

DEPARTMENT

Computer Science & Engineering

PROGRAM

***B.Sc. in Computer Science & Engineering (CSE)
(4 Years Program)
From January 2010, Spring Semester***

FACULTY

School of Science and Engineering

Southeast University

*Proposed modified Syllabus
of
B.Sc. in Computer Science & Engineering (CSE)
(4 Years Program)*

Table of Contents

<i>SL #</i>	<i>Title</i>	<i>Page No.</i>
<i>1</i>	<i>Degree Offering Department</i>	<i>1</i>
<i>2</i>	<i>Entry Requirements</i>	<i>2</i>
<i>3</i>	<i>Semester Duration and Credit definition</i>	<i>3</i>
<i>4</i>	<i>Meaning of Course Code & Number</i>	<i>4</i>
<i>5</i>	<i>Degree Requirements</i>	<i>5</i>
<i>6</i>	<i>Evaluation Process</i>	<i>6</i>
<i>7</i>	<i>Grading System</i>	<i>7</i>
<i>8</i>	<i>Category of Courses</i>	<i>8</i>
<i>9</i>	<i>Semester View of Courses</i>	<i>11</i>
<i>10</i>	<i>Detailed Syllabus of B.Sc. in CSE</i>	<i>14</i>

Degree offering Department

Name of the program: B Sc. In Computer Science & Engineering

Name of the Department: Computer Science & Engineering

Name of the School: School of Science and Engineering

B.Sc. in Computer Science & Engineering (CSE) is a 4-years program offered by the Department of Computer Science & Engineering under the School of Science and Engineering of this University.

Entry Requirements

For admission in B.Sc. in Computer Science & Engineering (CSE) a student must have at least Second Division or minimum GPA 2.5 in both SSC & HSC Examinations or A Level in three subjects with minimum GPA 2.5 and O-Level in five subjects with minimum GPA 2.5, in the scale of A = 5, B = 4, C = 3, D = 2, & E = 1 (More than one 'E' will not be accepted). In addition, the student must have Physics, Chemistry and Mathematics in SSC/O-Level and HSC/A-level.

For Diploma Engineers with minimum Second division or minimum GPA 2.5, maximum one year equivalent courses (one-fourth of total credits) may be exempted.

Semester Duration and Credit definition

- **4-Years Program:**

B.Sc. in Computer Science & Engineering (CSE) is a 4 years program consisting of 12 semesters. There are 3 semesters in each academic year namely Spring (January to April), Summer (May to August) and Fall (September to December).

- **Semester system:**

Each semester consists of 16 weeks of which there are a minimum of 12 weeks class and rest of the weeks are reserved for examinations and other academic purposes.

- **Credit hour definition and class duration of theory courses:**

For theory courses, 1 credit represents 1 hour actual lecture time per week which results minimum 12-hours of actual class time per semester. Minimum duration of each theory class is 1.5 hour.

- **Credit hour definition and class duration of lab courses:**

For lab courses, 1 credit represents 2 hours actual lab works per week which results minimum 24-hours of actual lab works per semester. Minimum duration of each lab class is 2 hours.

Meaning of Course Code & Number

Each Course has a relevant course code with a four digit number. First and third digit of the number usually represents year and Semester respectively.

*CSE – Computer Science and Engineering Course
EEE - Electrical and Electronic Engineering Course
ENG - English Courses
PHY – Physics Courses
ACT – Accounting Course
SOC – Social Science Course
ECO – Economics Course
MGT – Management Course
CHEM – Chemistry Course
MATH - Mathematics Course*

For courses of CSE, code number is kept between 1011 and 4039. Other courses such as (ENG, CSE, MATH, CHEM, PHY, STAT, MEC etc.) also have relevant course code. The second digit zero represents School of Science & Engineering

Degree Requirements

At least 144 credit hours must be earned to be eligible for graduation, and this must include the all the core courses. The minimum CGPA requirement for obtaining a Bachelor degree in engineering is 2.5. The following table shows detailed degree requirement for the program.

Bachelor of Science in Computer Science & Engineering (CSE)

Curriculum Requirement

<i>SL #</i>	<i>Description</i>	<i>No. of Course(s)</i>	<i>Total Credits</i>
1	<i>English Language</i>	2	6
2	<i>General Education</i>	4	12
3	<i>Basic Sciences (Theory)</i>	3	9
4	<i>Basic Sciences (Lab)</i>	2	2
5	<i>Mathematics & Statistics</i>	6	18
6	<i>Inter Disciplinary Engineering Courses (Theory)</i>	2	6
7	<i>Inter Disciplinary Engineering Courses (Lab)</i>	2	2
8	<i>Core Courses (Theory)</i>	17	51
9	<i>Core Courses (Lab)</i>	12	12
10	<i>Core Courses (Project)</i>	1	6
11	<i>Main Technical Concentration (Theory)</i>	4	12
12	<i>Main Technical Concentration (Lab)</i>	2	2
13	<i>Other Area</i>	2	6
14	<i>Total</i>	59	144

Evaluation Process

Distribution of marks for each theory and lab course is given below:

Theory Course:

<i>Class Attendance</i>	<i>5 marks</i>
<i>Class Test</i>	<i>10 marks</i>
<i>Assignment</i>	<i>15 marks</i>
<i>Midterm</i>	<i>30 marks</i>
<i>*Final Examination</i>	<i>40 marks</i>
<i>Total</i>	<i>100 marks</i>

**Duration of Final Examination is 2 hours*

Lab Course:

<i>Lab Attendance</i>	<i>10 marks</i>
<i>Assignment (Lab report)</i>	<i>20 marks</i>
<i>Lab Performance</i>	<i>10 marks</i>
<i>Term Final Examination (Experiment)</i>	<i>40 marks</i>
<i>Viva Voce</i>	<i>20 marks</i>
<i>Total</i>	<i>100%</i>

Grading System

The total performance of a student in a given course is based on a scheme of continuous assessment. For theory courses this continuous assessment is made through a set of quizzes, class evaluation, midterm examination, homework and a term final examination. The assessment in laboratory/sessional courses is made through practical work during the class, lab report, exam and viva-voce.

Each course has a certain number of credits, which describes its corresponding weights. A letter grade with a specified number of grade points is awarded for each course for which a student is registered. The performance of a student is measured by both the number of credits completed satisfactorily and the weighted average of the grade point earned.

Letter grades and corresponding grade points will be awarded in accordance to the provisions shown below as prescribed by UGC.

Grade	Grade Points	Numerical Markings
<i>A+</i>	<i>4.0</i>	<i>80% and above</i>
<i>A</i>	<i>3.75</i>	<i>75% to 79%</i>
<i>A-</i>	<i>3.50</i>	<i>70% to 74%</i>
<i>B+</i>	<i>3.25</i>	<i>65% to 69%</i>
<i>B</i>	<i>3.0</i>	<i>60% to 64%</i>
<i>B-</i>	<i>2.75</i>	<i>55% to 59%</i>
<i>C+</i>	<i>2.50</i>	<i>50% to 54%</i>
<i>C</i>	<i>2.25</i>	<i>45% to 49%</i>
<i>D</i>	<i>2.0</i>	<i>40% to 44%</i>
<i>F</i>	<i>0.00</i>	<i>Below 40%</i>
<i>I</i>	<i>-</i>	<i>Incomplete</i>
<i>S</i>	<i>-</i>	<i>Satisfactory (non credit courses)</i>
<i>U</i>	<i>-</i>	<i>Unsatisfactory (non credit courses)</i>

Category of Courses

<i>1. ENGLISH LANGUAGE: 2 * 3 = 6 Credits</i>			
<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
<i>ENG-1011</i>	<i>English Fundamental Skills</i>	<i>3</i>	<i>Nil</i>
<i>ENG-1021</i>	<i>English for Engineers</i>	<i>3</i>	<i>ENG-1011</i>

<i>2. GENERAL EDUCATION: 4 * 3 = 12 Credits</i>			
<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
<i>ACT-1021</i>	<i>Introduction to Accounting</i>	<i>3</i>	<i>Nil</i>
<i>MGT-2011</i>	<i>Introduction to Business Management</i>	<i>3</i>	<i>Nil</i>
<i>ECO-2021</i>	<i>Introduction to Economics</i>	<i>3</i>	<i>Nil</i>
<i>SOC-2031</i>	<i>Engineering Ethics</i>	<i>3</i>	<i>Nil</i>

<i>3. BASIC SCIENCES: (3*3) Credits theory + (2*1) Credits Lab = 11 Credits</i>			
<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
<i>PHY-1021</i>	<i>Physics-I</i>	<i>3</i>	<i>Nil</i>
<i>PHY-1031</i>	<i>Physics-II</i>	<i>3</i>	<i>PHY-1021</i>
<i>PHY-1034</i>	<i>Physics Lab</i>	<i>1</i>	<i>PHY-1021</i>
<i>CHEM-1031</i>	<i>Chemistry</i>	<i>3</i>	<i>Nil</i>
<i>CHEM-1032</i>	<i>Chemistry Lab</i>	<i>1</i>	<i>Nil</i>

<i>4. MATHEMATICS & STATISTICS: 6 * 3 = 18 Credits</i>			
<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
<i>MATH-1024</i>	<i>Coordinate Geometry and Vector Analysis</i>	<i>3</i>	<i>Nil</i>
<i>MATH-1034</i>	<i>Differential & Integral Calculus</i>	<i>3</i>	<i>MATH-1024</i>
<i>MATH-1035</i>	<i>Ordinary Differential Equations and Partial Differential Equation</i>	<i>3</i>	<i>MATH-1034</i>
<i>MATH-2014</i>	<i>Complex Variables and Transforms (Laplace & Fourier)</i>	<i>3</i>	<i>MATH-1035</i>
<i>MATH-2015</i>	<i>Linear Algebra and Matrices</i>	<i>3</i>	<i>MATH2014</i>
<i>STAT-2012</i>	<i>Statistical Methods & Probability</i>	<i>3</i>	<i>Nil</i>

<i>5. INTERDISCIPLINARY ENGINEERING COURSES: 2 * (3+1) = 8 Credits</i>			
<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisite(s)</i>
<i>EEE-2011</i>	<i>Electronic Devices and Circuits I</i>	<i>3</i>	<i>EEE-1021</i>
<i>EEE-2012</i>	<i>Electronic Devices and Circuits Lab</i>	<i>1</i>	<i>EEE-1021, EEE-1022</i>
<i>ITE-2023</i>	<i>Communication Theory</i>	<i>3</i>	<i>MATH-2014, EEE-2011</i>
<i>ITE-2024</i>	<i>Communication Theory Lab</i>	<i>1</i>	<i>MATH-2014, EEE-2011</i>

