

## Electronics and Communication Engineering (EC)

### Curriculum Outline

Electronics and Communication Engineering are among the most challenging fields of study in electrical engineering. The areas of study in electronics and communication engineering are quite diverse. The curriculum is therefore developed to include many major study areas so that the student will be well prepared for work in the highly competitive electronics and communication engineering professions.

The compulsory courses are designed to provide students broad knowledge in electronics and communication engineering, which is necessary to satisfy the general needs of the industrial sectors in Thailand. The compulsory courses include four laboratory courses in electrical engineering, which are provided to illustrate practical aspects of electric circuits, electronics, feedback control, signal processing and communication. By the end of the third year, the student will complete the study of most compulsory courses, except for courses related to seminar and senior project, which will be taken in the fourth year.

After gaining sufficient basic knowledge through the compulsory courses, students can choose compulsory elective courses provided in three major areas: Communications, Electronics, and Mechatronics, in the fourth year. The Communications Area concentrates on the study on advanced communication systems, such as optical and mobile communication systems. The Electronics Area focuses on solid state technology, microelectronics and advanced electronic circuit design. The Mechatronics Area provides fundamental and intermediate courses in mechatronics, robotics, and advanced control systems.

In addition, courses for topics in communications are also offered as technical elective courses in order to cope with the rapid changing in technology and the highly diverse areas of study in communication engineering. During the last semester, students can choose from 3 main options: academic exchange programs abroad, extended training programs with leading local companies, or senior projects with SIIT advisors.

### Structure and Components

<b>1. General Basic Courses</b>	<b>33 Credits</b>
1.1 Part I	21 Credits
1.1.1 Humanities	3 Credits
1.1.2 Social Sciences	3 Credits
1.1.3 Languages	9 Credits
1.1.4 Science and Mathematics	6 Credits
1.2 Part II	12 Credits
<b>2. Core Courses</b>	<b>111 Credits</b>
2.1 Compulsory Courses	93 Credits
2.2 Compulsory Elective Courses	12 Credits
2.3 Technical Elective Courses	6 Credits
<b>3. Free Elective Courses</b>	<b>6 Credits</b>
<b>Total</b>	<b><u>150</u> Credits</b>

### Details of the Curriculum

<b>1. General Basic Courses</b>	<b>33 Credits</b>
1.1 Part I	21 Credits
1.1.1 Humanities (1 course) TU 110	3 Credits
1.1.2 Social Sciences (1 course) TU 120	3 Credits
1.1.3 Languages (3 courses) EL 171 EL 172 TU 140	9 Credits
1.1.4 Science and Mathematics (2 courses) ITS 100 TU 130	6 Credits
1.2 Part II	12 Credits
EC 210 GTS 132 GTS 133 GTS 202	
<b>2. Core Courses</b>	<b>111 Credits</b>
2.1 Compulsory Courses	93 Credits
2.1.1 Sciences and Mathematics	21 Credits
MAS 116 MAS 117 MAS 210 SCS 126 SCS 138 SCS 139 SCS 176 SCS 183 SCS 184	
2.1.2 Non-EC Courses	11 Credits
GTS 302 IES 303 MES 211 MES 351	
2.1.3 EC Courses (24-26 courses)	61 Credits
ECS 210 ECS 213 ECS 216 ECS 217 ECS 218 ECS 231 ECS 233 ECS 261 ECS 281 ECS 315 ECS 320 ECS 322 ECS 332 ECS 341 ECS 370 ECS 371 ECS 380 ECS 381 ECS 382 ECS 386 ECS 396 ECS 450 ECS 472 (ECS 398 and ECS 300) or (ECS 399) or (ECS 496 and ECS 497 and ECS 300))	
2.2 Compulsory Elective Courses	12 Credits
Select 4 courses (12 credits) from the following courses:	
ECS 323 ECS 363 ECS 424 ECS 425 ECS 427 ECS 431 ECS 441 ECS 442 ECS 451 ECS 452 ECS 455 ECS 456 ECS 462 ECS 475 ECS 477 ECS 478 ECS 481 ECS 485 ECS 486 ITS 432	
2.3 Technical Elective Courses	6 Credits
Select 6 credits from the list of courses offered by SIIT, except basic courses. XXS xxx	
<b>3. Free Elective Courses</b>	<b>6 Credits</b>
Students may choose any free elective courses (not less than 6 credits in total) including general basic courses, except:	
1. General basic courses in Science and Mathematics	
2. All general basic TU courses in both part 1 and part 2	
<b>Total Credit Requirement</b>	<b><u>150</u> Credits</b>

## EC Curriculum : 150 Credits

### First Year

#### **Semester I Credits (lecture-practice-self study hrs)**

EL	171	English Course II	3(3-1-5)
GTS	132	Introduction to Biological Science	3(3-1-5)
MAS	116	Mathematics I	3(3-1-5)
SCS	126	Chemistry for Engineers	3(3-1-5)
SCS	138	Applied Physics I	3(3-1-5)
SCS	176	Chemistry Laboratory	1(0-3-0)
SCS	183	Physics Laboratory I	1(0-3-0)
TU	130	Integrated Sciences and Technology	3(3-0-6)
<b>Sub-Total</b>			<b>20(18-11-31)</b>

#### **Semester II**

EL	172	English Course III	3(3-1-5)
GTS	133	Environmental Studies	3(2-2-5)
ITS	100	Intro. to Computers and Programming	3(2-3-4)
MAS	117	Mathematics II	3(3-1-5)
SCS	139	Applied Physics II	3(3-1-5)
SCS	184	Physics Laboratory II	1(0-3-0)
TU	140	Thai Studies	3(3-0-6)
<b>Sub-Total</b>			<b>19(16-11-30)</b>

