

# Department of computer science and Engineering (CSE)

**REVISED SYLLABUS**  
(With Effect from Autumn-2010)

***Approved by the IIUC Academic Council held on 16.01.05. and on 18.06.05***

*(Further modification done in the CSE departmental academic committee held on 28.05.06 in view of IEB accreditation team & subsequently approved by Academic Council held on 08.08.06. Minor revision of the syllabus has been accepted in the 23<sup>rd</sup> meeting of the Academic Council held on 04.12.2007. New Exam system to be executed from Autumn-2010 which has been approved in the 26<sup>th</sup> meeting of the Academic Council held on 13.04.2010 )*



**C S E**



**International Islamic University Chittagong  
(I I U C)**

## **Faculty of Sciences and Engineering**

### **Department of Computer Science and Engineering**

Computer Science and Engineering is a relatively new field of study. Education of computer science and IT has taken paramount importance in the country. It is often said that the nation's best resource is the human resource and that computer education may one day be the answer to the country's economic problems. Its importance for development and progress of the society and the needs for specialists in this field have become obvious in all spheres of life. Modern civilization in now a day is significantly influenced by the application and use of computers.

So, it must be acquired and put to use for the benefit of Muslim Ummah in general and Bangladesh in particular. The International Islamic University Chittagong (IIUC) acknowledges this importance and has thereby decided to introduce Computer Science and Engineering (CSE) department in the Faculty of Sciences and Engineering. It has a noble venture keeping in view the balanced growth of modern sciences and moral values by giving all academic, financial and administrative rights and support to the Department.

The objective of the Computer Science and Engineering curriculum is to enable the students imbued with Islamic out-look to be competent professionals in the computer and to carry out research work in this specific field. Students entering CSE department (IIUC) leave with a confident feel of the subject to meet any challenges demanded by their jobs.



**International Islamic University Chittagong**  
**Faculty of Sciences and Engineering**  
**Department of Computer Science and Engineering**

**Programs of Study:**

The B.Sc. (Engineering) program in the department of Computer Science & Engineering consist of 85 courses carrying 161 Credit Hours. There are 10 University Requirement Courses (URC) carrying 13 credit hours, 4 Interdisciplinary Courses carrying 8 credit hours and 72 Core Courses carrying 140 credit hours. In the Core Courses there are 38 theory courses carrying 98 credit hours and 34 practical courses carrying 42 credit hours.

There are three sets of optional courses. From each set of courses one course is to be taken. Total 161 credit hours have to be undertaken and completed by a student during 8 semesters. Duration of each semester is 6 months. Each course carries 100 marks. Of the total marks allotted to each course, 10 marks are for attendance, 30 marks are for class tests/assignments/oral tests etc (N.B. n+1 class test/assignment/oral test to be taken, out of which, best of n will be accepted, where n means credit hour) and 60 marks for the final examination (To Answer any three questions out of four from Group-A and any three questions out of four from Group-B; Separate answer script must be used for Group-A and Group-B). A student must pass separately in theory and practical courses and will repeat the failed courses in practical or theory. Registration, add/drop and withdrawal must be made in pair (theory and practical). Out of 100 marks for Laboratory courses, 50 marks is allotted for running assessment and 50 marks is for practical exam, viva, quiz etc at the end of semester final examination

Marks distribution for projects/thesis is as follows:

1) Project/Thesis evaluation by Supervisor-	35%
2) Project/Thesis evaluation by Examiner-	35%
<u>3) Viva-Voce &amp; Thesis/Project Presentation</u>	<u>30%</u>
Total	100%

## Summary of Courses

Types of Courses	No. of Courses	Credit Hours
University Requirement Courses	10	13
Interdisciplinary Courses	4	8
Core Courses Theory	38	98
Core Courses Practical	34	42
<b>Total</b>	<b>86</b>	<b>161</b>

Semester	No. of Courses	Contact hours/Week			Credit Hours		
		Theory	Practical	Total	Theory	Practical	Total
1 <sup>st</sup>	12	20	10	30	15	5	20
2 <sup>nd</sup>	11	18	9	27	16	4.5	20.5
3 <sup>rd</sup>	10	16	9	25	15	4.5	19.5
4 <sup>th</sup>	13	17	11	28	17	5.5	22.5
5 <sup>th</sup>	11	18	6	24	18	3	21
6 <sup>th</sup>	10	15	10	25	15	5	20
7 <sup>th</sup>	10	13	11	24	13	6.5	19.5
8 <sup>th</sup>	9	11	16	27	10	8	18
<b>Total</b>	<b>86</b>	<b>128</b>	<b>82</b>	<b>210</b>	<b>119</b>	<b>42</b>	<b>161</b>

### A. List of University Requirement Courses

Serial No	Course No.	Course Title	Contact Hours/Week		Credit Hours		Prerequisite Courses
			Theory	Practical	Theory	Practical	
1	URAL-1101 URQS-1101	Elementary Arabic or Quranic Studies in Text and Translation	3		1		
2	URAL-1202 URHS-1202	Intermediate Arabic or Hadith Studies in Texts and Translation	3		1		
3	UREL-1103	Advanced English	3		2		
4	URIS-1101	Islamic Aqidah	1		1		
5	URIS-1203	Introduction to Ibadah	1		1		
6	URIS-2303	Introduction to Qur'an and Sunnah	2		1		
7	URIS-2405	Dealings and Behavior in Islam	1		1		
8	URIS-3505	Government and Politics in Islam	1		1		
9	URIS-3609	Biography of the Prophet(SAW) and History of Khilafah up to 1258	3		2		
10	URBS-4802	Bangladesh Studies	2		2		
	<b>Total</b>	<b>10 Courses</b>	<b>20</b>		<b>13</b>		

### B. List of Interdisciplinary Courses

Serial No	Course No.	Course Title	Contact Hours/Week		Credit Hours		Prerequisite Courses
			Theory	Practical	Theory	Practical	
1	ACC-2401	Financial and Managerial Accounting	2		2		
2	ECON-3501	Principles of Economics	2		2		
3	MGT-3601	Industrial Management	2		2		
4	XXX- 47xx	Option-I (One optional course)	2		2		
5	<b>Total</b>	<b>4 Courses</b>	<b>8</b>		<b>8</b>		

### C. List of Core Courses

Serial No	Course Code	Course Title	Contact Hours/Week		Credit Hours		Prerequisite Courses
			Theory	Practical	Theory	Practical	
1.	MATH-1101	Elementary Mathematics	3		1		
2.	MATH-1201	Mathematics I (Differential Calculus and Geometry)	3		3		MATH-1101
3.	MATH-2301	Mathematics II (Matrices and Integral Calculus)	3		3		MATH-1201
4.	MATH-2401	Mathematics III (Differential Equations and Vector Analysis)	3		3		MATH-2301
5.	MATH-3505	Mathematics IV (Complex Variable, Laplace Transforms and Fourier Series and Integrals)	3		3		MATH-2401
6.	PHY-1103	Physics I (Mechanics, Waves, Heat and Thermodynamics)	3		3		
7.	PHY-1104	Physics I sessional (Mechanics, Waves, Heat and Thermodynamics)		3		1.5	
8.	PHY-1203	Physics II (Electromagnetism, Optics and Modern Physics)	3		3		PHY-1103
9.	PHY-1204	Physics II sessional (Electromagnetism, Optics and Modern Physics)		3		1.5	
10.	STAT-1211	Statistics	3		3		
11.	EEE-1105	Basic Electrical Engineering	2		2		
12.	EEE-1106	Basic Electrical Engineering sessional		2		1	
13.	EEE-1205	Electronic Devices and Circuits	2		2		EEE-1105
14.	EEE-1206	Electronic Devices and Circuits sessional		2		1	
15.	EEE-2403	Electrical Drives and Instrumentation	2		2		
16.	EEE-2404	Electrical Drives and Instrumentation sessional		2		1	
17.	CSE-1107	Computer Fundamentals	2		2		
18.	CSE-1108	Computer Fundamentals sessional		2		1	
19.	CSE-1109	Structured Programming	3		3		
20.	CSE-1110	Structured Programming sessional		3		1.5	
21.	CSE-1208	Engineering Drawing sessional		2		1	
22.	CSE-1209	Object Oriented Programming	3		3		CSE-1109
23.	CSE-1210	Object Oriented Programming sessional		2		1	
24.	CSE-2303	Pulse Techniques and Digital Electronics	3		3		EEE-1205
25.	CSE-2304	Pulse Techniques and Digital Electronics sessional		3		1.5	
26.	CSE-2305	Digital Logic Design	2		2		EEE-1205
27.	CSE-2306	Digital Logic Design sessional		2		1	
28.	CSE-2307	Discrete Mathematics	3		3		
29.	CSE-2309	Data Structures	3		3		CSE-1109
30.	CSE-2310	Data Structures sessional		2		1	
31.	CSE-2312	Software Development I sessional		2		1	CSE-1109
32.	CSE-2405	Computer Algorithms	3		3		CSE-2309
33.	CSE-2406	Computer Algorithms sessional		2		1	
34.	CSE-2407	Assembly Language	1		1		
35.	CSE-2408	Assembly Language sessional		2		1	
36.	CSE-2409	Database System	3		3		



37.	CSE-2410	Database System sessional		3		1.5	
38.	CSE-2411	Programming with Java	2		2		CSE-1209
39.	CSE-2412	Programming with Java sessional		2		1	
40.	CSE-3507	Numerical Methods	2		2		CSE-1109
41.	CSE-3508	Numerical Methods sessional		2		1	
42.	CSE-3509	Computer Architecture	3		3		CSE-2305
43.	CSE-3511	Microprocessors and Microcontrollers	2		2		CSE-2407
44.	CSE-3512	Microprocessors and Microcontrollers sessional		2		1	
45.	CSE-3513	Software Engineering	3		3		
46.	CSE-3515	Data Communication	2		2		
47.	CSE-3516	Data Communication sessional		2		1	
48.	CSE-3603	Computer Interfacing	2		2		CSE-3509
49.	CSE-3604	Computer Interfacing sessional		2		1	
50.	CSE-3606	Software Development II sessional		2		1	CSE-2409
51.	CSE-3607	System Analysis and Design	3		3		CSE-2409
52.	CSE-3608	System Analysis and Design sessional		3		1.5	
53.	CSE-3609	Computer Graphics	3		3		MATH-2401
54.	CSE-3610	Computer Graphics sessional		3		1.5	
55.	CSE-3611	Operating System	3		3		CSE-3509
56.	CSE-4711	Computer Networks	3		3		CSE-3515
57.	CSE-4712	Computer Networks sessional		3		1.5	
58.	CSE-4713	Compiler	2		2		CSE-2307
59.	CSE-4714	Compiler sessional		2		1	
60.	CSE-4715	Artificial Intelligence	3		3		CSE-2409
61.	CSE-4716	Artificial Intelligence sessional		3		1.5	
62.	CSE-4718	Field Work		2 weeks		1	
63.	CSE-47xx	Option II (One optional course)	3		3		
64.	CSE-47xx	Option II (One optional course) sessional		3		1.5	
65.	CSE-4800	Project / Thesis and General Viva-Voce		8		4	
66.	CSE-4801	Pattern Recognition and Image processing	3		3		MATH-3505
67.	CSE-4802	Pattern Recognition and Image processing sessional		3		1.5	
68.	CSE-4803	Internet Technologies and Web Programming	2		2		CSE-2411
69.	CSE-4804	Internet Technologies and Web Programming sessional		2		1	
70.	CSE-48xx	Option III (One optional course)	3		3		
71.	CSE-48xx	Option III (One optional course) sessional		3		1.5	
72.	CSE-4821	Seminar	1	0	0	0	
	<b>Total</b>	<b>72Courses</b>	<b>100</b>	<b>84</b>	<b>98</b>	<b>42</b>	

**D. List of Optional Courses** (one course to be taken from each option)

**Option-I** (one course to be taken)

Course No.	Course Title	Contact Hours/Week		Credit Hours		Prerequisite Courses
		Theory	Practical	Theory	Practical	
SCO-4701	Impact of computer on Society	2		2		
SCO-4703	Sociology	2		2		
PSY-4705	Psychology	2		2		
LAW-4707	Business and Cyber Law	2		2		
GOV-4709	Government	2		2		

**Option-II** (one course to be taken)

Course No.	Course Title	Contact Hours/Week		Credit Hours		Prerequisite Courses
		Theory	Practical	Theory	Practical	
CSE-4719	Digital System Design	3		3		CSE-3511
CSE-4720	Digital System Design sessional		3		1.5	
CSE-4721	Fault Tolerant System	3		3		CSE-3509
CSE-4722	Fault Tolerant System sessional		3		1.5	
CSE-4723	Mathematical Analysis for Computer Science	3		3		MATH-3505
CSE-4724	Mathematical Analysis for Computer Science sessional		3		1.5	
CSE-4725	Basic Graph Theory	3		3		CSE-2309
CSE-4726	Basic Graph Theory sessional		3		1.5	
CSE-4727	Optical Fiber Communication	3		3		CSE-3515
CSE-4728	Optical Fiber Communication sessional		3		1.5	
CSE-4729	Communication Engineering	3		3		CSE-3515
CSE-4730	Communication Engineering sessional		3		1.5	
CSE-4731	Internet and Intranet Engineering	3		3		CSE-2411
CSE-4732	Internet and Intranet Engineering sessional		3		1.5	
CSE-4733	Simulation and Modeling	3		3		MATH-3505
CSE-4734	Simulation and Modeling sessional		3		1.5	

**Option-III** (one course to be taken)

Course No.	Course Title	Contact Hours/Week		Credit Hours		Prerequisite Courses
		Theory	Practical	Theory	Practical	
CSE-4807	Multimedia Theory	3		3		
CSE-4808	Multimedia Theory sessional		3		1.5	
CSE-4809	VLSI Design	3		3		CSE-2303
CSE-4810	VLSI Design sessional		3		1.5	
CSE-4811	Neural Network and Fuzzy System	3		3		
CSE-4812	Neural Network and Fuzzy System sessional		3		1.5	
CSE-4813	Computer Vision and Robotics	3		3		
CSE-4814	Computer Vision and Robotics sessional		3		1.5	
CSE-4815	Distributed Database	3		3		CSE-2409
CSE-4816	Distributed Database sessional		3		1.5	
CSE-4817	Fixed Telephony Cellular and Mobile Communication	3		3		CSE-4729
CSE-4818	Fixed Telephony Cellular and Mobile Communication sessional		3		1.5	
CSE-4819	Special Topic on Computer Science and Engineering	3		3		
CSE-4820	Special Topic on Computer Science and Engineering sessional		3		1.5	

**International Islamic University Chittagong**  
**Faculty of Modern Sciences**  
**Department of Computer Science and Engineering**

(Semester wise Courses offered to the Undergraduate Students)

**FIRST SEMESTER**

Course No.	Course Title	Contact Hours/Week		Credit Hours		Prerequisite Courses
		Theory	Practical	Theory	Practical	
UREL-1103	Advanced English	3		2		
URIS-1101	Islamic Aqidah	1		1		
URAL-1101	Elementary Arabic or	3		1		
URQS-1101	Quranic Studies in Text and Translation					
MATH-1101	Elementary Mathematics	3		1		
PHY-1103	Physics I (Mechanics, Waves, Heat and Thermodynamics)	3		3		
PHY-1104	Physics I sessional (Mechanics, Waves, Heat and Thermodynamics)		3		1.5	
EEE-1105	Basic Electrical Engineering	2		2		
EEE-1106	Basic Electrical Engineering sessional		2		1	
CSE-1107	Computer Fundamentals	2		2		
CSE-1108	Computer Fundamentals sessional		2		1	
CSE-1109	Structured Programming	3		3		
CSE-1110	Structured Programming sessional		3		1.5	
<b>Total</b>	<b>12 Courses</b>	<b>20</b>	<b>10</b>	<b>15</b>	<b>5</b>	

**SECOND SEMESTER**

Course No.	Course Title	Contact Hours/Week		Credit Hours		Prerequisite Courses
		Theory	Practical	Theory	Practical	
URAL-1202	Intermediate Arabic or	3		1		
URHS-1202	Hadith Studies in Texts and Translation					
URIS-1203	Introduction to Ibadah	1		1		
MATH-1201	Mathematics I (Differential Calculus and Geometry)	3		3		MATH-1101
PHY-1203	Physics II (Electromagnetism, Optics and Modern Physics)	3		3		PHY-1103
PHY-1204	Physics II sessional (Electromagnetism, Optics and Modern Physics)		3		1.5	
EEE-1205	Electronic Devices and Circuits	2		2		EEE-1105
EEE-1206	Electronic Devices and Circuits sessional		2		1	
CSE-1208	Engineering Drawing sessional		2		1	
CSE-1209	Object Oriented Programming	3		3		CSE-1109
CSE-1210	Object Oriented Programming sessional		2		1	
STAT-1211	Statistics	3		3		
<b>Total</b>	<b>11 Courses</b>	<b>18</b>	<b>9</b>	<b>16</b>	<b>4.5</b>	

### THIRD SEMESTER

Course No.	Course Title	Contact Hours/Week		Credit Hours		Prerequisite Courses
		Theory	Practical	Theory	Practical	
URIS-2303	Introduction to Qur'an and Sunnah	2		1		
MATH-2301	Mathematics II (Matrices and Integral Calculus)	3		3		MATH-1201
CSE-2303	Pulse Techniques and Digital Electronics	3		3		EEE-1205
CSE-2304	Pulse Techniques and Digital Electronics		3		1.5	
CSE-2305	Digital Logic Design	2		2		EEE-1205
CSE-2306	Digital Logic Design sessional		2		1	
CSE-2307	Discrete Mathematics	3		3		
CSE-2309	Data Structures	3		3		CSE-1109
CSE-2310	Data Structures sessional		2		1	
CSE-2312	Software Development I sessional		2		1	CSE-1109
<b>Total</b>	<b>10 Courses</b>	<b>16</b>	<b>9</b>	<b>15</b>	<b>4.5</b>	

### FOURTH SEMESTER

Course No.	Course Title	Contact Hours/Week		Credit Hours		Prerequisite Courses
		Theory	Practical	Theory	Practical	
URIS-2405	Dealings and Behavior in Islam	1		1		
MATH-2401	Mathematics III (Differential Equations and Vector Analysis)	3		3		MATH-2301
ACC-2401	Financial and Managerial Accounting	2		2		
EEE-2403	Electrical Drives and Instrumentation	2		2		
EEE-2404	Electrical Drives and Instrumentation sessional		2		1	
CSE-2405	Computer Algorithms	3		3		CSE-2309
CSE-2406	Computer Algorithms sessional		2		1	
CSE-2407	Assembly Language	1		1		
CSE-2408	Assembly Language sessional		2		1	
CSE-2409	Database System	3		3		
CSE-2410	Database System sessional		3		1.5	
CSE-2411	Programming with Java	2		2		CSE-1209
CSE-2412	Programming with Java sessional		2		1	
<b>Total</b>	<b>13 Courses</b>	<b>17</b>	<b>11</b>	<b>17</b>	<b>5.5</b>	

### FIFTH SEMESTER.

Course No.	Course Title	Contact Hours/Week		Credit Hours		Prerequisite Courses
		Theory	Practical	Theory	Practical	
URIS-3505	Government and Politics in Islam	1		1		
ECON-3501	Principles of Economics	2		2		
MATH-3505	Mathematics IV (Complex Variable, Laplace Transforms and Fourier Series and Integrals)	3		3		MATH-2401
CSE-3507	Numerical Methods	2		2		CSE-1109
CSE-3508	Numerical Methods sessional		2		1	
CSE-3509	Computer Architecture	3		3		CSE-2305
CSE-3511	Microprocessors and Microcontrollers	2		2		CSE-2305
CSE-3512	Microprocessors and Microcontrollers sessional		2		1	
CSE-3513	Software Engineering	3		3		

CSE-3515	Data Communication	2		2		MATH-3505
CSE-3516	Data Communication sessional		2		1	
<b>Total</b>	<b>11 Courses</b>	<b>18</b>	<b>6</b>	<b>18</b>	<b>3</b>	

#### SIXTH SEMESTER

Course No.	Course Title	Contact Hours/Week		Credit Hours		Prerequisite Courses
		Theory	Practical	Theory	Practical	
URIS-3609	Biography of the Prophet (SAW) and History of Khilafah up to 1258	2		2		
MGT-3601	Industrial Management	2		2		
CSE-3603	Computer Interfacing	2		2		CSE-3509
CSE-3604	Computer Interfacing sessional		2		1	
CSE-3606	Software Development II sessional		2		1	CSE-2409
CSE-3607	System Analysis and Design	3		3		CSE-2409
CSE-3608	System Analysis and Design sessional		3		1.5	
CSE-3609	Computer Graphics	3		3		MATH-2401
CSE-3610	Computer Graphics sessional		3		1.5	
CSE-3611	Operating System	3		3		CSE-3509
<b>Total</b>	<b>10 Courses</b>	<b>15</b>	<b>10</b>	<b>15</b>	<b>5</b>	

#### SEVENTH SEMESTER

Course No.	Course Title	Contact Hours/Week		Credit Hours		Prerequisite Courses
		Theory	Practical	Theory	Practical	
XXX- 47xx	Option-I (One optional course)	2		2		
CSE-4711	Computer Networks	3		3		CSE-3515
CSE-4712	Computer Networks sessional		3		1.5	
CSE-4713	Compiler	2		2		CSE-2307
CSE-4714	Compiler sessional		2		1	
CSE-4715	Artificial Intelligence	3		3		CSE-2409
CSE-4716	Artificial Intelligence sessional		3		1.5	
CSE-4718	Field Work		2 weeks		1	
CSE-47xx	Option II (One optional course)	3		3		
CSE-47xx	Option II (One optional course) sessional		3		1.5	
<b>Total</b>	<b>10 Courses</b>	<b>13</b>	<b>11</b>	<b>13</b>	<b>6.5</b>	

#### EIGHTH SEMESTER

Course No.	Course Title	Contact Hours/Week		Credit Hours		Prerequisite Courses
		Theory	Practical	Theory	Practical	
URBS-4802	Bangladesh Studies	2		2		
CSE-4800	Project / Thesis and General Viva-voce		8		4	
CSE-4801	Pattern Recognition and Image processing	3		3		MATH-3505
CSE-4802	Pattern Recognition and Image processing sessional		3		1.5	
CSE-4803	Internet Technologies and Web Programming	2		2		CSE-2411
CSE-4804	Internet Technologies and Web Programming sessional		2		1	
CSE-48xx	Option III (One optional course)	3		3		
CSE-48xx	Option III (One optional course) sessional		3		1.5	
CSE4821	Seminar	1	0	0	0	
<b>Total</b>	<b>9 Courses</b>	<b>11</b>	<b>16</b>	<b>10</b>	<b>8</b>	

# Synopsis of the Courses

## A. University Requirement Courses

### **UREL-1103 Advanced English**

**Credit Hours:** 2

**Contact Hours:** 3 per week

1. **Grammar Review:** Tense and their aspects, subject-verb agreement, affirmative agreement, negative agreement, negation, Modal auxiliaries, modals + perfective, conditional sentences, active and passive voice, preposition, causative verbs, participle & gerund, conjunction.
2. **Reading:** *Pride and Prejudice*, *The Great Gatsby*, *Jane Eyre* and *A Tale of Two Cities*.
3. **Writing:** Paragraph, Comprehension and Dialogue.

