

## **Department of Electrical and Electronic Engineering**

### **Program of Optoelectronic Information Science and Engineering for**

#### **Class 2018**

#### **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.

#### **II. Objectives**

Optoelectronic Information Science and Engineering major aims to nourish students with solid photonics knowledge as well as practical skills and hands-on research experience. Students will be exposed to the state-of-the-art technologies of display, lighting, photovoltaic, laser, terahertz imaging technology, liquid crystal photonics, and fiber communications. Our graduates can either work in photonics related areas like display, lighting and semiconductor, laser spectral, terahertz imaging technology, liquid crystal photonics, or continue post-graduate education in photonics or related fields. They are capable of pursuing research, development, education, and management positions at a broad spectrum of enterprises, research institutes, and universities.

#### **III. Study Length and Degree Requirements**

Study length: 4 years

Degree conferred: Bachelor of Engineering

The minimum credit requirement for graduation: 135 credits (not including English courses);

#### **IV. Discipline**

Optoelectronics and Laser Technology

#### **V. Main Courses**

Major courses include Solid-State Electronics, Semiconductor Devices, Fundamental of Optoelectronic Technology, Fundamental of Optics, Principles of Lasers, Optical Design, Semiconductor Optics, Display and Lighting Technologies .etc.

#### **VI. Practice-Based Courses**

Major practical training includes Optoelectronics Devices Fabrication Laboratory, Optoelectronic related Innovative Experiment, Industrial Practice, Advanced Electronic Science Experiment (Outstanding students after their junior year, can join research working with their professor), and all sorts of domestic and international academic competitions.

#### **VII. Course Structure and Credit Requirements**

General Education (GE) Required Courses: 51 credits (not including English courses);

General Education (GE) Elective Courses: 10 credits (4 credits for Humanities Module, 4 credits for Social Sciences Module, and 2 credits for Arts Module);

Major Foundational Courses: 25 credits;

Major Core Courses: 18 credits;

Major Elective Courses: 19 credits;

Undergraduate Thesis/Projects, Research Projects and Internship: 12 credits;

The minimum credit requirement for graduation: 135 credits (not including English courses).

### VIII. Requirements for Science Module of GE Required Courses

Course Cod	Course Name	Credit	Lab Credits	Hours/week	Term	Instruction Language	Prerequisite	Dept
MA101B	Calculus I A	4		4	Spr/ Fall	B/E	NA	MA
MA102B	Calculus II A	4		4	Spr/ Fall	B/E	Calculus I A	MA
MA103A	Linear Algebra I-A	4		4	Spr/ Fall	B/E	NA	MA
PHY103B	General Physics B (I)	4		4	Spr/ Fall	B/E	NA	PHY
PHY105B	General Physics B (II)	4		4	Spr/ Fall	B/E	General Physics B (I)	PHY
CH101B	General Chemistry B	3		3	Spr/ Fall	B/E	NA	CH
BIO102B	Introduction to Life Science	3		3	Spr/ Fall	B/E	NA	BIO
CS102B	Introduction to Computer Programming B	3	1	4	Spr/ Fall	B/E	NA	CS
PHY104B	Experiments of Fundamental Physics	2	2	4	Spr/ Fall	B/E	NA	PHY
<b>Total</b>		<b>31</b>	<b>3</b>	<b>34</b>				

### IX. Pre-requisites for Major Declaration

Course Code	Course Name	Notes
EE203	Solid-State Electronics	
EE204	Introduction to Semiconductor Devices	
EE210	Fundamentals of Optics	