### Second Year

#### **Semester I Credits (lecture-practice-self study hrs)**

ECS	213	Electrical Engineering Mathematics	3(3-0-6)
ECS	216	Circuit Analysis	3(3-1-5)
ECS	217	Computer Tools in EE	1(0-3-0)
GTS	202	English Language Structures	3(3-1-5)
MAS	210	Mathematics III	3(3-1-5)
MES	351	Engineering Dynamics	3(3-1-5)
TU	120	Integrated Social Science	3(3-0-6)
<b>Sub-Total</b>			<b>19(18-7-32)</b>

#### **Semester II**

ECS	210	Basic Electrical Engineering Laboratory	1(0-3-0)
ECS	218	Data Structures, Algorithms, and Object Oriented Programming	3(2-2-5)
ECS	231	Electronic Circuits I	3(3-0-6)
ECS	233	Electromagnetics	3(3-0-6)
ECS	261	Electrical Measurement and Instrumentation	3(3-0-6)
ECS	281	Signals and Systems	3(3-0-6)
ECS	371	Digital Circuits	3(3-0-6)
GTS	302	Technical Writing	2(2-1-3)
<b>Sub-Total</b>			<b>21(19-6-38)</b>

## EC Curriculum : 150 Credits

### Third Year

#### **Semester I Credits (lecture-practice-self study hrs)**

ECS 315	Probability and Random Processes	3(3-0-6)
ECS 320	Electronic Circuits Laboratory	1(0-3-0)
ECS 322	Electronic Circuits II	3(3-0-6)
ECS 332	Principles of Communications	3(3-0-6)
ECS 370	Digital Circuit Laboratory	1(0-3-0)
ECS 381	Feedback Control Systems	3(3-0-6)
MES 211	Thermofluids	3(3-1-5)
TU 110	Integrated Humanities	3(3-0-6)
<b>Sub-Total</b>		<b>20(18-7-35)</b>

#### **Semester II**

EC 210	Introductory Economics	3(3-1-5)
ECS 341	Mobile Application Programming	3(3-0-6)
ECS 380	Feedback Control Laboratory	1(0-3-0)
ECS 382	Microprocessors	3(3-0-6)
ECS 386	Introduction to Embedded Systems	3(3-0-6)
ECS 450	Signal Processing and Communication Laboratory	1(0-3-0)
ECS 472	Digital Signal Processing	3(3-0-6)
ECS xxx	Compulsory Elective Courses	3(3-0-6)
<b>Sub-Total</b>		<b>20(18-7-35)</b>

#### **Summer**

ECS 300	Electronics and Communication Engineering Training	0(0-0-0)
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#### **Remark**

Students, who take ECS 399 Extended Electronics and Communication Engineering Training in their last semester, are exempted from ECS 300 Electronics and Communication Engineering Training and are advised to complete 6 credits of Free Electives by the first semester of their fourth year.

### Fourth Year

#### **Semester I Credits (lecture-practice-self study hrs)**

ECS 396	Project Development	1(0-3-6)
EC/IT-S xxx	Compulsory Elective Courses	3(x-x-x)
ECS xxx	Compulsory Elective Courses	3(3-0-6)
ECS xxx	Compulsory Elective Courses	3(3-0-6)
IES 303	Engineering Management and Cost Analysis	3(3-0-6)
XXS xxx	Technical Elective	3(x-x-x)
XXS xxx	Technical Elective	3(x-x-x)
<b>Sub-Total</b>		<b>19(x-x-x)</b>

#### **List of Compulsory Elective Courses**

*Choose 4 courses from the following list:*

##### Communication Area

ECS 442	Microwave Principles	3(3-0-6)
ECS 451	Data Communications and Networks	3(3-0-6)
ECS 452	Digital Communication Systems	3(3-0-6)
ECS 455	Mobile Communications	3(3-0-6)
ECS 456	Optical Communications	3(3-0-6)
ECS 462	Antennas	3(3-0-6)
ECS 477	Signal Processing for Communication Systems	3(3-0-6)

##### Electronics Area

ECS 323	Physical Electronics	3(3-0-6)
ECS 424	Analog Integrated Circuits	3(3-0-6)
ECS 425	Digital Integrated Circuits	3(3-0-6)
ECS 427	Introduction to VLSI Design	3(3-0-6)
ECS 431	Industrial Electronics	3(3-0-6)
ECS 441	Communication Electronics	3(3-0-6)

##### Mechatronics Area

ECS 363	Mechatronic Instrumentation	3(3-0-6)
ECS 475	Digital Image Processing	3(3-0-6)
ECS 478	Introduction to Computer Vision and Pattern Recognition	3(3-0-6)
ECS 481	Introduction to Robotics	3(3-0-6)
ECS 485	Dynamic Systems and Control	3(3-0-6)
ECS 486	Embedded System Development	3(2-2-5)
ITS 432	Real-time and Embedded Systems	3(3-0-6)

#### **Semester II**

XXX xxx	Free Elective	3(x-x-x)
XXX xxx	Free Elective	3(x-x-x)

**and one of the following 3 tracks:**

##### **1) Senior Project Track**

ECS 398	Senior Project	6(0-18-0)
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##### **2) Foreign Exchange Track**

ECS 496	Special Study in EC I	3(3-0-6)
ECS 497	Special Study in EC II	3(3-0-6)

##### **3) Extended Training Track**

ECS 399	Extended Electronics and Communication Engineering Training	6(0-40-0)
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<b>Sub-Total</b>		<b>12(x-x-x)</b>
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