Recommended Books:

- |                                     |   |
|-------------------------------------|---|
| 1. Wishon, G.E and Burks, J.M.      | : Let's Write English                         |
| 2. Wren & Martin                    | : High School English Grammar and Composition |
| 3. Murphy                           | : Intermediate English                        |
| 4. Maurice Imhoof and Herman Hudson | : From Paragraph to Essay                     |
| 5. Jupp and Milne                   | : Guided Course in English Composition        |
| 6. Houghton Mifflin English         | : Grammar and Composition                     |
| 7. Longhead, Lin                    | : Business Correspondence                     |

### **URAL-1101 Elementary Arabic**

**Credit Hours:** 1

**Contact Hours:** 3 per week

This course has been provided to the students for basic knowledge of Arabic scripts, how to write scripts in words and Arabic writing. It also aims to provide about 500 normal using words in order to develop sentence construction as well as they will be able to communicate with others orally in various situations. Generally there are two Main areas of concentration:

**Firstly**, the course aims at helping the student to acquire the level of proficiency that will enable them understand the texts and content of Al-Qur'an and Sunnah of prophet (SAW) from the original Arabic text.

**Secondly**, to enable the student acquire the skills of understanding the Arabic lecture. Taking notes and proficiency in writing answer script in Arabic language, and using the original sources written in the Arabic language and with the course to help the students acquire the proficiency with competence on communication in Arabic which is widely used within Muslim Ummah particularly.

Recommended Books:

- Dr. F. Abdur Rahim : Al-Arabia Lin-Nasheyen Book-I.

### **URQS -1101: *Qur'an* Studies in Texts & Translation**

**Credit Hours:** 1

**Contact Hours:** 3 per week

The course will be comprised with the following main points:

- ▶ The meaning of the significant words & expression mentioned in the text.
  - ▶ Central theme and subject matter of the text.
  - ▶ General meaning of the text.
  - ▶ Teachings and implication of the text.
  - ▶ Comparison between the requirements of *Ayats* and the reality of our life.
- **Description of selected texts:**
    1. Surah Al-Fatihah.
    2. Surah Al-Baqarah: Ayats: 1-5, 30, 51-59, 186, 238, 246-249, 358-359.

3. Surah Al-Imran: 38-41.
4. Surah Al-Nisa: 11, 19, 94, 110, 147-148, 174.
5. Surah Al-Ma'idah: 13, 27-31, 96, 110.
6. Surah Al-An'am: 160.
7. Surah Al-A'raf: 113, 137, 143, 148.
8. Surah Al-Anfal: 34-35.
9. Surah Al-Tawbah: 96.
10. Surah Yunus: 84-85.
11. Surah Huud: 43, 58, 118-119, 123.
12. Surah Yusuf: 1-5.
13. Surah Al-Ra'd: 41.
14. Surah Ibrahim: 23.
15. Surah Al-Hijr: 9.
16. Surah Al-Nahl: 14, 24, 30, 66, 68-69.
17. Surah Al-Isra: 45, 64, 82, 85.
18. Surah Al-kahf: 18, 63, 83.
19. Surah Maryam: 24, 65.
20. Surah Taha: 13, 18, 27, 48-52, 120.
21. Surah Al-Anbya: 47, 78.
22. Surah Al-Hajj: 73.
23. Surah Al-Mu'minun: 10-11, 15.
24. Surah Al-Nun: 15.
25. Surah Al-Furqan: 11-12, 77.
26. Surah Al-Shu'ara': 62, 128-129.
27. Surah Al-Naml: 18, 22-23.
28. Surah Al-Qasas: 7.
29. Surah Al-Ahzab: 59, 72.
30. Surah Saba: 14.
31. Surah Yasin: 10-12.
32. Surah Al-Saffat: 142-144.
33. Surah Sa-d: 20-22.
34. Surah Al-Zumar: 24-30.
35. Surah Al-Gafir: 28.

- **Reference books:**

1. Kathir, Ibn, *Tafsirul Qur'anal-'Azim*, published by Dar Ihyaul Katubul 'Arabiyyah, Cairo.
2. Qurtubi, *Al-Jami-'li-Ahkamil Qur'an*, Published by Barul kutub Al-Masriyyah, Cairo.
3. Maududi, S.A.A, *Tafhimul Qur'an*, Published by Ahunik Prokashoni, Dhaka, Third addition-2005.
4. Sabuni, *Safwatal Tafasir*, published by Dar As-Sabuni. Cairo, 9<sup>th</sup> addition-1989.
5. Tabari, *Jami'ul Bayan Fi Tafsirul Qur'an*, Published by Dar Al-Ma'rifah, 3<sup>rd</sup> addition, Beirut.

## URIS-1101 Islamic Aqidah

**Credit Hours:** 1

**Contact Hours:** 1 per week

To introduce correct Islamic Aqidah and rectification of traditional misconcepts as to Aqidah. Special emphasis on Tawhid, Risalat, Akhirat and serious consequences of Shirk and Nifaq.

1. **Islam: Introduction:** a) Meaning of Islam b) Historical background of Islam c) Islam as a complete code of life. d) Importance of Islamic Aqidah and relation between Iman and Islam.
2. **The Articles of Faith:** a) Unity of Allah (Tawheed) b) Impact of Tawheed on human life. c) The Shirk and its consequences d) Different types of Shirks e) Nifaq: Its meaning, signs and consequences.
3. **Belief in Allah's Angels (Malaikah):** a) Angels, their nature and their functions. b) Virtues of belief on Angels.
4. **Belief in the books of Allah:** a) The Qur'an: The last and unchanged divine book.

5. **Belief in Allah's Prophet (SAW):** a) Prophets and Messengers are human being. b) Mohammad (SAW) the greatest, the best and last among all the prophets. c) Duties and the responsibilities of the prophets d) Love of the prophets.
6. **Belief in the life after the death:** a) Impact of belief in the life after the death on human life b) Inevitability of Akhirat and its stages.
7. **Belief in Qadr (Fate) and Divine decree:** a) Man's freedom of will b) Fate: no excuse for sinners c) Evil: not attributable to Allah.

Recommended Books:

- |                               |                    |
|-------------------------------|--------------------|
| 1. Syed Mahmudul Hasan        | : "ISLAM"          |
| 2. Prof. Dr. Abu Bakr Rafique | : "Islamic Aqidah" |
| 3. Md. Shafiu Alam Bhuiyan    | : "Arkanul Iman"   |

**URAL-1202: Intermediate Arabic**

**Credit Hours: 1**

**Contact Hours: 3 per week**

**Course outline:** URAL – 1202 course has been provided for those who have become familiar with Arabic alphabets alongwith the basic words and foundations of it. Any language course should go through **listening, speaking, reading and writing**. In order to fulfill this demand Intermediate Arabic course prescribes the following contents:

1. **Introduction** to the course and its objectives - 1(one) Lecture.
2. **Dialogue between two persons:** (9 Lessons) – Word meanings and making sentences – reading and listening. Practice – understanding the meaning of the dialogue, question and answer – practicing on prepared structures, making new dialogue. – 13 (Thirteen) Lectures.
3. **Passages:** (11 Lessons) – Reading and listening practice, word meanings and making sentences – understanding the meaning of the passage – practicing comprehensions, fill in the blanks, structures and matching of synonyms-antonyms.- 15 (Fifteen) Lectures.
4. **Grammatical Part:** (11 Lessons) – Hand writing practice, filling the blanks with appropriate words – making sentences by arranging words – joining sentences and usages of verbs. - 13 (Thirteen) Lectures.

**References:**

1. Abdur Rahman, Dr. Fuad, *Durusul lugatil Arabia li gairinnatiqeena biha* (Lessons of Arabic Language for the non speakers), 1983.
2. *Al- Arabia Al-Muyassarah (Easy Arabic)*, King Saud University, Published by - Arabic Language Institute, 1981.
3. *Al-Arabiātu Lil Hayat (Arabic For daily life)*, King Saud University, Published by - Arabic Language Institute, 1981.

**URHS-1202: Hadith Studies in Texts & Translation**

**Credit Hours: 1**

**Contact Hours: 3 per week**

This course will focus on the following main points:

- ▶ The meaning of the significant words & expression mentioned in the text.
- ▶ Central theme and subject matter of the text.
- ▶ General meaning of the text.
- ▶ Teachings and implication of the text.
- ▶ Comparison between the requirements of *Hadith* and the reality of our life.

• **Description of selected texts:**

The Text is divided into four sections, and each section will contain some topics as follows:

**Section (A)*****Duties and Obligations***

1. Duty towards Parents
2. Duty towards Children
3. Duty towards Neighbors
4. Duty towards Guests
5. Duty towards Husband and Wife
6. Love of the Prophet (*Saw*)
7. Duty towards Orphan and the Needy

**Section (B)*****Basic Qualities of Every Individual***

1. Intention (*Niyyah*)
2. *Iman, Islam* and *Ihsan*
3. Learning
4. *Salah* and *Taharah*
5. Truthfulness
6. Keeping Promises
7. Tolerance
8. Politeness
9. Contentment (Satisfaction)
10. Kindness
11. Thankfulness
12. Charity
13. Repentance (*Tawbah*)
14. Visiting the sick

**Section (C)*****Good Manners***

1. Talking
2. Meeting
3. Eating and Drinking
4. Clothing
5. Greeting
6. Steadfastness (*Al-Istiqamah*)
7. Gifts

**Section (D)*****Bad Conducts***

- Lying
- Back-biting
- Suspicion
- Jealousy
- Anger
- Pride
- Hypocrisy
- Taunting
- Robbery
- Extravagance

- **Reference books:**

1. *Al-Bukhari*, Abu 'Abdillah Muhammad bin Ismail, *Sahih Al-Bukhari*, Darul Kutub al-Islamiyah, Beirut.
2. An-Nisaburi, Muslim bin Hajjaj, *Sahih Muslim*, Darul Hadith, Cairo, 1991.
3. An-Nawawi, Abu Zakariah Yahya bin Sharaf, *Riyadh al-Salehin*, Dar al-Thaqafah al-'Arabia, Riyadh, 1991.
4. Al-Ahadith al-Qudsiyah, *Ministry of Auqaf*, 10<sup>th</sup> Edition, Cairo, 1997.

5. Abu Daud, Sulaiman Ibnul Asha' th, *Sunan Abi Daud*, Darul Fikr.
6. Ash-Shaukani, Muhammad Ibn 'Ali, *Nailul Autar*, Dar al-Jeel, Beirut, 1973.
7. Al-Hisami, Ali Ibn Abi Bakr, *Majmauz Zawaid*, Dar al-Raiyan, Cairo, 1407 A.H.

## URIS-1203 Introduction to 'Ibadah

**Credit Hours: 1**

**Contact Hours: 1 per week**

This course is designed:

- a) To provide the students with proper knowledge about the Islamic way of life.
- b) To make them aware of the mis-activities and traditions existing contradicted with the basic faith and knowledge of Islam.
- c) To give them a clear concept about the all-embracing view of Ibadah in Islam.

1. **Ibadah:** Its meaning and significance in Islam, Scope of Ibadah in Islam, Obejctives of Ibadah, Conditions of Ibadah.
2. **Characterstics of Ibadah in Islam:** Free from intermediaries, not being confined to specific places, All- embracing view.
3. **Position of specific Rituals, Its Significance and Teachings:** Salah (Prayer), Sowm (Fasting), Zakah, Hajj (Pilgrimage).
4. **Jihad:** Its definition, significance, importance, classification from various aspects.
5. **Islam & Asceticism.**

### Recommended Books:

- |                          |                                  |
|--------------------------|----------------------------------|
| 1. Mahmudul Hasan        | : "Islam"                        |
| 2. Khurshed Ahmed        | : "Islam its meaning & Message." |
| 3. Syed Abul Ala Mawdudi | : "Towards Understanding Islam"  |
| 4. Gulam Sarwar          | : "ISLAM (Beliefs & Teachings)"  |
| 5. Shah Abdul Hannan     | : "Social Laws of Islam"         |

## URIS-2303 Introduction to Qur'an and Sunnah

**Credit Hours: 1**

**Contact Hours: 2 per week**

1. **Introduction to Qur'an:** Definition of the Qur'an (literally and terminology), Revelation of the Holy Qur'an , Preservation and Compilation of the Holy Qur'an, Characteristics of the Holy Qur'an, Central subject-matter and the main themes of the Holy Qur'an, The necessity of the Holy Qur'an, The superiority of Holy Qur'an as a Scripture, Makki and Madani Surahs and the characteristics of each. Abrogation (Nusk) in the Holy Qur'an and its classification, Inimitability of the Holy Qur'an, Asababunnauzul & its benefits.
2. **Introduction to Sunnah:** Sunnah: Its meaning, definition and the difference between Sunnah and Hadith, The importance of Sunnah in Islamic Shariah, Explanation of some important terms of Sunnah, The authority of Sunnah in Islam, Collection and compilation of Sunnah, Method of distinguishing a genuine Hadith from a spurious Hadith 1) Al Dirayat 2) Al Riwayat.
3. **The Classification of Hadith:** According to the reference to a particular authority, According to the links in the isnad, According to the number of reporters involved in each stages of the isnad, According to the number in which the Hadith is reported, According to the reliability and the memory of the reporter.

### Recommended Books:

- |                       |                         |
|-----------------------|-------------------------|
| 1. Dr. Suhaib Hasan   | : The Science of Hadith |
| 2. Abdul Qayyum Natiq | : Sirat-e-Mustaqim      |
| 3. Mahmudul Hasan     | :: Islam                |

## URIS-2405 : Dealings and Behavior in Islam

Credit Hours: 1

Contact Hours: 1 per week

1. **Mu'amalah: Its Meaning, Definition and Scope:**
2. **Family Life of Islam:**
  - a) Role of Marriage as the basis of Islamic Family.
  - b) Status of women in Islam.
  - c) Rights and duties of women in Islam.
  - d) Husband-wife relations (Duties and obligations to each other)
  - e) Rights of Children in Islam.
  - f) Duty towards Parents.
3. **Economic System of Islam:**
  - a) Earning and expenditure by *Halal* means.
  - b) Right to own property and individual liberty.
  - c) System of *Zakah*.
  - d) Prohibition of interest (*Riba*).
  - e) Law of Inheritance (*Mirath*).
4. **Islamic Law regarding Business, Dress and Special relations.**
5. **Duties and obligations:** Duty towards Parents, Relatives, Neighbors, Guests, Needy and Orphan. Duties of the Muslims to each other.
6. **Social Manners:** (1) Brotherhood (2) Greetings (3) Co-operation (4) Meetings (5) Talking (6) Keeping promise (7) Asking permission before entering someone's house.
7. **Basic virtues and Islam:** (1) Honesty (2) Truthfulness (3) Kindness (4) Perseverance (5) Firmness against evil (6) Tolerance (7) Punctuality (8) Courage (9) Trust worthiness (10) Forgiveness (11) Chastity for women (12) Intention (13) Promise (14) Modesty (15) Charity (16) Gifts (17) Thankfulness (18) Visiting the sick.

### References:

1. Sarwar, Golam, *Islam: Beliefs and Teachings*, IIUI, Pakistan.
2. Abdul Hannan, Shah, *Social Laws of Islam*, BIIT, Dhaka, 1995.
3. Zino, Muhammad bin Jamil, *Islamic Guidelines*, Darusalam, Riyadh, 1996.

## URIS – 3505: Government and Politics in Islam

Credit Hours: 1

Contact Hours: 1 per week

### Course Outlines:

1. Government and Politics: (Meaning and Organs).
2. Islamic Political System:(Meaning, Importance and Principles)
3. *Shari'ah* (Islamic Law): [Meaning, Sources and Differences]
4. Constitution: (Meaning, Islamic Constitution and Special Features)
5. The Executive (Head of the state): [Conception and Qualifications]
6. Legislative (*Al-Shura*): [Meaning, Importance, Example and Functions]
7. The Judiciary (*Al-Qada*): [Meaning, Importance, Nature and Implementation]
8. Citizenship (Nationality): [Meaning, Types, Rights]

### References:

1. Mawdudi, Syed Abul A'la, *Principles of Islamic State*, Islamic Publications, 1987.
2. Matin, Abdur Rashid, *Political Science: An Islamic Perspective*.
3. Mawdudi, Syed Abul Al'a, *Islamic Law and Constitution*.
4. Avāj i nāg gharīḥ, *Avj i Kvi Avāb i vō'ī mi Kvi*
5. Hasan, Prof. Masudul, *Reconstruction of Political Thought in Islam*, Islam Publications (Pvt. Limited, Lahore, Pakistan, 1988.
6. Muhammad, Al-Buraey, *Administration Development: Islamic Perspective*.
7. Asad, Mohammad, *Basic principles of state and Government in Islam* (California; Southern California University Press, eivj vq Abpē' Aa'vck kvtn` Avj x, Bmj wqK dvDfÜkb]
8. Watt, Montgomery, *The Majesty That was ISLAM*.
9. Ibnī Taymīyah, *Public Duties in Islam*, Mokhter Holland translated.
10. Ali, Sk. Ansar, *Islamic Legal System*.

## URIS – 3609: Biography of the Prophet (SAW) and History of Khilafah upto 1258

Credit Hours: 2

Contact Hours: 3 per week

### 1. Biography of the Prophet (SAW):

An Introduction: Why should we learn Prophet's Biography?

Condition of Arabia during the time of the Prophet (SAW).

- \* Birth and Childhood.
  - Business trip to Syria with his uncle Abu Talib.
- \* Teenage
  - Battle of Fujjar
  - Hilful Fudul
  - Shepherdhood.
- \* Youth hood
  - Contribution of Muhammad (SAW) in the business of Khadijah.
  - Marriage of Muhammad (SAW) with Khadijah.
  - Rebuilding of Al-Ka'bah
  - Search for the Truth
- \* Prophet hood
  - Receiving the Truth.
- \* Challenges and Prospects
  - Propagation of Islam remains silently
  - The Early Muslims
  - End of the First Phase
- \* Islamic Movement becomes public.
  - The Prophet on the Mount of Safa
  - Oppositions faced from the Quraysh
  - Qur'anic approach towards Quraysh oppositions.
  - Emigration to Abyssinia
  - Boycott and Confinement
  - The Year of sorrow
  - Taif-the most difficult day.
- \* Mi'raj of the Prophet.
- \* Covenants of Al-Aqabah.
- \* Hijrah of the Prophet (SAW)
- \* The Prophet (SAW) at Madinah
  - The Mosque
  - The Charter of Madinah
  - The Battle of Badr
  - The Battle of Uhud
  - Hudaibiyah Agreement.
  - The Battle of Khandaq
  - The Battle of Ahzab
- \* The Conquest of Makkah
- \* The Pilgrimage
- \* The Farewell Address

### 2. History of Khilafah upto 1258

- **Khilafah:** Definition, Origin and Development of Khilafah, Difference between Khilafat in general sense and Khilafah 'Ala-minhaj a Nubuwwah, election to the office of the Khilafah, Khilafah vs Mulukiyyat, End of Khilafah.
- **Introduction to the Pious Khilafah:** The Shura, Civil Administration, Sources of Revenue, Bait-al-Mal, judicial Administration, Police-Prison, Religious Administration and Military Administration under the Pious Caliphs, Character and achievements of the Pious Caliphs.

