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 several major study areas so that students 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, students 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 offered as technical elective courses in order to cope with the rapid change in technology and the highly diverse areas of study in communication engineering. During the last semester, students can choose from three main options: academic exchange programs abroad, extended training programs with leading local companies, or senior projects with SIIT advisors.

Structure and Components

1. General Basic Courses	**33**	**Credits**
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
2. Core Courses	**111**	**Credits**
2.1 Compulsory Courses	93	Credits
2.2 Compulsory Elective Courses	12	Credits
2.3 Technical Elective Courses	6	Credits
3. Free Elective Courses	**6**	**Credits**
Total	**150**	**Credits**

Details of the Curriculum

1. General Basic Courses — **33 Credits**

1.1 Part I — 21 Credits

1.1.1 Humanities (1 course) — 3 Credits
TU 110

1.1.2 Social Sciences (1 course) — 3 Credits
TU 120

1.1.3 Languages (3 courses) — 9 Credits
EL 171 EL 172 TU 140

1.1.4 Science and Mathematics (2 courses) — 6 Credits
ITS 100 TU 130

1.2 Part II — 12 Credits
EC 210 GTS 132 GTS 133 GTS 202

2. Core Courses — **111 Credits**

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

3. Free Elective Courses — **6 Credits**

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

Total Credit Requirement — **150 Credits**

EC Curriculum : 150 Credits

First Year

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

EL	171	English Course II	3(3-0-6)
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)
		Sub-Total	**20(18-10-32)**

Semester II

EL	172	English Course III	3(3-0-6)
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)
		Sub-Total	**19(16-10-31)**

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 Sciences	3(3-0-6)
		Sub-Total	**19(18-7-32)**

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)
		Sub-Total	**21(19-6-38)**

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	370	Digital Circuit Laboratory	1(0-3-0)
ECS	381	Feedback Control Systems	3(3-0-6)
ECS	382	Microprocessors	3(3-0-6)
MES	211	Thermofluids	3(3-1-5)
TU	110	Integrated Humanities	3(3-0-6)
		Sub-Total	**20(18-7-35)**

Semester II

EC	210	Introductory Economics	3(3-0-6)
ECS	332	Principles of Communications	3(3-0-6)
ECS	341	Mobile Application Programming	3(3-0-6)
ECS	380	Feedback Control Laboratory	1(0-3-0)
ECS	386	Introduction to Embedded Systems	3(3-0-6)
ECS	472	Digital Signal Processing	3(3-0-6)
ECS	xxx	Compulsory Elective Courses	3(3-0-6)
		Sub-Total	**19(18-3-36)**

Summer

Select either Senior Project Track, Foreign Exchange Track, or Extended Training Track

For Senior Project Track and Foreign Exchange Track

ECS	300	Electronics and Communication Engineering Training	0(0-0-0)
		Sub-Total	**0(0-0-0)**

For Extended Training Track

XXX	xxx	Free Elective	3(x-x-x)
XXX	xxx	Free Elective	3(x-x-x)
		Sub-Total	**6(x-x-x)**

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)
ECS	450	Signal Processing and Communication Laboratory	1(0-3-0)
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)
		Sub-Total	**20(x-x-x)**

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

1) Senior Project Track

ECS	398	Senior Project	6(0-18-0)
XXX	xxx	Free Elective	3(x-x-x)
XXX	xxx	Free Elective	3(x-x-x)
		Sub-Total	**12(x-x-x)**

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)
XXX	xxx	Free Elective	3(x-x-x)
XXX	xxx	Free Elective	3(x-x-x)
		Sub-Total	**12(x-x-x)**

3) Extended Training Track

ECS	399	Extended Electronics and Communication Engineering Training	6(0-40-0)
		Sub-Total	**6(0-40-0)**