## X. Course Arrangement

**Table 1: Major Required Course (Foundational and Core Courses)**

Course Category	Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	take the course Advised term to	language Instruction	Prerequisite	Dept.
Major Foundational Courses	ME102	CAD and Engineering Design	3	1 5	4.5	Spr /Fa ll	1/Spr or Fall	B/E	NA	ME
	EE104	Fundamentals of Electric Circuits	2		2	Spr /Fa ll	1/Spr or Fall	B/E	MA101B MA103A or MA103B	EE
	EE201-17	Analog Circuits	3		3	Fall	2/Fall	C	PHY105B EE104	EE
	EE201-17L	Analog Circuits Laboratory	1	1	2	Fall	2/Fall	B	EE201-17	EE
	EE202-17	Digital Circuits	3		3	Spr /Fa ll	2/Spr or Fall	B/E	PHY105B	EE
	EE202-17L	Digital Circuits Laboratory	1	1	2	Spr /Fa ll	2/Spr or Fall	B/E	EE202-17	EE
	EE203	Solid-State Electronics	3		3	Fall	2/Spr or Fall	B/E	NA	EE
	EE205	Signals and Systems	3	1	4	Fall	2/Fall	B	NA	EE
	EE208	Engineering Electromagnetics	3	1	4	Spr	2/Spr	B	MA101B MA103A EE104	EE
	EE303	Fundamentals of Optoelectronic Technology	3	1	4	Fall	3/Fall	B	PHY105B	EE
	Total		25	6. 5	31.5					
Major Core Courses	EE204	Introduction to Semiconductor Devices	3	1	4	Spr	2/Spr	B	EE203	EE
	EE210	Fundamentals of Optics	3		3	Spr	2/Spr	B	NA	EE
	EE301	Frontier Seminars in Modern Electronic Science and Technology I	1		1	Fall	3/Fall	B	NA	EE
	EE302	Frontier Seminars in Modern Electronic Science and Technology II	1		1	Spr	3/Spr	B	NA	EE
	EE309	Introduction to Semiconductor Optics	3		3	Fall	3/Fall	B	NA	EE
	EE310	Principles and Technologies of Lasers	3		3	Spr	3/Spr	B	NA	EE
	EE311	Optical Design	3	1	4	Fall	3/Fall	B	NA	EE

	EE401	Frontier Seminars in Modern Electronic Science and Technology III	1		1	Fall	4/Fall	B	NA	EE
	Total		18	2	20					
Practice	EE470	Internship	2	2	16	Smr	3/Smr	NA	NA	EE
	EE480	Research Projects	2	2				NA	NA	EE
	EE490	Undergraduate Thesis/Projects	8	8	8	Fall & Spr	4/Fall& Spr	NA	NA	EE
Total			<b>12</b>	<b>12</b>	<b>24</b>					
Notes: 1. Internship will be approximately 4 to 6 weeks, 14 to 16 hours per week. 2. Students can choose the term most appropriate for the course of Research Projects based on their study plan, so the advised term to take the course is not listed here. The minimum study load for this course is 48 to 64 hours in total.										

**Table 2: Major Elective Courses**

Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	take the course Advised term to	language Instruction	Prerequisite	Dept.
EE106	Introduction to Optoelectronic	2		2	Spr	1/Spr	B	NA	EE
EE206	Communication Principles	3	1	4	Spr	2/Spr	B	EE205	EE
EE304	Integrated Circuit Design	3	2	5	Fall	3/Fall	E	EE202-17 EE204	EE
EE305	Introduction to VLSI Technology	3	1	4	Fall	3/Fall	E	EE203	EE
EE306	Introduction to MEMS	3	1	4	Spr	3/Spr	E	PHY105B	EE
EE307	Antennas and Radio Propagation	3	1	4	Spr	3/Spr	E	EE208 EE104	EE
EE308	Fiber Communication Principles and Techniques	3	1	4	Spr	3/Spr	B	NA	EE
EE313	Wireless Communications	3	1	4	Fall	3/Fall	E	EE206	EE
EE312	Design of Modern Communication Systems	3	1	4	Spr	3/Spr	B	EE206 EE313	EE
EE316	Microwave Engineering	3	1	4	Fall	3/Fall	E	EE104 EE201-17 EE208	EE
EE317	Advanced Electronic Science Experiment I*	1	1	2	Fall	3/Fall	B	NA	EE
EE318	Advanced Electronic Science Experiment II	1	1	2	Spr	3/Spr	B	NA	EE
EE320- 15	Integrated Circuit Fabrication Laboratory	3	1.5	4.5	Spr Fall	3/Spr Fall	C	EE204	EE
EE322	Optoelectronic Devices Fabrication Laboratory	2	1	3	Spr	3/Spr	B	EE204	EE
EE323	Digital Signal Processing	3	1	4	Fall	3/Fall	E	EE205	EE
EE325	Nonlinear Optimization Techniques for Electrical Engineering	3	1	4	Fall	3 Fall	E	MA102B MA103A	EE
EE326	Digital Image Processing	3	1	4	Spr	3/Spr	E	EE205	EE
EE327	Fundamentals of Information Optics	3	1	4	Fall	3/Fall	B	EE205	EE
EE328	Speech Signal Processing	3	1	4	Spr	3/Spr	B	EE323	EE
EE330	DSP Design and Simulation	1.5	1.5	3	Spr	3/Spr	B	EE323	EE
EE332	Digital System Design	3	1	4	Spr	3/Spr	E	EE202-17	EE
EE334	Advanced integrated circuit design: machine learning on chip	3	1	4	Spr	3/Spr	E	EE202-17	EE
EE335	Liquid crystal optoelectronics	3	1	4	Fall	3/Fall	C	EE210	EE