- **The Umayyad Khilafah:** Conquest and expansion of Islamic empire. 'Umar Ibn 'Abdul 'Aziz and his Administration Policies, Central and Provincial Administration, social condition, Umayyad contribution towards the development of civilization & education. Fall of the Umayyad.
- **The Abbasid Khilafah:** Golden Prime of the Abbasids, Abbasid Society, Scientific and Literary development, Education, Development of Art and Architecture, Civil, Military, Judicial and Revenue Administration under the Abbasids.
- **The Umayyad Khilafah of Spain and The Fatamid Khilafah of Egypt.**

#### References:

1. M. Watt, *Muhammad at Macca and Muhammad at Madina*.
2. M. Watt, *Muhammad the Prophet and Statesman*
3. Rahman, Mohammad Mahburur, *The Ideal Life of the Prophet (SAW)*.
4. Wahiduddin Khan, *Muhammad the Revolution*.
5. Nadwi, Sayyid Sulaiman, *Muhammad The Ideal Prophet: A Historical, Practical, Perfect Model for Humanity*. Translated by Mohiuddin Ahmad. Islamic Book Trust K.L.N.D.
6. Mowdudi, S.A.A, *The Message of the Prophet's Seerah*. Hindustan Publications, Delhi, N.D.
7. Philip, K. Hitti, *History of the Arabs*, (London: Macmillan Press Ltd. 10<sup>th</sup> Edition 1970).
8. S.A.Q. Hussani, *The Arab Administration, (Lahore 1962)*.
9. Sayyid Ameer Ali: *The History of the Seracens*.
10. K. Ali, *Study of Islamic History*, Dhaka: NadiaKausar, 25<sup>th</sup> Edition 2002.
11. Muhammad A-Buracy, *Administration Development Islamic respective*.

## URBS-4802 Bangladesh Studies

**Credit Hours: 2**

**Contact Hours: 2 per week**

The objectives this study is to create awareness among the students about the History, Geography, Economics, Sociology, Politics, Language, Literature, Philosophy, Art and culture of Bangladesh and such other subjects as are significantly related to the life and society of Bangladesh.

1. Introduction to the course and its objectives.
2. Outline of geography of Bangladesh.
3. Advent of Islam in Bengal and the Muslim conquest, Its impact on the people –Origin of the Muslims of Bengal (Formation of Muslim society under the Bengal sultanate, Impact of Sufism in Bengal) (Reform Movements) Educational development under the Muslims, The British policy towards the education: A brief discussion Struggle for freedom from the British Colonialism Development of Bengali Prose Literature (New Trend of Nationalism) Creation of Pakistan and the Emergence of Bangladesh.
4. Political development in Bangladesh: Political parties & Constitutional Development.
5. Economic condition of Bangladesh
6. Socio-Cultural problems and prospects of Bangladesh.

#### Recommended Books:

1. Prof. Dr. Mohar Ali : History of Muslims in Bengal
2. Prof. Rounaque Jahan : Bangladesh Politics: Problems & Issues
3. Prof. G. W. Chowdhury : The last days of Pakistan

## **B. Interdisciplinary Courses**

### **ACC-2401 Financial and Managerial Accounting**

**Credit Hours: 2**

**Contact Hours: 2 per week**

- 1. Preliminaries:** Introduction to Accounting, History and development of accounting thought, types of accounting, Accounting Principles & ethics, Accounting Equation & Transaction Analysis. Introduction to Financial Statements.
- 2. Recording Business Transactions:** The Accounts & their types. Double-Entry Book keeping system; Journals, ledger & Trial balance. Correcting errors in the trial balance.
- 3. The Adjusting & Closing Procedure:** The adjusting process, Accrual versus cash basis Accounting, Preparation of Adjusted trial balance and financial statements, closing entries & reversing entries. Using accounting information in decision-making.
- 4. Accounting in practice:** Worksheet. Purchase book, sales book, cashbook, petty cashbook, etc. Control accounts and subsidiary accounts. Bank reconciliation statement.
- 5. Merchandising and the accounting cycle:** Invoice, discount from purchase price, purchase return and allowances, Sale of inventory, sales discount, sales returns and allowances; etc.
- 6. Cost In General:** Cost in general: objectives & classifications; Costing Journals; Job order costing, Process costing & Overhead costing, cost sheet; Cost of goods sold statement.
- 7. Marginal & Relevant costing:** Marginal costing tools and techniques, cost-volume-profit analysis. Guidelines for decision-making.
- 8. Budget:** Capital budgeting; planning, evaluation & control of capital expenditures.

Recommended Books:

- |   |                             |
|---|-----------------------------|
| 1. Charles T. Horngren & Walter T. Harrison             | : Accounting.               |
| 2. Adolph Matz & Milton F. Usry<br>and control          | : Cost Accounting- Planning |
| 3. Sankar Prasad Basu & Monilal Das.                    | : Practice in Accountancy.  |
| 4. Jerry J. Weygandt, Donald E. Kieso & Paul D. Kimmel. | : Accounting Principles.    |
| 5. Jay M Smith & K Fred Skousen.                        | : Intermediate Accounting.  |

### **ECON-3501 Principles of Economics**

**Credit Hours: 2**

**Contact Hours: 2 per week**

- 1. Introduction:** Definition of economics, Scope and utility of studying economics.
- 2. Micro-economics:** The theory of demand and supply and their elasticity, Price determination, Nature of an economic theory, applicability of economic theories to the problems of developing countries. Indifference curves technique, Marginal utility analysis,
- 3. Production:** Production function, types of productivity, The nature of Isoquants and Isocosts, Rational region of production of an engineering firm. Euler's theorem.
- 4. Market:** Concepts of market and market structure. Cost analysis and cost function. Small scale production and large-scale production, Optimization, Theory of distribution.
- 5. Macroeconomics:** Savings, investment, employment, National income analysis, Inflation.
- 6. Economic Policy:** Monetary policy, Fiscal policy and trade policy with reference to Bangladesh.
- 7. Economics of development:** Dimensions of development, Relevance of theory, the employment problem, Human resource development
- 8. Economics of planning:** Planning and market, Policy models, Planning experience.

Recommended Books:

- |                               |  |
|-------------------------------|--|
| 1. Richard Leftwich-          | :The Price System and Resource Allocation      |
| 2. P.A. Samuelson-            | :Economics                                     |
| 3. P.A. Samuelson & Nordhaus- | :Economics                                     |
| 4. G.J. Stigler-              | : The Theory of Price.                         |
| 5. McConnell & L.Brue         | : Economics(Principles, Problems and Policies) |

## MGT-3601 Industrial Management

**Credit Hours: 2**

**Contact Hours: 2 per week**

**1. Preliminaries:** Definition, Importance of management, Evolution, Functions of management, Introduction to Industry & organizational management.

**2. Organization and it's Environment:** Environmental context of the Organization.

**3. Organizing & staffing:** Theory & structure, Co-ordination, Span of control, Authority delegation, Formal & Informal Groups, Committee and task force, Manpower planning & Development.

**4. Cost & Financial Management:** Investment analysis, benefit-cost analysis & it's implications in decision making. Cost planning & Price Control, budget & budgetary control, development planning process.

**5. Marketing management:** Concepts, strategy, sales promotion, Transportation & Storage. Technology management: Management of innovation & changes, technology lifecycle.

**6. Production Management:** Designing operations system in production and service-oriented industry. Product layout, process layout, & fixed position layout. Organizational technologies: automation, computer-assisted manufacturing, flexible manufacturing system, and robotics. TQM, bench marking, ISO 9000, SQC.

**7. Industrial law:** Law of contract, sale of goods, Hire and purchase, Negotiable instrument Act, patent right and validity. Factories act, Industrial relations ordinance, workmen's compensation act.

**8. Professional Practice:** Tender documentation, General conditions of tender, Tech. Specification, Purchase & procurement rules-2004, Technical evaluation, Copyright, Intellectual property right.

Recommended Books:

- |                                   |   |
|-----------------------------------|---|
| 1. Ricky W. Griffin               | :“Management”   |
| 2. Heinz Weihrich & Harold Koontz | :Management A Global Perspective”,                          |
| 3. W.J. Stevenson                 | :Management Science   |
| 4. Terry & Frankin                | :Principle of Management                                    |
| 5. Edwin B. Flippo                | : Personnel Management.                                     |
| 6. Arun Monappa                   | : Industrial Relations.                                     |
| 7. Naceur Jabnoun                 | : Islam & Management.                                       |
| 8. F.R. Faridi                    | :Islamic Principles of Business Organization and Management |
| 9. Leon G. Schiffman & L.L. Kanuk | : Consumer Behavior.  |
| 10. W.J. Stevenson                | : Management Science  |
| 11. Herold Koontz                 | :Management   |
| 12. Terry & Frankin               | :Principle of Management                                    |

## **Option I (One Course to be taken)**

### **SCO-4701 Impact of Computer on Society**

**Credit Hours: 2**

**Contact Hours: 2 per week**

1. Impact of computer on education: Practice, test, tutorial, higher study, administration, library.
2. Impact of computer on E-Commerce: E-commerce, Online Banking, different types of card i.e. cash, credit etc. Online shopping, advertisement.
3. Impact of computer on Industry: Salary system, security, quality etc.
4. Computer Applications in Medicine: Electronic Medical Record Keeping, Patient Diagnosis, Patient Monitoring, Medical Research, Medical Technology etc.
5. Impact of computer transportation: Roads, train, air, sea, traffic control, online ticketing, digital driving.
6. Impact of computer on E-Governance: E-voting, id-cards, simulation, lab test etc.
7. Crime & security: Definition, types, impact, making secured system, crime elimination.
8. Cyber Ethics: Definition, types, positive & negative impact, cyber law etc.

**Recommended Books:**

- |   |                                     |
|---|-------------------------------------|
| 1. Computer and society                 | : Michael A Gallo & Robert B. Nenno |
| 2. A gift of fire (2 <sup>nd</sup> Ed.) | : Sara Baase                        |

### **SCO-4703 Sociology**

**Credit Hours: 2**

**Contact Hours: 2 per week**

Scope, Social evolution and techniques of production; Culture and civilization; Social structure of Bangladesh; Population and world resources; Oriental and occidental societies, Industrial revolution; Family- urbanization industrialization; Urban ecology, Co-operative and socialist movements, Rural sociology

**Recommended Books:**

- |                            |                |
|----------------------------|----------------|
| 1. P.B. Horton, C.L. Hunt  | : “Sociology”. |
| 2. R.T. Schaefer           | : “Sociology”. |
| 3. B.B. Hess, E.W. Markson | : “Sociology”  |

### **PSY-4705 Psychology**

**Credit Hours: 2**

**Contact Hours: 2 per week**

Introduction to psychology, Cognitive science; Reasoning, Object recognition and language Understanding, Learning industrial psychology; Introduction to job and analysis, Methods of selection; Training in industry; Motivation and work, Job satisfaction, Introduction to ergonomics, System engineering, Accident and safety.

**Recommended Books:**

- |                          |   |
|--------------------------|---|
| 1. M.L. Blum, J.C Naylor | : “Industrial Psychology”               |
| 2. E.E Ghiselli, Brawn   | : “Personal and Industrial Psychology”. |
| 3. Gilmer                | : “Industrial Psychology”               |
| 4. McCormick             | : “Human Factors Engineering”.          |

**LAW-4707****Business and Cyber Law****Credit Hours: 2****Contact Hours: 2 per week**

Principles of law of contract; Company law: law regarding formation, incorporation, management and winding up of companies; Labor law; Law in relation to wages hour, health, safety and other condition to work; The trade union legislation arbitration, the policy of the state in relation to labor; The factory Act (1965); The law of compensation (1965).

Cyber law: digital copyrights issues, illegal duplication of software, human rights and data encryption, international cyber law, information sharing.

**GOV-4709 Government****Credit Hours: 2****Contact Hours: 2 per week**

Some basic concepts of government and politics, Functions, Organs and forms of modern state and government; Socialism; Fascism; Marxism; U.N.O.; Government and politics of Bangladesh; Some major administrative systems of developed countries; Local self-government.

## Core Courses

### **MATH-1101 Elementary Mathematics**

**Credit Hours: 1**

**Contact Hours: 3 per Week**

1. **Number System & Progression:** Quantity, Natural Numbers, Integers, Prime Numbers, Composite Numbers, Rational Numbers, Fraction, Real Numbers, Complex Numbers, Negative Numbers, Ratio, Ordinal Numbers, Cardinal Numbers, Permutation & Combination, Sequence, Arithmetic Progression, Geometric Progression
2. **Series:** Summation of Series, Gregory's Series
3. **Exponents & Fraction:** Laws of exponents, Laws of Radicals, logarithms and Partial fraction
4. **Determinants & Inequalities:** Determinants upto nth order, Solve the inequalities, Proof of  $A.M > G.M$ , Cauchy's Inequality, Shaded Area
5. **Trigonometry:** Measurement of trigonometric angle: Polygons, idea of radian, trigonometric ratios area: Rectangle, Trapezium, Kite, Triangle, Parallelogram, Circle, Sector Area, Shaded Area, and Volume: Prism, Cylinder, Pyramid, Cone, Sphere.
6. **Functions:** Variable, Constant, Definition of function, graph of different functions, definition of different type of functions, Domain and range of a function, First order differential equation with Initial Condition
7. **De-Moivre's theorem:** polar and Cartesian form, Graphical presentation of complex numbers, De-Moivre's theorem, and hyperbolic functions.
8. **Geometry and Vectors:** Rectangular Coordinate System, Establish different type of equations of straight lines, Equations of circle and parabola. Vector: definition of Scalar and vector, Position Vector, Parallel Vectors, Proper Vector, Negative Vector, Unit Vector, vector addition, scalar and vector products, Some Problems.

Recommended Books:

- |   |  |
|---|--|
| 1. Lee Peng Yee Pure                    | :Mathematics                                   |
| 2. S.A. Sattar                          | :Higher Trigonometry                           |
| 3. K.A. Stroud                          | :Engineering Mathematics                       |
| 4. R. Spiegel (Schaum's Outline Series) | :Mathematical Handbook of Formulas and Tables. |

### **MATH-1201 Mathematics-I**

**Credit Hours: 3**

**Contact Hours: 3 per Week**

(Differential Calculus and Geometry)

[Pre requisite: MATH-1101 Elementary Mathematics]

1. **Functions:** Limit of Functions, continuity and differentiability, physical meaning of derivative of a function, , Indeterminate Form
2. **Ordinary Differentiation:** Differentiation, successive differentiation and Leibniz theorem,
3. **Expansions of Functions:**
  - a) Rolle's theorem, mean value theorem
  - b) Taylor's and Maclaurian's Formulae
4. **Partial Differentiation:** Partial Differentiation , Euler's formula, Maxima and minima.
5. **Two-dimensional Geometry:** review of equations for straight lines, circle, parabola, ellipse, hyperbola, pair of straight lines, Circles, System of Circles and solution problems



6. **Resolve into Standard form:** General equation of second degree
7. **Three-dimensional Geometry:** straight lines, planes
8. **Solid Geometry:** spheres, cylinder, cone, ellipsoid and paraboloid

Recommended Books:

- |                        |   |
|------------------------|---|
| 1. Thomas, Finey       | :Calculus and analytic geometry           |
| 2. K.A. Stroud         | :Engineering Mathematics                  |
| 3. P. K. Bhattacharjee | :Differential Calculus                    |
| 4. Howard Anton        | :Calculus A New Horizon                   |
| 5. Erwin Kreyszig      | :Advanced Engineering Mathematics         |
| 6. Abu Yusuf           | :Differential Calculus                    |
| 7. P. K. Bhattacharjee | :Co-ordinate geometry and vector analysis |
| 8. M. L. Khanna        | :Solid geometry:                          |
| 9. JT bell             | :Coordinate Geometry                      |

## MATH-2301 Mathematics II

**Credit Hours: 3**

**Contact Hours: 3 per Week**

(Matrices and Integral Calculus)

[Pre requisite: MATH-1201 Mathematics I]

1. **Matrix Terminology:** Vector presentation by matrix, different types of matrices, algebraic operations on matrices, adjoint and inverse of a matrix, augmented matrix, row operation method, rank of Matrices, some problems, distinguish between determinant and matrix, Normal Vector, Orthonormal Vectors, Orthogonality, co-variance matrix, MATLAB coding
2. **Linear System of Equations:** Echelon form, consistency and inconsistency, solution of homogeneous and non-homogeneous linear system of equations
3. **Characteristic equation:** Eigenvalues, eigenvectors, Graphical presentation of eigen vectors, Caley-Hamilton theorem, similar matrices, diagonalisation, linear dependence and independence, Characteristics roots. Adjacency Matrix with graphical representation, MATLAB coding, Geometrical Application of Matrices.
4. **Matrix Decomposition:** Eigen Decomposition Theorem, Singular Value Decomposition (SVD), LU Decomposition, MATLAB coding, Physical application of Matrix Decomposition Theorem
5. **Indefinite integral:** Physical meaning of integration of a function, method of substitution, integration by parts, special trigonometric functions and rational fractions different techniques of integration,
6. **Definite integral:** Fundamental theorem, general properties, and evaluations of definite integral and reduction formula, definite integral as the limit of a sum, Gamma and Beta Function
7. **Multiple Integral:** Determination of length, areas and volumes
8. **Integration by Revolution:** area of surfaces of revolution, Volumes of solids of revolution

Recommended Books:

- |  |  |
|--|--|
| 1. K.A. Stroud                                 | :Engineering Mathematics               |
| 2. Seymour Lipschutz (Schaum's Outline Series) | :Theory and problems of Linear Algebra |
| 3. Richard Bronson                             | :Linear Algebra                        |
| 4. Earl W. Swokowski                           | :Calculus with Analytic Geometry       |
| 5. Howard Anton                                | :Calculus A New Horizon                |
| 6. Erwin Kreyszig                              | :Advanced Engineering Mathematics      |
| 7. P. N. Chatterjee                            | :Matrices                              |
| 8. P. K Bhattacharjee                          | :Integral Calculus                     |
| 9. B. C. Das                                   | :Integral Calculus                     |
| 10. M. R Spiegel                               | :Advanced Calculus                     |

### MATH-2401 Mathematics III

**Credit Hours:** 3

**Contact Hours:** 3 per Week

(Differential Equations and Vector Analysis)

[Pre requisite: MATH-2301 Mathematics II]

1. **First order differential equation:** Definition, solution of first order and first degree differential equation with initial conditions, Solution of Linear differential Equation, homogeneous equations, Bernoulli Equation, Exact Differential equations, Integrating Factors, Boundary Value Problems ,
2. **Higher order differential equations:** Solution of higher order linear differential equations with constant & variable coefficient, Practical problems solution of homogeneous and non-homogeneous differential equations
3. **Bessel's Function :** Solution of Bessel's, Legender's Equation
4. **Application:** Physical application of differential equations.
5. **Vector analysis:** Scalar and vectors, operation of vectors, vector addition and multiplication - their applications. Vector components in spherical and cylindrical systems, Scalar Field, Vector Field, Derivative of vectors and problems
6. **Del operator:** Del operator, gradient, divergence and curl and their physical significance.
7. **Vector Integration:** Line Integrals, physical significance of Vector integration and Problems
8. **Vector's Theorem :** Greens, Gauss & Stocks theorem and their applications

Recommended Books:

- |                 |                                  |
|-----------------|----------------------------------|
| 1. K.A. Stroud  | :Engineering Mathematics         |
| 2. F. Ayrs      | :Differential Equation           |
| 3. K.A.Stroud   | :Further Engineering Mathematics |
| 4. B. D. Havog  | :Differential Equation           |
| 5. M. R Spiegel | :Vector Analysis                 |
| 6. H. K. Das    | :Advanced Eng. Math              |

### MATH 3505 Mathematics IV

**Credit Hours:** 3

**Contact Hours:** 3 per Week

(Complex Variable, Lap laces Transform Fourier Transform, Fourier series, Z-transform)

[Pre requisite: MATH-2401, Mathematics III]

1. **Complex variable:** Complex numbers and their properties, functions of a complex variable, Complex mapping, Linear Transformation: translation, magnification and rotation , Non-linear transformations: inversion, bilinear etc.
2. **Complex Differentiation:** Differentiation of a complex function, Analytic function, Singularities, the Cauchy-Riemann Equations, Complex Integration , Contour Integration
3. **Set Theory:** Function, Relation
4. **Laplace transforms:** Definition, Laplace transforms of different functions, inverse Laplace transforms, shifting and change of scale property, Laplace transforms of derivatives
5. **Convolution:** Unit Step Function, Impulse Function, Ramp Function, Sketch Waveform, convolution theorem
6. **Fourier series:** Fourier series, Trigonometric form and Complex form of Fourier analysis and Fourier Integral, Physical Application of Fourier Series
7. **Transform:** Fourier transforms, Z transforms, Inverse Z transform.

