Deparment of Electrical and Electronic Engineering (EEE)

Revised Syllabus
for
B.Sc. in Electrical and Electronic Engineering

Spring-2006

International Islamic University Chittagong (IIUC)

Faculty of Modern Sciences
Department of Electrical and Electronic Engineering

Course Plan in EEE

The following section gives a course plan in EEE with four major as listed below.

1) Major in **communication engineering**
2) Major in **electronics engineering**
3) Major in **power systems engineering**
4) Major in **computer science & engineering**

Course Identification Plan

For course identification, the following code plan has been adapted:

First digit stands for Year, the Second digit stands for Semester, the Third digit stands for Group & the Fourth digit stands for the course number (odd number has been assigned to theory course and the even number has been assigned to laboratory course). Further coding scheme:

Digit 0 and 1 is for core courses
2 for interdisciplinary
3 for communication
5 for electronics
7 for power
9 for computer

Programs of Study:

The B.Sc. (Engineering) program in the department of Electrical & Electronic Engineering consist of 72 courses carrying 160 Credit Hours. There are 9 University Requirement Courses (URC) carrying 12 credit hours, 4 Interdisciplinary Courses carrying 8 credit hours, 48 Core Courses carrying 111.5 credit hours and 11 Elective Courses carrying 28.5 credit hours. In the Core Courses there are 29 theory courses carrying 83 credit hours and 19 practical courses carrying 28.5 credit hours. In the elective courses there are 8-theory course carrying 24 credit hours and 3 practical courses carrying 4.5 credit hours

Total 160 credit hours 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, 20 marks are for class tests/assignments/oral tests, 30 marks for mid-term examination and 50 marks for the final examination. 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 and general viva-voce is as follows:

1) Project/Thesis evaluation by Supervisor-	35%
2) Project/Thesis evaluation by Examiner-	35%
3) General Viva-Voce-	30%
Total	100%

Summary of Courses

Types of Courses	No. of Courses	Credit Hours
University Requirement Courses	9	12
Interdisciplinary Courses	4	8
Core Courses Theory	27	76
Core Courses Practical	21	35.5
Elective Courses Theory	8	24
Elective Courses Practical	3	4.5
Total	**72**	**160**

Semesterwise Summary of Courses

Semester	No. Of Courses	Contact hours/Week			Credit Hours		
		Theory	Lab	Total	Theory	Lab	Total
1st	9	15	8	23	11	4	15
2nd	9	16	9	25	16	4.5	20.5
3rd	9	18	9	27	14	4.5	18.5
4th	10	18	12	30	17	6	23
5th	10	15	12	27	14	6	20
6th	8	17	6	23	17	3	20
7th	9	15	10	25	15	6	21
8th	8*	16	10	26	16	6	22
Total	72	130	76	206	120	40	160

* Here thesis has not been counted as it has been counted in 7th semester

A. List of University Requirement Courses

Serial No	Course No.	Course Title	Contact Hours/Week		Credit Hours		Prerequisite Courses
			Theory	Practical	Theory	Practical	
1	UREL-1103	Advanced English	3		2		
2	URAL-1101	Elementary Arabic	3		1		
3	URIS-1101	Islamic Aqidah	1		1		
4	URIS-1203	Introduction to Ibadah	1		1		
5	URIS-2303	Introduction to Qur'an and Sunnah	2		1		
6	URIS-3505	Introduction to Islamic Political System	1		1		
7	URIS-3607	Biography of the Prophet (SAW)	2		2		
8	URIH-4701	A Survey of Islamic History	1		1		
9	URBS-4802	Bangladesh Studies	2		2		
	Total	**9 Courses**	**16**		**12**		

B. List of Interdisciplinary Courses

Serial No	Course No.	Course Title	Contact Hours/Week		Credit Hours		Prerequisite Courses
1	ACC-2501	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		
	Total	**4 Courses**	**8**		**8**		

C. Core Courses

SL. No.	Course Number	Course Name	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 Equation and Vector Analysis)	3		3		Math-2301
5	Math-3501	Mathematics IV (Linear Algebra)	3		2		Math 2401
6	Stat-1211	Statistics	3		3		
7	Phy-1103	Physics I (Mechanics, Waves, Heat & Thermodynamics)	3		3		
8	Phy-1104	Physics I Sessional		3		1.5	
9	Phy-1203	Physics II (Electromagnetism, Optics & Modern Physics)	3		3		Phy-1103
10	Phy-1204	Physics II Sessional		3		1.5	
11	ME-2301	Fundamentals of Mechanical Engineering	3		2		
12	ME-2302	Fundamentals of Mechanical Engineering Sessional		3		1.5	
13	CE-2301	Engineering Drawing Sessional		3		1.5	
14	CSE-1101	Computer Fundamentals	2		1		
15	CSE-1102	Computer Fundamentals Sessional		2		1	
16	CSE-1201	Computer Programming	3		3		

SL. No.	Course Number	Course Name	Contact Hours/Week		Credit Hours		Prerequisite Courses
			Theory	Practical	Theory	Practical	
17	CSE-1202	Computer Programming Sessional		3		1.5	
18	EEE-1101	Electrical Circuits I	3		3		
19	EEE-1102	Electrical Circuits I Sessional		3		1.5	
20	EEE-1201	Electrical Circuits II	3		3		EEE-1101
21	EEE-1202	Electrical Circuit II Sessional		3		1.5	
22	EEE-2301	Electronics I	3		3		EEE-1201
23	EEE-2302	Electronic I Sessional		3		1.5	
24	EEE-2303	Energy Conversion I	4		4		EEE-1201
25	EEE-2401	Energy Conversion II	4		4		EEE-2303
26	EEE-2402	Energy Conversion Sessional		3		1.5	
27	EEE-2403	Electronics II	3		3		EEE-2301
28	EEE-2404	Electronics II Sessional		3		1.5	
29	EEE-2405	Engineering Electromagnetism	3		2		EEE-1201
30	EEE-2407	Digital Electronics	3		3		EEE-2301
31	EEE-2408	Digital Electronics Sessional		3		1.5	
32	EEE-2410	Numerical Technique Sessional		3		1.5	CSE-1101
33	EEE-3501	Continuous Signals & Linear Systems	3		3		Math 2401
34	EEE-3503	Power System I	3		3		EEE-1201
35	EEE-3504	Power System I Sessional		3		1.5	
36	EEE-3505	Microprocessor & Interfacing	3		3		EEE-2407
37	EEE-3506	Microprocessor & Interfacing Sessional		3		1.5	
38	EEE-3510	Circuit Simulation Sessional		3		1.5	EEE-2301
39	EEE-3512	Electrical Services Design Sessional		3		1.5	
40	EEE-3601	Communication Theory	3		3		EEE-3501
41	EEE-3602	Communication Theory Sessional		3		1.5	
42	EEE-3603	Digital Signal Processing I	3		3		EEE-3501
43	EEE-3604	Digital Signal Processing I Sessional		3		1.5	
44	EEE-3605	Electrical Properties of Materials	3		3		EEE-2301
45	EEE-3607	Solid State Devices	3		3		EEE-2403
46	EEE-4701	Control System I	3		3		EEE-3501
47	EEE-4702	Control System I Sessional		3		1.5	
48	EEE- 4800	Thesis		6		6	
Total		48 courses	82	65	76	35.5	

Optional Courses (one course to be taken)

Course No.	Course Title	Contact Hours/Week		Credit Hours		Prerequisite Courses
		Theory	Practical	Theory	Practical	
FIN-4701	Finance and Marketing for Engineers	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		

Elective Courses

In order to achieve a degree in Electrical and Electronic Engineering from IIUC, a student will have to complete 11 elective courses (3 lab courses and 8 theory courses) of 28.5 credit hours from any of the following five major disciplines or specialized areas:

- Communication Engineering
- Electronics Engineering
- Power Systems Engineering
- Computer Science & Engineering
- Interdisciplinary Fields

A student has to take 2 lab courses and at least 4 (but not more than 5) theory courses from one group as major; at least 2 theory courses from other groups as minor and must take 1 theory course and 1 lab course from interdisciplinary group [Total 11 courses (3 lab courses and 8 theory courses)]. Any lab course must be followed with the corresponding theory course and vice versa (if any).

(i) Communication Engineering

SL. No.	Course Number	Course Name	Contact Hours/Week		Credit Hours		Prerequisite Courses
			Theory	Practical	Theory	Practical	
1	EEE-3631	Random Signals & Processes	3		3		EEE-3501
2	EEE-4731	Digital Signal Processing II	3		3		EEE-3603
3	EEE-4733	Microwave Engineering	3		3		EEE-3601
4	EEE-4734	Microwave Engineering Sessional		3		1.5	
5	EEE-4735	Optical Fiber Communication	3		3		EEE-3601
6	EEE-4831	Digital Communication	3		3		EEE-3601
7	EEE-4832	Digital Communication Sessional		3		1.5	
8	EEE-4833	Mobile Cellular Communication	3		3		EEE-3601
9	EEE-4835	Telecommunication Engineering	3		3		EEE-3601

(ii) Electronics Engineering

SL. No.	Course Number	Course Name	Contact Hours/Week		Credit Hours		Prerequisite Courses
			Theory	Practical	Theory	Practical	
1	EEE-3651	Analog Integrated Circuit	3		3		EEE-2403
2	EEE-4751	Processing & Fabrication Technology	3		3		EEE-3607
3	EEE-4753	VLSI I	3		3		EEE-3607
4	EEE-4754	VLSI I Sessional		3		1.5	
5	EEE-4755	Compound Semiconductor & Heterojunction Devices	3		3		EEE-2403
6	EEE-4851	VLSI II	3		3		EEE-4753
7	EEE-4852	VLSI II Sessional		3		1.5	
8	EEE-4853	Opto-electronics	3		3		EEE-2403
9	EEE-4855	Semiconductor Device Theory	3		3		EEE-3607

(iii) Power Systems Engineering

SL. No.	Course Number	Course Name	Contact Hours/Week		Credit Hours		Prerequisite Courses
			Theory	Practical	Theory	Practical	
1	EEE-3671	Power System II	3		3		EEE-3503
2	EEE-4771	Energy Conversion III	3		3		EEE-2401
3	EEE-4773	Power Electronics	3		3		EEE-2403
4	EEE-4774	Power Electronics Sessional		3		1.5	
5	EEE-4775	Power Plant Engineering	3		3		
6	EEE-4871	Power System Protection	3		3		EEE-3503
7	EEE-4872	Power System Protection Sessional		3		1.5	
8	EEE-4873	Power System Reliability	3		3		EEE-3503
9	EEE-4875	Power System Operation & Control	3		3		EEE-3503
10	EEE-4877	High Voltage Engineering	3		3		EEE-3503
11	EEE-4878	High Voltage Engineering Sessional		3		1.5	