<i>6. CORE COURSES: 17*3 + 12*1 + 6 = 69 Credits</i>			
<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisite(s)</i>
<i>CSE-1011</i>	<i>Programming Language I (C)</i>	<i>3</i>	<i>Nil</i>
<i>CSE-1012</i>	<i>Programming Language I (C) Lab</i>	<i>1</i>	<i>Nil</i>
<i>CSE-1021</i>	<i>Discrete Mathematics</i>	<i>3</i>	<i>CSE-1011</i>
<i>EEE-1021</i>	<i>Electrical Circuits Design I</i>	<i>3</i>	<i>Nil</i>
<i>EEE-1022</i>	<i>Electrical Circuits Design I Lab</i>	<i>1</i>	<i>Nil</i>
<i>CSE-1031</i>	<i>Numerical Methods</i>	<i>3</i>	<i>CSE-1011, MATH-1024</i>
<i>CSE-1033</i>	<i>Data Structures</i>	<i>3</i>	<i>CSE-1021</i>
<i>CSE-1034</i>	<i>Data Structures Lab</i>	<i>1</i>	<i>CSE-1021</i>
<i>CSE-2013</i>	<i>Digital Logic Design</i>	<i>3</i>	<i>CSE-1011</i>
<i>CSE-2014</i>	<i>Digital Logic Design Lab</i>	<i>1</i>	<i>CSE-1011</i>
<i>CSE-2015</i>	<i>Programming Language II (OOP in Java & C++)</i>	<i>3</i>	<i>CSE-1011</i>
<i>CSE-2016</i>	<i>Programming Language II (OOP in Java & C++) Lab</i>	<i>1</i>	<i>CSE-1011, CSE-1012</i>
<i>CSE-2021</i>	<i>Algorithm</i>	<i>3</i>	<i>CSE-1033</i>
<i>CSE-2022</i>	<i>Algorithm Lab</i>	<i>1</i>	<i>CSE-1033, CSE-1034</i>
<i>CSE-3011</i>	<i>Database Design</i>	<i>3</i>	<i>CSE-2015</i>
<i>CSE-3012</i>	<i>Database Design Lab</i>	<i>1</i>	<i>CSE-2015</i>
<i>CSE-3013</i>	<i>Microprocessor Design & Assembly Language Programming</i>	<i>3</i>	<i>CSE-1033</i>
<i>CSE-3014</i>	<i>Microprocessor Design & Assembly Language Programming Lab</i>	<i>1</i>	<i>CSE-1033 CSE-1034</i>
<i>CSE-3015</i>	<i>Computer Architecture</i>	<i>3</i>	<i>CSE-2013</i>
<i>CSE-3023</i>	<i>Computer Interfacing</i>	<i>3</i>	<i>CSE-3013</i>
<i>CSE-3024</i>	<i>Computer Interfacing Lab</i>	<i>1</i>	<i>CSE-3013, CSE3014</i>
<i>CSE-3025</i>	<i>Theory of Computing</i>	<i>3</i>	<i>CSE-2021</i>
<i>CSE-3031</i>	<i>Operating Systems</i>	<i>3</i>	<i>CSE-3013</i>
<i>CSE-3032</i>	<i>Operating Systems Lab</i>	<i>1</i>	<i>CSE-3013, CSE-3014</i>
<i>CSE-4000</i>	<i>Project</i>	<i>6</i>	<i>Completion of at least 110 credit hours</i>
<i>CSE-4011</i>	<i>Computer Networking</i>	<i>3</i>	<i>ITE-2023</i>
<i>CSE-4012</i>	<i>Computer Networking Lab</i>	<i>1</i>	<i>ITE-2023</i>
<i>CSE-4013</i>	<i>Computer Graphics & Animation</i>	<i>3</i>	<i>CSE-2015, MATH-2015</i>
<i>CSE-4014</i>	<i>Computer Graphics & Animation Lab</i>	<i>1</i>	<i>CSE-2015, MATH-2015</i>

CSE-4023	Artificial Intelligence	3	CSE-2021
7. SOFTWARE ENGINEERING GROUP: 3*4 + 2*1= 14 Credits			
Course Code	Course Title	Credits	Prerequisites
CSE-2031	Advanced Algorithm	3	CSE2021
CSE-2032	Advanced Algorithm Lab	1	
CSE-3033	Compiler Construction	3	CSE3025
CSE-3035	Information System Design & Software Engineering	3	CSE2015, CSE2016
CSE-4029	Image Processing	3	CSE2015, CSE-2021
CSE-4033	Web and Internet Programming	3	CSE3035
CSE-4034	Web and Internet Programming Lab	1	CSE3035
CSE-4035	Software Development and Project Management	3	CSE3035
CSE-4036	Software Development and Project Management Lab	1	CSE3035
CSE-4039	Management Information System	3	After Completion of 110 Credit Hours

8. NETWORK ENGINEERING GROUP: 3*4 + 2*1= 14 Credits			
Course Code	Course Title	Credits	Prerequisites
CSE-3021	Mathematical Analysis for Computer Science	3	STAT-2012, CSE1021
ITE-3031	Telecommunication Engineering	3	EEE-2011, ITE-2023
ITE-3032	Telecommunication Engineering Lab	1	EEE-2012, ITE-2024
ITE-3033	Digital Communication	3	ITE-2023, MATH2015
ITE-4013	Digital Signal Processing	3	ITE-3031
ITE-4014	Digital Signal Processing Lab	1	ITE-3032
CSE-4017	E-Commerce & E-Governance	3	CSE-3011, SOC-2031
EEE-4025	VLSI Design	3	CSE-2013, CSE-2014
EEE-4026	VLSI Design Lab	1	CSE-2013, CSE-2014
CSE-4027	Advanced Networking	3	CSE-4011
CSE-4028	Advanced Networking Lab	1	CSE-4011, CSE-4012
CSE-4037	Cryptography & Network Security	3	CSE-4011

Semester view of CSE Courses

Semester 1

<i>SI No.</i>	<i>Course Code</i>	<i>Course Title</i>	<i>Prerequisite(s)</i>	<i>Credit(s)</i>	<i>Credit Hours</i>
1	CSE-1011..N	Programming Language I ©	Nil	3	3
2	CSE-1012..N	Programming Language I (C) Lab	Nil	1	2
3	ENG-1011..N	English Fundamental Skills	Nil	3	3
4	MATH-1024..N	Coordinate Geometry and Vector Analysis	Nil	3	3
5	ACT-1021..N	Introduction to Accounting	Nil	3	3
<i>Subtotal:</i>				13	14

Semester 2

<i>SI No.</i>	<i>Course Code</i>	<i>Course Title</i>	<i>Prerequisite(s)</i>	<i>Credit(s)</i>	<i>Credit Hours</i>
1	CELP-II..N	Certificate in English Language Proficiency II	Nil	Non Credit	3
2	PHY1021..N	Physics – I	Nil	3	3
3	EEE-1021..N	Electrical Circuits Design I	Nil	3	3
4	EEE-1022..N	Electrical Circuits Design I Lab	Nil	1	2
5	MATH-1034	Differential & Integral Calculus	MATH-1024	3	3
<i>Subtotal:</i>				10	14

Semester 3

<i>SI No.</i>	<i>Course Code</i>	<i>Course Title</i>	<i>Prerequisite(s)</i>	<i>Credit(s)</i>	<i>Credit Hours</i>
1	CSE-1021	Discrete Mathematics	CSE-1011, CSE-1012	3	3
2	ENG-1021	English for Engineers	ENG-1011	3	3
3	PHY-1031	Physics II	PHY-1021	3	3
4	PHY-1034	Physics II Lab	PHY-1021	1	2
5	MATH-1035	Ordinary Differential Equations and Partial Differential Equation	MATH-1034	3	3
<i>Subtotal:</i>				13	14

Semester 4

<i>SI No.</i>	<i>Course Code</i>	<i>Course Title</i>	<i>Prerequisite(s)</i>	<i>Credit(s)</i>	<i>Credit Hours</i>
1	CSE-2013	Digital Logic Design	CSE-1011	3	3
2	CSE-2014	Digital Logic Design Lab	CSE-1011	1	2
3	STAT-2012	Statistical Methods & Probability	Nil	3	3
4	EEE-2011	Electronic Devices & Circuits I	EEE-1021	3	3
5	EEE-2012	Electronic Devices & Circuits I Lab	EEE-1021, EEE-1022	1	2
6	ECO-2021	Introduction to Economics	Nil	3	3
<i>Subtotal:</i>				14	16

Semester 5

<i>SI No.</i>	<i>Course Code</i>	<i>Course Title</i>	<i>Prerequisite(s)</i>	<i>Credit(s)</i>	<i>Credit Hours</i>
1	CHEM-1031	Chemistry	Nil	3	3
2	CHEM-1032	Chemistry Lab	Nil	3	3
3	CSE-1031	Numerical Methods	CSE1021, MATH1024	3	3
4	CSE-1033	Data Structures	CSE-1021	3	3
5	CSE-1034	Data Structures Lab	CSE-1021	1	2
6	MATH-2014	Complex Variables and Transforms (Laplace & Fourier)	MATH-1035	3	3
<i>Subtotal:</i>				16	17

Semester 6

<i>SI No.</i>	<i>Course Code</i>	<i>Course Title</i>	<i>Prerequisite(s)</i>	<i>Credit(s)</i>	<i>Credit Hours</i>
1	CSE-2015	Programming Language II (OOP in JAVA and C++)	CSE-1011	3	3
2	CSE-2016	Programming Language II (OOP in JAVA and C++) Lab	CSE1011, CSE-1012	1	2
3	MATH-2015	Linear Algebra and Matrices	MATH-2014	3	3
4	SOC-2031	Engineering Ethics	Nil	3	3
5	CSE-2021	Algorithm	CSE-1033	3	3
6	CSE-2022	Algorithm Lab	CSE-1033, CSE1034	1	2
<i>Subtotal:</i>				14	16

Semester 7

<i>SI No.</i>	<i>Course Code</i>	<i>Course Title</i>	<i>Prerequisite(s)</i>	<i>Credit(s)</i>	<i>Credit Hours</i>
1	CSE-3011	Database Design	CSE-2015	3	3
2	CSE-3012	Database Design Lab	CSE-2015	1	2
3	ITE-2023	Communication Theory	MATH-2014, EEE-2011	3	3
4	ITE-2024	Communication Lab	MATH-2014, EEE-2011	1	2
5	CSE-3015	Computer Architecture	CSE-2013	3	3
6	MGT-2011	Introduction to Business Management	Nil	3	3
<i>Subtotal:</i>				14	16

Semester 8

<i>SI No.</i>	<i>Course Code</i>	<i>Course Title</i>	<i>Prerequisite(s)</i>	<i>Credit(s)</i>	<i>Credit Hours</i>
1	Elective I*	Any Lab Excluded Course from Major Group**	*	3	3
2	CSE-4011	Computer Networking	ITE-2023	3	3
3	CSE-4012	Computer Networking Lab	ITE-2023	1	2
4	CSE-3013	Microprocessor Design & Assembly Language Programming	CSE-1033	3	3
5	CSE-3014	Microprocessor Design & Assembly Language Programming Lab	CSE-1033	1	2
6	CSE-3025	Theory of Computing	CSE-1023	3	3
<i>Subtotal:</i>				14	16