8. **Mathematical Analysis** on Signal Processing (Fourier Series, Fourier Transform, Convolution, Unit Step Function etc) using MATLAB

Recommended Books:

- |                                  |  |
|----------------------------------|--|
| 1. Glyn James                    | :Advanced Modern Engineering Mathematics |
| 2. Michael D. Greenberg          | :Advanced Engineering Mathematics        |
| 3. K.A.Stroud                    | :Further Engineering Mathematics         |
| 4. H. K Das                      | :Advanced Eng. Mathematics               |
| 5. M. R Spigel                   | :Advanced Calculus                       |
| 6. M. R. Spigel                  | :Complex Variable                        |
| 7. Laplaces Transformation (SOS) |  |

**PHY-1103, Physics I (Mechanics, Waves and Thermodynamics)**

**Credit Hours: 3**

**Contact Hours: 3 per Week**

- Mechanics:** Linear motion of a body as function of time, position and velocity, momentum (Linear and angular momentum), simple harmonic motion and its application, damped and forced Vibration and resonance.
- Dynamics of rigid body:** Conservation theorem of momentum and energy, collision and torque, center of mass of rigid body, rotational kinetic energy, fly wheel, axes theorems and their application, Determination of moment of inertia of a rigid body.
- Gravity and Gravitation:** Definitions, compound pendulum, gravitational potentials and fields, relation between, potential due to spherical shell, escape velocity and Kepler's law of planetary motion.
- Elasticity:** Hooke's law, relation between different elastic constants, bending of beams, cantilever, determination of Young's modulus and its engineering applications
- Surface tension:** Definitions, molecular theory of surface tension, capillarity, angle of contact, expression for surface tension
- Fluid Dynamics and viscosity** stream line and turbulent motion, Bernauli's equation and its application, coefficient of viscosity, Stoke's law, Determination of coefficient of viscosity.
- Waves:** Waves in elastic media, standing waves and resonance, Sound waves, beats and Doppler's effect, Fourier theorem and its application.
- Thermodynamics:** Thermodynamic system, First and second law of thermodynamics, The thermodynamic temperature scale, Carnot's heat engine, The efficiency of engine, combined first and second law, Entropy and refrigerator.

Recommended Books:

- |  |                           |
|--|---------------------------|
| 1. F.W.Constant                        | : Theoretical Physics     |
| 2. David Halliday and Robert Resnick : | : Physics part-I.         |
| 3. Young and Fredman                   | : University Physics,     |
| 4. D.S. Mathur                         | : Properties of matter    |
| 5. Brij lal and N. Subrahmanyum        | : A textbook of sound     |
| 6. Brij lal and N. Subrahmanyum        | : Heat and thermodynamics |
| 7. Brij lal and N. Subrahmanyum        | : Properties of matter    |
| 8 F.W.Sears                            | : Thermodynamics          |

**PHY-1104 Physics I (sessional)**

**Credit Hours: 1.5**

**Contact Hours: 3 per Week**

- To determine the moment of inertia of a flywheel about its axis of rotation.
- To determine the value of g, acceleration due to gravity by means of a compound pendulum.
- To determine the surface tension of water by capillary tube method.

4. To determine the specific heat of a liquid by the method of mixture.
5. To determine the specific heat of a liquid by the method of cooling.
6. To verify the laws of transverse vibration of strings and to determine the frequency of a tuning fork by Melde's experiment.
7. To determine the Young's Modulus by the flexure of a Beam (Bending Method)

### **PHY1203 Physics II (Electromagnetism, Optics and Modern Physics)**

**Credit Hours:** 3

**Contact Hours:** 3 per Week

[Pre requisite: PHY-1103, Physics I]

- 1. Charge and Matter:** Electric charge, conductors and insulators, Coulomb's law, electric field, electric field strength  $E$ , Gauss's law and its applications
- 2. Electric potential:** Electric potential and potential function, electric dipole, Dielectrics and Gauss's law, energy storage in an electric field.
- 3. Current and Resistance:** Current and current density, Ohm's law, Resistivity, Electromotive force, potential difference. RC Circuits
- 4. The Magnetic Field:** The definition of  $\mathbf{B}$ , the magnetic force on a current, magnetic force on current, Ampere's law, Biot -Savart law and their application, Lorentz force.
- 5. Electromagnetic induction:** Faraday's law of induction, Lenz's law, self and mutual induction, energy density in the magnetic field, generation of alternating current and e.m.f,
- 6. Interference and Diffraction of light:** Definition, Young's experiment, Newton's ring , Fresnel and Fraunhofer diffraction, diffraction gratings, Polarization of light and Optical fiber.
- 7. Relativity and Light waves:** Postulates of special relativity, time dilation and length contraction, mass – energy relation, Photo-electric effect, X-ray and Bragg's law. Compton effect, De Broglie waves.
- 8. Modern Physics:** Bohr's atom model, atomic spectra and Zeeman effect, atomic nucleus and binding energy, radioactive decays and half-life.

Recommended books:

- |                                      |  |
|--------------------------------------|--|
| 1. David Halliday and Robert Resnick | : Physics part-I. I                    |
| 2. Young and Freedman                | : University Physics,                  |
| 3 Arthur Beiser                      | : Concepts of Modern Physics           |
| 4 D.S. Mathur                        | : Properties of matter                 |
| 5 M S Hoq and Rafiullah              | : Concept of Electricity and Magnetism |
| 6. Brij lal and N. Subrahmanyum      | : A textbook of Optics                 |
| 7. Brij lal and N. Subrahmanyum      | : Atomic and Nuclear Physics           |

### **PHY-1204 Physics II Sessional**

**(Electromagnetism, optics and Modern Physics)**

**Credit Hours:** 1.5

**Contact Hours:** 3 per Week

1. Determination of the end corrections for a meter bridge.
2. Determination of specific resistance of the material of a wire by a meter bridge.
3. Determination of the resistance of a wire by means of post office box.
4. Experimental verification of the laws of series and parallel connections of resistance by means of a post office box.
5. Calibration of a meter bridge wire.
6. Determination of the value of low resistance by the method of fall of potential (Mathiesen and Hockins Method)
7. Determination of the resistance of a galvanometer by half deflection method.

8. Determination of the current sensitivity (figure of merit) of a galvanometer.
9. Calibration of an ammeter by potential drop method with the help of a potentiometer.
10. Calibration of a voltmeter by potentiometer.
11. To perform also other experiments relevant to this course.

## STAT-1211 Statistics

**Credit Hours: 3**

**Contact Hours: 3 per Week**

- 1. Preliminaries:** Definition of Statistics, Its necessity & importance, Population and Sample, Variable and Constants, Different types of variables, Statistical data, Data Collection and presentation, Construction of Frequency distribution, Graphical presentation of Frequency distribution.
- 2. Measures of Central Tendency:** Arithmetic Mean, Geometric Mean, Harmonic Mean, Median, Mode, Weighted Mean, and Theorems & Problems.
- 3. Measures of Dispersion:** Range, Standard Deviation, Mean Deviation, Quartile Deviation, Variance, Moments, Skewness and Kurtosis, Theorems & Problems.
- 4. Correlation Theory:** Linear Correlation --- Its measures and significance, Rank Correlation, Theorems & Problems.
- 5. Regression Analysis:** Linear and non-linear regression, Least-square method of curve fittings, Theorems & Problems.
- 6. Fundamentals of Probability:** Elementary Concepts, Laws of Probability – Additive and Multiplicative Law, Conditional Probability and Bay's theorem.
- 7. Probability:** Random Variables, Mathematical Expectation and Variance of a random variable, Theorems & Problems
- 8. Probability Distributions:** Binomial distribution, Poisson distribution and Normal distribution – Their properties, uses, Theorems & Problems.

### Recommended Books:

- |                               |   |
|-------------------------------|---|
| 1. S.C. Gupta and V.K. Kapoor | :Fundamentals of Mathematical Statistics                  |
| 2. R.N. Shill & S.C. Debnath  | :An introduction to the theory of Statistics              |
| 3. M.G. Mostafa               | :Methods of Statistics                                    |
| 4. Murry R. Spiegel           | :Theory and problems of Statistics                        |
| 5. J.N. Kapoor & H.C. Saxena  | :Mathematical Statistics                                  |
| 6. Dr Manindra Kumar Roy      | :An Introduction to the theory of Probability             |
| 7. S.P. Gupta                 | : Advanced Practical Statistics.                          |
| 8. M.K. Roy                   | :Fundamentals of Probability and Probability Distribution |

## EEE-1105 Basic Electrical Engineering

**Credit Hours: 2**

**Contact Hours: 2 per Week**

- 1. Fundamental electrical concepts:** D.C voltage, current, resistance and power; dependent and independent sources, active and passive elements, networks definitions, conversion between Y and  $\Delta$  networks, Reduction of complicated networks, KVL & KCL.
- 2. Different Analysis Methods:** Mesh and Node circuit analysis, Supernode, Supermesh, Source Transformation.
- 3. Different Network Theorems:** Superposition theorem, the reciprocity theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem, Charging and discharging of RC circuits.
- 4. Introduction to Magnetic Circuits:** Magnetic Field, Reluctance, Hysteresis, Ampere's Circuital Law, Series and Parallel Magnetic Circuits.



**5. Transformers:** Different types of transformer, Transformer construction, working principle, transformer's EMF equation, Transformer regulation and efficiency.

**6. A.C Circuits:** Instantaneous, Average and R.M.S. values of current, voltage and power, Real, Reactive and Apparent power, Volt-ampere, Phase and Phase difference, Power Factor, Impedance, Determination of Average and R.M.S values of different sinusoidal and non-sinusoidal waves, power calculation of RL, RC and RLC circuits, Nodal and Mesh Analysis.

**7. Phasor Algebra:** Use of complex quantities in AC circuits, Phasor Diagram, Nodal and Mesh Analysis using Phasor, resonant circuits, Q value and band width, frequency response.

**8. Filters and Balanced 3- $\phi$  Circuits:** Different types of filters, Fundamental concepts of RL and RC filter, Properties of symmetrical networks filter fundamentals, Introduction to Polyphase Circuits, three-phase three wire system, Y and  $\Delta$  connected system, Power calculation in balanced 3- $\phi$  systems.

Recommended Books:

1. Alexander and Sadiku : Fundamental of Electric Circuits
2. Nielson : Electrical Circuits
3. Boylestad Introductory Circuit Analysis
4. Hayt, Kemmerly, Durbin : Electrical Circuit Analysis
5. B. L. Theraja : Electrical Technology
6. Corcoran : Alternating Current circuits.

### EEE-1106 Basic Electrical Engineering Sessional

**Credit Hours: 1**

**Contact Hours: 2 per Week**

Laboratory works based on CSE-1105

1. To familiar with the operation of different electrical instruments.
2. To verify the following theorems:
  - i. KCL and KVL theorem,
  - ii. Superposition theorem,
  - iii. Thevenin's theorem,
  - iv. Norton's theorem and
  - v. Maximum power transfer theorem
3. To design and construct of low pass and high pass filter and draw their characteristics curves.
4. To investigate the voltage regulation of a simulated transmission network.  
Study the characteristics of Star-Delta connection
5. Study the frequency response of an RLC circuit and find its resonant frequency.
  6. To perform also other experiments relevant to this course.

### EEE-1205 Electronics Devices and Circuit

**Credit Hours: 2**

**Contact Hours: 2 per Week**

**[Pre requisite: EEE-1105 Basic Electrical Engineering]**

**1. Theory of semiconductors:** Electronic structure of the elements, crystalline and amorphous solids, different types of crystal, band theory of solids, structure of silicon and germanium

**2. Intrinsic and extrinsic semiconductors:** N and P type semiconductor, carrier densities, generation and recombination of excess carriers, carrier life time, continuity equation.

**3. Diode circuits:** The PN junction, biasing and V-I characteristics of diodes , rectifier concept, half wave and full wave rectifiers, Zener diode and voltage regulators.

**4. Bipolar transistor:** Junction transistors, principles of operation, characteristics in different configurations (CE, CB & CC)

**5. Transistor biasing:** Biasing, DC and AC load line, transistor equivalent circuits. Gain and impedance, Analysis of small signal low frequency transistor amplifier by using h -parameters.

**6. Field effect transistor:** Construction of JFET, its parameters, biasing, characteristics and principles of operation, different types of MOSFET and its operation and , characteristics ,

**7. Other semiconductor devices:** Thermistor, SCR, UJT, DIAC, TRIAC and micro-electronics devices.

**8. Amplifier:** Voltage and current amplifiers of different configurations, RC coupled amplifier, operational amplifiers (OPAMPS), linear applications of OPAMPS, gain, input and output impedance. Integrate circuits:

Recommended Books:

- |                                     |   |
|-------------------------------------|---|
| 1. V. K Metha                       | : Principles of Electronics.            |
| 2. Malpino                          | : Electronic Principles.                |
| 3. R. L. Boylestad, Louis Nashelsky | : Electronic Device and circuit theory. |
| 4. J. Millman and C. C. Halkias     | : Electronic Device and circuits.       |

### EEE-1206 Electronics Devices and Circuit sessional

**Credit Hours:** 1

**Contact Hours:** 2 per Week

1. To familiar with electronic devices and Laboratory Equipments.
2. To study of V-I Characteristics curve of P-N junction diode.
3. To study of V-I Characteristics curve of a Zener diode.
4. To study of Half-Wave Rectification circuit.
5. To study of Full-Wave Rectification circuit (Bridge & Cente- tap)
6. To familiar with NPN and PNP Transistors.
7. To study of Full-Wave filter circuit.
8. To study of Common Emitter (CE) Transistor Amplifier circuits.
9. To study of Clipping and clamping circuit.
10. To study of output characteristics of an FET.
11. To study of JFET as an amplifier.
12. To study of output characteristics of a JFET.
13. To perform other experiments related to this course.

### EEE-2403 Electrical Drives and Instrumentation

**Credit Hours:** 2

**Contact Hours:** 2 per Week

**1 Three phase Circuits:** Introduction to three phases circuits, alternators.

**2 Motors:** Principles of operation of DC, synchronous, induction, universal, and stepper motors; Thyristor and microprocessor based speed control of motors.

**3 Instrumentation amplifiers:** Differential, logarithmic and chopper amplifiers. Noise reduction in instrumentation.

**4 Electrical Instruments:** Absolute and secondary instruments, Essentials of indicating instruments, Moving iron and moving coils instruments, advantages and disadvantages, sensitivity.

**5 Measurements:** Frequency, voltage and watt measurements using analog and digital techniques; recorders and display devices.

**6 Analyzers:** Spectrum analyzers and logic analyzers.

**7 Transducers:** Terminology, types, principles and application of photovoltaic, piezoelectric, thermoelectric, variable reactance and opto-electronic transducers.

**8 Data acquisition:** Data acquisition and interfacing to microprocessor based systems.

**Books recommended:**

1. B.L. Theraja & A.K. Theraja :A textbook of Electrical Technology
2. Huges : Introduction to Technology
3. Sawhney :Measurement and Instrumentation
- 4 Ranganm : Introduction to Instrumentation
- 5.Jha :Fundamental of Instruments

**EEE-2404 Electrical Drives and Instrumentation sessional****Credit Hours: 1****Contact Hours: 2 per Week**

Laboratory works based on CSE-2403

1. To study the characteristics of motor
2. To study the characteristics of chopper amplifier
3. To construct a multimeter.
4. To perform also other experiments relevant to this course.

**CSE-1107 Computer Fundamentals****Credit Hours: 2****Contact Hours: 2 per Week**

**1. Introduction of Computer and its Organization:** Historical evolution of computers & classification, Computer generations, Basic organization and functional units of computer, Input/ output/storage/arithmetic logic/control and central processing unit, Internal structure of CPU.

**2. Number Systems, Computer Codes and Arithmetic:** Non-positional/positional number system, different number systems & their conversion, Fractional numbers, Numeric/alphanumeric data, BCD/EBCDIC/ASCII code, Binary arithmetic (Addition, subtraction, multiplication and division).

**3. Computer Memory:** Memory location and address, RAM, ROM, PROM, and EPROM, cache memory, Sequential/Direct/Random access device, Magnetic tape and disk, hard disk, floppy disk, CDROM, optical disk.

**4. I/O Devices, Logic Gates:** Input and output devices, Printers, Keyboard, Mouse, Scanner, and other devices, Basic concepts of logic gates, truth table, OR gate, AND gate, XOR gate, NOR gate, universal gates.

**5. Computer Program, Software and Language:** Program planning, algorithms, flow charts, pseudocode, Software and firmware, types of computer software, types of computer language, translator, interpreter, compiler.

**6. Operating System and Data processing:** Evolution of OS, Multiprogramming, Multiprocessing, Time sharing system, Real time system, types of data processing, database concept, database management system.

**7. Data Communication and Computer Network:** Basic elements of a communication system, Types of communications among computers, characteristics of communication channels, Computer Networks, LAN, MAN, WAN, Network topologies.

**8. Business Data Processing, Multimedia and Internet:** Goals of office automation, Advantages and threats of office automation, Multimedia concepts and components, WWW, WAP, E-commerce, Internet, Internet services.

Recommended Books:

- |    |                       |   |
|----|-----------------------|---|
| 1. | Dr. M. Lutfar Rahaman | : Computer Fundamentals                                 |
| 2. | P. K. Sinha           | :Computer Fundamentals Concepts, Systems & Applications |
| 3. | N. Subramanian        | : Introduction to Computers                             |
| 4. | V. Rajarcman          | : Fundamentals of Computers                             |
| 5. | Peter Norton          | : Introduction to Computer                              |
| 6. | Satish Jain           | : Introduction to Computer Science                      |

## CSE-1108 Computer Fundamentals sessional

**Credit Hours: 1**

**Contact Hours: 2 per Week**

1. **Operating System:** Proposed Operating Systems: Windows 2000/XP, MS-DOS  
Topics: Files, Folders, Basic operations on file/folders, File System, Windows OS Organization and Hierarchy, Searching files and folders.
2. **Word Processing:** Proposed Application Software: Microsoft Word  
Topics: Formatting, Table Editing, Picture, Clipart and object, Charts, Drawing, Text box and shapes, Hyperlink, Macro, Equation editor etc.  
Lab Assignment: CV Design, Application/Letter writing/formatting.
3. **Spreadsheet Analysis:** Proposed Application Software: Microsoft Excel  
Topics: Basic idea, Cell formatting, Equation, Function, Different sheet data calculation.  
Lab Assignment: Grade sheet calculation, Salary Sheet calculation.
4. **Slide Oriented Presentation:** Proposed Application Software: Microsoft Power Point  
Topics: Hyperlinks, Slide window detail, Audio, Video, Animation, Slide transition.  
Lab Assignment: Simple slide based presentation (topics are free of choice).
5. **Database Application:** Proposed Application Software: Microsoft Access  
Topics: Database basics, Field, Table, Keys, ER Diagram, Form, Report, Query.  
Lab Assignment: Address book (Insert, Update, Delete, and Search).
6. **Computer Hardware**  
Topics: Installing/binding a new computer system, Installing operating system and other software.
7. **Internet**  
Topics: Browsing Concepts, Searching in the web, Email.
8. **Hardware Trouble Shooting,** HDD Partition and to perform also other experiments relevant to this course.

### References and resources

1. MSDN (Microsoft developer network) library.
2. Microsoft Office 2000/XP Premium Edn. - BPB Publications.
3. Mastering Access 2000, BPB Publication, [ISBN: 81-7656-093-6]
4. Peter Norton's Complete Guide to MS Windows 2000 Professional
5. Complete PC Upgrading & Maintenance (Lab Manual) – BPB Pub, [ISBN: 81-7656241-6]
6. Networking Essentials – BPB Publication
7. Internet (2<sup>nd</sup> Edn.) – BPB Publication, [ISBN: 81-7029-053-7]

## CSE–1109 Structured Programming

**Credit Hours: 3**

**Contact Hours: 3 per Week**

1. **Introduction:** Definition of Software, its classification, Problem solving steps, Introduction of C and its structure, history and Characteristics, Introduction to keywords, constants and identifiers, Fundamental of C variable and data types, Rules of constants, Operators, arithmetic, relational and logical, bitwise operators, precedence of arithmetic operators, expressions, type conversions, Built in mathematical functions.
2. **Input and Output management & Branching:** Managing data input, Managing data output, Decision making and branching. *If* and *if... else* statements, Other control statements, *switch* and The '?' operator.
3. **Looping :** Decision making and looping, *While* looping, *Do...while* and *for* looping statements, Jumps in loops, *goto* statement, *break* and *continue statement*.
4. **Arrays and Strings:** Introduction to arrays, One-dimensional array, Some sample programs, Two-dimensional array. Some sample programs, String handling in C and some examples..



5. **User defined functions:** Need for multifunction programs, return values, types and some examples, Calling functions and arguments, Recursions, passing arrays to functions, Storage class..
6. **Structures, Unions and Graphics:** Definition of Structure, Union, Structure union applications, Self-referential Structure, Array of structure and some examples, Introduction to graphics in C, Drawing some geometric objects.
7. **Pointers:** Understanding pointers, Pointers and arrays, Pointers and functions, pointers and structures, Some special features of C (Macros, Enumerations), Bitwise operations.
8. **Files and Dynamic memory allocations:** File management concept in C, Defining, opening and closing a file, Input/output operations in file, Error handling and command line arguments, Dynamic memory allocation & Linked list.

Recommended Books:

1. Byron S. Gottfried : Theory and Problems of Programmin with C.
2. Herbert Schild : Teach Yourself C.
3. Robert Lafore : The Waite Group's C Programming using Turbo C++.
4. Yashavant Kanetkar, : Let Us C.
5. Herbert Schildt: : Turbo C/C++: The Complement Reference.
6. E. Balagurusamy : Programming in ANSI C.
7. C Kernighan & D.M. Ritchie : The C programming Language.
8. H.M. Deitel : C how to program.
9. Yashavant Kanetkar, : Graphics under C.
10. Steve Summit : C programming FAQs.