(iv) Computer Science & Engineering

SL. No.	Course Number	Course Name	Contact Hours/Week		Credit Hours		Prerequisite Courses
			Theory	Practical	Theory	Practical	
1	EEE-3691	Discrete Mathematics	3		3		EEE-2410
2	EEE-4791	Operating System	3		3		EEE-2410
3	EEE-4793	Data Structure	3		3		EEE-2410
4	EEE-4794	Data Structure Sessional		3		1.5	
5	EEE-4795	Software Engineering	3		3		EEE-2410
6	EEE-4891	Computer Networks	3		3		EEE-2410
7	EEE-4892	Computer Networks Sessional		3		1.5	
8	EEE-4893	Computer Architecture	3		3		EEE-3505
9	EEE-4895	Multimedia Communication	3		3		EEE-2410
10	EEE-4897	Microprocessor System Design	3		3		EEE-3505
11	EEE-4898	Microprocessor System Design Sessional		3		1.5	

(v) Interdisciplinary Fields

SL. No.	Course Number	Course Name	Contact Hours/Week		Credit Hours		Prerequisite Courses
			Theory	Practical	Theory	Practical	
1	EEE-4821	Control System II	3		3		EEE-4701
2	EEE-4822	Control System II Sessional		3		1.5	
3	EEE-4823	Numerical Methods	3		3		EEE-2410
4	EEE-4824	Numerical Methods Sessional		3		1.5	
5	EEE-4825	Biomedical Instrumentation	3		3		EEE-2403
6	EEE-4826	Biomedical Instrumentation Sessional		3		1.5	
7	EEE-4827	Measurement & Instrumentation	3		3		EEE-2403
8	EEE-4828	Measurement & Instrumentation Sessional		3		1.5	

Semester wise Course Offerings:

The semester wise course distribution will follows in the following sub-sections.

FIRST SEMESTER

Course Number	Course Name	Contact Hours/Week		Credit Hours		Prerequisite Courses
		Theory	Practical	Theory	Practical	
EEE-1101	Electrical Circuits I	3	0	3		
EEE-1102	Electrical Circuits I Sessional	0	3	0	1.5	
CSE-1101	Computer Fundamentals	2	0	1	0	
CSE-1102	Computer Fundamentals Sessional	0	2	0	1	
Math-1101	Elementary Mathematics	3	0	1		
Phy-1103	Physics I (Mechanics, Waves, Heat & Thermodynamics)	3	0	3	0	
Phy-1104	Physics I Sessional	0	3	0	1.5	
UREL-1103	Advanced English	3	0	2	0	
URIS-1101	Islamic Aqidah	1	0	1	0	
Total	(6+3) Courses	15	8	11	4	

SECOND SEMESTER

Course Number	Course Name	Contact Hours/Week		Credit Hours		Prerequisite Courses
		Theory	Practical	Theory	Practical	
EEE-1201	Electrical Circuits II	3	0	3	0	EEE-1101
EEE-1202	Electrical Circuits II Sessional	0	3	0	1.5	
CSE-1201	Computer Programming	3	0	3		
CSE-1202	Computer Programming Sessional	0	3		1.5	
Phy-1203	Physics II (Electromagnetism, Optics & Modern Physics)	3	0	3	0	Phy-1103
Phy-1204	Physics II Sessional	0	3	0	1.5	
MATH-1201	Mathematics I (Differential Calculus and Geometry)	3	0	3	0	Math-1101
STAT-1211	Statistics	3	0	3	0	
URIS-1203	Introduction to Ibadah	1	0	1	0	
Total	(6 + 3) Courses	16	9	16	4.5	

THIRD SEMESTER

Course Number	Course Name	Contact Hours/Week		Credit Hours		Prerequisite Courses
		Theory	Practical	Theory	Practical	
EEE-2301	Electronics I	3	0	3	0	EEE-1201
EEE-2302	Electronic Circuit I Sessional	0	3	0	1.5	
EEE-2303	Energy Conversion I	4	0	4	0	EEE-1201
MATH-2301	Mathematics II (Matrices and Integral Calculus)	3	0	3	0	MATH-1201
CE -2301	Engineering Drawing Sessional	0	3	0	1.5	
ME- 2301	Fundamentals of Mechanical Engineering	3	0	2	0	
ME-2302	Fundamentals of Mechanical Engineering Sessional	0	3	0	1.5	
URAL-1101	Elementary Arabic	3	0	1	0	
URIS-2303	Introduction to Qur'an and Sunnah	2	0	1	0	
Total	(6 + 3) Courses	18	9	14	4.5	

FOURTH SEMESTER

Course Number	Course Name	Contact Hours/Week		Credit Hours		Prerequisite Courses
		Theory	Practical	Theory	Practical	
EEE-2401	Energy Conversion II	4	0	4	0	EEE-2303
EEE-2402	Energy Conversion Sessional	0	3	0	1.5	
EEE-2403	Electronics II	3	0	3	0	EEE-2301
EEE-2404	Electronics II Sessional	0	3	0	1.5	
EEE-2405	Engineering Electromagnetism	3	0	2	0	EEE-1201
MATH-2401	Mathematics III (Differential Equation and Vector Analysis)	3	0	3	0	MATH-2301
EEE-2407	Digital Electronics	3	0	3	0	EEE-2301
EEE-2408	Digital Electronics Sessional	0	3	0	1.5	
EEE-2410	Numerical Technique Sessional	0	3	0	1.5	CSE-1101
ECON-3501	Principles of Economics	2	0	2	0	
Total	(6 + 4) Courses	18	12	17	6	

FIFTH SEMESTER

Course Number	Course Name	Contact Hours/Week		Credit Hours		Prerequisite Courses
		Theory	Practical	Theory	Practical	
EEE-3501	Continuous Signals & Linear Systems	3	0	3	0	MATH-2401
EEE-3503	Power System I	3	0	3	0	EEE-1201
EEE-3504	Power System I Sessional	0	3	0	1.5	
EEE-3505	Microprocessor and Interfacing	3	0	3	0	EEE-2407
EEE-3506	Microprocessor & Interfacing Sessional	0	3	0	1.5	
EEE-3510	Circuit Simulation Sessional	0	3	0	1.5	EEE-2301
EEE-3512	Electrical Services Design Sessional	0	3	0	1.5	
Math-3501	Mathematics IV (Linear Algebra)	3	0	2	0	MATH-2401
ACC-2501	Financial and Managerial Accounting	2	0	2	0	
URIS-3505	Introduction to Islamic Political System	1	0	1	0	
Total	(6 + 4) Courses	15	12	14	6	

SIXTH SEMESTER

Course Number	Course Name	Contact Hours/Week		Credit Hours		Prerequisite Courses
		Theory	Practical	Theory	Practical	
EEE-3601	Communication Theory	3	0	3	0	EEE-3501
EEE-3602	Communication Theory Sessional	0	3	0	1.5	
EEE-3603	Digital Signal Processing I	3	0	3	0	EEE-3501
EEE-3604	Digital Signal Processing I Sessional	0	3	0	1.5	
EEE-3605	Electrical Properties of Materials	3	0	3	0	EEE-2301
EEE-3607	Solid State Devices	3	0	3	0	EEE-2403
EEE-36XX	Elective I	3	0	3	0	
MGT-3601	Industrial Management	2	0	2	0	
Total	(6 + 2) Courses	17	6	17	3	

SEVENTH SEMESTER

Course Number	Course Name	Contact Hours/Week		Credit Hours		Prerequisite Courses
		Theory	Practical	Theory	Practical	
EEE-4800	Project/ Thesis	0	4	0	3	
EEE-4701	Control System I	3	0	3	0	EEE-3501
EEE-4702	Control System I Sessional	0	3	0	1.5	
EEE-47XX	Elective II	3	0	3	0	
EEE-47XX	Elective III	3	0	3	0	
EEE-47XX	Elective III Sessional	0	3	0	1.5	
EEE-47XX	Elective IV	3	0	3	0	
XXX-47xx	One optional course	2	0	2	0	
URIH-4701	A Survey of Islamic History	1	0	1	0	
Total	(6 + 3) Courses	15	10	15	6	

EIGHTH SEMESTER

Course Number	Course Name	Contact Hours/Week		Credit Hours		Prerequisite Courses
		Theory	Practical	Theory	Practical	
EEE-4800	Project / Thesis	0	4	0	3	
EEE-48XX	Elective V	3	0	3	0	
EEE-48XX	Elective V Sessional	0	3	0	1.5	
EEE-48XX	Elective VI	3	0	3	0	
EEE-48XX	Elective VII	3	0	3	0	
EEE-48XX	Elective VIII	3	0	3	0	
EEE-48XX	Elective VIII Sessional	0	3	0	1.5	
URIS-3607	Biography of the Prophet (SAWS)	2	0	2	0	
URBS-4802	Bangladesh studies	2	0	2	0	
Total	(6 + 3) Courses	16	10	16	6	

Grand Total 160

Semesterwise Elective Courses:

Elective I (6th Semester)

SL. No.	Course Number	Course Name	Contact Hours/Week		Credit Hours		Prerequisite Courses
			Theory	Practical	Theory	Practical	
1	EEE-3631	Random Signals & Processes	3		3		EEE-3501
2	EEE-3651	Analog Integrated Circuits	3		3		EEE-2403
3	EEE-3671	Power System II	3		3		EEE-3503
4	EEE-3691	Discrete Mathematics	3		3		EEE-2410

Elective II (7th Semester)

SL. No.	Course Number	Course Name	Contact Hours/Week		Credit Hours		Prerequisite Courses
			Theory	Practical	Theory	Practical	
1	EEE-4731	Digital Signal Processing II	3		3		EEE-3603
2	EEE-4751	Processing Fabrication Technology	3		3		EEE-3607
3	EEE-4771	Energy Conversion III	3		3		EEE-2401
4	EEE-4791	Operating System	3		3		EEE-2410

Elective III (7th Semester)