EE336	Fundamentals of Photovoltaics	3	1	4	Fall	3/Fall	E	EE204	EE
EE337	Analog Integrated Circuit Design	3	1	4	Fall	3/Fall	B	EE201-17 EE204	EE
EE339	Analog IC Layout Design	1	1	2	Fall	3/Fall	B	EE304	EE
EE341	Advanced Integrated Circuit Design: Microprocessor	3	1	4	Fall	3/Fall	B	EE202-17	EE
EE343	Optoelectronic Instrumentation	3	1	4	Fall	3/Fall	B	NA	EE
EE345	Introduction of Wide Bandgap Semiconductors	3		3	Fall	3/Fall	B	EE203 or EE204	EE
EE402	Frontier Seminars in Modern Electronic Science IV	1		1	Spr	4/Spr	B	NA	EE
EE403	Introduction to Display and Lighting Technologies	2		2	Fall	4/Fall	B	EE204	EE
EE405	Advanced Electronic Science Experiment III	1	1	2	Fall	4/Fall	B	NA	EE
EE411	Information Theory and Coding	2		2	Fall	4/Fall	B	MA212	EE
EE415	Advances in Micro Energy and Micro Systems	2	1	3	Fall	4/Fall	B	NA	EE
EE417	Communications System Design II	2	2	4	Fall	4/Fall	E	EE316 EE206 EE307	EE
EE423-14	Pattern Recognition	3	1	4	Fall	4/Fall	B	EE323 EE326	EE
EE427	Principles of Remote Sensing	2		2	Fall	4/Fall	B	EE323 EE326	EE
EE431	Bio MEMS and Lab-on-a-Chip	3		3	Fall	4/Fall	E	NA	EE
EE433	Modern Electric Vehicle Technologies	2		2	Fall	4/Fall	B	EE104 EE208	EE
EES10 1	Brief Introduction of Creative Electronic Design I	1	0.5	6	Smr	1/Smr	C	PHY105B	EE
EES10 2	DIY Project: Assembling an iphone6	2	2	8	Smr	1/Smr	C	NA	EE
EES20 1	Brief Introduction of Creative Electronic Design II	0.5	0.5	4	Smr	2 Smr	C	NA	EE
EES20 2	Design Based on LabVIEW Programming	1	1	8	Smr	2/Smr	C	NA	EE
EES20 3	Innovation and Entrepreneurship	0.5	0.5	4	Smr	2/Smr	C	NA	EE
EES20 4	Fiber Sensor Design	1	1	8	Smr	2 Smr	C	NA	EE
EES20 5	Advanced Technology Forecasting	1.5		6	Smr	2/Smr	E	NA	EE
EES30 1	Statistical Machine Learning	2		8	Smr	3/Smr	E	MA103B MA212	EE
EES30 2	2D Materials: Properties and Devices	2		8	Smr	3 Smr	E	NA	EE
EES30 3	Convex optimization	2		2	Smr	3/Smr	E	MA103A;MA215 or MA212	EE

EES305	Electronic Materials	2		2	Smr	3/Smr	E	NA	EE
MSE320	Introduction to Photovoltaics and Photo-thermal	3		3	Spr	3/Spr	B	PHY105B EE201-17 EE204	MSE
CS301	Embedded system and microcomputer principle	3	1	4	Fall	3/Fall	B	CS207	CS
BMEB221	Biomedical Instrumentation and Experiment	4	2	6	Spr	2/Spr	C	NA	BMEB
MA201b	Ordinary Differential Equations B	4		4	Fall	2/Fall	B	MA102B MA103A	MA
<b>Total</b>		127	42.5	212.5					



