

# 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 compulsory elective courses, which are required for graduation, can be selected from one of these:

- (1) Major in Intelligent Systems,
- (2) Major in Pervasive Technology, or
- (3) Major in 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. Core Courses</b>	<b>108 Credits</b>
2.1 Compulsory Courses	87 Credits
2.2 Compulsory Elective Courses	18 Credits
2.3 Technical Elective Courses	3 Credits
<b>3. Free Elective Courses</b>	<b>6 Credits</b>
<b>Total</b>	<b><u>150 Credits</u></b>

## Details of the Curriculum

<b>1. General Basic Courses</b>	<b>36 Credits</b>
1.1 Part I	21 Credits
1.1.1 Humanities (1 course)	2 Credits
TU110	
1.1.2 Social Sciences (2 courses)	5 Credits
TU120    TU100	
1.1.3 Languages (3 courses)	9 Credits
EL171    EL172    TU140	
1.1.4 Science and Mathematics (2 courses)	5 Credits
ITS100    TU130	
1.2 Part II	15 Credits
EC210    GTS101    GTS133	
GTS202    GTS231	
<b>2. Core Courses</b>	<b>108 Credits</b>
2.1 Compulsory Courses	87 Credits
2.1.1 Science and Mathematics (6 courses)	18 Credits
CSS226    GTS116    GTS117	
GTS210    SCS138    SCS139	
2.1.2 Non CPE Courses (19 courses)	44 Credits
ECS203    ECS204    ECS370    ECS371	
GTS302    IES302    ITS102    ITS103	
ITS201    ITS221    ITS227    ITS229	
ITS231    ITS322    ITS329    ITS336	
ITS351    ITS352    MTS252	
2.1.3 CPE Courses (9 courses)	25 Credits
CSS221    CSS224    CSS225    CSS321	
CSS331    CSS332    CSS333    CSS334	
CSS400	
2.2 Compulsory Elective Courses	18 Credits
2.2.1 Select one of the following tracks (6 credits):	
(1) Senior Project Track (2 courses)	
CSS300    CSS403	
(2) Foreign Exchange Track (3 courses)	
CSS300    CSS495    CSS496	
(3) Extended Training Track (1 course)	
CSS499	
2.2.2 Select one of the following options (12 credits):	
(1) <b>Option I: Intelligent Systems</b> (4 courses)	
CSS431    CSS432    CSS433    CSS434	
(2) <b>Option II: Pervasive Technology</b> (4 courses)	
CSS441    CSS442    CSS443    CSS444	
(3) <b>Option III: General Computer Engineering</b>	
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 Technical Elective Courses	3 Credits
Select 3 credits from the list of courses offered by SIIT, except for basic courses.	
XXSxxx	
<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	

**Total Credit Requirement** **150 Credits**

**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)
CSS442	Computer Interfacing	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**

CSS443	Real-time and Embedded Systems	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>