Semester 9

<i>SI No.</i>	<i>Course Code</i>	<i>Course Title</i>	<i>Prerequisite(s)</i>	<i>Credit(s)</i>	<i>Credit Hours</i>
1	CSE-3031	Operating Systems	CSE-3013	3	3
2	CSE-3032	Operating Systems Lab	CSE-3014	1	2
	CSE-4023	Artificial Intelligence	CSE-2021	3	3
3	Elective II*	Any lab included course from major group***	*	3	3
4	Elective II* Lab	Associated Lab***	*	1	2
<i>Subtotal:</i>				11	13

Semester 10

<i>SI No.</i>	<i>Course Code</i>	<i>Course Title</i>	<i>Prerequisite(s)</i>	<i>Credit(s)</i>	<i>Credit Hours</i>
1	CSE-3023	Computer Interfacing	CSE-3013	3	3
2	CSE-3024	Computer Interfacing Lab	CSE-3013	1	2
3	Elective III*	Any Lab excluded course from Minor Group	*	3	3
4	Elective IV*	Any Lab included course from Major Group	*	3	3
5	Elective IV* Lab	Associated Lab	*	1	2

<i>Subtotal:</i>	11	13
------------------	----	----

Semester 11

<i>SI No.</i>	<i>Course Code</i>	<i>Course Title</i>	<i>Prerequisite(s)</i>	<i>Credit(s)</i>	<i>Credit Hours</i>
1	CSE-4000	Project 1	Completion of 110 credit hours	3	3
2	CSE-4013	Computer Graphics & Animation	CSE2015, MATH2015	3	3
3	CSE-4014	Computer Graphics & Animation Lab	CSE2015, MATH2015	1	2
4	Elective V*	Any Lab excluded course from Major Group*	*	3	3
5	Elective VI*	Any Lab excluded course from Minor Group	*	3	3
<i>Subtotal:</i>				13	14

Semester 12

<i>SI No.</i>	<i>Course Code</i>	<i>Course Title</i>	<i>Prerequisite(s)</i>	<i>Credit(s)</i>	<i>Credit Hours</i>
1	CSE-4034	Project 2	CSE4000	3	3
<i>Subtotal:</i>				3	3

** Software Engineering Group Must take CSE-3035 as Elective I

*** Network Engineering Group Must take CSE4027 as Elective II

**** Student should take 14 Credits from Major Group and 6 Credits from Minor Group

Elective: Network Engineering Group*		14 Credits	
<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CSE-3021	Mathematical Analysis for Computer Science	3	STAT-2012, CSE1021
ITE-3031	Telecommunication Engineering	3	EEE-2011, ITE-2023
ITE-3032	Telecommunication Engineering Lab	1	EEE-2012, ITE-2024
ITE-3033	Digital Communication	3	ITE-2023, MATH2015
ITE-4013	Digital Signal Processing	3	ITE-3031
ITE-4014	Digital Signal Processing Lab	1	ITE-3032
CSE-4017	E-Commerce & E-Governance	3	CSE-3011, SOC-2031
EEE-4025	VLSI Design	3	CSE-2013, CSE-2014
EEE-4026	VLSI Design Lab	1	CSE-2013, CSE-2014
CSE-4027	Advanced Networking	3	CSE-4011
CSE-4028	Advanced Networking Lab	1	CSE-4011, CSE-4012
CSE-4037	Cryptography & Network Security	3	CSE-4011

Elective: Other Area of OA (Software Engineering Group)*		14 Credits	
<i>Course Code</i>	<i>Course Title</i>	<i>Credits</i>	<i>Prerequisites</i>
CSE-2031	Advanced Algorithm	3	CSE2021
CSE-2032	Advanced Algorithm Lab	1	
CSE-3033	Compiler Construction	3	CSE3025
CSE-3035	Information System Design & Software Engineering	3	CSE2015, CSE2016
CSE-4029	Image Processing	3	CSE2015, CSE-2021
CSE-4033	Web and Internet Programming	3	CSE3035
CSE-4034	Web and Internet Programming Lab	1	CSE3035
CSE-4035	Software Development and Project Management	3	CSE3035
CSE-4036	Software Development and Project Management Lab	1	CSE3035
CSE-4039	Management Information System	3	After Completion of 110 Credit

			<i>Hours</i>
--	--	--	--------------

***Detailed Syllabus
of
B.Sc. in Computer Science & Engineering (CSE)***

ENGLISH LANGUAGE:

ENG 1011: ENGLISH FUNDAMENTAL SKILLS

CREDITS: 3 CREDITS

PREREQUISITE(S): Nil

TOPICS:

General discussion: Introduction, various approaches to learning English.

Grammar: Tense, Right form of verbs, Voice, Narration, article, preposition, subject-verb agreement, clause, conditional and sentence structure, Transformation of Sentences.

Grammatical Problems: Construction of sentences, grammatical errors, sentence variety and style, conditionals, vocabulary and diction.

Reading Skill: Discussion readability, scan and skimming reading, generating ideas through purposive reading, reading of selected stories

Writing Skill: Principles of effective writing; Organization, planning and development of writing; Composition, précis writing, amplification

General strategies for the writing process: Generating ideas, identifying audiences and purposes, construction arguments, stating problems, drafting and finalizing

Listening Skill: The phonemic systems and correct English pronunciation

Speaking Skill: Practicing dialogue; Story telling; Oral skills including communicative expressions for personal identification, life at home, giving advice and opinion, instruction and directions, requests, complains, apologies, describing people and places, narrating events.

RECOMMENDED BOOK(S):

1. [Text] *A Practical English Grammar* - A. J. Thomson V. Martinet
2. *How to Write Reports and Proposals* - Patrick Forsyth

ENG 1021: ENGLISH FOR ENGINEERS

CREDITS: 3 CREDITS

PREREQUISITE(S): ENG 1011

TOPICS:

Discussion on common terms related to Electronics, Electricity, Communication Engineering and Computer system, Report writing, Formal presentation, Business Communication, Dialogue writing, Technology based essay writing.

Efficient listening and note taking: Listening to recorded texts and class lectures and learning to take useful notes based on listening.

Approaches to Communication: Communication today, business communication, different types of business communication.

Effective oral presentation: Academic Presentations, preparation and styles of presentation.

Report Writing: Defining a report, classification of reports, structure of a report, and writing of reports.

RECOMMENDED BOOK(S):

1. [Text] *A Practical English Grammar* - A. J. Thomson V. Martinet

GENERAL EDUCATION COURSES:

ACT-1021: INTRODUCTION TO ACCOUNTING

CREDITS: 3 CREDITS

PREREQUISITE(S): Nil

TOPICS:

Financial Accounting: Objectives and importance of accounting, accounting as an information system, computerized systems and applications in accounting, recording system – double entry mechanism, accounts and their classification, accounting equation, accounting cycle, journal, ledger, trial balance, preparation of financial statements considering adjusting and closing entries, accounting concepts and conventions.

Cost & Management Accounting: Cost concepts and classification, overhead cost – meaning and classification, distribution of overhead cost, overhead recovery method, job order costing, preparation of job cost sheet and quotation price, inventory valuation, absorption costing and marginal/variable costing technique, cost-volume-profit analysis, contribution-margin approach, sensitivity analysis. Short term investment decisions – relevant and differential cost analysis, long term investment decisions – capital budgeting, various techniques of evolution of capital investment

RECOMMENDED BOOK(S):

1. [Text] Accounting Principle – Weygandt, Kieso and Kimmel
2. [Ref 1] Accounting Theory – Ahmed Riahi Belkaoui
3. [Ref 2] Fundamentals of Accounting Principles – Pyle and Larson

MGT 2011: INTRODUCTION TO BUSINESS AND MANAGEMENT

CREDITS: 3 CREDITS

PREREQUISITE(S): Nil

TOPICS:

Concepts of Business, its components, classifications, importance, national and international business, group dynamics and leadership in business and non-businesses organizations.

Introduction to the components of management in information system and their integration for managerial control and decision support. Principle and process of management, types of management, Management in Engineering.

RECOMMENDED BOOK(S):

1. [Text] Introduction to Business - Jeff Madura
2. [Ref 1] Enterprise Planning and Development: small business and enterprise start-up survival and growth - David Butler
3. [Ref 2] Management Information system: An organizational perspective-D. Bodly, A. Boonstra & G. Kennedy.

ECO 2021: PRINCIPLE OF ECONOMICS

CREDITS: 3 CREDITS

PREREQUISITE(S): Nil

TOPICS:

Definition of economics, economics and engineering, principles of economics. Introduction to various economic systems – capitalist, command and mixed economy, fundamental economic problems and mechanisms through which these problems can be solved, theory of demand and supply and their elasticities, theory of consumer behavior, cardinal and ordinal approaches of utility analysis, price determination, nature of an economic theory, applicability of economic theories to the problems of developing countries, indifference curve techniques, theory of production, production function, types of productivity, rational region of production of an engineering firm, concepts of market and market structure, cost analysis and cost function, small and large scale production, optimization, theory of distribution, use of derivatives in economics, maximization and minimization of economic functions, relationship among total, marginal and average concepts. Micro-Economics: Savings, investment, employment, national income analysis, inflation, monetary policy, fiscal policy and trade policy with reference to Bangladesh, economics and development and planning.

RECOMMENDED BOOK(S):

1. [Text] Economics - Samuelson, P.
2. [Ref 1] Principles of Economics - Lipsey, R. G.
3. [Ref 2] Macroeconomics - Darnbusch, R.

SOC 2031: ENGINEERING ETHICS

CREDITS: 3 CREDITS

PREREQUISITE(S): Nil

TOPICS:

Definition and scopes of Ethics, Different branches of Ethics, Social change and the emergence of new technologies, History and development of Engineering Ethics, Science and Technology- necessity and application, Study of Ethics in Engineering. Applied Ethics in engineering

Human qualities of an engineer, Obligation of an engineer to the clients, Attitude of an engineer to other engineers, Measures to be taken in order to improve the quality of engineering profession

Ethical Expectations: Employers and Employees; inter-professional relationship: Professional Organization- maintaining a commitment of Ethical standards. Desired characteristics of a professional code, Institutionalization of Ethical conduct

RECOMMENDED BOOK(S):

1. [Text] Engineering Ethics - M. Govindarajan
2. [Ref 1] Ethics in Engineering Practice and Research- Caroline Whitbeck

BASIC SCIENCES:

PHY 1021: PHYSICS-I

CREDITS: 3 CREDITS

PREREQUISITE(S): Nil

TOPICS:

Mechanics: Kinematics, Graphical representations of displacement-time, velocity-time and acceleration-time. Motion in two and three dimensions – projectile motion. Applications of Newton's laws of motion, Free body diagrams, Analyses of frames of trusses, Friction, Equilibrium of forces, Work-kinetic energy theorem., Power, Conservative forces. Conservation of energy. Conservation of linear momentum for a system of particles. Center-of-mass motion. Elastic and inelastic collision in one dimension. Rotational kinematics. Angular momentum of a single particle. Conservation of angular momentum Moment of Inertia, Balancing of rotating masses. Gravitation: Gravitational field. Kepler's laws.