**CSE -1110 Structured Programming sessional**

**Credit Hours:** 1.5

**Contact Hours:** 3 per Week

1. Write a program to calculate the roots of the quadratic equation  $ax^2 + bx + c = 0$  where a, b and c are known.
2. Write a program that reads a year from the keyboard and determine whether it is a leap year or not.
3. Write a program that reverses the digits of a given integer.
4. Write a program to compute the sum up the digits of positive integer  $N$ .
5. Write a program to find  $N$  is prime or not.
6. Write a program to determine the value of the  $N^{th}$  Fibonacci number  $F_n$  Where  $F_n = F_{n-1} + F_{n-2}$  and  $F_1 = F_2 = 1$
7. Write a program that receives the score of a student and display the grade according to the following classification:

<u>Grade</u>	<u>Score</u>
1. A	80 ..100
2. B	65 .. 79
3. C	50 .. 64
4. F	<65

8. Write a program to read multiple lines of text from the keyboard and write it out to a data file called TEST.DAT.
9. Write a program to write 100 integers to a file called RAND. DAT.
10. Write a program using structure that will allow you to enter and display the following information about your family members:  
i) name ii) address iii) age iii) occupation iv) salary
11. To perform also other experiments relevant to this course.

**CSE-1208 Engineering Drawing sessional**

**Credit Hours:** 1

**Contact Hours:** 2 per Week

1. Introduction, Instruments and their uses
2. First and third angle projection

3. Orthographic drawing
4. Isometric views
5. Missing lines and views
6. Sectional and conventional practices
7. Auxiliary views

Recommended Books:

- |   |                        |
|---|------------------------|
| 1. S. Salaby                            | : Descriptive Geometry |
| 2. Fredrick E. Giessecke, Alva Mitchell | : Technical Drawing    |

## CSE-1209 Object Oriented Programming

**Credit Hours: 3**

**Contact Hours: 3 per Week**

[Pre requisite: CSE-1109, Structured Programming]

**1. Introducing C++:** Definition of OOP, C++ Console I/O, Introduction to Classes, Basic concept of Object Oriented Programming, Difference between Structured Programming and Object Oriented Programming, Difference between C/C++, Introducing Function Overloading, Benefits of OOP, Characteristics of Procedure Oriented Programming, Characteristics of Object Oriented Programming and Application of Object Oriented Programming.

**2. Introducing Classes, Arrays, Pointers and References:** Constructor and Destructor, Constructors with parameters, Introducing Inheritance, Object Pointers, Relation between Classes, Structures and unions, In-line functions, Automatic in-line functions, Assigning objects, Passing objects to functions, Returning objects from function, Friend functions, Static member functions. Array of objects, Pointer to objects, the pointer, using *new* and *delete*, passing references, returning references independent references.

**3. Function Overloading:** Constructor Overloading, Copy constructor, Default arguments, Overloading ambiguity, Address of overloaded function.

**4. Operator Overloading:** Binary operator overloading, Unary operator overloading, Relational and logical operator overloading, Operator overloading using friend functions, Limitations of operator overloading.

**5. Inheritance:** Defining derived classes, Single inheritance, multiple inheritance, multilevel inheritance, Hierarchical inheritance, Virtual base classes, Constructors in derived classes, Nesting of classes.

**6. C++ I/O System:** Streams, Stream classes, Unformatted I/O, Binary I/O, formatted I/O, I/O manipulators, Inserters, Extractors, File I/O streams, Opening and closing files, Random access files, I/O status checking, Customized I/O and files.

**7. Virtual Functions:** Pointers to derived classes, Applying Polymorphism using virtual functions, Polymorphic class, Pure Virtual functions, Abstract classes, early binding, and late binding.

**8. Template Exception Handling and Standard Template Library:** Generic functions, Generic classes, Exception handling, Throwing mechanism, Catching mechanism, Rethrowing mechanism, Specifying exceptions Templates, Components of STL, Container, Algorithms.

Recommended Books:

- |                      |  |
|----------------------|--|
| 1. Robert Lafore     | : “Object Oriented Programming in C++”   |
| 2. Herbert Schildt   | : “Teach yourself C++”                   |
| 3. E Balagurusamy    | : “Object-Oriented Programming with C++” |
| 4. Irvine            | : “C++ Object Oriented Programming”      |
| 5. Bruce Eckel       | : “Thinking in C++”                      |
| 6. Bjarne Stroustrup | : “The C++ Programming Language”         |

## CSE-1210 Object Oriented Programming Sessional

**Credit Hours: 1**

**Contact Hours: 2per Week**

**[Pre requisite Course: CSE-1209, Object Oriented Programming]**

Problems related to creation of classes generating output; Experiments related to Introducing Inheritance and verification; Problems using array of objects, pointers and references; Problems related to creation of Overloaded functions; Problems related to overloading relational and logical operators; Inheriting classes and sharing base classes functions; Performing various C++ I/O operations; Using random access files for solving problems; Test of achieving runtime polymorphism; Problems related to sharing common algorithms and procedures for different data type; Problems on ACM. To perform also other experiments relevant to this course.

### Recommended Books:

1. Robert Lafore : “Object Oriented Programming in C++”
2. Herbert Schildt : “Teach yourself C++”
3. E Balagurusamy : “Object-Oriented Programming with C++”
4. Irvine : “C++ Object Oriented Programming”
5. Bruce Eckel : “Thinking in C++”
6. Bjarne Stroustrup : “The C++ Programming Language”

## CSE-2303 Pulse Techniques and Digital Electronics

**Credit Hours: 3**

**Contact Hours: 3per week**

**[Pre requisite: EEE-1205 Electronics Devices and Circuit]**

- 1. Wave shaping:** Linear wave shaping, Wave shaping techniques, High pass and low pass RC circuits (sinusoidal, step voltage, pulse, square wave, exponential and ramp inputs).
- 2. Diode and Op-amp circuit applications:** Clipping and Clamping circuits, Design of different Clipping and Clamping circuits according to application, RLC circuit response, Ringing circuits,
- 3. Operational Amplifiers:** Introduction to Operational Amplifiers (OP-AMP), Linear application of Op-amps, Comparator circuits, Zero crossing detector, Positive and Negative voltage level detectors and other applications.
- 4. Switching and Time-based circuits:** Switching concept of diodes and transistors, Pulse transformers, Pulse transmission, Pulse generation, Equivalent circuit of pulse transformer, Pulse transformer response in different regions, Application of pulse transformers, Timing circuits.
- 5. Stable state and regenerative switching:** Monostable, bistable and astable multivibrators, use of multivibrators, Schmidt trigger, blocking oscillators.
- 6. Logic gates:** Transistor, MOS gates, propagation delay, product and noise immunity; open collector and high impedance gates, construction of NAND, NOR, NOT and other gates using TTL and CMOS logic, totem poles.
- 7. Integrated Circuits as Digital System:** Digital integrated circuits, SSI, MSI, LSI and VLSI logic gates Flip-flop, registers, counters, coder, decoder, encoder, multiplexer, demultiplexer. Design of user defined applications using logic gates.
- 8. ADC/DAC and others:** ADC and DAC working principles and applications, Sample and Hold (S/H) circuits, LED, LCD, pulse width modulation (PWM), microcontroller, ADC and DAC in microcontrollers.

### Recommended Books:

1. Jacob Millman and Herbert Taub : Pulse, Digital and Switching Electronics.
2. Robert Coughlin : Operational Amplifier and Linear Integrated Circuits
3. Tocci : Digital Systems
4. 5. M.Mouris Mano : Digital and Computer Design
6. S.C.Lee : Digital Circuits and Logic Design
7. Neschalski : Digital Computer
8. V.K.Jain : Switching theory and Digital Electronics

## CSE-2304 Pulse Techniques and Digital Electronics Sessional

**Credit Hours:** 1.5

**Contact Hours:** 3 per week

Laboratory works based on CSE-2405

1. To construct and study the low pass/high pass RC circuit.
2. Construct and study the characteristics of Monstable circuit.
3. Construct and study the characteristics of Bistable circuit.
4. To construct and study
5. a blocking oscillator.
6. To perform also other experiments relevant to this course.

## CSE-2305 Digital Logic Design

**Credit Hours:** 2

**Contact Hours:** 2 per Week

[Pre requisite: EEE-1205 Electronic Devices and Circuits]

- 1. Logic function and gates:** Different types of gates and their truth tables, Boolean algebra.
- 2. Physical Devices to construct gates:** Physical Devices used to construct gates, NOT, AND, OR, NOR, NAND and EXOR, EXNOR Universalities of gates
- 3. Simplification of logic circuits:** The map methods, product of sum simplification, Sum of product Methods, Graphical methods, pairs, quad and octets.
- 4. Combinational logic Circuits:** Adders, Subtractor, Binary parallel adders, carry look\_ ahead adder, decoder, encoder, multiplexer & demultiplexer.
- 5. Sequential Circuits:** Oscillators & multivibrators, Flip-Flops-R-S J-K & D-Flip-Flops, Counters binary up-down, shift registers.
- 6. IC Logic Families:** DTL, TTL, ECL, MOS, CMOS,  $I^2L$  and their circuits.
- 7. Memory Devices:** Semiconductor memories, RAM, ROM, PLA's, EPROM, magnetic core memories.
- 8. Converters:** Different types of A/D and D/A Converters with applications.

### Recommended Books:

- |                   |                        |
|-------------------|------------------------|
| 1. M. Morris Mano | : Digital Logic Design |
| 2. Tocci-widmer   | : Digital Systems      |
| 3. Dr. V. K. Jain | : Switching Theory     |

## CSE-2306 Digital Logic Design sessional

**Credit Hours:** 1

**Contact Hours:** 2 per Week

1. To construct and study the following logic gates
  - a. AND, OR, NOT
  - b. NAND, NOR, EXOR
2. Verify the Demorgans Law : Law(I) and Law(II)
3. To Verify different kind of applications of Boolean algebra.
4. To construct an AND gate by diode resistors and observe its characteristics.
5. To verify the characteristics of Exclusive OR and Exclusive NOR using basic logic gate.
6. To be familiar with demultiplexer using the 74138 IC.
7. Experiment on synchronous up counter and down counter.
8. To perform other experiments relative to this course.

## CSE-2307 Discrete Mathematics

**Credit Hours:** 3

**Contact Hours:** 3 per Week

- 1. Introduction: Set theory-**Set operation, Representation of Sets, Algebraic Properties of set, computer representation of set, Logic-Propositional Calculus, Logic and bit operation, Predicate and quantifier, Translating sentence into logical expressions
- 2. Function-Introduction** of function, some important function, Properties of function, Sequence and summation, Relation- Representation of Relation, Properties of Relation, Some important Relations, Closures of relation.
- 3. Number Theory-Fundamental** Theorem of Arithmetic, Modular Arithmetic; GCD, LCM, Prime Number Congruence, Application of Congruence
- 4. Linear Congruence,** Application of Number Theory, Mathematical Induction, Methods of Proof, First and Second principle of Mathematical induction.
- 5. Counting Principle-** Basic Counting principle, Inclusion-Exclusion principle, Application of Sum rule and Product rule, Pigeon hole principle, Permutation Combination, Binomial Theorem.
- 6. Definition of Graph,** Types of graphs, Representation of graph, Euler and Hamilton path, circuit, necessary and sufficient conditions.
- 7. Graph coloring,** Isomorphism of graph, Tree- Comparison of tree and Graph,
- 8. Spanning tree,** algorithm of several trees, Application of trees, Tree Traversal, Trees and sorting.

### Recommended Books:

- |  |   |
|--|---|
| 1. Kenneth H. Rosen                            | : Discrete Mathematics and its Applications                               |
| 2. Seymour Lipschutz & Marc Laris Lipson (SOS) | : Theory and Problems of Discrete Mathematics.                            |
| 3. J. P. Tremblay and R. P. Manohar            | : Discrete Mathematical Structures with applications to Computer Science. |
| 4. Donald F. Stanat and David F. McAllister    | : Discrete Mathematics in Computer Science                                |
| 5. B. Kolman, R.C. Busby and S. Ross           | : Discrete Mathematical Structures.                                       |
| 6. C. L. Liu                                   | : Elements of Discrete Mathematics.                                       |
| 7. Olympia Nicodemi                            | : Discrete Mathematics  |

## CSE-2309 Data Structures

**Credit Hours:** 3

**Contact Hours:** 3 per Week

[Pre requisite: CSE-1109 Structured Programming]

- 1. Data structure basics:** Data structure basic operations, complexity, big O notation, representation of data, one dimensional array (representation, traversing, element insertion, element deletion), multidimensional arrays, string processing (different string processing operations, pattern matching algorithms).
- 2. Stack :** Real life examples of stacks, basic stack operations (push, pop, stack top), array implementation of stack, stack applications (parentheses matching), recursion (factorial function, fibonacci sequence, tower of Hanoi)
- 3. Queue :** Real life examples of queues, basic queue operations (enqueue, dequeue, queue front, queue end), array implementation of queue, queue applications (job queue), priority queue.
- 4. Linear List, Linked List:** Classification of lists, list operations, Static vs. dynamic memory allocation, garbage collection, representation of one way linked list, basic operations of one way linked list (add node, delete node, find node, traverse list), two way and circular linked list.



**5. Trees:** Tree terminologies, Complete binary trees, extended binary trees, Representation of binary tree in memory, Traversing Binary Trees, Inorder, Preorder, Postorder, Binary Search Trees: searching, insertion, deletion.

**6. Graphs:** Graph theory terminologies, representations of graphs, adjacency matrix, path matrix, traversing a graph: BFS and DFS algorithm

**7. Sorting:** Bubble sort, insertion sort, selection sort, merge-sort, heap sort, complexity of these algorithms

**8. Searching, Hashing:** Linear and binary search algorithms and their complexity, hashing (hash functions, collision, collision resolution, linear probing, chaining).

Recommended Books:

- |  |   |
|--|---|
| 1. Seymour Lipschetz                       | : Data Structure                          |
| 2. Y. Langsam, Augenstein, A. M. Tanenbaum | : Data Structures Using C and C++         |
| 3. Edward M. Reingold                      | : Data structures                         |
| 4. Robert Sedgwick                         | : Algorithms in C                         |
| 5. Niklaus wirth                           | : Algorithms and Data Structures Program. |

### CSE-2310 Data Structures sessional

**Credit Hours:** 1

**Contact Hours:** 2 per Week

- 1. Array and string processing:** Traversing arrays (one dimension, multi dimension), string length, substring, insert a string into another string, delete a substring from a string, pattern matching algorithm
2. Stack, queue implementation
3. Implementation of linked list
4. Tree implementation
5. Graph implementation
6. Implementation of different sorting algorithms
7. Implementation of different searching algorithms
8. Implementation of recursion in various application
9. To perform other experiments relative to this course.

### CSE-2312 Software Development I Sessional

**Credit Hours:** 1

**Contact Hours:** 2 per week

[Pre requisite Course: CSE-1109, Structured Programming]

To develop Banking Software; Library Management Software; Superstore Management Software; Clinic Management Software; Ticket Booking Software; Bookshop Management Software and Games project. Problems on ACM. To perform other experiments relative to this course.

Recommended Books

- |                       |                                 |
|-----------------------|---------------------------------|
| 1. Yashavant Kanetkar | : “Let us C”                    |
| 2. E Balagurusami     | : “Programming in ANSI C”       |
| 3. H. Schildt         | : “Advanced Turbo C”            |
| 4. Dennish Ritchie    | : “C Programming Language”      |
| 5. R. G. Gottfried    | : “How to solve it by Computer” |

## CSE-2405 Computer Algorithms

**Credit Hours:** 3

**Contact Hours:** 3 per week

[Prerequisite courses: CSE-2309 (Data structures)]

**1. Algorithm and Data structure:** Algorithm, Properties of good algorithm, Data Structure, Application Areas of Algorithm. Time and Space Complexity Analysis of Algorithms, Asymptotic Notations, Insertion Sort and its Complexity Analysis.

**2. Divide and Conquer approach & Heaps:** Divide and Conquer approach and Merge Sort, Algorithm of Merge Sort, Complexity Analysis Merge Sort, Quick Sort and its Algorithm, Complexity Analysis of Quick Sort, Heap Construction Algorithm, Heap sort, Application of Heap: Priority Queue.

**3. Dynamic Programming:** Algorithm of LCS, Dynamic Programming, Matrix Chain Multiplication Example, Algorithm of MCM, and Example of Longest Common Subsequence, Complexity Analysis.

**4. Greedy Algorithm:** Greedy Algorithm, Activity Selection Problem, Huffman Codes and its application, Knapsack problem, Traveling Salesperson Problem, Complexity Analysis

**5. Graphs basic & traversal techniques:** Representation of Graphs, Breadth First Search, Depth First Search, Algorithm of BFS and DFS, Minimum Spanning Tree, Kruskal and Prims Algorithm, Complexity Analysis.

**6. Shortest Path:** Single Source Shortest Paths, Dijkstra's Algorithm, and Bellman-Ford Algorithm. All pair Shortest Path, Floyd Warshall Algorithm, and Complexity Analysis

**7. Recurrences & Backtracking:** Recurrences, *NP*-Hard and *NP*-Complete Problems, Backtracking, *n*-Queen Problem, Complexity Analysis, Branch and Bounds.

**8. Computational Geometry & Number Theory:** Computational Geometry, Line Segment Properties, Convex Hull, Graham Scan Algorithm of Convex Hull, Number Theory, GCD, Modular Arithmetic, Prime Number generation, Complexity Analysis

### Recommended Books:

- |                     |  |
|---------------------|--|
| 1. Cormen           | :Introduction to Algorithms                    |
| 2. Horowitz, Shanny | :Computer Algorithms                           |
| 3. D. E. Knuth      | :The art of Computer Programming               |
| 4. M. Allen         | :Data Structure and Algorithm analysis in C++. |

## CSE-2406 Computer Algorithms sessional

**Credit Hours:** 1

**Contact Hours:** 2 per week

[Prerequisite courses: CSE-2306 (Data structures)]

Implementation and Analysis of Insertion Sort , Merge Sort , Quick Sort , Heap sort , Matrix Chain Multiplication, Longest Common Subsequence, Job selection problem, Breadth First Search , Depth First Search , Dijkstra's Algorithm, Floyd-Warshall Algorithm , Random Number Generation, Backtracking Algorithm, *n*-Queen Problem , Huffman Algorithm, Knapsack Problem , Minimum Spanning Tree, Traveling Salesperson Problem.

To perform also other experiments relevant to this course.

## CSE-2407 Assembly Language

**Credit Hours:** 1

**Contact Hours:** 1 per week

### **1. Introductory Concept:**

Hardware of Microprocessor, Registers, assembler, Assembly language syntax, variables, Directives, Basic Instructions and their formats

### **2. FLAGS Register and Flow Control:**

The FLAG register, JMP, CMP instructions, Conditional jump instruction

**3. Flow Control, Logic, Shift and Rotate instructions:**

High level language structures (branching and looping structures), Logic, shift and rotate instructions

**4. Stack, Procedure, Multiplication and Division:**

Logic instructions, Shift instructions, Rotate instruction, the stack and stack related instructions, Procedure and procedure related instructions, Multiplication and Division instructions- MUL, IMUL, DIV, IDIV, CBW, CWD,

**5. Arrays and Addressing Modes:**

Arrays (one dimensional and two dimensional arrays), Addressing modes, XLAT instructions.

**6. String and Macros**

String instructions, Macro definition, Parameters in Macro, Macro directives, Nested macros

**7. Bios and Dos Interrupts:**

Interrupt, Interrupt vector and routine, Bios Interrupt, Dos Interrupt

**8. I/O and Numeric Processing:**

The IN, OUT, INS and OUTS instructions, 8087 Numeric Processor's register and data type, Instruction, Multiple-precision integer I/O, Real number I/O

Recommended Books:

1. Ytha Yu; Charles Marut, :Assembly Language Program and Organization of the IBM PC
5. Kip r. Irvine : Assembly Language for the IBM-PC.
6. Peter Abel : IBM PC Assembly Language and Programming;
7. Mohamed Rafiqzaman, : Microprocessor and Microcomputer Based System Design.

**CSE-2408 Assembly Language sessional****Credit Hours: 1****Contact Hours: 2 per week**

Laboratory works based on CSE-2407

1. Registers, JMP, LOOP, CMP instructions, Conditional jump instruction.
2. Implementation of different types of instructions (rotating, shifting etc)
3. Instructions (MUL, IMUL, DIV, IDIV, CBW, CWD, arrays, XLAT).
4. String instructions, macro handling.
5. Bios Interrupt, Dos Interrupt
6. The IN, OUT, INS and OUTS instructions,
7. To perform also other experiments relevant to this course.

**CSE-2409 Database Systems****Credit Hours: 3****Contact Hours: 3 per Week**

**1. Introduction:** Database, data, database management system, Database system versus file system, Data model, Database language, Database user administration, Database system structure, Storage manager, Overview of Physical storage medium.

**2. Entity-Relationship Model:** Entity sets, Relationship sets, Mapping Cardinalities, Keys, Attributes, Entity relationship diagram, Weak entity sets, Specialization, Generalization, Structure of Relational databases, Database Schema.

**3. The Relational Algebra and SQL:** Selection, projection, Union, Set difference, Cartesian-product, Rename, Set-intersection, Natural-join, Division, Assignment, projection, Aggregate functions, Deletion, Insertion, Updating, Views, Nested sub-queries, Set membership, Set comparison.

**4. Integrity, Security and Relational Database Design:** Domain constraint, Integrity, Assertions, Triggers, Authorization, Authentication, Security, Privileges, Roles, Audit trails, Encryption-Decryption Algorithm, Decomposition etc.

**5. Functional Dependency and Normalization:** Functional Dependencies, Closure of a set of Functional dependencies. Un-normal Form (UNF), First Normal Form (1NF), Second Normal Form (2NF), Third Normal Form (3NF), Boyce and Code Normal Form (BCNF).