SL. No.	Course Number	Course Name	Contact Hours/Week		Credit Hours		Prerequisite Courses
			Theory	Practical	Theory	Practical	
1	EEE-4733	Microwave Engineering	3		3		EEE-3601
2	EEE-4734	Microwave Engineering Sessional		3		1.5	
3	EEE-4753	VLSI I	3		3		EEE-3607
4	EEE-4754	VLSI I Sessional		3		1.5	
5	EEE-4773	Power Electronics	3		3		EEE-2403
6	EEE-4774	Power Electronics Sessional		3		1.5	
7	EEE-4793	Data Structure	3		3		EEE-2410
8	EEE-4794	Data Structure Sessional		3		1.5	

Elective IV (7th Semester)

SL. No.	Course Number	Course Name	Contact Hours/Week		Credit Hours		Prerequisite Courses
			Theory	Practical	Theory	Practical	
1	EEE-4735	Optical Fiber Communication	3		3		EEE-3601
2	EEE-4755	Compound Semiconductor & Hetero-Junction Devices	3		3		EEE-2403
3	EEE-4775	Power Plant Engineering	3		3		
4	EEE-4795	Software Engineering	3		3		EEE-2410

Elective V (8th Semester)

SL. No.	Course Number	Course Name	Contact Hours/Week		Credit Hours		Prerequisite Courses
			Theory	Practical	Theory	Practical	
1	EEE-4831	Digital Communication	3		3		EEE-3601
2	EEE-4832	Digital Communication Sessional		3		1.5	
3	EEE-4851	VLSI II	3		3		EEE-4753
4	EEE-4852	VLSI II Sessional		3		1.5	
5	EEE-4871/ EEE-4877	Power System Protection / High Voltage Engineering	3		3		EEE-3503
6	EEE-4872/ EEE-4878	Power System Protection Sessional / High Voltage Engineering Sessional		3		1.5	
7	EEE-4891/ EEE-4897	Computer Networks/ Microprocessor System Design	3		3		EEE-2410/ EEE-3505
8	EEE-4892/ EEE-4898	Computer Networks Sessional/ Microprocessor System Design Sessional		3		1.5	

Elective VI (8th Semester)

SL. No.	Course Number	Course Name	Contact Hours/Week		Credit Hours		Prerequisite Courses
			Theory	Practical	Theory	Practical	
1	EEE-4833	Mobile Cellular Communication	3		3		EEE-3601
2	EEE-4853	Opto-electronics	3		3		EEE-2403
3	EEE-4873	Power System Reliability	3		3		EEE-3503
4	EEE-4893	Computer Architecture	3		3		EEE-3505

Elective VII (8th Semester)

SL. No.	Course Number	Course Name	Contact Hours/Week		Credit Hours		Prerequisite Courses
			Theory	Practical	Theory	Practical	
1	EEE-4835	Telecommunication Engineering	3		3		EEE-3601
2	EEE-4855	Semiconductor Device Theory	3		3		EEE-3607
3	EEE-4875	Power System Operation & Control	3		3		EEE-3503
4	EEE-4895	Multimedia Communication	3		3		EEE-2410

Elective VIII (8th Semester, Interdisciplinary)

SL. No.	Course Number	Course Name	Contact Hours/Week		Credit Hours		Prerequisite Courses
			Theory	Practical	Theory	Practical	
1	EEE-4821	Control System II	3		3		EEE-4701
2	EEE-4822	Control System II Sessional		3		1.5	
3	EEE-4823	Numerical Methods	3		3		EEE-2410
4	EEE-4824	Numerical Methods Sessional		3		1.5	
5	EEE-4825	Biomedical Instrumentation	3		3		EEE-2403
6	EEE-4826	Biomedical Instrumentation Sessional		3		1.5	
7	EEE-4827	Measurement & Instrumentation	3		3		EEE-2403
8	EEE-4828	Measurement & Instrumentation Sessional		3		1.5	

Synopsis of the Courses

A. University Requirement Courses

UREL-1103 Advanced English
Credit Hours: 2
Contact Hours: 3 per week

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. Reading: Pride and Prejudice, The great Gatesby, Jane Eyre and A Tale of two Cities. Writing: Paragraph, Comprehension and Dialogue.

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.

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. Islam: Introduction: Meaning of Islam, Historical background of Islam, Islam as a complete code of life and Importance of Islamic Aqidah and relation between Iman and Islam. The Articles of Faith: Unity of Allah (Tawheed), Impact of Tawheed on human life, The Shirk and its consequences, Different types of Shirks, Nifaq: Its meaning, signs and consequences. Belief in Allah's Angels (Malaikah): Angels, their nature and their functions, Virtues of belief on Angels. Belief in the books of Allah: The Qur'an: The last and unchanged divine book. Belief in Allah's Prophet (SAW): Prophets and Messengers are human being, Mohammad (SAW) the greatest, the best and last among all the prophets, Duties and the responsibilities of the prophets and Love of the prophets. Belief in the life after the death: Impact of belief in the life after the death on human life, Inevitability of Akhirat and its stages. Belief in Qadr (Fate) and Divine decree: Man's freedom of will, Fate: no excuse for sinners and Evil: not attributable to Allah.

URIS-1203 Introduction to Ibadah
Credit Hours: 1
Contact Hours: 1 per week

This course is designed: To provide the students with proper knowledge about the Islamic way of life. To make them aware of the mis-activities and traditions existing contradicted with the basic faith and knowledge of Islam. To give them a clear concept about the all-embracing view of Ibadah in Islam. Ibadah: Its meaning and significance in Islam, Scope of Ibadah in Islam, Objectives of Ibadah, Conditions of Ibadah. Characteristics of Ibadah in Islam: Free from intermediaries, not being confined to specific places, All- embracing view. Position of specific Rituals, Its Significance and Teachings: Salah (Prayer), Sowm

(Fasting), Zakah, Hajj (Pilgrimage). Jihad: Its definition, significance, importance, classification from various aspects. Islam & Asceticism.

URIS-2303 Introduction to Qur'an and Sunnah
Credit Hours: 1
Contact Hours: 2 per week

The main objectives of this course are as follows: To make the students familiar with the Qur'an and Sunnah, as they are the main sources of Islamic Shariah. To achieve the main goal of the university of islamization of knowledge through enlightening the students with revealed knowledge of the Qur'an and the Sunnah, 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. 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. The Classification of Hadith: According to the reference to a particular authority, according 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.

URIS-3505 Introduction to Islamic Political System
Credit Hours: 1
Contact Hours: 1 per week

To introduce the Political system of Islam with its concepts characteristics and principles (Special emphasis on Sovereignty of Allah, Shurah and Khilafah). Islamic political system, State and Sovereignty, Concepts of politics in Islam, Salient feature of Islamic political order, Organs of a government with special reference to Islamic viewpoint, Principles of Islamic Rule, Major characteristics of a constitution based on the Qur'an and the Sunnah.

URIS-3607 Biography of the Prophet (SWA)
Credit Hours: 2
Contact Hours: 2 per week

To introduce the ideal history of Muhammad (SAW). Special emphasis on his dawah and way of establishing Islam. Importance of prophets biography, Condition of Arab in the time of Prophet Mohammad (SAW), Birth and childhood, Prophet Muhammad (SAW) with his foster mother 'Halimah', Business trip to Syria with his uncle Abu Talib. Battle of Fuzzar and Hilful-Fudul, Contribution of Mohammad (SAW) in the business of Khadijah, Marriage, Rebuilding of Al-ka'bah, Search for the truth, receiving the truth, Islamic movement begins, early Muslims., Prophet (SAW) on the mount Safa, Embracing Islam by Hamjah®, Emigration to Abyssinia, Umar ® accepts Islam., Boycott agreement and confinement of Banu Hashim, The year sorrow, Taif-the most difficult day, Al-miraj., Covenants/contract 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, Hudaybiyah agreement, the conquest of Makkah, The (Hajj), The farewell address, the sad news.

URIH-4701 A Survey of Islamic History
Credit Hours: 1
Contact Hours: 1 per week

The objective of this course is to create awareness among the students about the importance of studying history with special reference to the study of Islamic History. This course also aims at making the students acquainted with the glorious contribution of the Pious Caliphs and their successors towards the development of just administration advancement of civilization and education and their great services

towards humanity at large. Definition of History and Islamic History: Kinds of History, Importance of History, and Sources of Islamic History. Study of Islamic History in Bangladesh, Khilafat: Definition, origin and development of Khilafat – Difference between Khilafat in general sense and Khilafat Ala-minhaj – an Nubuwwat – Election to the office of the Khilafat – Khilafat vs Mulukiyyat – End of Khilafat, Introduction to Pious Khilafat: The Shura – Civil Administration – Sources of Revenue – Bait-al-Mal – Judicial Administration – Police – Prison – Religious Administration and Military Administration under Pious Caliphs, Character and achievements of the Pious Caliphs. The Ummayyad Khilafat: conquest and expansion of Islamic empire. Umar bin Abdul Aziz and his Administrative Policies – Central and Provincial Administration – Social condition – Ummayyad's contribution towards the development of civilization & education - Fall of the Ummayyads. The Abbasid Khilafat: Golden Prime of the Abbasids – Abbasid society – Scientific and Literary development – Education – Development of Art & Architecture – Civil, Military, Judicial and Revenue Administration under the Abbasids. Status of women & non-Muslim citizens in Islamic Society, during the period of Kulafa-e-Rashideen and the Ummayyad and Abbasid Khilafat.

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. Introduction to the course and its objectives. Outline of geography of Bangladesh. 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. Political development in Bangladesh: Political parties & Constitutional Development. Economic condition of Bangladesh Socio-Cultural problems and prospects of Bangladesh.

B. Interdisciplinary Courses

ACC-2501 Financial and Managerial Accounting
Credit Hours: 2
Contact Hours: 2 per week

Preliminaries: Introduction to Accounting, History and development of accounting thought, types of accounting, Accounting Principles & ethics, Accounting Equation & Transaction Analysis. Introduction to Financial Statements. Recording Business Transactions: The Accounts & their types. Double-Entry Book keeping system; Invoice, discount from purchase price, purchase return and allowances, Sale of inventory, sales discount, sales returns and allowances; Journals, ledger & Trial balance. Correcting errors in the trial balance. 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. Accounting in practice: Worksheet. Purchase book, sales book, cashbook, patty cashbook, etc. Control accounts and subsidiary accounts. Bank reconciliation statement. Cost In General: Cost in general: objectives & classifications; Costing Journals; Job order costing, Process costing & Overhead costing, cost sheet; Cost of goods sold statement. Marginal & Relevant costing: Marginal costing tools and techniques, cost-volume-profit analysis. Guidelines for decision-making. Budget: Capital budgeting; Planning, evaluation & control of capital expenditures.