Waves and oscillations: Differential equation of simple harmonic oscillator, total energy and average energy, combination of simple harmonic oscillations, spring mass system, torsional pendulum; two body oscillation, reduced mass, damped oscillation, forced oscillation, resonance, progressive wave, power and intensity of wave, stationary wave, group and phase velocities.

Thermodynamics: Heat and work- the first law of thermodynamics and its applications; Kinetic Theory of gases- Kinetic interpretation of temperature, specific heats of ideal gases, equipartition of energy, mean free path, Maxwell's distribution of molecular speeds, reversible and irreversible processes, Carnot's cycle, second law thermodynamics, Carnot's theorem, entropy, Thermodynamic functions, Maxwell relations, Clausius and Clapeyron equation.

RECOMMENDED BOOK(S):

1. [Text] Outlines of Physics Vol. 1 - Ahmed, Giasuddin
2. [Ref 1] Physics: Part-I - Resnick, R. & Haliday, D.
3. [Ref 2] Properties of Matters - Brijlal & Subrahmanyam
4. [Ref 3] Heat & Thermodynamics - Brijlal & Subrahmanyam
5. [Ref 4] Waves & Oscillations - Brijlal & Subrahmanyam
6. [Ref 5] Elements of Properties of Matters - Mathur, D. S.

PHY 1031: PHYSICS-II

CREDITS: 3 CREDITS

PREREQUISITE(S): PHY 1021

TOPICS:

Electricity and Magnetism: Electric charge and Coulomb's law, Electric field, concept of electric flux and the Gauss's law- some applications of Gauss's law, Gauss's law in vector form, Electric potential, relation between electric field and electric potential,

capacitance and dielectrics, gradient, Laplace's and Poisson's equations, Current, Current density, resistivity, the magnetic field, Ampere's law, Biot-Savart law and their applications.

Optics: Defects of images: spherical aberration, astigmatism, coma, distortion, curvature, chromatic aberration. Theories of light; Interference of light: Young's double slit experiment, displacement of fringes and its uses, Fresnel bi-prism, interference in thin films, Newton's rings, interferometers; Diffraction: Diffraction by single slit, diffraction from a circular aperture, resolving power of optical instruments, diffraction at double slit and N-slits, diffraction grating; polarization: Production and analysis of polarized light, Brewster's law, Malus law, polarization by double refraction, Nicol prism, optical activity, Polarimeters.

RECOMMENDED BOOK(S):

1. [Text] *Outlines of Physics Vol. 2* - Ahmed, Giasuddin
2. [Ref 1] *Physics: Part-2* - Resnick, R. & Haliday, D.
3. [Ref 2] *Properties of Matters* - Brijlal & Subrahmanyam
4. [Ref 3] *A Textbook of Optics* - Brijlal & Subrahmanyam

PHY 1034: PHYSICS LAB

CREDITS: 1 CREDIT

PREREQUISITE(S): PHY 1021

TOPICS: Laboratory Works based on PHY 1021 and PHY 1031.

CHEM 1031: CHEMISTRY

CREDITS: 3 CREDITS

PREREQUISITE(S): Nil

TOPICS:

Atomic Structure, quantum numbers, electronic configuration, periodic table, Properties and uses of noble gases, Different types of chemical bonds and their properties. Molecular structures of compounds, Selective organic reactions

Different types of solutions and their compositions. Phase rule, phase diagram of monocomponent system. Properties of dilute solutions, Thermo Chemistry, chemical kinetics, chemical equilibrium, Ionization of water and pH concept, Electrical properties of solution

RECOMMENDED BOOK(S):

1. [Text] *Essentials of Physical Chemistry* – Bhal, Arun and G.D. Tuli.
2. [Ref 1] *A Textbook of Physical Chemistry* – K. L. Kapoor.
3. [Ref 2] *A Textbook of Physical Chemistry* – A. S. negi, S.C. Anand.

CHEM 1032: CHEMISTRY LAB

CREDITS: 1 CREDIT

PREREQUISITE(S): Nil

TOPICS: Laboratory Works based on CHEM 1031.

MATHEMATICS AND STATISTICS:

MATH 1024: COORDINATE GEOMETRY AND VECTOR ANALYSIS

CREDITS: 3 Credits

PREREQUISITE(S): Nil

TOPICS:

Transformation of coordinates, Straight lines, parallel lines, perpendicular lines, Cartesian and polar coordinates, Pair of straight lines (homogeneous second degree equations, general second degree equations representing pair of straight lines, angle between pair of straight lines, bisectors of angles between pair of straight lines).

General equations of second degree (reduction to standard forms, identifications, properties and tracing conics)

Coordinates in three dimensions, direction cosines, direction ratios, Planes (equations of plane, angle between two planes, distance of a point from a plane).

Vectors in plane and space, equality of vectors, addition and subtraction of vectors, scalar vector product of two vectors

Triple scalar product. Applications of vectors to geometry (vector equation of straight lines, planes, areas and volumes).

RECOMMENDED BOOK(S):

1. [Text] Coordinate Geometry - Chatterjee, P. N.
2. [Ref 1] Coordinate Geometry - Eisenhart, L. P.
3. [Ref 2] Schaum's Outline of Principles and Problems of Plane Geometry with Coordinate Geometry - Rich, B.
4. [Ref 3] An Elementary Treatise on Coordinate Geometry of Three Dimensions - Robert J.T. Bell-

MATH 1034: DIFFERENTIAL AND INTEGRAL CALCULUS

CREDITS: 3 Credits

PREREQUISITE(S): MATH 1024

TOPICS:

Differential Calculus: *Limits, continuity and differentiability, successive differentiation of various types of functions, Leibnitz's theorem, Mean-value theorem in finite and infinite forms, Lagrange's form of remainders, Cauchy's form of remainder, expansion of functions, evaluation of indeterminate forms by L'Hospital's rule, partial differentiation, Tangent and Normal, Subtangent and Subnormal in Cartesian and Polar coordinates, maximum and minimum values of functions of single variable, points of inflexion, curvature – radius of curvature, centre of curvature, asymptotes, curve tracing.*

Integral Calculus: Definitions of Integration, integrations by methods of substitutions, integration by parts, standard integrals, integration by the method of successive reduction, definite integrals and its properties and use in summing series, Walli's formula, Improper integrals, Beta function & Gamma function, area under a plane curve in Cartesian and polar coordinates, area of the region enclosed by two curves in Cartesian and Polar coordinates: Arc lengths of curves in Cartesian and Polar coordinates, parametric and pedal equations, intrinsic equations, volume of solids of revolutions, volume of hollow solids of revolution by shell method, area of surface of revolution, Jacobian, multiple integrals and its applications.

RECOMMENDED BOOK(S):

1. [Text] Calculus: A New Horizon - Anton, H.
2. [Ref 1] Integral Calculus - Das, B. C. & Mukherjee, B. N.
3. [Ref 2] Differential Calculus - Das, B. C. & Mukherjee, B. N.

MATH 1035: ORDINARY DIFFERENTIAL EQUATIONS & PARTIAL DIFFERENTIAL EQUATIONS

CREDITS: 3 Credits

PREREQUISITE(S): MATH 1034

TOPICS:

ODE: Degree and order of ordinary differential equations: formation of differential equations, solution of first order differential equations by various methods, solution of first order higher degree ordinary differential equations, solution of general linear equations of second and higher orders with constant coefficients, solution of homogeneous linear equations and its applications, solution of differential equations of higher order when dependent and independent variables are absent, solution of differential equations by the method of factorization of operators.

PDE: Four rules for solving simultaneous equations, Langrange's method of solving PDE of order one. Integral surfaces passing through a given curve, non-linear PDE of order one (complete, particular, singular and general integrals). Standard forms, Charpit's method, second order PDE, its nomenclature and classification to canonical, parabolic, elliptic, hyperbolic, solution by separation of variables, linear PDE with constant coefficients.

RECOMMENDED BOOK(S):

1. [Text] Differential Equations - Sharma, B.
2. [Ref 1] An Elementary Treatise on differential Equations and their Applications - Piaggio, H. T

MATH 2014: COMPLEX VARIABLES AND TRANSFORMS (LAPLACE AND FOURIER)

CREDITS: 3 Credits

PREREQUISITE(S): MATH 1035

TOPICS:

Complex Variables: complex number system, general function of a complex variable, limits and continuity of a function of a complex variable and related theorems, complex differentiation, the Cauchy-Riemann equation, mapping by elementary functions, line integral of a complex function, Cauchy's Integral Theorem and formula, Liouville's theorem, Taylor's theorem, Laurent's theorem, Singular points, Residue, Cauchy's Residue Theorem, evaluation of Residues, Contour integration, conformal mapping.

Laplace Transforms: Laplace transforms of some elementary functions, sufficient conditions for existence of Laplace Transforms, inverse Laplace transforms, Laplace transforms of derivatives, the unit step function, periodic function, some special theorems on Laplace transforms, partial fractions, solutions of differential equations.

Fourier Transforms: Real and complex form of Fourier series, finite transforms, Fourier Integral, Fourier transforms and their uses in solving boundary value problems of wave equations.

RECOMMENDED BOOK(S):

1. [Text] *Complex Variables and Applications* - Brown, J. W.
2. [Ref 1] *Schaum's Outline Series: Theory and Problems of Complex Variables* - Spiegel, M. R.
3. [Ref 2] *Schaum's Outline Series: Theory and Problems of Laplace Transforms* - Spiegel, M. R.
4. [Ref 3] *Schaum's Outline of Fourier Analysis with Applications to Boundary Value Problems* - Spiegel, M. R.

MATH 2015: LINEAR ALGEBRA AND MATRICES

CREDITS: 3 Credits

PREREQUISITE(S): MATH 2014

TOPICS:

Definition of matrix, different types of matrices, algebra of matrices, adjoint and inverse of a matrix, elementary transformations of a matrix, matrix polynomials, canonical forms, Rank of matrices.

System of linear equations (homogeneous and nonhomogeneous) and their solutions. Applications of system linear equations in real life problems.

Definition and properties of vector space, subspaces, Linear combination of vectors, Linear dependence and independence of vectors, basis and dimension, linear transformations, kernel and image of a linear transformation(LT), definition and properties, linear operator matrix, matrix representation of linear transformations, change of basis, Eigenvalues and eigenvectors, Diagonalization, Cayley-Hamilton theorem and its application.

RECOMMENDED BOOK(S):

1. [Text] *Elementary Linear Algebra* - Anton, H. & Rorres, C.