**6. Indexing and Hashing:** Ordered indices, Hash indices, Hash function, Primary index, Secondary index, Dense, sparse, Multilevel indices, B+ tree index files, Handling Bucket Overflows, Overflow Chaining, Closed Hashing, Open Hashing, Linear probing, Hash indices, Dynamic Hashing.

**7. Transaction:** ACID Properties, Transaction state diagram, Implementation of Atomicity and Durability, Shadow copy technique, Concurrent Execution, Serializability, Recoverability, Recoverable schedule, Cascade-less Schedules, Implementation in Isolation, Testing of Serializability.

**8. Concurrency control, Recovery System and Distribute databases:** Lock-Based Protocols, Granting of locks, Two-phase locking protocol, Graph based protocol, Tree protocol, Timestamp based protocols, Deadlock detection and recovery. Failure classification, Storage types, Checkpoints. Distributed data, Replication and Fragmentation.

**Recommended Books:**

1. H. F. Korth	: “Database System Concept”
2.. Oracle	: “SQL Star International Limited”
2. Thomas Connolly, Carolyn Begg	: “Database Systems- Practical Approach”
3. Ramez E. Marsi	: “Fundamentals of Database Systems”
4. Jeffry	: “Fundamentals of Database”
5. Kock and Loney	: “Oracle 8i the Complete Reference”
6. Kelvin Loney	: “Oracle DBA Handbook”

**CSE-2410 Database System Sessional**

**Credit Hours:** 1.5

**Contact Hours:** 3 per week

[Pre requisite Course: CSE-3513, Database System]

1. Introduction to SQL, Relational Database Management System.
2. Oracle8: Object Relational Database Management System, SQL statements, about PL/SQL and its environments.
3. Writing Basic SQL statements, Capabilities of SQL SELECT Statements, Restricting and sorting data.
4. Single-Row-Functions, Displaying Data from multiple tables, aggregating data using Group Functions.
5. Sub queries, Multiple-Column Sub queries, Producing Readable output with SQL \*Plus.
6. Manipulating Data, Creating and Managing Tables including constraints.
7. Other Database Objects, Controlling User Access.
8. SQL Workshop.
9. Declaring Variables, writing Executable Statements.
10. Interacting with the Oracle Server, Writing Control Structures.
11. Working with Composite Data types.
12. Writing Explicit Cursors, Advanced Explicit Cursors Concepts.
13. Handling Exceptions.
14. PL/SQL Workshop.
15. To perform also other experiments relevant to this course.

**Recommended Books:**

1. H. F. Korth	: “Database System Concept”
2. Oracle	: “SQL Star International Limited”
3. BOU	: “Database Management Systems”
4. Ramez E. Marsi	: “Fundamentals of Database Systems”
5. Jeffry	: “Fundamentals of Database”
6. Kock and Loney	: “Oracle 8i the Complete Reference”
7. Kelvin Loney	: “Oracle DBA Handbook”

## CSE-2411 Programming with Java

**Credit Hours:** 2

**Contact Hours:** 2 per week

[Pre requisite: CSE-1209 Object Oriented Programming]

- 1. Introduction:** Local variable, global variable. *Method:* Method overloading. *Class:* Default constructor, abstract class, final class and static class. *Object:* Definition of an object, object model, relation between an object and a class.
- 2. Inheritance:** Definition of inheritance, use of inheritance, multiple inheritances, method overriding, relation between subclass and super-class, a constructor in subclass invokes a constructor in super-class and polymorphism.
- 3. Thread:** Use of a thread, different ways to get a thread, how to start a thread, special character of start method of the Thread class, Runnable interface.
- 4. Interface:** Definition of an interface, use of interface, contents of an interface, an abstract class can be used as an interface.
- 5. Applet:** Life cycle of an applet, major events in the life of an applet, looping problem of init method, embedding an applet to a web page, paint method, repaint method.
- 6. Event Handling:** Event source, different kind of listeners, registering the listener. *Layout Management:* Container, component, flow layout, border layout, grid layout.
- 7. Exception & Network programming:** *Exception:* Definition of exception, how to generate, throw and handle an exception, exception ducking, *Networking:* Socket, server socket, connect a client to a server.
- 8. Input Output:** Stream, input stream, output stream, character stream, byte stream, Reader & Writer classes to handle input and output.

### Recommended Books:

- |     |                                   |   |
|-----|-----------------------------------|---|
| 1.  | P. Naughton and H. Schildt,       | : <i>The Complete Reference Java 2,</i>                                   |
| 2.  | M. Campione and K. Walrath,       | : <i>The Java Tutorial, Object-Oriented Programming for the Internet,</i> |
| 3.  | Patrick Naughton, Herbert Schildt | : <i>The Complete Reference, Java-2</i>                                   |
| 4.  | E. Balagurusamy                   | : <i>Programming with Java</i>  |
| 5.  | Deitel & Deitel                   | : <i>Java How to Program</i>  |
| 6.  | SAMS publications                 | : <i>Teach Yourself Java-2 in 21 days</i>                                 |
| 7.  | John Zukowski                     | : <i>Mastering Java-2</i>   |
| 8.  | A primer, E Balagurusamy          | : <i>Programming with Java.</i>   |
| 9.  | Deitel & Deitel.                  | : <i>How to Program Java</i>  |
| 10. | Naughton Schildt,                 | : <i>The Complete Reference Java 2</i>                                    |

## CSE- 2412 Programming with Java sessional

**Credit Hours:** 1

**Contact Hours:** 2 per week

1. To observe how a constructor in sub class invokes a constructor in the super class, how a static variable shared in many instances of the class and how a sub class overrides a method in the super class.
2. Show that a string cannot be changed
3. Sort an array of strings in alphabetic order.
4. Show how to use an abstract class and how to use an interface.
5. Design a thread extending the thread class and a thread implementing the Runnable interface
6. Show a button registers the Action Listener
7. Write a class to implement the Action Listener interface and a class to implement the Mouse Listener interface.
8. Add two buttons in an applet to start and stop animation.
9. Write a program to remove the looping problem of the init method. and a program to draw a circle on the Canvas
10. To perform also other experiments relevant to this course.

## CSE-3507 Numerical Methods

**Credit Hours:** 2

**Contact Hours:** 2 per week

[Pre requisite: CSE-1109 Structured Programming]

1. **Significant figure**, Rounding off numbers, Error in Numerical Calculation. Solution of Algebraic and Transcendental Equation
2. **Interpolation** with equal and unequal intervals- Missing values, Newton's binomial expansion formula, Newton's forward and backward interpolation formula.
3. **Interpolation: Central difference** interpolation formulae, inverse interpolation.
4. **Numerical Differentiation**- Derivates using Newton's forward backward and Stirling's formula.
5. **Numerical Integration**- General quadrature formula for equidistant ordinates. Trapezoidal rule, Simpson's one-third rule, Simpson's three-eight rules, Weddle's rule.
6. **Numerical solution** of ordinary differential equations- Taylor's series method, Euler's method, Adams Bashforth Moulton method, Runge-Kutta method.
7. **Solution of linear equations**- Gauss-elimination method, Iteration methods. Gauss-Seidel method, Gauss-Jordan method.
8. **Curve Fitting**- objective of fitting a curve, fitting a straight line, fitting a parabola

### Recommended Books:

1. G. Shanker Rao :Numerical Analysis, New Age International (P) Limited.
2. Webb Miller :The Engineering of Numerical Software.
3. K. R. Jackson :Simplified Fortran Guide

## CSE-3508 Numerical Methods sessional

**Credit Hours:** 1

**Contact Hours:** 2 per week

1. Experiment on Interpolation with equal and unequal intervals.
2. Implementation of:
  - a. Newton's forward and backward interpolation formula.
  - b. Newton's binomial expansion formula
  - c. Central difference interpolation formula
  - d. Numerical derivation and derivates using Newton's forward and backward formula
3. Different kinds of numerical integration
4. To Show Taylor's series method, Euler's method, Runge Kutta method
5. To perform also other experiments relevant to this course.

## CSE-3509 Computer Architecture

**Credit Hours:** 3

**Contact Hours:** 3 per week

[Pre requisite: CSE-2305 Digital Logic Design]

1. Information representation, Performance measurement
2. Instruction and data access methods
3. Arithmetic Logic Unit (ALU): arithmetic and logical operations floating point operations, ALU design.
4. The control unit (Single cycle Data path) : hardwired and micro programmed
5. The control unit (Multiple cycle Data path) : hardwired and micro programmed
6. Hazard; Exceptions; Pipelining
7. Memory organization
8. I/O systems, channels, interrupts, DMA

### Recommended Books:



1. J. P. Hayes :Computer Architecture and Organization
2. Dr. M. Rafiquzzaman :Fundamentals of Computer System Architecture
3. Romesh S. Gaonkar :Microprocessor, Architecture, Programming and Application with 8085
4. John Hennessy, David Patterson : Computer Organization.
5. Shafwat Zaky :Computer Architecture

## CSE-3511 Microprocessor & Microcontrollers

**Credit Hours:** 2

**Contact Hours:** 2 per week

[Prerequisite course: CSE-2407 Assembly Language]

- 1. Introductory Concept:** Evaluation of microprocessor, Types of microprocessor, system bus, hardware of a microprocessor, memory-addressing technique.
- 2. 8086 Microprocessor:** properties, architecture, registers, FLAGS register, physical address calculation, addressing modes. Addressing Techniques of 8086 Microprocessor
- 3. Instruction:** Instruction set, Instruction format, Fetch-decode-Execution cycle.
- 4. Interrupt System:** Sources of interrupt, Types of interrupt, handling interrupt request, interrupt vector and table
- 5. An overview** of Intel 80186, 80286, 80386, 80486 and Pentium microprocessor
- 6. Advanced microprocessor:** Embedded microprocessor, Bit slice microprocessor, arithmetic processor, Multitasking, Itanium and Merced Microprocessor
- 7. I/O operation:** Isolated and memory mapped I/O, DMA technique, I/O ports, I/O processor
- 8. Micro controller:** Architecture of 8051, Signals, Operational features, Memory and I/O addressing, Interrupts, Instruction set, Applications.

### Recommended Books:

1. Dr. M. Rafiquzzaman :Microprocessors & Microcomputer -Based System Design
2. T. Hanley :Microprocessor and microcomputer
3. John F. wakerly :Micro Computer architecture and programming
4. John P. Hayes :Compute architecture and organization
5. Bary B Brey :The INTEL Microprocessors 8086/8088
6. Douglas V. :Hall, Microprocessor and Interface.
7. Ramesh Gaonker :Microprocessor Interfacing
8. Mohamed Ali Mazidi, Janice Gillispie Mazidi :The 8051 microcontroller and embedded systems

## CSE-3512 Microprocessor and Micro controllers sessional

**Credit Hours:** 1

**Contact Hours:** 2 per week

Operation of microprocessor kit. **MDE-8086**

Storing and executing of a typical machine code program using **MDE-8086** kit and to observe the operation in single step.

### **8255A Interface:**

- a) 7-segment display interface to display the hexadecimal character.
- b) LED interface

### **Interface experiment:**

- a) Interfacing a speaker with microprocessor and to operate on by the program
  - b) Dot matrix LED displays.
- D/A converter experiment.

### **Experiments on Interrupt:**

- a) Interrupt due to division by zero
- b) Interrupt due to overflow
- c) Interrupt due to user defined software

### **Experiment with serial monitor:**

- a) Execution of different serial monitor commands
- b) Loading and executing assembly language program.

### **LCD interfacing**

Stepping motor interface and to control it both in clockwise and anti-clockwise direction

### **Analog to digital (A/D) conversion**

To perform also other experiments relevant to this course.

## CSE-3513 Software Engineering

**Credit Hours:** 3

**Contact Hours:** 3 per week

**1. Introduction:** Software, nature and problems of software, engineering vs. software engineering, state of the art of software engineering, characteristics of software, basic elements of engineering Software, software process model, costs of software engineering, software engineering methods, professional and ethical responsibility of a software engineer.

**2. Software Processes:** Software process and software process model, different software process models: linear sequential, water fall, prototyping, incremental, spiral, advanced software development life cycle and other appropriate models.

**3. Software Requirements:** Requirement definition, Functional and non-functional requirements, requirement specification, software Prototyping, Basic concepts of different formal software specification techniques

**4. Requirement Engineering Processes:** requirement engineering process, software requirements document, requirement validation and evolution, requirement analysis process model, system context, social and organisational factors, data-flow models, semantic data models, object models, Data dictionaries,

**5. Software Design:** Context of software design, design process, design quality and strategies, system structuring, control models, modular decomposition, domain-specific architecture, data-flow design, structural decomposition, detailed design, JSP, Coupling and Cohesion, attributes of design, object-oriented design and Component-level design, design principles, user-system interaction, information presentation, user guidance, interface evaluation, design for reuse.

**6. Software Validation and Verification:** Verification and validation planning, testing fundamentals, including test plan creation and test case generation, black-box and white-box testing techniques, unit, integration, validation, and system testing, object-oriented testing, inspections

**7. Software Evolution:** Software maintenance, characteristics of maintainable software, re-engineering, legacy systems, Software reuse and configuration.

**8. Software Management:** Cognitive fundamentals, management implications, project staffing, software cost estimation techniques, different models (COCOMO, tree, PNR curve, statistical and Delphi), process quality assurance, Software and documentation standards, software metrics and product quality metrics, Zipf's law, Halstead formula, Fan in/Fan out, information Fan in/Fan out, Henry and Kafura's metric, Card and Glass's Systems Complexity, process and product quality, process (analysis, modeling, measurement, SEI process maturity model and classification).

Others: Software reliability metrics, software reliability specification, statistical testing and reliability growth modeling, Use of CASE tools and technological support in engineering software, introduction to unified modeling language–UML

### Recommended Books:

- |                      |   |
|----------------------|---|
| 1. Ian Sommerville   | :Software Engineering                           |
| 2. Roger S. pressman | :Software Engineering –A practitioner Approach. |

## CSE-3515 Data Communication

**Credit Hours:** 2

**Contact Hours:** 2 per week

### **1. Data Communication fundamentals**

Introduction to data communication, components, characteristics, data flow, Network architecture and topology, Information theory and Internet technology.

### **2. Network model and protocol**

Introduction to network standards and protocols, OSI model and function of its seven layers, TCP/IP protocol suite and addressing.

### **3. Signal and system**

Analog signal, digital signals, periodic signal, bandwidth, throughput, transmission impairment: attenuation, distortion and noise. Nyquist bit rate, Shannon capacity and performance analysis.

#### 4. Analog Transmission

Analog to digital conversion: AM, FM and PM. Digital to analog conversion: ASK, FSK and PSK. Bandwidth utilization.

#### 5. Digital Transmission

Line encoding schemes, block coding, PAM, PCM, and DM, Transmission modes: parallel, serial, synchronous, and asynchronous.

#### 6. Reliable Data Communications

Data link layer and control, Error detection and correction, framing, flow and error control, Stop-and-Wait protocol, Automatic Repeat Request (ARQ), Go-Back-N, Selective Repeat, HDLC.

#### 7. Multiplexing and switching

Multiplexing – FDM, WDM, TDM (Synchronous and statistical) spread spectrum FHSS & DSSS, packet-switched data networks, circuit switched data networks.

#### 8. Transmission media and interfaces

Guided media: twisted pair cable, coaxial and fiber optic cable. Unguided media: radio wave, microwave and Infrared. Standard connectors, NIC, HUB, bridge, router, gateway and modems.

#### Recommended Books

1. Behrouz A Forouzan: Data Communications and Networking. (4<sup>th</sup> Edition)
2. William Stallings: Data and computer communication, Seventh edition.
3. Curt M. White: Data Communications and Computer Networks.
4. Dennis Roddy & John Coolen : Electronic Communications
5. George Kennedy: Electronic Communication System
6. F. Halsall : Data communication Computer Network and open systems

### CSE-3516 Data Communication sessional

**Credit Hours: 1**

**Contact Hours: 2 per week**

Laboratory works based on CSE-3607

1. **Analog computing:** Describe the basic principles of analog radio communications and recognize a message signal, a carrier signal, and a modulated signal.
2. **Circuit board familiarization:** Describe analog radio communications circuits and locate them on the ANALOG COMMUNICATIONS circuit board.
3. **Amplitude modulation:** Describe the generation of amplitude-modulated signals and explain how the message signal affects the shape of the AM signal, calculate the modulation index and percentage of modulation from AM signal parameters, and describe 100% modulation, over modulation, and transmission efficiency.
4. **RF Power Amplifier:** Adjust the output impedance of the RF power amplifier, measure circuit parameters to calculate the RF power amplifier input power, output power, and power gain; calculate the percentage of output power transferred to the antenna load; and calculate the total power, carrier power, and sideband power of an signal.
5. **RF Stage:** Calculate the AM signal power at an RF filter input, describe how an RF filter is tuned to filter an AM signal, and calculate the power gain of an RF amplifier.
6. **Mixer, IF filter, and Envelope Detector:** Explain the operation of the mixer, describe the function of the IF filter, and describe how envelope detector converts a 455 kHz AM signal to the message signal
7. **Balanced Modulator and LSB Filter:** Describe how a balanced modulator produces a DSB signal, explain how the SSB is output from the LSB filter, and understand why an SSB has low power consumption and a narrow bandwidth.
8. **Mixer and RF Power Amplifier:** Describe the operation of a balanced mixer. Explain the function of the mixers output LC network. Describe the operation of an RF power amplifier. Understand the advantage of SSB transmission.
9. **Frequency and Phase Modulation:** Describe frequency modulation, phase modulation, and circuits.
10. **Demodulation (Quadrature Detector):** Explain demodulation of an FM signal and describe the operation of a quadrature detector.
11. **PLL Circuit and Operation:** Describe the PLL circuit, determine the VCO's free running frequency, and explain the PLL's capture and lock ranges.



12. **FM Detection with a PLL:** Explain how the phase detector's input frequencies affect the output signals, explain how the feedback signal to the VCO varies with the phase change between the input signals, and describe how a PLL demodulates an FM signal.\
13. **Troubleshooting Basics:** Troubleshoot analog communications circuits by using the guidance provided.
14. **Troubleshooting Analog Communications Circuits:** Troubleshoot analog communications circuits by using performance specification tables and students knowledge of analog communications circuits.
15. To perform also other experiments relevant to this course.
16. **Analog communication board:** Describe the basic principles of analog radio communications and recognize a message signal, a carrier signal, and a modulated signal. Circuit board familiarization: Describe analog radio communications circuits and locate them. Perform amplitude modulation: Describe the generation of amplitude-modulated signals and explain how the message signal affects the shape of the AM signal, calculate the modulation index.
17. **Pulse Amplitude Modulation** using Digital communication board.
18. **Simulation of analog,** digital and pulse modulation technique using MATLAB.
19. **Basic Transceiver simulation** using MATLAB.
20. Data communication between two computers using twisted pair cable and RJ45 jack.

### CSE-3603 Computer Interfacing

**Credit Hours: 2**

**Contact Hours: 2 per week**

[Pre requisite: CSE-3509 Computer Architecture, CSE-3511 Microprocessor & Microcontrollers ]

1. **Interfacing components:** 8284A Programmable timer, Bus architecture, Bus Timing, 8286 Transceiver device, 8282 Latches, 8288 Bus Controller.
2. **Memory interface and I/O interface:** Address Decoding, ROM, SRAM, DRAM, Types of I/O interface, I/O port addressing decoding.
3. **Analog and Digital Interface:** Sensors, Transducers, D/A interface, A/D interface, High power devices.
4. **Interrupt:** Interrupt sources, types of interrupt, 8259A priority interrupt controller, Daisy chain
5. **Serial Interface:** Characteristics of memory and I/O interface, Synchronous and asynchronous communication, Serial I/O interface, 8251A communication interface, RS-232 interface
6. **Parallel Interface and Devices:** 8255A Programmable peripheral Interface, Parallel adapter, parallel port, stepper motor.
7. **I/O Controller and Peripheral Components:** 8237A DMA Controller, Floppy and Hard disk Controller, Barcode Reader, Sound card.
8. **Embedded Systems:** Introduction to Embedded Systems, Characteristics, Components, Hardware-Software Partitioning, Specification and Modeling, Optimizing Design, SOC, Application Domains.

Recommended Books:

Yu Cheng Liu, Glenn A. Gibson	: Microcomputer System: The 8086/8088 Family.
Douglas V. Hall	: Microprocessor and Interface.
Mohamed Rafiqzaman,	:Microprocessor and Microcomputer Based System Design.
Artwick,	:Microprocessor and Interfacing
Ramesh Gaonker,	:Microprocessor Interfacing,
Frank Vahid, Tony D. Givargis	:Embedded System Design: A Unified Hardware/Software Introduction
Jack Ganssle	: The Art of Designing Embedded Systems.

### CSE-3604 Computer interfacing sessional

**Credit Hours: 1**

**Contact Hours: 2 per week**

- Details about ports ( pin description, port address and commands)
- LED interface / Interfacing 7-segment Display
- High power load interface

- Interfacing a microcomputer to stepping motor
- Inputting data into microcomputer
- Serial communication
- Parallel communication
- LCD operation and interfacing
- Analog interface /Digital interface
- Project

## CSE-3606 Software Development II sessional

**Credit Hours: 1**

**Contact Hours: 2 per week**

[Pre requisite: CSE-2312 Software Development I]

The goal of this course is to develop software in application level by the knowledge of previous knowledge such as database system, software engineering, data structure etc. The software will mainly database oriented. In daily life we feel different problem that may be solved by automated system.