ECON-3501 Principles of Economics
Credit Hours: 2
Contact Hours: 2 per week

Introduction: Definition of economics, Scope and utility of studying economics. Microeconomics: 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, Production: Production function, types of productivity, the nature of Isoquants and Isocosts, Rational region of production of an engineering firm. Euler's theorem. Market: Concepts of market and market structure. Cost analysis and cost function. Small-scale production and large-scale production, Optimization, Theory of distribution. Macroeconomics: Savings, investment, employment, National income analysis, Inflation, Monetary policy, Fiscal policy and trade policy with reference to Bangladesh. Economics of development: Dimensions of development, Relevance of theory, the employment problem, Human resource development Economics of planning: Planning and market, Policy models, Planning experience

MGT-3601 Industrial Management
Credit Hours: 2
Contact Hours: 2 per week

Preliminaries: Definition, Importance of management, Evolution, Functions of management, Introduction to Industry & organizational management, Environmental context of the Organization. Organizing & stuffing: Theory & structure, Co-ordination, Span of control, Authority delegation, Formal & Informal Groups, Committee and task force, Manpower planning & Development. Cost & Financial Management: Investment analysis, benefit-cost analysis & it's implications in decision making. Cost planning & Price Control, budget & budgetary control, development planning process. Marketing management: Concepts, strategy, and sales promotion, Transportation & Storage. Technology management: Management of innovation & changes, technology lifecycle. 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. 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. Professional Practice: Tender documentation, General conditions of tender, Tech. Specification, Purchase & procurement rules-2004, Technical evaluation, Copyright, Intellectual property right.

Optional Courses (One Course to be taken)

FIN-4701 Finance and Marketing for Engineers
Credit Hours: 2
Contact Hours: 2 per week

Financial reporting process and uses of accounting data, linkages between accounting information and management planning, decision-making and control. Other topics include traditional cost accounting concepts such as product costing, cost terminology, budgeting, cost volume-profit analysis, and standard costs, as well as non-traditional management accounting topics such as variable costing and activity based costing. Basic engineering economy along with capital asset pricing, debt versus equity decisions, cost of capital, financial leverage, and the management of working capital. Other topics include financial justification of operational "intangibles" such as shorter lead times, better quality, and improved customer responsiveness. Marketing Principles, strategic marketing, types of market and buyer behavior, product strategies, marketing decisions (price, channel, advertising, sales force), market research, and international marketing.

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

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.

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, heath, 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.

C. Core Courses

Mathematics

MATH-1101 Elementary Mathematics
Credit Hours: 1
Contact Hours: 3 per Week

Number System & Series: Quantity, Natural Numbers, Integers, Prime Numbers, Composite Numbers, Rational Numbers, Fraction, Real Numbers, Complex Numbers, Negative Numbers, Ratio, Ordinal Numbers, Cardinal Numbers, Sequence, series, Arithmetic Progression, Geometric Progression, Exponents & fraction: Laws of exponents, Laws of Radicals, logarithms and Partial fraction Determinants & inequalities: Determinants upto nth order, Solve the inequalities, Proof of A.M>G.M, 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. Calculus: function, graph of functions, Variable, Constant, Different type of functions, Domain and range of a function, geometrical meaning of differential coefficient, First order differential equation with Initial Condition. Complex number: polar and Cartesian form, Graphical presentation of complex numbers, De-Moivre's theorem, and hyperbolic functions. Coordinate geometry and Vectors: Rectangular Coordinate System, Establish different type of equations of straight lines, 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.

MATH-1201 Mathematics-I
Credit Hours: 3
Contact Hours: 3 per Week
(Differential Calculus and Geometry)
[Pre requisite: MATH-1101 Elementary Mathematics]

Functions: functions of a real variables and their plots, limit, continuity and differentiability, physical meaning of derivative of a function. Ordinary Differentiation: Differentiation, successive differentiation and Leibniz theorem, Expansions of Functions: Rolle's theorem, mean value theorem, Taylor's and Maclaurian's Formulae, Maximum and minimum values of functions, functions of two or three variables. Partial Differentiation: Indeterminate Forms, Euler's theorem, tangents and normal Two-dimensional Geometry: review of equations for straight lines, circle, parabola, ellipse, hyperbola, pair of straight lines, general equation of second degree Three-dimensional Geometry: equations for straight lines, equations for planes Solid Geometry: spheres, cylinder, cone, ellipsoid and parabolic

MATH-2301 Mathematics II
Credit Hours: 3
Contact Hours: 3 per Week
(Matrices and Integral Calculus)
[Pre requisite: MATH-1201 Mathematics I]

Algebra of Matrices: definition of matrix, different types of matrices, algebraic operations on matrices, adjoint and inverse of a matrix, rank of Matrices, some problems. Elementary transformations of matrix: Echelon, canonical and normal forms, consistency and inconsistency, solution of homogeneous and non-homogeneous system of equations and reduction to equivalent system. Characteristic equation: Eigenvalues, eigenvectors and Caley-Hamilon theorem, similar matrices and diagonalisation, linear dependence and independence, Characteristics roots. Indefinite integral: Physical meaning of integration of a function, beta and gamma. Functions, method of substitution, integration by parts, special trigonometric functions and rational fractions different techniques of integration, definite integral as the limit of a sum Definite integral: Fundamental theorem, general properties, and evaluations of definite integral and reduction formula. Multiple Integral: Determination of length, areas and volumes. Integration by Revolution: area of surfaces of revolution, Volumes of solids of revolution

MATH-2401 Mathematics III
Credit Hours: 3
Contact Hours: 3 per Week
(Differential Equations and Vector Analysis)
[Pre requisite: MATH-2301 Mathematics II]

First order differential equation: Definition, solution of first order and first-degree differential equation with initial conditions, first-order equations with variables coefficients. Higher order differential equations: Solution of higher order linear differential equations with constant & variable coefficient, Differentials equations: Series solution of linear differential equation, series solution of second order equation with variable coefficients. Solution of Laplace's, Bessel's, Legender's Equation. Application: Physical application of differential equations. Vector analysis: Scalar and vectors, operation of vectors, vector addition and multiplication - their applications. Vector components in spherical and cylindrical systems, Derivative of vectors: Vector operators, gradient, divergence and curl and their physical significance. Vector integration: Greens, Gauss & Stocks theorem and their applications

Math-3501 Mathematics IV
Credit Hour 2
Contact Hour: 3 per week
(Linear Algebra)
[Pre requisite: Math 2401 Mathematics III]

Introduction to systems of linear equations, Gaussian elimination, definition of matrices, algebra of matrices, transpose of a matrix and inverse of matrix, factorization, determinants, quadratic forms, matrix polynomials. Euclidean n-space, linear transformation IR n to IR m. Properties of linear transformation from IRn to IRm. Real vector spaces a subspaces. Basis and dimension. Rank and nullity. Inner product spaces. Gram- Schmidt process and QR-decomposition. Eigen values and Eigen vectors. Diagonalization linear transformation: Kernel and Range. Application of linear algebra to electric networks.

STAT-1211 Statistics
Credit Hours: 3
Contact Hours: 3 per Week

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. Measures of Central Tendency: Arithmetic Mean, Geometric Mean, Harmonic Mean, Median, Mode, Weighted Mean, and Theorems & Problems. Measures of Dispersion: Range, Standard Deviation, Mean Deviation, Quartile Deviation, Variance, Moments, Skew ness and Kurtosis, Theorems & Problems. Correlation Theory: Linear Correlation - Its measures and significance, Rank Correlation, Theorems & Problems. Regression Analysis: Linear and non-linear regression, Least-square method of curve fittings, Theorems & Problems. Probability: Elementary Concepts, Laws of Probability – Additive and Multiplicative Law, Conditional Probability and Bay's theorem, Random Variables, Mathematical Expectation and Variance of a random variable, Theorems & Problems. Probability Distributions: Binomial distribution, Poisson distribution and Normal distribution – Their properties, uses, Theorems & Problems.

Physics

PHY-1103, Physics I
Credit Hours: 3
Contact Hours: 3 per Week
(Mechanics, Waves and Thermodynamics)

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 and viscosity: molecular theory of surface tension, capillarity, angle of contact, expression for surface tension, 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.

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

PHY1203 Physics II
Credit Hours: 3
Contact Hours: 3 per Week
(Electromagnetism, Optics and Modern Physics)
[Pre requisite: PHY-1103, Physics I]

Charge and Matter: Electric charge, conductors and insulators, Coulomb's law, electric field, electric field strength E, Gauss's law and its applications, electric potential and potential function, electric dipole, Dielectrics and Gauss's law, energy storage in an electric field. Current and Resistance: Current and current density, Ohm's law, Resistively, Electromotive force, potential difference. RC Circuits The Magnetic Field: The definition of B, the magnetic force on a current, magnetic force on current, Ampere's law, Biot -Savart law and their application, Lorentz force. 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 emf, Interference and Diffraction of light: Definition, Young's experiment, Newton's ring, Fresnel and Fraunhofer diffraction, diffraction gratings, Polarization of light and Optical fiber. 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. Modern Physics: Bhor's atom model, atomic spectra and Zeeman effect, atomic nucleus and binding energy, radioactive decays and half-life.

PHY-1204 Physics II Sessional
Credit Hours: 1.5
Contact Hours: 3 per Week
(Electromagnetism, optics and Modern Physics)

Determination of the end corrections for a meter bridge. Determination of specific resistance of the material of a wire by a meter bridge. Determination of the resistance of a wire by means of post office box. Experimental verification of the laws of series and parallel connections of resistance by means of a post office box. Calibration of a meter bridge wire. Determination of the value of low resistance by the method of fall of potential (Mathiesen and Hockins Method) Determination of the resistance of a galvanometer by half deflection method. Determination of the current sensitivity (figure of merit) of a galvanometer. Calibration of an ammeter by potential drop method with the help of a potentiometer. Calibration of a voltmeter by potentiometer. To perform also other experiments relevant to this course.