2. [Ref 1] *Linear Algebra* - Hadley, G.
3. [Ref 2] *A Textbook of Matrices* - Narayan, S.
4. [Ref 3] *Theory and Problems of Statistics* - Ayres, F.
5. [Ref 4] *Matrices and Linear Transformations* - Ali, M. I.
6. [Ref 5] *Schaum's Outline of Linear Algebra* - Lipschutz, S.

STAT 2012: STATISTICAL METHODS AND PROBABILITY

CREDITS: 3 Credits

PREREQUISITE(S): Nil

TOPICS:

Data and variables, central tendency, dispersion, skewness, kurtosis, probability, random variables, probability distributions, mathematical expectation and moment generating functions, joint & marginal distributions, stochastic independence, central limit theorem, concepts of Sampling & its various methods, design of an experiment & analysis of variance, concepts of estimation, methods of estimation, hypothesis testing & inference. Concepts of Sample Survey & its various methods- S.R.S; St.R.S. Systematic Sampling & Multi stage Sampling. Analysis of variance- One way, Two way & Three way Classification. Design of an experiment-CRD, RBD, LSD & Factorial Experiment. Concepts of estimation- Criteria of a good estimator, Point estimation- Method of Moment, Least square, MLE, Min. Chai-square & Bayes Estimator. Interval Estimation-Confidence Interval, Feducial interval. Large & small Sample Test of significance & Hypothesis Testing. Non-Parametric Test.

RECOMMENDED BOOK(S):

1. [Text] *Introduction to Statistics and Probability* - Islam, M. N.
2. [Ref 1] *Schaum's Outline Series of Statistics* - Spiegel, M. R. & Stephens, L. J.
3. [Ref 2] *Mathematical Statistics* - Saxena, H. C. & Kapoor, V. K.
4. [Ref 3] *Fundamentals of Statistics* - Gupata, M. K. & Kapoor, V, K.

INTERDISCIPLINARY ENGINEERING COURSES:

EEE 2011: ELECTRONIC DEVICES AND CIRCUITS – I

CREDITS: 3 CREDITS

PREREQUISITE(S): EEE 1021, EEE 1022

TOPICS:

Introduction to semiconductors, Intrinsic and extrinsic semiconductors, p-type and n-type semiconductors, Drift current and diffusion current in semiconductors. The p-n junction diode: The p-n junction, Formation of depletion layer and junction or Barrier potential in a p-n junction, p-n junctions under forward and reverse biases, Junction Breakdown-Zener and Avalanche breakdown, the p-n junction diode, The ideal diode and real diode, Load line analysis of diode circuits, graphical analysis of diode circuits, equivalent circuits and frequency response, diode applications –Ideal rectifier concept, half and full wave rectifier circuits, Voltage doublers, Clipping and clamping circuits, characteristics of different types of diodes - zener, tunnel, schottky and photo diodes, Zener diode voltage regulator, Zener diode voltage regulator, Bipolar Junction Transistors (BJT): Bipolar junction transistor-Construction and Operation, I-V characteristics, Amplifying action, Common-base (CB), Common-collector (CC) and Common-emitter (CE) configurations, Thermal runaway and stability factor of a transistor, Input, output and current transfer characteristics of CB, CC and CE configuration of transistors, Different methods of transistor biasing, Darlington pair, Load Line (AC and DC), BJTs at low frequencies - hybrid model, h-parameters, small signal analysis of BJT amplifiers, high input impedance circuits.

RECOMMENDED BOOK(S):

1. [Text] *Electronic Devices and Circuits Theory* - Boylested, R. Lle.
2. [Ref 1] *Electronic Devices and Circuits Theory* - Bell, David A.
3. [Ref 2] *Integrated Electronics: Analog and Digital Circuits Systems* - Millman, J.
4. [Ref 3] *Basic Electronics and Linear circuits* - Bhargava, N. N.
5. [Ref 4] *Electronic Principles* - Malvino, A. P.

EEE 2012: ELECTRONIC DEVICES AND CIRCUITS LAB

CREDITS: 1 CREDIT

PREREQUISITE(S): EEE 1021, EEE1022

TOPICS: *Laboratory Work based on EEE 2011*

ITE 2023: COMMUNICATION THEORY

CREDITS: 3 CREDITS

PREREQUISITE(S): MATH 2014, EEE 2011

TOPICS:

Overview of communication systems: Basic principles, fundamental elements, system limitations. Noise: Source, characteristics of various types of noise, Information theory: Measure of information, source encoding, channel capacity, Communication systems: Analog and digital. amplitude modulation- introduction, double side band, single side band, vestigial side band, quadrature; envelope and synchronous detection; angle modulation- frequency modulation (FM) and phase modulation (PM), demodulation of FM and PM. Pulse modulation: Sampling- sampling theorem, Nyquist criterion, pulse code modulation (PCM), differential PCM, demodulation of PCM; delta modulation (DM)- principle, adaptive DM; Digital modulation: Amplitude-shift keying- principle, ON-OFF keying, bandwidth requirements, detection, noise performance; phase-shift keying (PSK)- principle, bandwidth requirements, detection, differential PSK, Quadrature PSK, noise performance; frequency-shift keying (FSK)- principle, continuous and discontinuous phase FSK, minimum-shift keying, bandwidth requirements, detection of FSK. Multiplexing: Time-division multiplexing (TDM), frequency-division multiplexing (FDM), multiple-access network- time-division multiple-access (TDMA), frequency-division multiple access (FDMA); code-division multiple-access (CDMA). Communication system design: design parameters, channel selection criteria and performance simulation.

RECOMMENDED BOOK(S):

1. [Text] *Modern Digital and Analog Communication Systems* - Lathi, B. P.
2. [Ref 1] *Communication Systems* - Haykin, S.

ITE 2024: COMMUNICATION THEORY LAB

CREDITS: 1 CREDIT

PREREQUISITE(S): MATH 2014, EEE 2011

TOPICS: *Laboratory Works based on ITE 2023*

CORE COURSES:

CSE1011: PROGRAMMING LANGUAGE – I (C)

CREDITS: 3 CREDITS

PREREQUISITE(S): Nil

TOPICS:

Introduction to computers, representation of data, input/output system, C character set, identifier and keyword, symbolic constants, operators and expressions, input/output functions in C, format strings, if-else statement, loops – for loop, while loop, do-while loop, solving different types of problems using loops such as drawing pyramid and other numeric patterns, functions – defining a function, how to call a function, function prototype, recursion, Storage class – global, local, static and register variable, arrays – addressing in one dimensional array and two dimensional array, sorting – bubble and selection sort, pointers – pointer to pointer to integer, pointer arithmetic, array and pointer, passing address of a variable to a function, dynamic memory allocation, structures – introduction to structure.

RECOMMENDED BOOK(S):

1. [Text] *Programming with C (Schaum's outline series) - B. S. Gottfried*
2. [Ref 1] *C Programming Language - Brian W. Kernighan and Dennis M. Ritchie*
3. [Ref 2] *Teach Yourself C - H. Schildt*

CSE 1012: PROGRAMMING LANGUAGE – I (C) LAB

CREDIT: 1 CREDIT

PREREQUISITE(S): Nil

TOPICS: *Laboratory Work based on CSE1011*

CSE1021 : DISCRETE MATHEMATICS

CREDITS : 3 CREDITS

PREREQUISITE(S): CSE1011, CSE1012

TOPICS:

Propositional equivalence, predicate, quantifiers, methods of proof, sets, functions, growth of functions, complexity of algorithms, integers and divisions, number theory & its applications, matrices, proof strategy, mathematical induction, recursive definitions, basic counting techniques, Pigeonhole principle, permutations and combinations, binomial coefficients, generating permutations and combinations, discrete probability, probability theory, recurrence relations, divide-and-conquer algorithm, generating functions, relations, n-ary relations and their applications, closures of relations, equivalent relations, partial ordering.

RECOMMENDED BOOK(S):

1. [Text] *Discrete Mathematics and its Applications - Rosen, K. H.*
2. [Ref 1] *Elements of Discrete Mathematics - Liu, C. L*
3. [Ref 2] *Schaum's outline of Discrete Mathematics - Lipschutz, S. & Lipson, M*

CSE1031 : NUMERICAL METHODS

CREDITS : 3 CREDITS

PREREQUISITE(S): CSE1011, CSE1012, MATH1024

TOPICS:

Representations of integers, floating-point numbers, arithmetic operations on big integers, errors and accuracy, propagation of errors, introduction to root-finding, bisection method, method of false position, Newton-Raphson method, Secant method, solving system of linear equations, Gaussian elimination, pitfalls of Gaussian elimination technique, techniques for improvement, computing determinants, forward and backward differences, divided differences, Taylor series, Newton's divided difference and interpolating polynomials, Lagrange's interpolating polynomials, Left endpoint, right endpoint, midpoint approximation, Trapezoidal rule, Simpson's 1/3 rule.

RECOMMENDED BOOK(S):

1. [Text] *Numerical Methods for Engineers - S. C. Chapra and R. P. Canale*
2. [Ref 1] *Numerical Methods for Scientists and Engineers - R. Hamming.*

CSE1033: DATA STRUCTURES

CREDITS : 3 CREDITS

PREREQUISITE(S): CSE1021

TOPICS:

Elementary data types, Structures, Algorithm & Complexity, Big O notation, Arrays and basic algorithms on arrays, Records and Pointers, Elementary searching: Linear, Binary Search etc. and sorting techniques: Bubble Sort, Insertion Sort, Selection Sort, Quick Sort, Merge Sort etc., Stacks, Queues, Linked Lists: algorithms of singly linked list, two-way Linked List, Recursion, Polish Notation, Binary Search Trees, In-order, pre-order & post-order traversal, Heap, Huffman coding and its application, Graph representation and elementary graph algorithms: topological sort, Depth-first and Breadth-first search, string handling: Pattern Matching. Hashing: different hashing & collision resolution techniques.

RECOMMENDED BOOK(S):

1. [Text] *Data Structures Using C and C++ - Langsam, Y. & Augenstein, M. J. & Tenenbaum, A. M*
2. [Ref 1] *Algorithms in C - Sedgewick, R.*
3. [Ref 2] *Introduction to Algorithms - Cormen, T. H. & Leiserson, C. E. & Rivest, R. L. & Stein, C*
4. [Ref 3] *Data Structures - Reingold, E. M. & Hansen, W. J*
5. [Ref 4] *Theory and Problems of Data Structures - Lipschutz, S. - Schaum's Outline Series*

CSE1034 : DATA STRUCTURES

CREDITS : 1 CREDIT

PREREQUISITE(S): CSE1021

TOPICS: Laboratory Work based on Theory Course CSE1033

CSE2013 : DIGITAL LOGIC DESIGN

CREDITS: 3 CREDITS

PREREQUISITE(S): CSE1021

TOPICS:

Binary Systems, Boolean algebra and Logic Gates, Gate Level Minimization, Combinational Logic, Synchronous Sequential Logic, Registers and Counters, Memory and Programmable Logic.

