

## Computer Engineering (CPE)

### Curriculum Outline

The computer engineering curriculum is designed to prepare students for new trends in hardware and software development, as well as frontiers in computing technology. Students will be exposed to a wide range of subjects covering all aspects of computer engineering and their applications. Emphasis is put on foundations of intelligent system development and techniques related to pervasive technology.

The compulsory core courses help students to:

- (1) Gain fundamental concepts related to computers and information technology that lead to high performance digital processing,
- (2) Know the essence of hardware and software systems that leads to the effective and efficient development of computer systems, and
- (3) Understand applications of fundamental knowledge to frontier multi-disciplinary fields.

After gaining enough background through the compulsory core courses, the students are allowed to tailor their courses according to their personal interest. Twelve credits of elective courses, which are required for graduation, can be selected from one of these:

- (1) Intelligent Systems,
- (2) Pervasive Technology, or
- (3) General Computer Engineering

### Structure and Components

<b>1. General Basic Courses</b>	<b>36 Credits</b>
1.1 Part I	21 Credits
1.1.1 Humanities	2 Credits
1.1.2 Social Sciences	5 Credits
1.1.3 Languages	9 Credits
1.1.4 Science and Mathematics	5 Credits
1.2 Part II	15 Credits
<b>2. Major Courses</b>	<b>108 Credits</b>
2.1 Core Courses	34 Credits
2.2 Specialized Courses	53 Credits
2.3 Elective Courses	15 Credits
2.4 Field-Experience Courses	6 Credits
<b>3. Free Elective Courses</b>	<b>6 Credits</b>
<b>Total</b>	<b>150 Credits</b>

<b>1. General Basic Courses</b>	<b>36 Credits</b>
1.1 Part I	21 Credits
1.1.1 Humanities (1 course) TU110	2 Credits
1.1.2 Social Sciences (2 courses) TU120 TU100	5 Credits
1.1.3 Languages (3 courses) EL171 EL172 TU140	9 Credits
1.1.4 Science and Mathematics (2 courses) ITS100 TU130	5 Credits
1.2 Part II	15 Credits
EC210 GTS101 GTS133 GTS202 GTS231	
<b>2. Major Courses</b>	<b>108 Credits</b>
2.1 Core Courses	34 Credits
2.1.1 Core Engineering Courses	
GTS116 GTS117 GTS210 SCS138 SCS139 CSS226 CSS331 CSS400 ECS203 ECS204 GTS302 IES302 MTS252	
2.2 Specialized Courses	53 Credits
2.2.1 Technologies for Applications	7 Credits
ITS229 ITS322 ITS351	
2.2.2 Technologies and Software Processes	14 Credits
ITS102 ITS103 ITS221 ITS227 ITS231 ITS329	
2.2.3 System Infrastructure	19 Credits
CSS221 CSS225 CSS321 CSS334 ITS201 ITS336 ITS352	
2.2.4 Hardware and Computer Architecture	13 Credits
CSS224 CSS332 CSS333 ECS370 ECS371	
2.3 Elective Courses	15 Credits
2.3.1 Select one of the following options	
2.3.1.1 Option I: Intelligent Systems	12 Credits
CSS431 CSS432 CSS433 CSS434	
2.3.1.2 Option II: Pervasive Technology	12 Credits
CSS441 CSS442 CSS443 CSS444	
2.3.1.3 Option III: General Computer Engineering	
Select 4 courses from the following courses:	
CSS431 CSS432 CSS433 CSS434 CSS441 CSS442 CSS443 CSS444 ITS481 ITS482 ITS483 ITS484 ITS485 ITS486 ITS487 ITS488 ITS489	
2.3.2 Technical Elective Course	3 Credits
Select 3 credits from the list of courses offered by SIIT, except for basic courses. XXSxxx	
2.4 Field-Experience Courses	6 Credits
Select one of the following tracks	
2.4.1 Senior Project Track	
CSS300 CSS403	
2.4.2 Foreign Exchange Track	
CSS300 CSS495 CSS496	
2.4.3 Extended Training Track	
CSS499	
<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>150 Credits</b>

## CPE Curriculum : 150 Credits

### Course Credits (lecture-practice-self study hours)

#### First Year

##### Semester I

EL171	English Course II	3(3-0-6)
GTS101	Skills Development for Technical Studies	3(3-0-6)
GTS116	Mathematics for Technologists I	3(3-0-6)
GTS133	Environmental Studies	3(2-2-5)
ITS100	Introduction to Computers and Programming	3(2-3-4)
MTS252	Materials Science	3(3-0-6)
SCS138	Applied Physics I	3(3-0-6)
<b>Sub-Total</b>		<b>21(19-5-39)</b>

##### Semester II

EC210	Introductory Economics	3(3-0-6)
EL172	English Course III	3(3-0-6)
GTS117	Mathematics for Technologists II	3(3-0-6)
ITS102	Object-Oriented Programming	3(3-0-6)
ITS103	Object-Oriented Programming Laboratory	1(0-3-0)
SCS139	Applied Physics II	3(3-0-6)
TU100	Civic Education	3(3-0-6)
TU130	Integrated Sciences and Technology	2(2-0-4)
<b>Sub-Total</b>		<b>21(20-3-40)</b>