Mechanical Engineering (ME)

ME-2301 Fundamental of Mechanical Engineering
Contact Hours: 3 per Week
Credit Hours: 2

Study of fuels, Steam generation units with accessories and mountings study of steam generators and steam turbines. Introduction to internal combustion engines and their cycles. Study of SI engines, CI engines and gas turbines with their accessories. Refrigeration and air conditioning with their applications. Study of different refrigeration methods, refrigerants. Refrigeration equipments: compressors, condensers, evaporators, expansion devices, other control and safety devices, and psychosomatics. Study of air conditioning systems with their accessories. Types of fluid machinery. Study of impulse and reaction

turbines. Pelton wheel and Kaplan turbines. Study of centrifugal and axial flow machines; pumps, fans, blowers and compressors. Study of reciprocating pumps.

ME-2302 Fundamental of Mechanical Engineering Sessional
Contact Hours: 3 per Week
Credit Hours: 1.5

In this course students will perform experiments to verify practically the theories and concepts learned in ME 3501.

Civil Engineering (CE)

CE-2301 Engineering Drawing Sessional
Credit Hours: 1.5
Contact Hours: 3 per Week

Introduction, Instruments and their uses. First and third angle projection. Orthographic drawing. Isometric views. Missing lines and views. Sectional and conventional practices. Auxiliary views

Computer Science and Engineering (CSE)

CSE-1101 Computer Fundamentals
Credit Hours: 1
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 & I/O devices: 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, Printers, Keyboard, Mouse, Scanner, and other devices.
4. 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.
5. 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.
6. 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.
7. 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.

CSE-1102 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.

To perform also other experiments relevant to this course.

CSE 1201 Computer Programming
Credit Hour: 3
Contact Hour: 3/Week

Introduction to digital computers. Programming languages, algorithms and flow charts. Structured Programming using C. Variable and constants, operators, expressions, control statements, function, arrays, pointers, structure unions. User defined data types. Input output and files. Object oriented Programming using C++: introduction, classes and objects; polymorphism; function and operator overloading; inheritance.

CSE 1202 Computer Programming Sessional
Credit Hour: 1.5
Contact Hour: 3/Week

This course consists of two parts. In the first part students will perform experiments to verify practically the theories and concepts learned in CSE 1201. In the second part students will learn program design.

Electrical and Electronic Engineering (EEE)

EEE 1101 Electrical Circuits I
Credit Hours: 3
Contact Hours: 3 per Week

Circuit variables and elements: Voltage, current, power, energy, independent and dependent sources, and resistance. Basic laws: Ohm's law, Kirchoff's current and voltage laws. Simple resistive circuits: Series and parallel circuits, voltage and current division, wye-delta transformation. Techniques of circuit analysis: Nodal and mesh analysis including supernode and super mesh. Network theorems: Source transformation, Thevenin's, Norton's and superposition theorems with applications in circuits having independent and dependent sources, maximum power transfer condition and reciprocity theorem. Energy storage elements: Inductors and capacitors, series parallel combination of inductors and capacitors. Responses of RL and RC circuits: Natural and step responses.
Magnetic quantities and variables: Flux, permeability and reluctance, magnetic field strength, magnetic potential, flux density, magnetization curve. Laws in magnetic circuits: Ohm's law and Ampere's circuital law. Magnetic circuits: series, parallel and series-parallel circuits.

EEE 1102 Electrical Circuit I Sessional
Credit Hours: 1.5
Contact Hours: 3 per Week

In this course students will perform experiments to verify practically the theories and concepts learned in EEE 1101.

EEE 1201 Electrical Circuits II
Credit Hours: 3
Contact Hours: 3 per Week
[Pre requisite: EEE 1101 Electrical Circuits I]

Sinusoidal functions: Instantaneous current, voltage, power, effective current and voltage, average power, phasors and complex quantities, impedance, real and reactive power, power factor. Analysis of single-phase ac circuits: Series and parallel RL, RC and RLC circuits, nodal and mesh analysis, application of network theorems in ac circuits, circuits with non-sinusoidal excitations, transients in ac circuits, passive filters. Resonance in ac circuits: Series and parallel resonance. Magnetically coupled circuits. Analysis of three phase circuits: Three phase supply, balanced and unbalanced circuits, and power calculation.

EEE 1202 Electrical Circuit II Sessional

In this course students will perform experiments to verify practically the theories and concepts learned in EEE 1201.
Credit Hours: 1.5
Contact Hours: 3 per Week

EEE 2301 Electronics I
Credit Hours: 3
Contact Hours: 3 per Week
[Pre requisite: EEE 1201 Electrical Circuits II]

P-N junction as a circuit element: Intrinsic and extrinsic semiconductors, operational principle of p-n junction diode, contact potential, current-voltage characteristics of a diode, simplified dc and ac diode models, dynamic resistance and capacitance. Diode circuits: Half wave and full wave rectifiers, rectifiers with filter capacitor, characteristics of a Zener diode, Zener shunt regulator, clamping and clipping circuits. Bipolar junction transistor (BJT) as a circuit element: Bipolar junction transistor: current components, BJT characteristics and regions of operation, BJT as an amplifier, biasing the BJT for discrete circuits, small

signal equivalent circuit models, BJT as a switch. Single stage mid-band frequency BJT amplifier circuits: Voltage and current gain, input and output impedance of a common base, common emitter and common collector amplifier circuits. Metal-oxide-semiconductor field-effect-transistor (MOSFET) as circuit element: structure and physical operation of an enhancement MOSFET, threshold voltage, Body effect, current- voltage characteristics of an enhancement MOSFET, biasing discrete and integrated MOS amplifier circuits, single-stage MOS amplifiers, MOSFET as a switch, CMOS inverter. Junction field-effect-transistor (JFET): Structure and physical operation of JFET, transistor characteristics, pinch-off voltage. Differential and multistage amplifiers: Description of differential amplifiers, small-signal operation, and differential and common mode gains, RC coupled mid-band frequency amplifier.

EEE 2302 Electronics I Sessional
Credit Hours: 1.5
Contact Hours: 3 per Week

In this course students will perform experiments to verify practically the theories and concepts learned in EEE 2301.

EEE 2303 Energy Conversion I
Credit Hours: 4
Contact Hours: 4 per Week
[Pre requisite: EEE 1201 Electrical Circuits II]

Transformer: Ideal transformer - transformation ratio, no-load and load vector diagrams; actual transformer - equivalent circuit, regulation, short circuit and open circuit tests. Three phase induction motor: Rotating magnetic field, equivalent circuit, vector diagram, torque-speed characteristics, effect of changing rotor resistance and reactance on torque-speed curves, motor torque and developed rotor power, no-load test, blocked rotor test, starting and braking and speed control. Single phase induction motor: Theory of operation, equivalent circuit and starting.

EEE 2401 Energy Conversion II
Credit Hours: 4
Contact Hours: 4 per Week
[Pre requisite: EEE 2303 Energy Conversion I]

Synchronous Generator: excitation systems, equivalent circuit, vector diagrams at different loads, factors affecting voltage regulation, synchronous impedance, synchronous impedance method of predicting voltage regulation and its limitations. Parallel operation: Necessary conditions, synchronizing, circulating current and vector diagram. Synchronous motor: Operation, effect of loading under different excitation condition, effect of changing excitation, V-curves and starting. DC generator: Types, no-load voltage characteristics, and build-up of a self-excited shunt generator, critical field resistance, load-voltage characteristic, effect of speed on no-load and load characteristics and voltage regulation. DC motor: Torque, counter emf, speed, and torque-speed characteristics, starting and speed regulation. Introduction to wind turbine generators Construction and basic characteristics of solar cells.

EEE 2402 Energy Conversion Sessional
Credit Hours: 1.5
Contact Hours: 3 per Week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE 2303 and EEE 2401. In the second part, students will design simple systems using the principles learned in EEE 2303 and EEE 2401.

EEE 2403 Electronics II
Credit Hours: 3
Contact Hours: 3 per Week
[Pre requisite: EEE 2301 Electronics I]

Frequency response of amplifiers: Poles, zeros and Bode plots, amplifier transfer function, techniques of determining 3 dB frequencies of amplifier circuits, frequency response of single-stage and cascade amplifiers, frequency response of differential amplifiers. Operational amplifiers (Op-Amp): Properties of ideal Op-Amps, non-inverting and inverting amplifiers, inverting integrators, differentiator, weighted summer and other applications of Op-Amp circuits, effects of finite open loop gain and bandwidth on circuit performance, logic signal operation of Op-Amp, dc imperfections. General purpose Op-Amp: DC analysis, small-signal analysis of different stages, and gain and frequency response of 741 Op-Amp. Negative feedback: properties, basic topologies, and feedback amplifiers with different topologies, stability, and frequency compensation. Active filters: Different types of filters and specifications, transfer functions, realization of first and second order low, high and band pass filters using Op-Amps. Signal generators: Basic principle of sinusoidal oscillation, Op-Amp RC oscillators, and LC and crystal oscillators. Power Amplifiers: Classification of output stages, class A, B and AB output stages.

EEE 2404 Electronics II Sessional
Credit Hours: 1.5
Contact Hours: 3 per Week

In this course students will perform experiments to verify practically the theories and concepts learned in EEE 2403.

EEE 2405 Engineering Electromagnetic
Credit Hours: 2
Contact Hours: 3 per Week
[Pre requisite: EEE 1201 Electrical Circuits II]

Static electric field: Postulates of electrostatics, Coulomb's law for discrete and continuously distributed charges, Gauss's law and its application, electric potential due to charge distribution, conductors and dielectrics in static electric field, flux density - boundary conditions; capacitance - electrostatic energy and forces, energy in terms of field equations, capacitance calculation of different geometries; boundary value problems – Poisson's and Laplace's equations in different co-ordinate systems. Steady electric current: Ohm's law, continuity equation, Joule's law, and resistance calculation. Static Magnetic field: Postulates of magnetostatics, Biot-Savart's law, Ampere's law and applications, vector magnetic potential, magnetic dipole, magnetization, magnetic field intensity and relative permeability, boundary conditions for magnetic field, magnetic energy, magnetic forces, torque and inductance of different geometries. Time varying fields and Maxwell's equations: Faraday's law of electromagnetic induction, Maxwell's equations - differential and integral forms, boundary conditions, potential functions; time harmonic fields and Poynting theorem. Plane electromagnetic wave: plane wave in loss less media - Doppler effect, transverse electromagnetic wave, polarization of plane wave; plane wave in lossy media – low-loss dielectrics, good conductors; group velocity, instantaneous and average power densities, normal and oblique incidence of plane waves at plane boundaries for different polarization.