RECOMMENDED BOOK(S):

1. [Text] *Digital Design - Mano, M. M.*
2. [Ref 1] *Digital Design: A Pragmatic Approach - Johnson, E. L. & Karim, M. A*
3. [Ref 2] *Digital Logic Design - Tocci*

CSE2014 : DIGITAL LOGIC DESIGN LAB

CREDITS : 1 CREDIT

PREREQUISITE(S): CSE1021

TOPICS : Laboratory Work based on Theory Course CSE2013

CSE2015 : PROGRAMMING LANGUAGE – II (OOP IN JAVA AND C++)

CREDITS: 3 CREDITS

PREREQUISITE(S): CSE1011, CSE1012

TOPICS:

Introduction to OOP, Introduction to Java, Object, Classes, Methods, Inheritance, Interface, Nested Classes, Exceptions, I/O, Threads, AWT, Events, Applets, Images, Swing.

RECOMMENDED BOOK(S):

1. [Text] *Java 2: The Complete Reference - Schildt, H.*
2. [Ref 1] *Java: How to Program - Deitel and Deitel*

CSE2016 : PROGRAMMING LANGUAGE – II (OOP IN JAVA AND C++) LAB

CREDITS : 1 CREDIT

PREREQUISITE(S): CSE1011, CSE1012

TOPICS: Laboratory Work based on Theory Course CSE2015

CSE2021 : ALGORITHM

CREDITS : 3 CREDITS

PREREQUISITE(S): CSE1033, CSE1034

TOPICS:

Sorting (Insertion, Selection, Merge, Quick, Counting, Radix), Growth of Function, Divide and Conquer, Solving Recurrences, Heap, Median and Order Statistics, Hashing, Elementary Graph Algorithms, Shortest Paths, Sets and Disjoint Sets, Minimum Spanning Tree, Backtracking, Introduction to Computational Geometry, Introduction to Greedy Algorithms, Introduction to Dynamic Programming.

RECOMMENDED BOOK(S):

1. [Text] Introduction to Algorithms - Cormen, T. H. & Leiserson, C. E. & Rivest, R. L. & Stein, C
2. [Ref 1] Introduction to Algorithms A Creative Approach - Manber, U.
3. [Ref 2] Algorithms in C - Sedgewick, R.
4. [Ref 3] Introduction to Algorithms - Shahni

CSE2022 : ALGORITHM LAB**CREDITS : 1 CREDIT****PREREQUISITE(S):** CSE1033, CSE1034**TOPICS:** Laboratory Work based on Theory Course CSE2021**CSE3011 : DATABASE DESIGN****CREDITS : 3 CREDITS****PREREQUISITE(S):** CSE2015, CSE2016**TOPICS:**

Concepts of database systems, E-R model & Relational model, relational algebra, SQL, integrity constraint, relational database design, file organization and retrieval, file indexing, transaction manager, security system, database administration, advanced database management systems: distributed, multimedia, object oriented, object-relational.

RECOMMENDED BOOK(S):

1. [Text] Database System Concepts - Silberschatz, A. & Korth, H. F. & Sudarshan, S.
2. [Ref 1] Fundamentals of database systems - Elmarsi, R. & Navathe, S. B.
3. [Ref 2] Database Management System - Ramakrishnan, R.
4. [Ref 3] Principles of Database and Knowledge-Base Systems - Ullman, J. D.

CSE3012 : DATABASE DESIGN LAB**CREDITS : 1 CREDIT****PREREQUISITE(S):** CSE2015, CSE2016**TOPICS:** Laboratory Works based on Theory Course CSE3011**CSE3013 : MICROPROCESSOR DESIGN & ASSEMBLY LANGUAGE PROGRAMMING****CREDITS : 3 CREDITS****PREREQUISITE(S):** CSE1033

TOPICS:

Hardware and software architecture, instruction types and their formats, assembly program format, assembly process, interrupts and system services, addressing methods, high level control structure formation, use of subroutines and macros, numeric processing and string processing, concurrent processes & high level linking, disk geometry, file system and file I/O handling.

Introduction to 8-bit, 16-bit, and 32-bit microprocessor – architecture, addressing modes, instruction set, interrupts, multi-tasking and virtual memory – memory interface, bus interface, arithmetic co-processor, Microcontrollers, integrating microprocessors with interfacing chips.

RECOMMENDED BOOK(S):

1. [Text] *Assembly Language for Intel based Computers - Irvine, K. R.*
2. [Text] *Microprocessors and Microcomputers: Hardware and Software – Tocci and Ambrosio,*
3. [Ref 1] *80X86 IBM PC and Compatible Computers: Assembly Language, Design, and Interfacing - Mazidi, M. A.*
4. [Ref 2] *Microcomputer Systems: 8086/8088 Family - Liu, Y. & Gibson, G. A.*

CSE3014 : MICROPROCESSOR DESIGN & ASSEMBLY LANGUAGE PROGRAMMING LAB**CREDITS : 1 CREDIT****PREREQUISITE(S): CSE1033****TOPICS:** *Laboratory Works based on Theory Course CSE3014***CSE3015 : COMPUTER ARCHITECTURE****CREDITS: 3 CREDITS****PREREQUISITE(S): CSE2013****TOPICS:**

Fundamentals of computer design – tasks of a computer architect, technology and trends, cost and trends, measurement of performance, quantitative principles of computer design, the concepts of memory hierarchy, Instruction set principles – classification, memory addressing, operations, types and size of operands, encoding, study of sample instruction set architecture, pipelining – hurdles and Hazards, data hazards and control hazards, handling multi-cycle operations, instruction level parallelism (ILP) – overcoming data hazards with dynamic scheduling, reducing Branch penalties with dynamic hardware prediction, compiler support for exploiting ILP, hardware support for extracting more parallelism, Memory hierarchy design – Caches, reducing cache misses & penalty, reducing hit time, main memory, virtual memory, protection and examples of virtual memory, Storage systems – types of

storage devices, Buses, I/O performance measures, reliability, availability and RAID, multiprocessors – centralized & distributed shared memory architectures, synchronization, computer arithmetic, vector processors, survey of RISC architectures and Intel 80x86.

RECOMMENDED BOOK(S):

1. [Text] *Computer Architecture: A Quantitative Approach* - Patterson, D. A. & Hennessy, J. L.
2. [Ref 1] *Computer Systems Design and Architecture* - Heuring, V. P. & Jordan, H. F.
3. [Ref 2] *Computer Architecture* - Carter, N.
4. [Ref 3] *Computer System Architecture* - Mano, M. M.
5. [Ref 4] *Computer Organization* - Hamacher, V & Vranesic, Z. & Zaky, S.
6. [Ref 5] *Computer Architecture & Organization* - Hayes, J. P.

CSE3023 : COMPUTER INTERFACING

CREDITS : 3 CREDITS

PREREQUISITE(S): CSE3013

TOPICS:

I/O system – I/O devices, designing I/O systems, programmable peripheral interface (interface to A/D and D/A converter), keyboard/display interface, programmable timer, programmable interrupt controller, DMA controller, floppy and hard-disk controller, serial communication interface, barcode reader, sound card, MIDI interface, printer interface, ISA, PCI, AGP, PS/2 and USB interfaces, interfacing with power circuits, stepper motors, opto-isolation, controlling semiconductor power switches – MOSFET, BJT, SCR, Triac and Solenoids.

RECOMMENDED BOOK(S):

1. [Text] *Computer Interfacing* - Hall
2. [Ref 1] *Computer Interfacing* - Smith, G. A.
3. [Ref 2] *Microprocessor Interfacing* - Goanker, R.

CSE3024 : COMPUTER INTERFACING LAB

CREDITS : 1 CREDIT

PREREQUISITE(S): CSE3013

TOPICS: *Laboratory Works based on Theory Course CSE3023*

CSE3025 : THEORY OF COMPUTING

CREDITS : 3 CREDITS

PREREQUISITE(S): CSE2021

TOPICS:

Formal proofs, finite automata, DFA/NFA and their equivalence, properties of regular languages, minimizing automata, regular expressions, Pumping lemma, non-regular languages, context-free grammar, Chomsky normal form, pushdown automata, non-context free languages, Turing machines, variants of Turing machines, definition of algorithms, decidable languages, the halting problem, time complexity, classes P, NP, NPC.

RECOMMENDED BOOK(S):

1. [Text] *Introduction to the Theory of Computation - Sipser, M.*
2. [Ref 1] *Elements of the Theory of Computation - Lewis, H. R. & Papadimitriou, C. H.*
3. [Ref 2] *Introduction to Automata Theory, Languages, and Computation. - Hopcroft, J. E. & Motwani, R. & Ullman, J. D.*
4. [Ref 3] *Theory of Computation - Papadimitriou, C. H*

CSE3031 : OPERATING SYSTEMS**CREDITS : 3 CREDITS****PREREQUISITE(S): CSE3013****TOPICS:**

Operating systems – it's role in computer systems, concepts & structure, operating system process – model & implementation, inter-process communication (IPC), classical IPC problems, process scheduling, multiprocessing and time-sharing, memory management, swapping, paging, segmentation, virtual memory, input/output – hardware, software, disks, terminals, clocks, deadlock – resource allocation, deadlock detection, prevention & recovery, file systems – files, directories, security, protection, case study of some operating systems, shell programming.

RECOMMENDED BOOK(S):

1. [Text] *Operating System - Galvin*
2. [Ref 1] *Operating Systems: Design and Implementation - Tanenbaum, A. S. & Woodhull, A. S.*
3. [Ref 2] *Modern Operating Systems - Tanenbaum, A. S.*
4. [Ref 3] *Operating Systems: Implementation and Design Principles - Stallings, W.*
5. [Ref 4] *Distributed Operating Systems - Tanenbaum, A. S.*

CSE3032 : OPERATING SYSTEMS LAB**CREDITS : 1 CREDIT****PREREQUISITE(S): CSE3013****TOPICS:** *Laboratory Works based on Theory Course CSE3031***CSE4000 : PROJECT****CREDITS : 6 CREDITS****PREREQUISITE(S):** *Successful completion of 110 or more credits.*

TOPICS:

Study of problems in the field of Computer Science & Engineering. A student needs to select a suitable topic of his/her interest or supervisors may display a list of project works related with the academic needs in research activities.

CSE4011 : COMPUTER NETWORKING**CREDITS : 3 CREDITS****PREREQUISITE(S): ITE2023****TOPICS:**

Computer Network, LAN, MAN, WAN, Network topologies, Networking Media: TP, Coaxial Cable, Fiber Optic, Protocol hierarchies: ALOHA, Slotted ALOHA, CSMA, CSMA/CD, OSI model, TCP/IP model, data link control – HLDC, DLL in Internet, DLL of ATM, LAN protocols – standards IEEE 802, Switches and Hubs, Bridges, FDDI, fast Ethernet, routing algorithms, internetworking, WAN, fragmentation, firewalls, IPV4, IP address, IPV6, ARP, RARP, Mobile IP, network layers of ATM, transport protocols, transmission control protocols – connection management, transmission policy, timer management, UDP, AAL of ATM, network security, cryptography, DES, public key algorithm, authentication, digital signatures, Gigabit Ethernet, DNS – name servers, Email and its privacy, SNMP, HTTP, WWW, Wireless LAN: requirements, technologies, Nomadic Access, LAN extension, Ad Hoc Network.