**Table 3: Overview of Practice-Based Courses**

Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	take the course Advised term to	language Instruction	Prerequisite	Dept.
ME102	CAD and Engineering Drawing	3	1.5	4.5	Spr/F all	1/Spr or Fall	B/E	NA	ME
EE201-17L	Analog Circuits Laboratory	1	1	2	Fall	2/Fall	B	EE201-17	EE
EE202-17L	Digital Circuits Laboratory	1	1	2	Spr/F all	2/Spr or Fall	B/E	EE202-17	EE
EE205	Signals and Systems	3	1	4	Fall	2/Fall	B	NA	EE
EE208	Engineering Electromagnetics	3	1	4	Spr	2/Spr	B	MA101B MA103A EE104	EE
EE303	Fundamentals of Optoelectronic Technology	3	1	4	Fall	3/Fall	B	PHY105B	EE
EE204	Introduction to Semiconductor Devices	3	1	4	Spr	2/Spr	B	EE203	EE
EE311	Optical Design	3	1	4	Fall	3/Fall	B	NA	EE
EE470	Internship	2	2	16	Smr	3/Smr	NA	NA	EE
EE480	Research Projects	2	2				NA	NA	EE
EE490	Undergraduate Thesis/Projects	8	8	8	Fall & Spr	4/Fall & Spr	NA	NA	EE
EE206	Communication Principles	3	1	4	Spr	2/Spr	B	EE205	EE
EE304	Integrated Circuit Design	3	2	5	Fall	3/Fall	E	EE202-17 EE204	EE
EE305	Introduction to VLSI technology	3	1	4	Fall	3/Fall	E	EE203	EE
EE306	Introduction to MEMS	3	1	4	Spr	3/Spr	E	PHY105B	EE
EE307	Antennas and Radio Propagation	3	1	4	Spr	3/Spr	E	EE208 EE104	EE
EE308	Fiber Communication Principles and Techniques	3	1	4	Spr	3/Spr	B	NA	EE
EE313	Wireless Communications	3	1	4	Fall	3/Fall	E	EE206	EE
EE312	Design of Modern Communication Systems	3	1	4	Spr	3/Spr	B	EE206 EE313	EE
EE316	Microwave Engineering	3	1	4	Fall	3/Fall	E	EE104 EE201-17 EE208	EE

EE317	Advanced Electronic Science Experiment I	1	1	2	Fall	3/Fall	B	NA	EE
EE318	Advanced electronic science experiment II	1	1	2	Spr	3/Spr	B	NA	EE
EE320-15	Integrated Circuit Fabrication Laboratory	3	1.5	4.5	Spr Fall	3/Spr Fall	C	EE204	EE
EE322	Optoelectronics Devices Fabrication Laboratory	2	1	3	Spr	3/Spr	B	EE204	EE
EE323	Digital Signal Processing	3	1	4	Fall	3/Fall	E	EE205	EE
EE325	Nonlinear Optimization Techniques for Electrical Engineering	3	1	4	Fall	3 Fall	E	MA102B MA103A	EE
EE326	Digital Image Processing	3	1	4	Spr	3/Spr	E	EE205	EE
EE327	Fundamentals of Information Optics	3	1	4	Fall	3/Fall	B	EE205	EE
EE328	Speech Signal Processing	3	1	4	Spr	3/Spr	B	EE323	EE
EE330	DSP Design and Simulation	1.5	1.5	3	Spr	3/Spr	B	EE323	EE
EE332	Digital System Design	3	1	4	Spr	3/Spr	E	EE202-17	EE
EE334	Advanced Integrated Circuit Design: Machine Learning on Chip	3	1	4	Spr	3/Spr	E	EE202-17	EE
EE335	Liquid Crystal Optoelectronics	3	1	4	Fall	3/Fall	C	EE210	EE
EE336	Fundamentals of Photovoltaics	3	1	4	Fall	3/Fall	E	EE204	EE
EE337	Analog Integrated Circuit Design	3	1	4	Fall	3/Fall	B	EE201-17 EE204	EE
EE339	Analog IC Layout Design	1	1	2	Fall	3/Fall	B	EE304	EE
EE341	Advanced Integrated Circuit Design: Microprocessor	3	1	4	Fall	3/Fall	B	EE202-17	EE
EE343	Optoelectronic Instrumentation	3	1	4	Fall	3/Fall	B	NA	EE
EE405	Advanced Electronic Science Experiment III	1	1	2	Fall	4/Fall	B	NA	EE
EE415	Advances in Micro Energy and Micro Systems	2	1	3	Fall	4/Fall	B	NA	EE
EE417	Communications System Design II	2	2	4	Fall	4/Fall	E	EE316 EE206 EE307	EE