EEE 2407 Digital Electronics
Credit Hours: 3
Contact Hours: 3 per Week
[Pre requisite: EEE 2301 Electronics I]

Introduction to number systems and codes. Analysis and synthesis of digital logic circuits: Basic logic functions, Boolean algebra, combinational logic design, minimization of combinational logic. Implementation of basic static logic gates in CMOS and BiCMOS: DC characteristics, noise margin and power dissipation. Power optimization of basic gates and combinational logic circuits. Modular combinational circuit design: pass transistor, pass gates, multiplexer, demultiplexer and their implementation in CMOS, decoder, encoder, comparators, binary arithmetic elements and ALU design.

Programmable logic devices: logic arrays, field programmable logic arrays and programmable read only memory. Sequential circuits: different types of latches, flip-flops and their design using ASM approach, timing analysis and power optimization of sequential circuits. Modular sequential logic circuit design: shift registers, counters and their applications. Plane wave in lossy media – low-loss dielectrics, good conductors; group velocity, instantaneous and average power densities, normal and oblique incidence of plane waves at plane boundaries for different polarization.

EEE 2408 Digital Electronics Sessional
Credit Hours: 1.5
Contact Hours: 3 per Week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE 2407. In the second part, students will design simple systems using the principles learned in EEE 2407.

EEE 2410 Numerical Techniques Sessional
Credit Hours: 1.5
Contact Hours: 3 per Week
[Pre requisite: CSE 1201 Computer Programming]

Laboratory on numerical techniques using computer solution of differentiation and integration problems, transcendental equations, linear and non linear differential equations and partial differential equations.

EEE 3501Continuous Signals and Linear Systems
Credit Hours: 3
Contact Hours: 3 per Week
[Pre requisite: MATH-2401 Mathematics III]

Classification of signals and systems: signals - classification, basic operation on signals, elementary signals, representation of signals using impulse function; systems –classification. Properties of Linear Time Invariant (LTI) systems: Linearity, causality, time invariance, memory, stability, and invariability. Time domain analysis of LTI systems: Differential equations - system representation, order of the system, solution techniques, zero state and zero input response, system properties; impulse response – convolution integral, determination of system properties; state variable - basic concept, state equation and time domain solution. Frequency domain analysis of LTI systems: Fourier series- properties, harmonic representation, system response, frequency response of LTI systems; Fourier transformation- properties, system transfer function, system response and distortion-less systems. Applications of time and frequency domain analyses: solution of analog electrical and mechanical systems, amplitude modulation and demodulation, time-division and frequency-division multiplexing. Laplace transformation: properties, inverse transform, solution of system equations, system transfer function, system stability and frequency response and application.

EEE 3503 Power Systems I
Credit Hours: 3
Contact Hours: 3 per Week
[Pre requisite: EEE 1201 Electrical Circuits II]

Network representation: Single line and reactance diagram of power system and per unit. Line representation: equivalent circuit of short, medium and long lines. Load flow: Gauss- Siedel and Newton Raphson Methods. Power flow control: Tap changing transformer, phase shifting, booster and regulating transformer and shunt capacitor. Fault analysis: Short circuit current and reactance of a synchronous machine. Symmetrical fault calculation methods: symmetrical components, sequence networks and unsymmetrical fault calculation. Protection: Introduction to relays, differential protection and distance protection. Introduction to circuit breakers. Typical layout of a substation. Load curves: Demand factor, diversity factor, load duration curves, energy load curve, load factor, capacity factor and plant factor.

EEE 3504 Power System I Sessional
Credit Hours: 1.5
Contact Hours: 3 per Week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE 3503. In the second part, students will design simple systems using the principles learned in EEE 3503.

EEE 3505 Microprocessor and Interfacing
Credit Hours: 3
Contact Hours: 3 per Week
[Pre requisite: EEE 2407 Digital Electronics]

Introduction to microprocessors. Intel 8086 microprocessor: Architecture, addressing modes, instruction sets, assembly language programming, system design and interrupt. Interfacing: programmable peripheral interface, programmable timer, serial communication interface, programmable interrupt controller, direct memory access, keyboard and display interface. Introduction to micro-controllers.

EEE 3506 Microprocessor and Interfacing Sessional
Credit Hours: 1.5
Contact Hours: 3 per Week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE 3505. In the second part, students will design simple systems using the principles learned in EEE 3505.

EEE 3510 Circuit Simulation Sessional
Credit Hours: 1.5
Contact Hours: 3 per Week
[Pre requisite: EEE 2301 Electronics I]

- Simulation laboratory based on EEE 1101 and EEE 1201 theory courses. Students will verify the theories and concepts learned in EEE 1101 and EEE 1201 using simulation software like pspice and Matlab. Students will also perform specific design of dc and ac circuits theoretically and by simulation.
- Simulation laboratory based on EEE 2301 and EEE 2403 theory courses. Students will verify the theories and concepts learned in EEE 2301 and EEE 2403 using simulation soft wares like pspice and Matlab. Students will also perform specific design of electronic circuits theoretically and by simulation.

EEE 3512 Electrical Services Design Sessional
Credit Hours: 1.5
Contact Hours: 3 per Week

Wiring system design, drafting, and estimation. Design for illumination and lighting. Electrical installations system design: substation, BBT and protection, air-conditioning, heating and lifts. Design for intercom, public address systems, telephone system and LAN. Design of security systems including CCTV, fire Alarm, smoke detector, burglar alarm, and sprinkler system. A design problem on a multi-storied building.

EEE 3601 Communication Theory
Credit Hours: 3
Contact Hours: 3 per Week
[Pre requisite: EEE 3501Continuous Signals and Linear Systems]

Overview of communication systems: Basic principles, fundamental elements, system limitations, message source, bandwidth requirements, transmission media types, and bandwidth and transmission capacity. Noise: Source, characteristics of various types of noise and signal to noise ratio. Information theory:

Measure of information, source encoding, error free communication over a noisy channel, channel capacity of a continuous system and channel capacity of a discrete memory less system. Communication systems: Analog and digital. Continuous wave modulation: Transmission types – base-band transmission, carrier transmission; amplitude modulation – introduction, double side band, single side band, vestigial side band, quadrature; spectral analysis of each type, envelope and synchronous detection; angle modulation – instantaneous frequency, frequency modulation (FM) and phase modulation (PM), spectral analysis, demodulation of FM and PM. Pulse modulation: Sampling – sampling theorem, Nyquist criterion, aliasing, instantaneous and natural sampling; pulse amplitude modulation - principle, bandwidth requirements; pulse code modulation (PCM) - quantization principle, quantization noise, non-uniform quantization, signal to quantization error ratio, differential PCM, demodulation of PCM; delta modulation (DM) - principle, adaptive DM; line coding – formats and bandwidths. Digital modulation: Amplitude-shift keying - principle, ON-OFF keying, bandwidth requirements, detection, noise performance; phase-shift keying (PSK) - principle, bandwidth requirements, detection, differential PSK, quadrature PSK, noise performance; frequency-shift Keying (FSK) - principle, continuous and discontinuous phase FSK, minimum-shift keying, bandwidth requirements, detection of FSK. Multiplexing: Time- division multiplexing (TDM) - principle, receiver synchronization, frame synchronization, TDM of multiple bit rate systems; frequency-division multiplexing - principle, de-multiplexing; wavelength-division multiplexing, multiple-access network – time-division multiple-access, frequency-division multiple access; code-division multiple- access (CDMA) - spread spectrum multiplexing, coding techniques and constraints of CDMA. Communication system design: design parameters, channel selection criteria and performance simulation.

EEE 3602 Communication Theory Sessional
Credit Hours: 1.5
Contact Hours: 3 per Week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE 3601. In the second part, students will design simple systems using the principles learned in EEE 3601.

EEE 3603 Digital Signal Processing I
Credit Hours: 3
Contact Hours: 3 per Week
[Pre requisite: EEE 3501Continuous Signals and Linear Systems]

Introduction to digital signal processing (DSP): Discrete-time signals and systems, analog to digital conversion, impulse response, finite impulse response (FIR) and infinite impulse response (IIR) of discrete-time systems, difference equation, convolution, transient and steady state response. Discrete transformations: Discrete Fourier series, discrete-time Fourier series, discrete Fourier transform (DFT) and properties, fast Fourier transform (FFT), inverse fast Fourier transform, Z transformation - properties, transfer function, poles and zeros and inverse Z transform. Correlation: circular convolution, auto-correlation and cross correlation. Digital Filters: FIR filters - linear phase filters, specifications, design using window, optimal and frequency sampling methods; IIR filters – specifications, design using impulse invariant, bi-linear Z transformation, least-square methods and finite precision effects.

EEE 3604 Digital Signal Processing I Sessional
Credit Hours: 1.5
Contact Hours: 3 per Week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE 3603. In the second part, students will design simple systems using the principles learned in EEE 3603.

EEE 3605 Electrical Properties of Materials
Credit Hours: 3
Contact Hours: 3 per Week
[Pre requisite: EEE 2301 Electronics I]

Crystal structures: Types of crystals, lattice and basis, Bravais lattice and Miller indices. Classical theory of electrical and thermal conduction: Scattering, mobility and resistivity, temperature dependence of metal resistivity, Mathiessen's rule, Hall effect and thermal conductivity. Introduction to quantum mechanics: Wave nature of electrons, Schrodinger's equation, one-dimensional quantum problems - infinite quantum well, potential step and potential barrier; Heisenbergs's uncertainty principle and quantum box. Band theory of solids: Band theory from molecular orbital, Bloch theorem, Kronig-Penny model, and effective mass, density-of-states. Carrier statistics: Maxwell-Boltzmann and Fermi-Dirac distributions, Fermi energy. Modern theory of metals: Determination of Fermi energy and average energy of electrons, classical and quantum mechanical calculation of specific heat. Dielectric properties of materials: Dielectric constant, polarization - electronic, ionic and orientational; internal field, Clausius-Mosotti equation, spontaneous polarization, frequency dependence of dielectric constant, dielectric loss and piezoelectricity. Magnetic properties of materials: Magnetic moment, magnetization and relative permitivity, different types of magnetic materials, origin of ferromagnetism and magnetic domains. Introduction to superconductivity: Zero resistance and Meissner effect, Type I and Type II superconductors and critical current density.