RECOMMENDED BOOK(S):

1. [Text] *Computer Networking: A Top-Down Approach Featuring the Internet - Kurose, J. F. & Ross, K. W.*
2. [Ref 1] *Computer Networks - Tanenbaum, A. S.*

CSE4012 : COMPUTER NETWORKING LAB**CREDITS : 1 CREDIT****PREREQUISITE(S): ITE2023****TOPICS:** *Laboratory Works based on Theory Course CSE4011***CSE4013 : COMPUTER GRAPHICS & ANIMATION****CREDITS : 3 CREDITS****PREREQUISITE(S): CSE2015, MATH2015****TOPICS:**

Graphics hardware – display devices, input devices, basic raster graphic algorithms for drawing 2D primitives, two and three dimensional viewing, clipping & transformations, Projection three dimensional object representations – polygon surface, B-Spline curves & surfaces, BSP trees, Octrees, fractal geometry methods, visible surface detection methods, Z-buffer method, illumination and shading models, surface rendering methods, polygon rendering, ray tracing, terrain visualization with height mapping, modeling surface details with texture mapping, color models, computer animation.

RECOMMENDED BOOK(S):

1. [Text] *Computer Graphics: Principles and Practice in C* - Foley, J. D. & van Dam, A. & Feiner, S. K. & Hughes, J. F.
2. [Ref 1] *Schaum's Outline of Computer Graphics* - Xiang, Z. & Plastock, R. A.
3. [Ref 2] *3D Computer Graphics* - Watt, A. H.
4. [Ref 3] *Mathematics for 3D Game Programming and Computer Graphics* - Lengyel, E.
5. [Ref 4] *OpenGL Programming Guide, the official guide to learn OpenGL* - Shreiner, Dave

CSE4014 : COMPUTER GRAPHICS & ANIMATION LAB

CREDITS : 1 CREDIT

PREREQUISITE(S): CSE2015, MATH2015

TOPICS: *Laboratory Works based on Theory Course CSE4013*

CSE4023 : ARTIFICIAL INTELLIGENCE

CREDITS : 3 CREDITS

PREREQUISITE(S): CSE2021

TOPICS:

Search (Graph Search, Constraint Satisfaction, Games), Knowledge Representation and Inference (Propositional and First Order Logic, Rule-based systems, Natural Language), Machine Learning (Nearest Neighbors, Decision Trees, Neural Networks, SVM).

RECOMMENDED BOOK(S):

1. [Text] *Artificial Intelligence: A Modern Approach* - Russell, S. & Norvig, P.
2. [Ref 1] *Artificial Intelligence: A New Synthesis* – Nilsson, N. J.
3. [Ref 2] *Neural Networks: A Comprehensive Foundation* - Haykin, S.

EEE1021: ELECTRICAL CIRCUIT DESIGN – I

CREDITS : 3 CREDITS

PREREQUISITE(S): Nil

TOPICS:

Units, DC sources, Resistance and Conductance, Ohm's law, Power and Energy, Series and parallel circuits, Series-Parallel Networks; Methods of analysis: Mesh analysis, Node analysis and other methods of analysis; Kirchhoff's laws, Y-delta transformation; Circuit theorems: Superposition Theorem, Norton's Theorem, Thevenin's Theorem, Millman's Theorem, Capacitors, Magnetic circuits, Inductors, R-C and R-L circuits with DC excitation.

RECOMMENDED BOOK(S):

1. [Text] *Introductory Circuit Analysis - Boylestad R.L*
2. [Ref 1] *Fundamentals of Electric Circuits - Alexander & Sadiku*
3. [Ref 2] *A Textbook of Electrical Technology - B.L.Theraja & A.K. Theraja*

EEE1022 : ELECTRICAL CIRCUIT DESIGN – I LAB

CREDITS: 1 CREDIT

PREREQUISITE(S): Nil

TOPICS: *Laboratory Works based on Theory Course EEE1021*

ELECTIVE COURSES

1. SOFTWARE ENGINEERING GROUP:

CSE2031 : ADVANCED ALGORITHM

CREDITS : 3 CREDITS

PREREQUISITE(S): CSE2021

TOPICS:

Introduction to the design and analysis of efficient algorithms, models of computation, efficient sorting and searching, algorithms for algebraic problems, graph algorithms, polynomial time algorithms for matching, Fusion trees and their applications to integer sorting, Fibonacci heaps and self adjusting search trees, splay trees, linking and cutting trees. State-of-the-art algorithms for minimum spanning trees, shortest path problem, Network flows pre flow-push algorithms, max flow algorithms, linear programming, scaling algorithms, dynamic programming, probabilistic methods, approximation algorithms, completeness, lower bound theory for parallel computation, lower bounds on the resource requirements of algorithms. Non polynomial Algorithm and satisfiability set construction.

RECOMMENDED BOOK(S):

1. [Text] *Introduction to Algorithms - Cormen, T. H. & Leiserson, C. E. & Rivest, R. L. & Stein, C*
2. [Ref 1] *Introduction to Algorithms A Creative Approach - Manber, U.*
3. [Ref 2] *Algorithms in C - Sedgewick, R.*
4. [Ref 3] *Introduction to Algorithms - Shahni*

CSE2032 : ADVANCED ALGORITHM LAB

CREDITS : 1 CREDIT

PREREQUISITE(S): CSE2021, CSE2022

TOPICS: *Laboratory Work based on Theory Course CSE2032*

CSE3033 : COMPILER CONSTRUCTION

CREDITS : 3 CREDITS

PREREQUISITE(S): CSE3013, CSE3025

TOPICS:

Principles and techniques of lexical analysis, parsing theory (LL, LR, LALR), semantic analysis, intermediate code generation and optimization, code generation, design and implementation of a functional compiler for a given programming language.

RECOMMENDED BOOK(S):

1. [Text] *Compilers: Principles, Techniques, and Tools - Aho, A. V. & Sethi, R. & Ullman, J. D.*
2. [Ref 1] *Lex and Yacc - Levine, J. R. & Mason, T. & Brown, D.*

CSE3035 : INFORMATION SYSTEM DESIGN & SOFTWARE ENGINEERING

CREDITS ; 3 CREDITS

PREREQUISITE(S): CSE2015, CSE3011

TOPICS:

Introduction to information system (information, information system, information gathering, information sources, system analysis), data collection process (interviewing), fact finding techniques (questionnaire, joint application design (JAD)), prototyping, system design tools overview, data flow diagram, data dictionary, process specifications, E-R diagram, state diagram, variations of modeling tools (flowcharts and its variations, Nassi-Shneiderman diagram, Ferstl diagram, Hamilton-Zeldin diagram, problem analysis diagrams (PAD), system flowchart, HIPO diagrams, structure charts, variations on data flow diagram and E-R diagram), analysis models (essential model, environmental model, behavior model, user implementation model), introduction to UML (use case modeling and use case diagram, class modeling, relationship, class diagrams, object interaction – modeling sequence, collaboration diagram, state chart diagram, activity diagram, component and deployment diagram), ethical and social issues, security issues, project estimation, COCOMO model, PERT/CPM analysis, Gantt charts, cost benefit analysis, introduction to linear programming, project work

Software Quality Concepts, Process Models, Software Requirements Analysis, Design Methodologies, Software Testing, Software Maintenance, Testing and Debugging, Modularity, Specification, Data Abstraction, Object Modeling, Design Patterns, Testing, RUP, UML, Project Work.

RECOMMENDED BOOK(S):

1. [Text] *Just Enough Structured Analysis* - Yourdon, E.
2. [Ref 1] *Object Oriented System Development* - Dennis de Champeaux, Douglas Lea, and Penelope Faure
3. [Text] *Software Engineering: A Practitioner's Approach* - Pressman, R.
4. [Ref 1] *Applying UML and Patterns* - Larman, C.
5. [Ref 2] *Design Patterns* - Gamma, E.

CSE4029 : IMAGE PROCESSING**CREDITS: 3 CREDITS****PREREQUISITE(S): CSE2015, CSE2021****TOPICS:**

Digital image fundamentals, perceptions, representation, image transforms – Fast Fourier Transform (FFT), Discrete Cosine Transforms (DCT), Karhunen and Loeve Transforms (KLT), Wavelet transform and sub-band decomposition, image enhancement and restoration techniques, image compression techniques, image compression standards – JPEG, MPEG, H.261, H.263

RECOMMENDED BOOK(S):

1. [Text] *Digital Image Processing* - Gonzalez, R. C. & Woods, R. E.
2. [Ref 1] *Algorithms for Image Processing and Computer Vision* - Parker, J. R.

CSE4033 : WEB AND INTERNET PROGRAMMING**CREDITS : 3 CREDITS****PREREQUISITE(S): CSE3035**

TOPICS:

HTML, DHTML, JavaScript, XML, Java Web Start, Basics of Web Programming in JAVA – Servlet and JSP, PHP.

RECOMMENDED BOOK(S):

1. [Text] *Java 2: The Complete Reference - Schildt, H.*
2. [Text] *PHP and MySQL Web Development by Luke Welling*
3. [Ref 1] *Java: How to Program - Deitel and Deitel*
4. [Ref 2] *JSP Programming – Worx Publication*

CSE4034 : WEB AND INTERNET PROGRAMMING LAB

CREDITS : 3 CREDITS

PREREQUISITE(S): CSE3035

TOPICS:

Lab works Based on theory course CSE4033

CSE4035 : SOFTWARE DEVELOPMENT AND PROJECT MANAGEMENT

CREDITS : 3 CREDITS

PREREQUISITE(S): CSE3035

TOPICS:

Foundations of software project management; organization structure and staffing; motivation, authority and influence; conflict management; proposal preparation; a large engineering software system management; client management; managing software project teams; project planning and scheduling; risk management; configuration management; pricing estimation and cost control; quality assurance and accreditation; factors affecting software quality; software quality assurance plans; business context and legal issues for software projects; software measurement: testing, upgrading and maintenance; network systems; and international project management.

CSE4036 : SOFTWARE DEVELOPMENT AND PROJECT MANAGEMENT LAB

CREDITS : 1 CREDIT

PREREQUISITE(S): CSE3035

TOPICS:

Lab works based on theory course CSE4035.

CSE4039 : MANAGEMENT OF INFORMATION SYSTEM

CREDITS : 3 Credits

PREREQUISITE(S): Successful completion of 110 or more credits

TOPICS:

Introduction to the components of the management information system and their integration for managerial control and decision support, major functional applications and impacts of information technology on individuals and the society, basic discussion of the environments, approaches, principles and processes of management, environmental forces, planning, organizing and control processes, motivation, teamwork, group dynamics and leadership in business and non-business organizations.