At the start of the semester students will have to prepare to development on a particular topics. They also have to mention the reason to development such software.

They are also required to follow the procedure of software such as collection of user requirements by visiting different organization/institution or company.

They will use any of the following high level programming such as Java, Visual C++ or Visual Basic, Web pages with ASP/JSP/PHP as front-end Oracle, SQL Server, My SQL, Ms Access as back-end.

Some examples of software are:

1. House hold accounting- for budgeting of a particular family.
2. Library management system-to run a library.
3. Payroll system.
4. Lubricating oil management system.
5. Super shop management system.
6. Etc

### Recommended Books:

- |   |  |
|---|--|
| 1. Oracle Complete Reference            | : Oracle Press                         |
| 2. Official Document of Microsoft Press | :Visual Basic 6.0 Programmer's Guide   |
| 3. BPB Publications                     | :Mastering Visual Basic 6              |
| 4. Jerke (Tata McGraw Hill)             | :The Complete Reference Visual Basic 6 |
| 5. Silbershatz, Korth                   | :Database System Concepts              |
| 6. Jeffry O Ullman                      | :Principles of Database System         |
| 7. Step by Step - Riorain               | :Microsoft SQL Server 2000 Programming |

## CSE-3607 System Analysis and Design

**Credit Hours: 3**

**Contact Hours: 3 per week**

1. **Concepts of system and its environment:** Information, Types of information, Quality of information, System, Types of systems, Components of system, Source of information.
2. **Information gathering:** strategy, Information searching methods, Interviewing technique, System development methodologies and life cycle.
3. **Feasibility study & Cost/Benefit analysis:** Feasibility considerations, steps in feasibility analysis, feasibility report, Cost and Benefit categories, procedure for cost and benefit determination, classification of cost and benefit, cost and benefit evaluation methods.
4. **Tools of analysis and design:** Data Flow Diagram(DFD), DFD symbols, Constructing DFD; Data Dictionary; Decision Tree, Structured English, Decision Tables.
5. **System Design and Construction:** The process of design, System design phases, Design methodologies; Structured design; Form-Driven methodology; Input design, Output design, File and database design
6. **Testing and Quality Assurance:** Testing, Types of system tests; White-Box testing; Black-box testing; Quality factors specifications.



7. **Implementation and Maintenance:** Types of implementation, Documenting the system, Training and supporting users, Factor models of implementation success; The process of maintaining information system, Types of maintenance, Cost of maintenance, Reducing maintenance cost.
8. **Hardware/ Software selection, control and security:** Phases in selection, Criteria for software selection, Hardware selection, Financial considerations in selection; Security definitions, Threats to system security, Control measures, system failures and recovery.

**Recommended Books:**

- |                                       |  |
|---------------------------------------|--|
| 1. System Analysis and Design         | : Alan Dennis, Barbara Haley Wixom                         |
| 2. System Analysis and design         | : Elias M. Awad  |
| 3. System Analysis and Design Methods | : Jeffrey L. Whitten, Lonnie D. Bentley                    |
| 4. Modern System Analysis and Design  | : Jeffrey A. Hoffer, Joey F. George and Joseph S. Valacich |

**CSE-3608 System Analysis and Design sessional**

**Credit Hours:** 1.5

**Contact Hours:** 3 per week

Laboratory works based on CSE-3613

To perform also other experiments relevant to this course.

**CSE-3609 Computer Graphics**

**Credit Hours:** 3

**Contact Hours:** 3 per week

[Pre requisite: MATH-2401 Mathematics III, CSE-2409 Computer Algorithms]

1. **Computer Graphics:** Introduction to computer graphics: brief history, applications, hardware and software and the fundamental ideas behind modern computer graphics, Characteristics of display devices
2. **Image representation:** Representing primitive's objects: point, line, circle, ellipse, rectangle, polygon, arc and sector, Representation of Characters, Filling Algorithm, Aliasing, Anti-aliasing etc.
3. **Two Dimensional Objects:** Two dimensional transformations, translation, rotation, scaling, mirror reflection.
4. **Two Dimensional Viewing and Clipping:** Two dimensional viewing, line, circle and polygon clipping, 2D graphics pipeline, Composite and Instance transformation.
5. **Three Dimensional Objects:** Three dimensional transformations, translation, rotation, scaling, mirror reflection, Three dimensional viewing, line, circle and polygon clipping, 3D graphics pipeline, Composite and Instance transformation.
6. **Projection & Curves:** Projection, orthogonal and perspective projection, perspective anomalies, parallel projection, 3D curves and surfaces
7. **Hidden Surface:** Hidden Surface, hidden-surface algorithms, z-buffer algorithm Color and shading models
8. **Ray Tracing & Modeling** Ray Tracing, Future trends in computer graphics, Modeling of 3D Objects, polygonal net model, wire-frame model.

Recommended Books :

- |                                   |  |
|-----------------------------------|--|
| 1. Roy Plastock and Zhigang Xiang | : Computer Graphics ( Schaum's Outlines)       |
| 2. Foley, Hughes                  | : Computer Graphics Principles and Practice    |
| 3. William M. Newman              | : Principles of Interactive Computer Graphics. |
| 4. F.S. Hill                      | : Fundamentals of computer Graphics.           |
| 5. Allan Watt                     | : 3D Computer Graphics.                        |
| 6. D. Hearn & M.P. Baker          | : Computer Graphics C Version.                 |
| 7. Steven Harrington              | : Computer Graphics and Programming Approaches |
| 8. The Red Book                   | : OpenGL programming Guide.                    |

## CSE-3610 Computer Graphics Sessional

**Credit Hours:** 1.5

**Contact Hours:** 3 per week

1. Draw a Line using Polynomial Line Algorithm, DDA Line Algorithm, Bresenham's Line Algorithm
2. Draw a Circle using Midpoint Circle Algorithm, Polynomial circle algorithm, Trigonometric circle algorithm, Bresenham's circle algorithm
3. Draw an Ellipse using Polynomial algorithm, Trigonometric algorithm.
4. Draw an Arc and a sector.
5. Scan conversion of various characters: using Bitmap method and Outline method
6. Scan converting a character bangle ka using Bitmap method and Outline method
7. Scan convert Shohid Minar, Sriti Shoudo , a clock and a flower.
8. Rotate a Line, Triangle and Rectangle about a point.
9. Magnifying a circle, a triangle and a rectangle about a point.
10. Create a flower with rotating an object.
11. Scan convert a three-dimensional "F" and cube then rotate the object about x-axis and magnify it.
12. Rotate a 3D cube and Sriti Shoudo using OpenGL.
13. Projection of 3D cube
14. Line & polygon clipping problems.
15. To perform also other experiments relevant to this course.
16. Project using OpenGL.

## CSE-3611 Operating System

**Credit Hours:** 3

**Contact Hours:** 3 per week

[Prerequisite course: CSE-3509 Computer Architecture]

- 1. Principle of operating systems and Operating system structure:** Definition of operating system, Different kinds of operating systems (Desktop, Multiprocessor, Distributed, Clustered, Real time, Handheld systems), Operating-System Services, User Operating-System Interface, System Calls, Types of System Calls, System Programs, Operating-System Design and Implementation, Operating-System Structure, Virtual Machines
- 2. Process:** process management, inter- process communication, Process scheduling, Process Concept, Operations on Processes, Inter process Communication, Communication in Client-Server Systems, Basic Concepts of Process Scheduling, Scheduling Criteria and Scheduling Algorithms
- 3. Multiprocessing and time sharing, Process coordination:** Multiple-Processor Scheduling, Thread Scheduling, Algorithm Evaluation, Control and scheduling of large information processing systems, Resource allocation; Dispatching; Processor access methods; Job control languages
- 4. Deadlocks:** Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery From Deadlock.
- 5. Memory management:** Background, Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation,
- 6. Virtual memory:** The idea and advantage of virtual memory, Demand Paging, Page Replacement, Page Replacement Algorithms (FIFO, Optimal page replacement, LRU), Thrashing
- 7. File systems:** File Concept, Access Methods, Directory Structure, File-System Mounting, File Sharing, File-System Implementation, Directory Implementation, Allocation Methods
- 8. Protection and security:** Protection, Principles of Protection, Domain of Protection, Access Matrix, Access Control, Revocation of Access Rights, The Security Problem, Program Threats, System and Network Threats, Cryptography as a Security Tool, User Authentication, Implementing Security Defenses, Fire walling to Protect Systems and Networks

### Recommended Books:

- |   |                                 |
|---|---------------------------------|
| 1) Abraham Silberschatz, Peter Baer Galvin, Greg Gagne. | :Operating System Concepts.     |
| 2) Andrew S. Tanenbaum,                                 | : Modern Operating Systems.     |
| 3) Andrew S. Tanenbaum,                                 | : Distributed Operating Systems |
| 4) Denis,   | :Mastering LINUX                |

## CSE-4711 Computer Networks

**Credit Hours:** 3

**Contact Hours:** 3 per Week

**1. Introduction:** Definition, Uses of Computer Networks, Network Topology, Network Media, Network Devices, Different Types of Network: LAN, MAN, WAN etc.

**2. IP addressing:** Classful IP Addressing, Subnetmask, CIDR, Private IP Address, Public IP Address, Subnetting, VLSM etc.

**3. Network Model:** OSI Reference Model, TCP/IT Reference Model, ATM Reference Model, Functions of the Layers of different models, Network Protocols working at different layers.

**4. Data Link Layer Design Issues, Framing:** Character Count, Byte Stuffing, Bit Stuffing, Error Detection: Cyclic Redundancy Check, Parity Bit Checking, and Correction: Hamming Code. Windowing Protocols: Go back N ARQ, Selective repeat ARQ, Elementary Data Link Protocols, High-level Data Link Control, Point to Point Protocol, The Medium Access Control Sub-layer.

**5. Multiple Access:** Random Access; ALOHA, CSMA, CSMA/CD, CSMA/CA, Channelized Access; CDMA, TDMA, FDMA, Controlled Access; Rsvation, Poling, Token Passing. Ethernet, Wireless LANs, and Bluetooth.

**6. Switching:** Circuit Switching, Packet Switching, Message Switching, Routing Algorithms, Virtual Circuit and Datagram, Congestion Control Algorithms, Quality of Service, Internetworking, Internetworking Devices etc.

**7. Network Layer Protocols:** Address Resolution Protocol, Internet Protocol, Internet Control Message Protocol, IPV6, Routing Information Protocol, Open Shortest Path First, Border Gateway Protocol, User Datagram Protocol, Transmission Control Protocol.

**8. Network Security:** Cryptography, Substitution Cipher, Transposition Cipher, One time Pads, Public Key Cryptography:RSA Encryption and Decryption, Authentication Protocol 1.0 to 5.0, Digital Signature, Key Distribution Center, Different symmetric Key Algorithm, Certificate Authority, DNS, Electronic Mail, World Wide Web.

### Recommended Books:

- |                                      |   |
|--------------------------------------|---|
| 1. Andrew S. Tanenbaum,              | :“Computer Networks”                      |
| 2. Behrouz A. Forouzan, .....        | : “Data Communication & Networking”       |
| 3. James Chellis and Charles Perkins | :“MCSE Networking Essentials Study Guide” |
| 4. Brenton, Chris                    | :‘Mastering Network Security’             |
| 5. Anderson, Christa                 | :‘Mastering Local Area Networks’          |
| 6. Peter Norton                      | :Networking                               |
| 7. CCNA study guide                  | :Network Fundamental                      |

## CSE-4712 Computer Network Sessional

**Credit Hours:** 1.5

**Contact Hours:** 3 per week

[Pre requisite: CSE-3608 Data Communication (Sessional)]

1. Cable Configuration
2. Network Hardware
3. Network Software
4. LAN Setup
5. WAN Technologies
6. Workgroup Setup
7. Client Server Setup
8. Administrator’s job
9. Create Active Directories
10. Router Configuration
11. Protecting Network Environment: security, Virus, Power supply etc.
12. Network Troubleshooting
13. Planning a Network for Organization
14. To perform also other experiments relevant to this course.

## CSE-4713 Compiler

**Credit Hours: 2**

**Contact Hours: 2 per week**

**[Pre requisite: CSE-2307 Discrete Mathematics]**

- 1. Structure of compiler:** Translator, Basic principles of compilers and compiler design, types of compilers, applications, phases of a compiler.
- 2. Grammars & expressions:** Concepts of languages and Grammars, Terminals and non-terminals, Useless non-terminals and Inaccessible tokens, Context-Sensitive Grammars, Context-Free Grammars, Right linear grammar, left linear grammar, Derivations and Parse trees, Ambiguous grammar.
- 3. Automata:** Lexical analysis, Regular expressions, finite automata, Non-deterministic Finite-State Automata, Minimization of Finite-State Automata, DFA, Symbol table management.
- 4. Syntax Analysis:** Parser, Error-Recovery, Left recursion, Left factoring, Top-Down Parsers, FIRST and FOLLOW, Recursive-Descent and Predictive Parsing, LL(1) parsing.
- 5. Parsing:** Bottom-Up Parsing, Operator Precedence parsing, LR Parsers, Construction of SLR, CLR, LALR Parse Tables, Shift-Reduce Parsing.
- 6. Syntax-Directed Translation:** Syntax-Directed definitions, Semantic Rules, Dependency Graph, Attributes, Construction of Syntax trees, Type checking, Type expressions, Translation Scheme, Type checking of expressions, statements and functions, Type conversions.
- 7. Intermediate code generation:** Run time environments, Activation tree, Control stack, rRun time storage organization, Storage allocation strategies, Intermediate languages, three address statements, quadruples, triples, indirect triples and polish notations.
- 8. Code Generation and Optimization:** Code generation issues, Instruction costs, Basic blocks, Flow graphs, DAG representation, Next use information, Transformations of Basic Blocks, Peephole optimization, Function preserving transformations, Optimization of Basic Blocks, Different models of code generation, error detection and error handling.

### Recommended Books:

- |   |   |
|---|---|
| 1. William A Barret, R. M. Bates            | : Compiler Construction theory and practice |
| 2. Compiler principles, technique and tools | : Alfred V. Aho, Ravi Sethi                 |
| 3. A.J Holub                                | : Compiler Design in C.                     |
| 4. Trembly and Sorensen                     | : Theory and Practices of Compiler Writing. |

## CSE-4714 Compiler sessional

**Credit Hours: 1**

**Contact Hours: 2 per week**

1. Accessible & Inaccessible Tokens
2. Grammar checking (CFG, CSG, RLG, LLG etc)
3. Parse tree derivation
4. LR parsers
5. Constructing parsing table
6. Simple intermediate code generation
7. Declaration
8. Perform other experiments relevant to this course.

## CSE- 4715 :Artificial Intelligence

**Credit Hours:** 3

**Contact Hours:** 3 per week

[Pre requisite: CSE-2409 Computer Algorithms]

- 1. Concepts of Artificial Intelligence:** Introduction, The Foundations of AI, The History of AI, AI technique, The State of the Art; **Problems and Problem Solving:** Problems, Example of Problems, Problem Formulation, Problem-solving methods.
- 2. Various Searching Techniques:** Search Strategies, Uninformed (blind) search strategies like Breadth-First search, Uniform cost search, Depth-First Search etc. and Informed or Heuristic Search Strategies like Generate-and-test, Hill Climbing, Best-First Search, Problem Reduction, Constraint Satisfaction, Means-End Analysis etc.
- 3. Propositional and First-Order logic:** Knowledge Representation, Reasoning and Logic; Propositional Logic: Syntax, Semantics, Validity and Inference, Rules of Inference for Propositional logic; First-Order Logic: Syntax and Semantics, Using first-order logic.
- 4. Inference in first order logic:** Inference Rules Involving Quantifiers, Example Proof, Generalized Modus Ponens, Forward and Backward Chaining, Completeness, Resolution.
- 5. Game playing:** Introduction, Perfect Decisions, Imperfect Decisions, Alpha-Beta Pruning; **Natural language processing:** Introduction, Syntactic Processing, Semantic Analysis, Discourse and Pragmatic Processing.
- 6. Planning:** Basic Plan-Generating Systems, Forward Production System, Representation for Plans, Backward Production System, STRIPS, Examples with problem domain;
- 7. Learning:** Introduction to Learning, Inductive Learning, Learning Decision Trees, Neural Net Learning;
- 8. Probabilistic Reasoning:** Probability and Bayes' Theorem, Certainty Factors and Rule-Based Systems, Bayesian Networks, Fuzzy Logic; **Some Expert Systems:** Representation and Using Domain Knowledge, Expert System Shells, Explanation, Knowledge Acquisition.

### Recommended Books:

Elaine Rich and Kevin Knight: *Artificial Intelligence*, 2<sup>nd</sup> Edition, Tata McGraw-Hill Publishing Company Limited.

Stuart Russell and Peter Norvig: *Artificial Intelligence A Modern Approach*, Pearson Education asia.

Nils J. Nilsson : *Principles of Artificial Intelligence*, Narosa Publishing House.

L. H. Tsoukalas and R. E. Uhrig : *Fuzzy and Neural Approches in Engineering*.

## CSE- 4716 Artificial Intelligence sessional

**Credit Hours:** 1.5

**Contact Hours:** 3 per week

Laboratory works based on CSE-4801

1. Various Problem Solving.
2. Searching Problems.
3. Features of LISP or PROLOG language.
4. Simple Logical Programs Using Prolog/LISP.
5. Basic Game Design Using Prolog/LISP.
6. Natural Language Processing Using Prolog/LISP.
7. Building Simple Expert Systems Using Prolog/LISP.
8. Other experiments relevant to this course.

### Recommended Books:

1. Carl Townsend : *Introduction To Turbo Prolog*, BPB Publications, New Delhi.

**CSE-4718 Field Work****Credit Hours:** 1**Contact Hours:** 2 weeks

Students will take a 2 weeks fieldwork from a computer related industry. Students will be evaluated on the basis of a report submitted by them after the completion of the training, oral examination and report from the concerned industry. This training is to be organized during the inter-session break. Or project work.

**CSE-4800 Project / Thesis and viva-voce****Credit Hours:** 4**Contact Hours:** 8 per week

Study of problems in the field of Computer Science & Engineering.

**CSE-4801 Pattern Recognition and Image processing****Credit Hours:** 3**Contact Hours:** 3 per week

[Pre requisite: MATH-3505 Mathematics IV]

**1. Introduction:** Introduction of Digital Image Processing and Pattern Recognition, Application areas, Fundamental steps of Digital Image Processing, Components of Digital Image Processing, Image & Video, Image & Human eyes, Color TV scheme.

**2. Analog and Digital Image:** Analog and Digital Image, Image Acquisition and acquisition devices, Spatial and amplitude quantization, Pixels, Resolution, Aspect Ratio, Gray levels, Relationship color and gray levels.

**3. Image Enhancement:** Different types of Image Enhancement operations, Spatial domain and frequency domain processing, Different types of filtering.

**4. Image Compression:** Fundamental concepts of Image Compression and Data Compression, Data Redundancy, Image Compression models, Error free and Lossy compression, Image Compression Standards.

**5. Morphological processing:** Morphological Image Processing, Dilation, Erosion, Opening, Closing, Hit and Miss etc.

**6. Segmentation:** Image Segmentation, Different types of Segmentation, Edge linking and boundary detection, Thresholding, Region oriented segmentation,

**7. Image Representation:** Object representation and description algorithms, Run Code, Chain Code, Signature, Skeleton, Boundary detection, Feature Extraction few case studies.

**8. Pattern Recognition:** Fundamental concepts of Pattern Recognition, Pattern, Pattern Classes, Types of Pattern Recognition, Decision Theoretic methods, Structural method, Statistical method, Neural Network, Few case studies like speech recognition, fingerprint recognition, character recognition etc.

Recommended Books:

- |   |  |
|---|--|
| 1. R. C. Gonzalez, R. E. Woods                  | :Digital Image Processing .              |
| 2. Earl Gose                                    | :Pattern Recognition and Image Analysis. |
| 3. Related Papers from Journals and Conferences |  |
| 4. I.T. Young, J.J. Gerbrands, L.J. van Vliet   | :Image Processing Fundamentals           |
| 5. Russ, J.C.                                   | :The Image Processing Handbook.          |

**CSE-4802 Pattern Recognition and Image processing sessional****Credit Hours:** 1.5**Contact Hours:** 3 per week

Laboratory works based on CSE-4805

Lab 1: Report on Bitmap image format, Write a program in C/C++ to open a bitmap font image.

Lab2: Image enhancement: Binary Image, gray level image, negative, brightness, darkness, thresholding (single, duel, contrast stretching).

Lab 3: Filtering: Smoothing, Sharpening.

Lab 4: Image Histogram: Calculate the histogram of an image, equalize the image.

Lab 5: Implement various image compression methods.

Lab 7 Implement different segmentation methods.  
 Lab 8 Pattern recognition using different approaches.  
 To perform also other experiments relevant to this course.

