326 | Digital Image Processing | 3 | 1 | 3 Spring | EE205 | EE |

| | | | | | | |
|---|---|---|---|---|---|---|
| EE328 | Speech Signal Processing | 3 | 1 | 3 Spring | EE323 | EE |
| EE332 | Digital System Design | 3 | 1 | 3 Spring | EE202-17 | EE |
| EE336 | Fundamentals of Photovoltaics | 3 | 1 | 3 Spring | EE204 | EE |
| EE368 | Robotic Motion and Control | 3 | 1 | 3 Spring | EE205 | EE |
| EE370 | Design and Practice of Computer Control System | 3 | 1 | 3 Spring | EE270<br>EE371 | EE |
| EE405 | Advanced Electronic Science Experiment III | 1 | 1 | 4 Fall | EE317 | EE |
| EE470 | Internship | 2 | 2 | 3 Summer | None | EE |
| EE417 | Communications System Design II | 2 | 2 | 4 Fall | EE316<br>EE206<br>EE307 | EE |
| CS405 | Machine Learning | 3 | 1 | 4 Fall | MA212<br>MA113 | CS |
| EE492 | Undergraduate Thesis/Projects | 12 | 12 | 4 Spring | None | EE |
| Total | | 113 | 52 | | | |

**Curriculum Structure of Optoelectronic Information Science and Engineering**




**Note: The Subject Elective course lists include only part of the courses, see more in Program.**