RECOMMENDED BOOK(S):

1. [Text] *Management Information Systems* by Effy Oz.
2. [Ref] *Management Information Systems* by James O'Brien and George Marakas

2. NETWORK ENGINEERING GROUP:

CSE3021 : MATHEMATICAL ANALYSIS FOR COMPUTER SCIENCE

CREDITS : 3 CREDITS

PREREQUISITE(S): CSE1021, STAT-2012

TOPICS:

Systematic ways of proving, mathematical notations, sums and recurrences, modular arithmetic, number theory – divisibility, primes, factorial, factors, relative primality, congruence relations, independent residues, ϕ and μ , Binomial coefficients – basic identities, generating functions, hyper-geometric functions, partial hyper-geometric sums and mechanical summations, Stirling numbers, Eulerian numbers, Harmonic numbers, Bernoulli numbers, Fibonacci numbers, continuants, Domino theory, solving recurrences using generating functions.

RECOMMENDED BOOK(S):

1. [Text] Elementary Number Theory - Underwood Dudley
2. [Ref 1] Concrete Mathematics - Graham, Knuth, Patashnik
3. [Ref 2] How to Solve it: Modern Huristics - Zbigniew Michalewicz and David B. Fogel
4. [Ref 3] Introduction to Algorithms - Udi Manber

ITE 3031: TELECOMMUNICATION ENGINEERING

CREDITS: 3 CREDITS

PREREQUISITE(S): EEE 2011, ITE 2023

TOPICS:

Introduction: Principle, evolution, networks, exchange and international regulatory bodies. Telephone apparatus: Microphone, speakers, ringer, pulse and tone dialing mechanism, side-tone mechanism, local and central batteries and advanced features. Switching system: Introduction to analog system, digital switching systems – space division switching, blocking probability and multistage switching, time division switching and two dimensional switching. Traffic analysis: Traffic characterization, grades of service, network blocking probabilities, delay system and queuing. Modern telephone services and network: Internet telephony, facsimile, integrated services digital network, asynchronous transfer mode and intelligent networks. Introduction to cellular telephony and satellite communication.

RECOMMENDED BOOK(S):

1. [Text] Digital Telephony – John C. Bellamy
2. [Ref 1] Telecommunication Switching Systems And Networks-[Viswanathan Thiagarajan](#)

ITE 3032: TELECOMMUNICATION ENGINEERING LAB

CREDITS: 1 CREDIT

PREREQUISITE(S): *EEE-2011, ITE-2023*

TOPICS: *Laboratory Works based on ITE-3031*

ITE 3033: DIGITAL COMMUNICATION

CREDITS: 3 CREDITS

PREREQUISITE(S): *ITE 2023, MATH-2015*

TOPICS:

Introduction: Communication channels, mathematical model and characteristics. Probability and stochastic processes. Source coding: Mathematical models of information, entropy, Huffman code and linear predictive coding. Digital transmission system: Base band digital transmission, inter-symbol interference, bandwidth, power efficiency, modulation and coding trade-off. Receiver for AWGN channels: Correlation demodulator, matched filter demodulator and maximum likelihood receiver.

Channel capacity and coding: Data Link Control, Flow control, Error Detection, Error control Channel models and capacities and random selection of codes. Block codes and conventional codes: Linear block codes, convolution codes and coded modulation. Spread spectrum signals and system.

RECOMMENDED BOOK(S):

1. [Text] *Data & Computer Communications - Stallings, W.*
2. [Ref 1] *Data Communication and Networking - Forauzam, B. A.*
3. [Ref 2] *Information, Transmission, Modulation and Noise - Schwartz, M. M.*
4. [Ref 3] *Data Communication - Gupta, P. C.*

ITE 4013: DIGITAL SIGNAL PROCESSING

CREDITS: 3 CREDITS

PREREQUISITE(S): *EEE 3031*

TOPICS:

Introduction to digital signals and digital signal processing, A/D conversion, sampling theorem, Illustration of aliasing, analysis of Discrete-Time Linear-Time-Invariant (LTI) systems, Resolution of Discrete-Time signals into impulse, Convolution and correlation, Z-transform, Concept of Pole and Zero, Frequency domain representation of discrete-time systems and signals, Discrete Fourier series and discrete Fourier transform (DFT), computation of the DFT, Fast Fourier Transform (FFT), Discrete Cosine Transform (DCT), Signal flow graph representation of digital networks. Filter structure for IIR and FIR filters, Introduction to speech and Image processing.

RECOMMENDED BOOK(S):

1. [Text] *Digital Signal Processing, principles, Algorithms, and applications* - John G. Proakis & Dimitrios G. Manolakis
2. [Ref 1] *Theory and Application of Digital processing* - L.R. Rabiner & B. Gold
3. [Ref 2] *Digital Signal Processing* - S.K.Mitra
4. [Ref 3] *Voice processing* - G.E. Pelton
5. [Ref 4] *Digital Image Processing* - R.C. Gonzalez
6. [Ref 5] *The Image Processing handbook* - J.C. Russ

EEE 4014: DIGITAL SIGNAL PROCESSING LAB

CREDITS: 1 CREDIT

PREREQUISITE(S): EEE 3031

TOPICS: *Laboratory Work based on EEE 4013*

CSE 4017: E-COMMERCE & E-GOVERNANCE

CREDITS: 3 CREDITS

PREREQUISITE(S): CSE3011, SOC2031

TOPICS:

Introduction: An overview, traditional and electronic business transactions, types of e-commerce, benefits of e-commerce.

Security and e-commerce: Review of private key and public key every option, comparison of encryption methods, digital signatures and certificates.

Handling money on the net: Transactions on the Internet, requirements for payment systems, types and tools for electronic payments electronic data interchange and components of EDI system.

Consumer and Business Markets: Consumer market and one to one marketing, value chains and the market place, Online communications and new marketing opportunities, websites and ordering online, online category, tying database to online catalogs, electronic customer support, tracking online problems, security software modules.

Virtual factory: Virtual coordination and implementation, access to shared data and applications, entrusting access to intermediary.

Business process engineering: Approaches, models and methodologies, management of changes.

Legal Issues: Risk associated with paper documents and electronic documents, authentication of electronic documents, laws for e-commerce, EDI interchange agreements legal issues for Internet commerce.

RECOMMENDED BOOK(S):

1. [Text] *E-Commerce: Business, Technology, Society (4th Edition)* by Kenneth C Laudon and Carol Guercio Traver
2. [Text] *E-Governance: A Comprehensive Framework* by D. N. Gupta and Sh. B. K. Chaturvedi
3. [Ref 1] *E-Commerce 2009* by Kenneth Laudon and Carol Guercio Traver

CSE4025 : VLSI DESIGN

CREDITS : 3 CREDITS

PREREQUISITE(S): CSE2013, CSE2014

TOPICS:

VLSI technology: terminologies and trends, MOS transistor characteristics and equations, MOS fabrication process, nMOS & CMOS inverters: dc & transient characteristics, pass transistor & pass gates, Derivation of drain-to source current (I_{ds}), I_{ds} VS V_{ds} , Pull-up to pull down ratio, CMOS & nMOS design Style, Stick Diagrams, CMOS layout and design rules: λ -based design rule. Complex CMOS gates: NAND, NOR, Exclusive OR, Resistance & Capacitance estimation and Modeling, raise time and fall time calculation of gate capacitance, Scaling & scaling factor of different parameters. Signal propagation delay, noise margin and power consumption, Interconnect, BiCMOS circuits. CMOS building blocks: adders, counters, multipliers and barrel shifters, Parity generator, Data paths, memory structures: Dynamic RAM cells, PLAs and FPGAs, VLSI testing: objectives & strategies.

RECOMMENDED BOOK(S):

1. [Text] *Basic VLSI design - Douglas A. Pucknell, Kamran Eshraghian,*
2. [Ref 1] *Design of VLSI systems: A practical introduction - Linda, E. M. Brackenbury*

CSE4026 : VLSI DESIGN LAB

CREDITS : 1 CREDIT

PREREQUISITE(S): CSE4026

TOPICS:

Lab works based on theory course CSE4025.

CSE4027 : ADVANCED NETWORKING

CREDITS: 3 CREDITS

PREREQUISITE(S): CSE4011

TOPICS:

Internet addressing, routing and routed algorithm., NAT, PAT, Sub-netting, Sub-netting the subnet (VLSM), VLAN, ICMP v4 and v6. IP multicasting, RSVP, next generation IP – IPng, ATM, wireless – radio basics, satellite systems, WAP, current

trends, issues with wireless over TCP, multiple conversation, socket, Denial service attack, congestion control – control vs. avoidance, overview of algorithms, congestion in the internet, Mobile IP, Voice over IP (VoIP), VPNs, network security, management – Quality of Service (QoS), network vs. distributed systems management, protocols, web-based management and other advanced TOPICS: Bluetooth, Wi-Fi (IEEE 802.11g), Wi-Max (IEEE 802.16).

RECOMMENDED BOOK(S):

1. [Text] *Computer Networking: A Top-Down Approach Featuring the Internet* - Kurose, J. F. & Ross, K. W.
2. [Ref 1] *Data and Computer Communications* - Stallings, W.
3. [Ref 2] *Computer Networks* - Tanenbaum, A. S.

CSE4028 : ADVANCED NETWORKING LAB

CREDITS : 1 CREDIT

PREREQUISITE(S): CSE4011, CSE4012

TOPICS: Laboratory Works based on Theory Course CSE4027

CSE 4037: CRYPTOGRAPHY & NETWORK SECURITY

CREDITS : 3 CREDITS

PREREQUISITE(S): CSE4011

TOPICS:

Classical Cryptography: Introduction to simple cryptosystems, Cryptanalysis; Shannon's Theory: Perfect secrecy, Entropy, Product cryptosystems; Data Encryption Standard: Description of DES, Differential cryptanalysis; RSA System and Factoring: Public-key cryptography, RSA cryptosystem, Attacks on RSA, Factoring algorithms; Other Public-key cryptosystems: ElGamal cryptosystem and discrete logs, Merkle-Hellman Knapsack System; Signature Schemes: ElGamal signature schemes, Digital signature standard, Fail-stop signatures; Hash Functions: Signatures and Hash functions, Collision-free Hash functions, Birthday attack; Key Distribution and Key Agreement: Key predistribution, Kerberos, Diffie-Hellman key exchange; Identification Schemes: Schnorr identification scheme, Okamoto identification schemes; Authentication Codes: Computing deception probabilities, Combinatorial bounds, Entropy bounds; Secret Sharing Schemes: Shamir threshold scheme, Access structure and general secret sharing; Pseudo-random Number Generation: Indistinguishable probability distribution, probabilistic encryption; Zero-knowledge proofs: Interactive proof systems, computational Zero-knowledge proofs.

RECOMMENDED BOOK(S):

1. [Text] *Cryptography and Network Security* by William Stallings
2. [Ref 1] *Cryptography and Network Security* by Behrouz A. Forouzan