EEE 3607 Solid State Devices
Credit Hours: 3
Contact Hours: 3 per Week
[Pre requisite: EEE 2403 Electronics II]

Semiconductors in equilibrium: Energy bands, intrinsic and extrinsic semiconductors, Fermi levels, electron and hole concentrations, and temperature dependence of carrier concentrations and invariance of Fermi level. Carrier transport processes and excess carriers: Drift and diffusion, generation and recombination of excess carriers, built-in-field, Einstein relations, continuity and diffusion equations for holes and electrons and quasi-Fermi level. PN junction: Basic structure, equilibrium conditions, contact potential, equilibrium Fermi level, space charge, non-equilibrium condition, forward and reverse bias, carrier injection, minority and majority carrier currents, transient and ac conditions, time variation of stored charge, reverse recovery transient and capacitance. Bipolar junction transistor: Basic principle of pnp and npn transistors, emitter efficiency, base transport factor and current gain, diffusion equation in the base, terminal currents, coupled-diode model and charge control analysis, Ebers-Moll equations and circuit synthesis. Metal-semiconductor junction: Energy band diagram of metal semiconductor junctions, rectifying and ohmic contacts. MOS structure: MOS capacitor, energy band diagrams and flat band voltage, threshold voltage and control of threshold voltage, static C-V characteristics, qualitative theory of MOSFET operation, body effect and current-voltage relationship of a MOSFET. Junction Field-effect-transistor: Introduction, qualitative theory of operation, pinch-off voltage and current-voltage relationship.

EEE 4701 Control System I
Credit Hours: 3
Contact Hours: 3 per Week
[Pre requisite: EEE 3501Continuous Signals and Linear Systems]

Introduction to control systems. Linear system models: transfer function, block diagram and signal flow graph (SFG). State variables: SFG to state variables, transfer function to state variable and state variable to transfer function. Feedback control system: Closed loop systems, parameter sensitivity, transient characteristics of control systems, effect of additional pole and zero on the system response and system types and steady state error. Routh stability criterion. Analysis of feedback control system: Root locus method and frequency response method. Design of feedback control system: Controllability and observability, root locus, frequency response and state variable methods. Digital control systems: introduction, sampled data systems, stability analysis in Z-domain.

EEE 4702 Control System I Sessional
Credit Hours: 1.5
Contact Hours: 3 per Week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE 4701. In the second part, students will design simple systems using the principles learned in EEE 4701.

CSE-4800 Project / Thesis and viva-voce
Credit Hours: 6
Contact Hours: 8 per week

Study of problems in the field of Electrical & Electronic & Engineering.

D. Elective Courses

Communication Engineering

EEE 3631 Random Signals and Processes
Credit Hours: 3
Contact Hours: 3 per week
[Prerequisite course: EEE 3501 Continuous Signals & Linear Systems]

Probability and random variables. Distribution and density functions and conditional probability. Expectation: moments and characteristic functions. Transformation of a random variable. Vector random variables. Joint distribution and density. Independence. Sums of random variables. Random Processes. Correlation functions. Process measurements. Gaussian and Poisson random processes. Noise models. Stationary and Periodicity. Spectral Estimation. Correlation and power spectrum. Cross-spectral densities. Response of linear systems to random inputs. Introduction to discrete time processes, Mean-square error estimation, Detection and linear filtering.

EEE 4731 Digital Signal Processing II
Credit Hours: 3
Contact Hours: 3 per week
[Prerequisite course: EEE 3603 Digital Signal Processing I]

Spectral estimation: Nonparametric methods – discrete random processes, autocorrelation sequence, periodogram; parametric method – autoregressive modeling, forward/backward linear prediction, Levinson-Durbin algorithm, minimum variance method and Eigenstructure method I and II. Adaptive signal processing: Application, equalization, interference suppression, noise cancellation, FIR filters, minimum mean-square error criterion, least mean-square algorithm and recursive least square algorithm. Multirate DSP: Interpolation and decimation, poly-phase representation and multistage implementation. Perfect reconstruction filter banks: Power symmetric, alias-free multi-channel and tree structured filter banks. Wavelets: Short time Fourier transform, wavelet transform, discrete time orthogonal wavelets and continuous time wavelet basis.

EEE 4733 Microwave Engineering
Credit Hours: 3
Contact Hours: 3 per week
[Prerequisite course: EEE 3601 Communication Theory]

Transmission lines: Voltage and current in ideal transmission lines, reflection, transmission, standing wave, impedance transformation, Smith chart, impedance matching and lossy transmission lines. Wave-guides: general formulation, modes of propagation and losses in parallel plate, rectangular and circular wave guide. Micro strips: Structures and characteristics. Rectangular resonant cavities: Energy storage, losses and Q.

Radiation: Small current element, radiation resistance, radiation pattern and properties, Hertzian and half wave dipoles. Antennas: Mono pole, horn, rhombic and parabolic reflector, array, and Yagi-Uda antenna.

EEE 4734 Microwave Engineering Sessional
Credit Hours: 1.5
Contact Hours: 3 per week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE 4733. In the second part, students will design simple systems using the principles learned in EEE 4733.

EEE 4735 Optical Fiber Communication
Credit Hours: 3
Contact Hours: 3 per week
[Prerequisite course: EEE 3601 Communication Theory]

Introduction. Light propagation through optical fiber: Ray optics theory and mode theory. Optical fiber: Types and characteristics, transmission characteristics, fiber joints and fiber couplers. Light sources: Light emitting diodes and laser diodes. Detectors: PIN photo-detector and avalanche photo-detectors. Receiver analysis: Direct detection and coherent detection, noise and limitations. Transmission limitations: Chromatic dispersion, nonlinear refraction, four wave mixing and laser phase noises. Optical amplifier: Laser and fiber amplifiers, applications and limitations. Multi-channel optical system: Frequency division multiplexing, wavelength division multiplexing and co-channel interference.

EEE 4831 Digital Communication
Credit Hours: 3
Contact Hours: 3 per week
[Prerequisite course: EEE 3601 Communication Theory]

Introduction: Communication channels, mathematical model and characteristics. Probability and stochastic processes. Source coding: Mathematical models of information, entropy, Huffman code and linear predictive coding. Digital transmission system: Base band digital transmission, inter-symbol interference, bandwidth, power efficiency, modulation and coding trade-off. Receiver for AWGN channels: Correlation demodulator, matched filter demodulator and maximum likelihood receiver. Channel capacity and coding: Channel models and capacities and random selection of codes. Block codes and conventional codes: Linear block codes, convolution codes and coded modulation. Spread spectrum signals and system.

EEE 4832 Digital Communication Sessional
Credit Hours: 1.5
Contact Hours: 3 per week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE 4831. In the second part, students will design simple systems using the principles learned in EEE 4831

EEE 4333 Mobile Cellular Communication
Credit Hours: 3
Contact Hours: 3 per week
[Prerequisite course: EEE 3601 Communication Theory]

Introduction: Concept, evolution and fundamentals. Analog and digital cellular systems. Cellular Radio System: Frequency reuse, co-channel interference, cell splitting and components. Mobile radio propagation: Propagation characteristics, models for radio propagation, antenna at cell site and mobile antenna. Frequency Management and Channel Assignment: Fundamentals, spectrum utilization, fundamentals of channel assignment, fixed channel assignment, non-fixed channel assignment, traffic and channel assignment. Handoffs and Dropped Calls: Reasons and types, forced handoffs, mobile assisted

handoffs and dropped call rate. Diversity Techniques: Concept of diversity branch and signal paths, carrier to noise and carrier to interference ratio performance. Digital cellular systems: Global system for mobile, time division multiple access and code division multiple access.

EEE 4835 Telecommunication Engineering
Credit Hours: 3
Contact Hours: 3 per week
[Prerequisite course: EEE 3601 Communication Theory]

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

Electronics Engineering

EEE 3651 Analog Integrated Circuits
Credit Hours: 3
Contact Hours: 3 per week
[Prerequisite course: EEE 2403 Electronics II]

Review of FET amplifiers: Passive and active loads and frequency limitation. Current mirror: Basic, cascode and active current mirror. Differential Amplifier: Introduction, large and small signal analysis, common mode analysis and differential amplifier with active load. Noise: Introduction to noise, types, representation in circuits, noise in single stage and differential amplifiers and bandwidth. Band-gap references: Supply voltage independent biasing, temperature independent biasing, proportional to absolute temperature current generation and constant transconductance biasing. Switch capacitor circuits: Sampling switches, switched capacitor circuits including unity gain buffer, amplifier and integrator. Phase Locked Loop (PLL): Introduction, basic PLL and charge pumped PLL.

EEE 4751 Processing and Fabrication Technology
Credit Hours: 3
Contact Hours: 3 per week
[Prerequisite course: EEE 3607 Solid State Devices]

Substrate materials: Crystal growth and wafer preparation, epitaxial growth technique, molecular beam epitaxy, chemical vapor phase epitaxy and chemical vapor deposition (CVD). Doping techniques: Diffusion and ion implantation. Growth and deposition of dielectric layers: Thermal oxidation, CVD, plasma CVD, sputtering and silicon-nitride growth. Etching: Wet chemical etching, silicon and GaAs etching, anisotropic etching, selective etching, dry physical etching, ion beam etching, sputtering etching and reactive ion etching. Cleaning: Surface cleaning, organic cleaning and RCA cleaning. Lithography: Photo-reactive materials, pattern generation, pattern transfer and metalization. Discrete device fabrication: Diode, transistor, resistor and capacitor. Integrated circuit fabrication: Isolation - pn junction isolation, mesa isolation and oxide isolation. BJT based microcircuits, p-channel and n-channel MOSFETs, complimentary MOSFETs and silicon on insulator devices. Testing, bonding and packaging.

EEE 4753 VLSI I
Credit Hours: 3
Contact Hours: 3 per week
[Prerequisite course: EEE 3607 Solid State Devices]

VLSI technology: Top down design approach, technology trends and design styles. Review of MOS transistor theory: Threshold voltage, body effect, I-V equations and characteristics, latch-up problems, NMOS inverter, CMOS inverter, pass-transistor and transmission gates. CMOS circuit characteristics and performance estimation: Resistance, capacitance, rise and fall times, delay, gate transistor sizing and power consumption. CMOS circuit and logic design: Layout design rules and physical design of simple logic gates. CMOS subsystem design: Adders, multiplier and memory system, and arithmetic logic unit. Programmable logic arrays. I/O systems. VLSI testing.

EEE 4754 VLSI I Sessional
Credit Hours: 1.5
Contact Hours: 3 per week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE 4753. In the second part, students will design simple systems using the principles learned in EEE 4753.