#### Second Year

##### Semester I

CSS224	Computer Architectures	3(3-0-6)
ECS371	Digital Circuits	3(3-0-6)
GTS210	Mathematics for Technologists III	3(3-0-6)
GTS231	Law and Technology	3(3-0-6)
ITS201	Discrete Mathematics	3(3-0-6)
ITS221	Data Structures and Algorithms	3(3-0-6)
ITS231	Data Structures and Algorithms Laboratory	1(0-3-0)
TU110	Integrated Humanities	2(2-0-4)
<b>Sub-Total</b>		<b>21(20-3-40)</b>

##### Semester II

CSS221	Computer Graphics and Applications	3(2-3-4)
CSS225	Operating System	3(3-0-6)
ECS203	Basic Electrical Engineering	3(3-0-6)
ECS370	Digital Circuit Laboratory	1(0-3-0)
IES302	Engineering Statistics	3(3-0-6)
ITS227	Algorithm Design	3(3-0-6)
ITS229	Human Computer Interface Design	3(3-0-6)
<b>Sub-Total</b>		<b>19(17-6-34)</b>

#### Third Year

##### Semester I

CSS226	Scientific Computing	3(3-0-6)
CSS321	Theory of Computation	3(3-0-6)
CSS331	Fundamentals of Data Communications	3(3-0-6)
ECS204	Basic Electrical Engineering Laboratory	1(0-3-0)
GTS202	English Language Structures	3(3-0-6)
ITS322	Database Systems	3(3-0-6)
ITS336	Artificial Intelligence	3(3-0-6)
ITS351	Database Programming Laboratory	1(0-3-0)
<b>Sub-Total</b>		<b>20(18-6-36)</b>

##### Semester II

CSS332	Microcontrollers and Applications	3(2-3-4)
CSS333	Parallel and Distributed Computing	3(3-0-6)
CSS334	Computer Networks and Internetworking	3(3-0-6)
GTS302	Technical Writing	2(2-1-3)
ITS329	System Analysis and Design	3(3-0-6)
ITS352	Networking Laboratory	1(0-3-0)

### Course Credits (lecture-practice-self study hours)

#### Option I: Intelligent Systems

CSS431	Machine Learning and Pattern Recognition	3(3-0-6)
CSS432	Information Retrieval	3(3-0-6)
<b>Sub-Total</b>		<b>21(19-7-37)</b>

#### Option II: Pervasive Technology

CSS441	Security and Cryptography	3(3-0-6)
CSS443	Real-time and Embedded Systems	3(3-0-6)
<b>Sub-Total</b>		<b>21(19-7-37)</b>

#### Option III: General Computer Engineering

CSSxxx	Compulsory Elective	3(x-x-x)
CSSxxx	Compulsory Elective	3(x-x-x)
<b>Sub-Total</b>		<b>21(x-x-x)</b>

#### Summer

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

#### 1) Senior Project Track and Foreign Exchange Track

CSS300	Computer Engineering Training	0(0-0-0)
<b>Sub-Total</b>		<b>0(0-0-0)</b>

#### 2) Extended Training Track

XXXxxx	Free Elective	3(x-x-x)
XXXxxx	Free Elective	3(x-x-x)
<b>Sub-Total</b>		<b>6(x-x-x)</b>

#### Fourth Year

##### Semester I

CSS400	Project Development	1(0-3-0)
TU120	Integrated Social Sciences	2(2-0-4)
TU140	Thai Studies	3(3-0-6)
XXSxxx	Technical Elective	3(x-x-x)

#### Option I: Intelligent Systems

CSS433	Computer Vision	3(3-0-6)
CSS434	Knowledge Representation and Reasoning	3(3-0-6)
<b>Sub-Total</b>		<b>15(x-x-x)</b>

#### Option II: Pervasive Technology

CSS442	Computer Interfacing	3(3-0-6)
CSS444	Wireless Networks	3(3-0-6)
<b>Sub-Total</b>		<b>15(x-x-x)</b>

#### Option III: General Computer Engineering

CSSxxx	Compulsory Elective	3(x-x-x)
CSSxxx	Compulsory Elective	3(x-x-x)
<b>Sub-Total</b>		<b>15(x-x-x)</b>

##### Semester II

#### 1) Senior Project Track

CSS403	Computer Engineering Project	6(0-18-0)
XXXxxx	Free Elective	3(x-x-x)
XXXxxx	Free Elective	3(x-x-x)
<b>Sub-Total</b>		<b>12(x-x-x)</b>

#### 2) Foreign Exchange Track

CSS495	Special Studies in Computer Engineering I	3(3-0-6)
CSS496	Special Studies in Computer Engineering II	3(3-0-6)
XXXxxx	Free Elective	3(x-x-x)
XXXxxx	Free Elective	3(x-x-x)
<b>Sub-Total</b>		<b>12(x-x-x)</b>

#### 3) Extended Training Track

CSS499	Extended Computer Engineering Training	6(0-40-0)
<b>Sub-Total</b>		<b>6(0-40-0)</b>