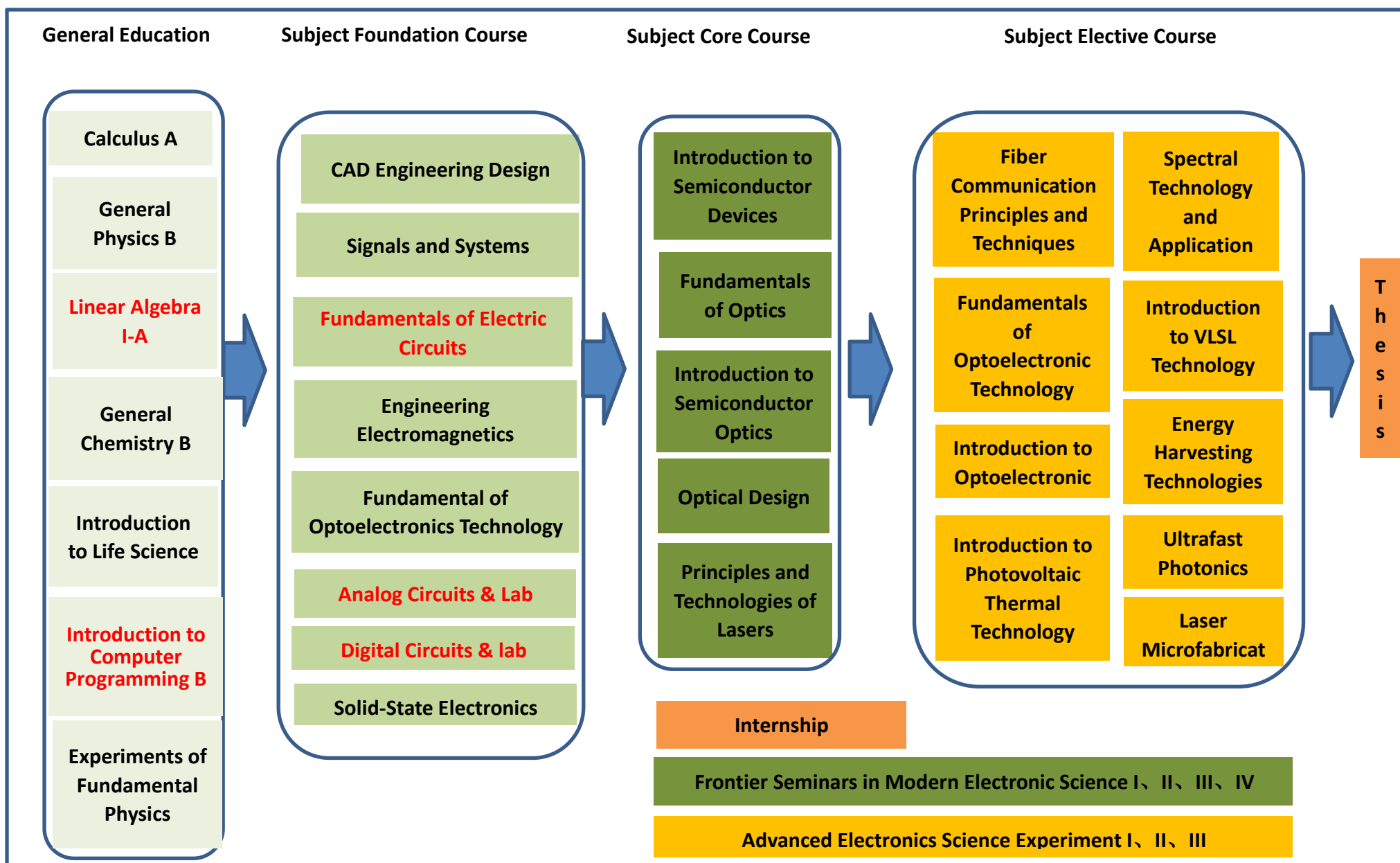
EE423-1 4	Pattern Recognition	3	1	4	Fall	4/Fall	B	EE323 EE326	EE
EES101	Brief Introduction of “Creative Electronic Design I”	1	0.5	6	Smr	1/Smr	C	PHY105B	EE
EES102	DIY Project: Assembling an iPhone6	2	2	8	Smr	1/Smr	C	NA	EE
EES201	Brief Introduction of “Creative Electronic Design II”	0.5	0.5	4	Smr	2/Smr	C	NA	EE
EES202	Design based on LabVIEW Programming	1	1	8	Smr	2/Smr	C	NA	EE
EES203	Innovation and Entrepreneurship	0.5	0.5	4	Smr	2/Smr	C	NA	EE
EES204	Fiber Sensor Design	1	1	8	Smr	2 Smr	C	NA	EE
CS301	Embedded System and Microcomputer Principle	3	1	4	Fall	3/Fall	B	CS207	CS
BMEB22 1	Biomedical Instrumentation	4	2	6	Spr	2/Spr	C	NA	BMEB
<b>Total</b>		125. 5	63	215					

**Table 4: Overview of Course Hours and Credits**

Course Category	Total Course Hours	Total Credits	Credit Requirements
General Education (GE) Required Courses (not including English courses)	800	51	51
General Education (GE) Elective Courses		10	10
Major Foundational Courses	504	25	25
Major Core Courses	320	18	18
Major Elective Courses	3400	127	19
Research Projects, Internship and Undergraduate Thesis/Projects	380	12	12
Total (not including English courses)	5024	243	135



## Curriculum Structure of Optoelectronic Information Science and Engineering



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