### **CSE-4803 Internet Technologies and Web Programming**

**Credit Hours: 2**

**Contact Hours: 2 per week**

[Pre requisite: CSE 2411:Programming with Java]

1. **Introduction:** Introduction to Computer and Internet; **Hyper Text Markup Language (HTML):** Introduction, Basic concepts, Lists, Tables, Forms, Internal Linking, Image maps, META and FRAMESET Tags.
2. **XML and XHTML:** XML basics; XHTML: Document Structure, Basic Tags, Text Formatting, Character Entities, Lists, Links, Images, Color, Tables, Forms, Image Maps, Meta tags, Framesets.
3. **JavaScript:** Introduction, Control Structures, Functions, Arrays, and Objects.
4. **Dynamic HTML:** Introduction, Cascading Style Sheets, Event Handlers, Document Object Model etc.
5. **E-commerce:** Introduction to E-business, Future of E-commerce
6. **Security :**Public Key Cryptography, Secure Sockets Layer (SSL), Secure Electronic Transaction (SET).
7. **Web Programming:** WWW database; The creation and updating the web content; Expanding Internet services by adding client-side and server-side processing; Interfacing internet to a database; Querying database using Cold Fusion.
8. **Others:** Overview of server-side technologies, including PHP, ASP etc.

#### Recommended Books:

1. Deitel, Deitel, and Nieto "Internet & World Wide Web How to Program", Third Edition.
2. Marty Hall and Larry Brown "Core Web programming", Second Edition.

### **CSE 4804: Internet Technologies and Web Programming Sessional**

**Credit Hours: 1**

**Contact Hours: 2 per week**

Laboratory works based on CSE 4803.  
 To perform other experiments relevant to this course.

## **OPTION II (ONE COURSE TO BE TAKEN)**

### **CSE-4719 Digital System Design**

**Credit Hours:** 3

**Contact Hours:** 3 per week

[Pre requisite: CSE-3511 Microprocessors and Microcontrollers]

Design using MSI and LSI components; Design of memory subsystem using SRAM and DRAM; Design of various components of computer: ALU, memory and control unit- hardwired and micro-programmed; Microprocessor based designs; Computer bus standards; Design using special purpose controllers, floppy disk controller.

### **CSE-4720 Digital System Design sessional**

**Credit Hours:** 1.5

**Contact Hours:** 3 per week

Laboratory works based on CSE-4719  
To perform also other experiments relevant to this course.

### **CSE-4721 Fault Tolerant System**

**Credit Hours:** 3

**Contact Hours:** 3 per week

[Pre requisite: CSE-3509 Computer Architecture]

Introduction to fault tolerant system and architecture; Fault detection and location in combination and sequential circuits; Fault test generation for combination and sequential circuits; Digital simulation as a diagnostic tool; Automatic test pattern generator; Fault modeling; Automatic test equipment, Faults in memory, memory test pattern and reliability; Performance monitoring, self-checking circuits; Burst error correction and triple modular redundancy; Maintenance processors.

#### Recommended Books:

David James Norman : Professional Electronics Trading

### **CSE-4722 Fault Tolerant System sessional**

**Credit Hours:** 1.5

**Contact Hours:** 3 per week

Laboratory works based on CSE-4721  
To perform also other experiments relevant to this course.

### **CSE-4723 Mathematical Analysis for Computer Science**

**Credit Hours:** 3

**Contact Hours:** 3 per week

[Pre requisite: MATH-3505 Mathematics IV]

Recurrent problems; Manipulation of sums; Number theory; Special number; Generating function; Random variables; Stochastic process; Markov chain (discrete parameter, continuous parameter, birth-death process); Queuing models (birth-death model, Markov model), open and closed queuing network; Application of queuing models.

#### Recommended Books:

1. Donald E.Knuth, Ronald Graham : Concrete Mathematics
2. Sheldon Ross : Introduction to probability Model.

### **CSE-4724 Mathematical Analysis for Computer Science sessional**

**Credit Hours:** 1.5

**Contact Hours:** 3 per week

Laboratory works based on CSE-4723

To perform also other experiments relevant to this course.

### **CSE-4725 Basic Graph Theory**

**Credit Hours:** 3

**Contact Hours:** 3 per week

[Pre requisite: CSE-2409 Computer Algorithms]

Graphs and simple graphs, diagraphs, subgraphs, walks, paths and cycles; trees spanning tree of graph, distance in graphs; Complementary graphs, cut-vertex, bridge and blocks, k-connected graphs; Euler tures, Hamiltonian cycles, Chines postman problem, Traveling salesman problem; Chromatic number, Chromatic polynomials, chromatic index, Vizing's theorems, planar graphs, perfect graphs.

### **CSE-4726 Basic Graph Theory sessional**

**Credit Hours:** 1.5

**Contact Hours:** 3 per week

Laboratory works based on CSE-4725

To perform also other experiments relevant to this course.

### **CSE-4727 Optical Fiber Communication**

**Credit Hours:** 3

**Contact Hours:** 3 per week

[Pre requisite: CSE-3607 Data Communication]

Optical fiber: introduction, structure, step index and graded index fibers, modes of propagation; Signal degradation in optical fibers: attenuation, signal distortion, pulses broadening mode coupling; Optical sources: LED, Laser diodes light source linearity modal partition and reflection noise; Power lunching and coupling: source to fiber power lunching Lansing scheme, fiber to fibber join, splicing fiber connectors; Photo detectors: basic principles, photo-detectors noise, response time, avalanche multiplication noise; Optical receiver operation: receiver configurations, digital receiver performance preamplifiers; Digital translation systems: point to point link, line coding, eye pattern, system performances; Advanced systems and techniques: WDM, local area networks, optical amplifier, phonic switching.

Recommended Books:

1. John M. Senior : Optical Fiber Communication.
2. D. K. Mynbaev : Fiber Optic communication teach.

### **CSE-4728 Optical Fiber Communication sessional**

**Credit Hours:** 1.5

**Contact Hours:** 3 per week

Laboratory works based on CSE-4727

To perform also other experiments relevant to this course.

### **CSE-4729 Communication Engineering**

Credit Hours: 3

Contact Hours: 3 per week [Pre requisite: CSE-3515 Data Communication]

#### **1. Digital Communication system**

Principal of Digital communication system design (Tx and Rx), Tradeoffs, advantages, comparison between analog and digital system. Information capacity, bit rate, baud rate and M-ary Encoding. Modulator and Demodulator of ASK, FSK, BPSK, QPSK, DPSK, GMSK, QAM etc.

#### **2. Performance analysis**

Performance metrics, Random variables and probability distribution. Probability of Error and Bit Error Rate. Error Performance. Random process, Gaussian process. Noise analysis, Channel types and characteristics, Simulation method.

### 3. Optical communication

Optical transmitter and receiver. Fiber optic cable Fiber geometry: step-index and graded-index fibers, wave propagation in fiber, dispersion. , Optical sources and detectors, feedback, driving circuitry. P-I-N and avalanche photodiode receivers, receiver sensitivity, bit error rate and fiber amplifiers. Multiplexing, System link budget.

### 4. Pulse Communication

Pulse Modulation: PAM, PPM, PWM, PCM. Transmitter and Receiver. Coding method. Delta modulation. Pulse Transmission method. Inter symbol Interference. Signal power and Eye diagram.

### 5. Wireless communication

Modern wireless communication system overview, Application and requirements of wireless service: Broadcast, cellular and cordless telephony, Trunking radio system and fixed wireless access. Data rate versus range for various application, Energy consumption, Use of spectrum, service quality, Economic and social aspect. Difference between wired and wireless system, Fading, frequency reuse principal.

### 6. Cellular and mobile communication

Cellular communications system, 3G, 4G system, Multiplexing and Air Interface: Frequency division multiple access (FDMA), Time division multiple access (TDMA). Spread spectrum multiple access: FHMA, DS CDMA. Service: GSM, EDGE etc. Mobile OS, Protocol, J2ME. New technology: UWB, Wi-Max etc.

### 7. Satellite communication

Configuration of satellite communication systems, satellite services and frequency allocation Satellite orbit, motion, paths, types of satellites. Earth station antennas: types, gain, and effective isotropic radiated power (EIRP). VSAT technologies and network configurations.

### 8. RF technique and Radio system design

RF components: Antenna, Amplifier, Filter, Mixer, Oscillator, Switch, Attenuator, Divider, Combiner, Coupler, Circulator, Isolator, transformer, Detector etc. Customized system design.

#### Book Reference:

1. Advanced electronic communication system by Wayne Tomasi
2. Digital Communication by Proakis
3. Wireless communication by A. F. Molisch
4. Modern wireless communication by Simon Haykin
5. Electronic Communication System by Kennedy & Davis

## CSE-4730 Communication Engineering sessional

**Credit Hours:** 1.5

**Contact Hours:** 3 per week

#### Digital Communication Board

- (a) PAM modulation and Demodulation
- (b) PCM modulation and Demodulation
- (c) Time division multiplexing (TDM)

#### MATLAB Simulation & Simulink

- (a) Signal analysis and Digital Modulation (ASK, FSK, PSK)
- (b) Tx/Rx, Channel and Noise
- (c) Pulse Communication

#### Optical Communication Board

- (a) Transmitter
- (b) Receiver

## CSE-4731 Internet and Intranet Engineering

**Credit Hours:** 3

**Contact Hours:** 3 per week

[Pre requisite: CSE-2411 Programming with Java]

Introduction, Internet services, Impacts of internet, Internet structure protocols and access overview, Internet protocol model overview, Internet addresses, Internet protocols, Transport layer, Upper layer protocols, IPv4, IPng (internet protocol next generation), Internet access & applications; Router technology: introduction, network fundamentals, internet routing & new developments, router market, Web server, from internet, intranet to extranet; How WWW Works: Hyper Text Transfer Protocol (HTTP); Web Servers; Web

access; Related Web capabilities; WWW proxies; Future of the web; WWW technology - virtual reality and the VRML, intranet and firewalls.

Internet audio conferencing, database interworking, Audio/Animation (RealAudio/ShockWave)

HTML technology, Applications and examples, The nuts and bolts of HTML; Tools and guides; Practical considerations; Beyond HTML; Future of HTML, WYSIWG HTML home page authoring tools, JAVA, JavaScript, PERL, tcl/tkl, CGI and tools, Browsing systems: overview, browsing features and capabilities; Netscape, Internet explorer & Other browsers. The next generation browser; Using browsers for business, Building a corporate Web Site: Using the WWW for business; getting connected; Elements of Web server; Internet security management issues, Extensions and applications on the Web, Legal and ethical issues; Online services, Future of the internet, Broadband communications, Supporting ATM services in IPng.

Recommended Books:

1. Daniel Minoli, McGraw-Hill :Internet and Intranet Engineering
2. Marion Cole, Pearson Education :Introduction to Telecommunications (Voice, Data, and Internet)
3. Deitel & Deitel ,Prentice Hall Publishers :How to Program Internet,
4. Naughton Schildt, Tata McGraw-Hill, Publishers: The Complete Reference Internet & Intranet
5. Douglas E. Commerce :The INTERNET Book

**CSE-4732 Internet and Intranet Engineering sessional**

**Credit Hours:** 1.5

**Contact Hours:** 3 per week

Laboratory works based on CSE-4731

To perform also other experiments relevant to this course.

**CSE-4733 Simulation and Modeling**

**Credit Hours:** 3

**Contact Hours:** 3 per week

[Pre requisite: MATH-3505 Mathematics IV]

Simulation methods, Model building, Random number generator, Simulation languages; Statistical analysis of results, Validation and verification technique; Digital simulation of continuous systems; Analogue simulation of continuous systems; Simulation and analytical methods for analysis of computer systems and practical problems in business and practice; Introduction to simulation packages.

Recommended Books:

1. J. Banks, J. S. Carson : Discrete Event System Simulation
2. Averill M. Law, W. D. Kelton : Simulation and Modeling Analysis

**CSE-4734 Simulation and Modeling sessional**

**Credit Hours:** 1.5

**Contact Hours:** 3 per week

Laboratory works based on CSE-4733

To perform also other experiments relevant to this course.

## OPTION III (ONE COURSE TO BE TAKEN)

### **CSE-4807 Multimedia Theory**

**Credit Hours:** 3

**Contact Hours:** 3 per week

Multimedia systems-introduction; Coding and compression standards; Architecture issues in multimedia; Operating systems issues in multimedia-real time OS issues, synchronization, interrupt handling; Database issues in multimedia- indexing and storing multimedia data, disk placement, disk scheduling, searching for a multimedia document; Networking issues in multimedia – Quality-of service guarantees, resource reservation, traffic specification, haping and monitoring, admission control; Multicasting issues; Session directories; Protocols for controlling sessions; Security issues in multimedia- digital water- marking, partial encryption schemes for video streams; Multimedia applications- audio and video conferencing, video on demand, voice over IP.

### **CSE-4808 Multimedia Theory sessional**

**Credit Hours:** 1.5

**Contact Hours:** 3 per week

Laboratory works based on CSE-4807

To perform also other experiments relevant to this course.

### **CSE-4809 VLSI Design**

**Credit Hours:** 2

**Contact Hours:** 2 per week

[Pre requisite: CSE-2303 Digital Electronics and Pulse Technique]

1. **Chapter one:** A Historical Perspective; Issues in VLSI Design; CMOS Logic (Inverter, Combinational Logic, NAND, NOR, Commppound gates, Multiplexers, Memory --Latches and Registers. Circuit and System Representations and Examples
2. **Chapter Two:** MOSFET Transistor; MOS Device Design Equations; CMOS Inverter and Bipolar Devices.
3. **Chapter Three:** Silicon Semiconductor and Basic CMOS Technology; CMOS Process Enhancements; Layout Design Rules and Latch up.
4. **Chapter Four:** CMOS Logic Gate Design; Basic Physical Design of Simple Logic Gates; CMOS Logic Structures; Clocking Strategies and I/O Structures
5. **Chapter Five:** Circuit Characterization and Performance Estimation (Resistance Estimation, Capacitance Estimation, Inductance, Switching Characteristics, Power Dissipation, Charge Sharing, Scaling of MOS Transistors Dimensions) and CMOS Design Methods (Design Strategies, CMOS Chip design options, Design Methods, Design Capture Tools, Design Verification Tools, Design economics)
6. **Chapter Six:** Need for Testing, Manufacturing Test Principles, Design Strategies for Test, Chip Level and System Level Test Techniques
7. **Chapter Seven:** CMOS Subsystem Design (Data path Operations, Memory elements and Control); A Core RISC Micro controller Design; Major Logic Blocs Design and A 6-bit Flash A/D Design

#### Recommended Books:

1. Neil H.E. Weste and Kamran Eshraghian :Principles of CMOS Design,
2. Sung-Mo Kang, Yusuf Leblebici :CMOS Digital Integrated Circuits Analysis and Design
3. R.Jacob Baker, Harry W .Li, David E.Boyce :CMOS Circuit design, Layout and Simulation, Modern VLSI Design : Systems on Silicon,.
4. Linda E.M. Brackendury :Design of VLSI Systems : A practical Introduction,
5. Jan M. Rabaey, :Digital Integrated Circuits:
6. James D. Plummer, Michael D. Deal and Peter B. Griffin :Silicon VLSI Technology: Fundamentals, Practice and Modeling.:

## CSE-4810 VLSI Design sessional

**Credit Hours:** 1.0

**Contact Hours:** 2 per week

Laboratory works based on CSE-4803

1. Installation of VLSI Software and introduction of the manual.
2. nWell CMOS design rules.
3. Layout design for the CMOS inverter and simulation.
4. Layout design for CMOS NAND2 and simulation.
5. Layout design for CMOS NOR2 and simulation.
6. Layout design for CMOS XOR2 and simulation.
7. Design the layout of a standard half adder and simulation.
8. Design the layout of a standard full adder and simulation.
9. Design of the layout of 6-transistor static RAM and simulation.
10. Design of the layout of 4-bit Manchester adder and simulation.
11. Other relevant design related this course.

## CSE-4811 Neural Network and Fuzzy System

**Credit Hours:** 3

**Contact Hours:** 3 per week

1. **Introductory Concept:** History of neural network, human brain, biological neural network, synapses and their weights, pre- and post-synaptic signals, activation potential and activation function. Excitatory and inhibitory synapses, biasing input, characteristics of neural network, limitation of neural network, application of neural network
2. **Fundamental concept of ANN:** Basic models of artificial neuron, activation function, network architecture, neural network viewed as directed graph, Basic learning rules, supervised and unsupervised learning, Competitive learning.
3. **Perceptrons:** Overview of perceptrons, Single layer of perceptrons, mathematical model of single layer perceptrons, perceptrons learning algorithm, Delta learning rule, Multi-layer perceptrons, Back propagation learning algorithm, mathematical model of MLP network.
4. **Function Approximation:** Basis function network, Radial Basis function networks (RBF), MLP vs. RBF networks, Support vector machine (SVM), Hebbian learning and PCA, Linear Associative Memories (LAMs)
5. **Competitive Network:** Simple competitive network: Winner-take-all network, Adaptive Resonance Theory (ART), ART-1 architecture and algorithm, Kohonen Self-organizing Maps (SOMs), Counter Propagation Network (CPNs)
6. **Associative memory network:** Linear Feedforward Associative memory network, Recurrent associative memory network, Bidirectional Associative memory network (BAM), Brain-State-in-a-Box (BSB) network, Hopfield networks, Boltzmann machine, Travelling salesman problem
7. **Fuzzy system:** Introduction to Fuzzy system, Fuzzy relations, fuzzy numbers, Linguistic description and their analytical form, fuzzy control.

### Recommended Books:

- 1) Simon Haykin : Neural Networks -- a Comprehensive Foundation
- 2) Zurada, Jacek M. : Introduction to Artificial Neural Systems,
- 3) S. Rajasekaran, G.A. Vijayalakshmi Pai, : Neural Networks, Fuzzy Logics, and Genetic Algorithm
- 4) Stamations V. Kartalopoulos, : Understanding Neural Networks and Fuzzy Logic,
- 5) Bart Kosko, : Neural Networks and Fuzzy System,
- 6) Mohamad H. Hassoun, : *Fundamentals of artificial neural networks*

## CSE-4812 Neural Network and Fuzzy System sessional

**Credit Hours:** 1.5

**Contact Hours:** 3 per week

Laboratory works based on CSE-4811

1. MATLAB and ANN Toolbox
2. Problem related perceptron (Logical AND, OR, NOT Problem)
3. Problem based on Backpropagation Network (XOR problem)
4. **Pattern Recognition:** Classification of Digits 0-9
5. Problems based on Hopfield Model
6. Boltzmann Machine problem: Traveling Salesman Problem
7. Problem related to Self-Organizing Map
8. Problems on Adaptive Resonance Theory
9. Problem on Fuzzy system
10. To perform also other experiments relevant to this course.

## CSE-4813 Computer Vision and Robotics

**Credit Hours:** 3

**Contact Hours:** 3 per week

Introduction to computer vision and perception; Image generation, Physics of image and sensors, statistical, estimation, binary vision and industrial vision systems, representations of the visual world; Two-dimensional systems, common recognition problems; Introduction to robotics: industrial robots, programming systems, geometric reasoning, assembly planning, collision avoidance, mobile robots, robotics IQ test, smart robotics.

### Recommended Books:

1. John J. Craig : Introduction To Robotics Machines and Control
2. R. Paul : Robot Manipulators

## CSE-4814 Computer Vision and Robotics sessional

**Credit Hours:** 1.5

**Contact Hours:** 3 per week

Laboratory works based on CSE-4813

To perform also other experiments relevant to this course.

## CSE-4815 Distributed Database

**Credit Hours:** 3

**Contact Hours:** 3 per week

[Pre requisite: CSE-3513 Database System]

Introduction to distributed databases; Replicated data, Distributed concurrency control; Deadlocks; Byzantine failures; Distributed transaction management; Query processing and optimization; Parallel database machine; Multimedia database servers; Heterogeneous multidatabase systems.

## CSE-4816 Distributed Database sessional

**Credit Hours:** 1.5

**Contact Hours:** 3 per week

Laboratory works based on CSE-4815

To perform also other experiments relevant to this course.

## CSE-4817 Fixed Telephony Cellular and Mobile Communication

**Credit Hours:** 3

**Contact Hours:** 3 per week

[Pre requisite: CSE-4729 Communication Engineering]

Cellular & Mobile Communication: Introduction to code divisions Multiple Access (CDMA), Basic concepts, Spread spectrum, DS (Direct sequence) spread spectrum, Reverse link DSCDMA, forward link DS-SS-CDMA, Cellular systems, GSM, AMPS, Cellular digital packet data. CDMA Air links: Pilot channel, Synchronous channel, Paging channel, Traffic channel, Free space propagation, Propagation model, Multi path propagation, Propagation environment, Marine environment.



Historical developments of Mobile Telephony, Trunking efficiency, Propagation criteria, mobile radio environment, Elements of cellular radio system design, Specifications, Channel capacity, Cell coverage for signal and traffic, Mobile propagation models and fading models, Interference effects, Power control, Mobile switching and traffic, Mobile switching system and its subsystems, Mobile communication protocols.

Satellite Communication: Introduction, Orbits, Station keeping, Satellite altitude, Transmission path, Path losses, Noise considerations, Satellite systems, Saturation flux density, Effective isotropic radiated power, Multiple access methods.

### **CSE-4818 Fixed Telephony Cellular and Mobile Communication sessional**

**Credit Hours:** 1.5

**Contact Hours:** 3 per week

Laboratory works based on CSE-4817

To perform also other experiments relevant to this course.

### **CSE-4819 Special Topic on Computer Science and Engineering**

**Credit Hours:** 3

**Contact Hours:** 3 per week

Selected advanced topic from the field of computer science and engineering. It may vary from time to time.

### **CSE-4820 Special Topic on Computer Science and Engineering sessional**

**Credit Hours:** 1.5

**Contact Hours:** 3 per week

Laboratory works based on CSE-4819

To perform also other experiments relevant to this course.