EEE 4755 Compound Semiconductor and Hetero-junction Devices
Credit Hours: 3
Contact Hours: 3 per week
[Prerequisite course: EEE 2403 Electronics II]

Compound semiconductor: Zinc-blend crystal structures, growth techniques, alloys, band gap, and density of carriers in intrinsic and doped compound semiconductors. Hetero-Junctions: Band alignment, band offset, Anderson's rule, single and double sided hetero- junctions, quantum wells and quantization effects, lattice mismatch and strain and common hetero-structure material systems. Hetero-junction diode: Band banding, carrier transport and I-V characteristics. Hetero-junction field effect transistor: Structure and principle, band structure, carrier transport and I-V characteristics. Hetero-structure bipolar transistor (HBT): Structure and operating principle, quasi-static analysis, extended Gummel-Poon model, Ebers-Moll model, secondary effects and band diagram of a graded alloy base HBT.

EEE 4851 VLSI II
Credit Hours: 3
Contact Hours: 3 per week
[Prerequisite course: EEE 4753 VLSI I]

VLSI MOS system design: Layout extraction and verification, full and semi-full custom design styles and logical and physical positioning. Design entry tools: Schematic capture and HDL. Logic and switch level simulation. Static timing. Concepts and tools of analysis, solution techniques for floor planning, placement, global routing and detailed routing. Application specific integrated circuit design including FPGA.

EEE 4852 VLSI II Sessional
Credit Hours: 1.5
Contact Hours: 3 per week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE 4851. In the second part, students will design simple systems using the principles learned in EEE 4851.

EEE 4853 Optoelectronics
Credit Hours: 3
Contact Hours: 3 per week
[Prerequisite course: EEE 2403 Electronics II]

Optical properties in semiconductor: Direct and indirect band-gap materials, radiative and non-radiative recombination, optical absorption, photo-generated excess carriers, and minority carrier lifetime, luminescence and quantum efficiency in radiation. Properties of light: Particle and wave nature of light, polarization, interference, diffraction and blackbody radiation. Light emitting diode (LED): Principles, materials for visible and infrared LED, internal and external efficiency, loss mechanism, structure and coupling to optical fibers. Stimulated emission and light amplification: Spontaneous and stimulated emission, Einstein relations, population inversion, and absorption of radiation, optical feedback and threshold conditions. Semiconductor Lasers: Population inversion in degenerate semiconductors, laser cavity, operating wavelength, threshold current density, power output, hetero-junction lasers, optical and electrical confinement. Introduction to quantum well lasers. Photo-detectors: Photoconductors, junction photo-detectors, PIN detectors, avalanche photodiodes and phototransistors. Solar cells: Solar energy and spectrum, silicon and Schottkey solar cells. Modulation of light: Phase and amplitude modulation, electro-optic effect, acousto-optic effect and magneto-optic devices. Introduction to integrated optics.

EEE 4855 Semiconductor Device Theory
Credit Hours: 3
Contact Hours: 3 per week
[Prerequisite course: EEE 3607 Solid State Devices]

Lattice vibration: Simple harmonic model, dispersion relation, acoustic and optical phonons. Band structure: Isotropic and anisotropic crystals, band diagrams and effective masses of different semiconductors and alloys. Scattering theory: Review of classical theory, Fermi-Golden rule, scattering rates of different processes, and scattering mechanisms in different semiconductors, mobility. Different carrier transport models: Drift-diffusion theory, ambipolar transport, hydrodynamic model, Boltzman transport equations, quantum mechanical model, and simple applications.

Power Systems Engineering

EEE 3671 Power System II
Credit Hours: 3
Contact Hours: 3 per week
[Prerequisite course: EEE 3503 Power System I]

Transmission lines cables: overhead and underground. Stability: swing equation, power angle equation, equal area criterion, multi-machine system, and step-by-step solution of swing equation. Factors affecting stability. Reactive power compensation. Flexible ac transmission system (FACTS). High voltage dc transmission system. Power quality: harmonics sag and swell.

EEE 4771 Energy Conversion III
Credit Hours: 3
Contact Hours: 3 per week
[Prerequisite course: EEE 2401 Energy Conversion II]

Special machines: series universal motor, permanent magnet dc motor, unipolar and bipolar brush less dc motors, stepper motor and control circuits. Reluctance and hysteresis motors with drive circuits, switched reluctance motor, electro static motor, repulsion motor, synchros and control transformers. Permanent magnet synchronous motors. Acyclic machines: Generators, conduction pump and induction pump. Magneto hydrodynamic generators. Fuel Cells, thermoelectric generators, and flywheels. Vector control, linear motors and traction. Photovoltaic systems: stand-alone and grid interfaced. Wind turbine generators: induction generator, ac-dc-ac conversion.

EEE 4773 Power Electronics
Credit Hours: 3
Contact Hours: 3 per week
[Prerequisite course: EEE 2403 Electronics II]

Power semiconductor switches and triggering devices: BJT, MOSFET, SCR, IGBT, GTO, TRIAC, UJT and DIAC. Rectifiers: Uncontrolled and controlled single phase and three phase. Regulated power supplies: Linear-series and shunt, switching buck, buck-boost, boost and Cuk regulators. AC voltage controllers: single and three phases. Choppers. DC motor control. Single-phase cycloconverter. Inverters: Single phase and three-phase voltage and current source. AC motor control. Stepper motor control. Resonance inverters. Pulse width modulation control of static converters.

EEE 4774 Power Electronics Sessional
Credit Hours: 1.5
Contact Hours: 3 per week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE 4773. In the second part, students will design simple systems using the principles learned in EEE 4773.

EEE 4775 Power Plant Engineering
Credit Hours: 3
Contact Hours: 3 per week

Power plants: general layout and principles, steam turbine, gas turbine, combined cycle gas turbine, hydro and nuclear. Power plant instrumentation. Selection of location: Technical, economical and environmental factors. Load forecasting. Generation scheduling: deterministic and probabilistic. Electricity tariff: formulation and types.

EEE 4871 Power System Protection
Credit Hours: 3
Contact Hours: 3 per week
[Prerequisite course: EEE 3503 Power System I]

Purpose of power system protection. Criteria for detecting faults: over current, differential current, difference of phase angles, over and under voltages, power direction, symmetrical components of current and voltages, impedance, frequency and temperature. Instrument transformers: CT and PT. Electromechanical, electronic and digital Relays: basic modules, over current, differential, distance and directional. Trip circuits. Unit protection schemes: Generator, transformer, motor, bus bar, transmission and distribution lines. Miniature circuit breakers and fuses. Circuit breakers: Principle of arc extinction, selection criteria and ratings of circuit breakers, types - air, oil, SF6 and vacuum.

EEE 4872 Power System Protection Sessional
Credit Hours: 1.5
Contact Hours: 3 per week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE 4871. In the second part, students will design simple systems using the principles learned in EEE 4871.

EEE 4873 Power System Reliability
Credit Hours: 3
Contact Hours: 3 per week
[Prerequisite course: EEE 3503 Power System I]

Review of probability concepts. Probability distribution: Binomial, Poisson, and Normal. Reliability concepts: Failure rate, outage, mean time to failure, series and parallel systems and redundancy. Markov

process. Probabilistic generation and load models. Reliability indices: Loss of load probability and loss of energy probability. Frequency and duration. Reliability evaluation techniques of single area system.

EEE 4875 Power System Operation and Control
Credit Hours: 3
Contact Hours: 3 per week
[Prerequisite course: EEE 3503 Power System I]

Principles of power system operation: SCADA, conventional and competitive environment. Unit commitment, static security analysis, state estimation, optimal power flow, automatic generation control and dynamic security analysis.

EEE 4877 High Voltage Engineering
Credit Hours: 3
Contact Hours: 3 per week
[Prerequisite course: EEE 3503 Power System I]

High voltage dc: Rectifier circuits, voltage multipliers, Van-de-Graaf and electrostatic generators. High voltage ac: Cascaded transformers and Tesla coils. Impulse voltage: Shapes, mathematical analysis, codes and standards, single and multi-stage impulse generators, tripping and control of impulse generators. Breakdown in gas, liquid and solid dielectric materials. Corona. High voltage measurements and testing. Over-voltage phenomenon and insulation coordination. Lightning and switching surges, basic insulation level, surge diverters and arresters.

EEE 4878 High Voltage Engineering Sessional
Credit Hours: 1.5
Contact Hours: 3 per week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE 4877. In the second part, students will design simple systems using the principles learned in EEE 4877.

Computer Science & Engineering

EEE 3691 Discrete Mathematics
Credit Hours: 3
Contact Hours: 3 per week
[Pre requisite: EEE 2410 Numerical Technique Sessional]

Introduction: Set theory-Set operation, Representation of Sets, Algebraic Properties of set, computer representation of set, Logic-Prepositional Calculus, Logic and bit operation, Predicate and quantifier, Translating sentence into logical expressions. 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. Number Theory-Fundamental Theorem of Arithmetic, Modular Arithmetic; GCD, LCM, Prime Number Congruence, Application of Congruence. Linear Congruence, Application of Number Theory, Mathematical Induction, Methods of Proof, First and Second principle of Mathematical induction. Counting Principle- Basic Counting principle, Inclusion-Exclusion principle, Application of Sum rule and Product rule, Pigeon hole principle, Permutation Combination, Binomial Theorem. Definition of Graph, Types of graphs, Representation of graph, Euler and Hamilton path, circuit, necessary and sufficient conditions. Graph coloring, Isomorphism of graph, Tree-Comparison of tree and Graph, Spanning tree, algorithm of several trees, Application of trees, Tree Traversal, Trees and sorting.

EEE 4791 Operating System
Credit Hours: 3
Contact Hours: 3 per week
[Prerequisite course: EEE 2410 Numerical Technique Sessional]

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. 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. Multiprocessing and time sharing, Process coordination, Deadlocks: Multiple-Processor Scheduling, Thread Scheduling, Algorithm Evaluation, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery From Deadlock. Control and scheduling of large information processing systems, Resource allocation; Dispatching; Processor access methods; Job control languages. Memory management: Background, Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation, Demand Paging, Page Replacement, Thrashing, Demand Paging, Page Replacement. File systems: File Concept, Access Methods, Directory Structure, File-System Mounting, File Sharing, File-System Implementation, Directory Implementation, Allocation Methods. 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

CSE-4793 Data Structures
Credit Hours: 3
Contact Hours: 3 per Week
[Pre requisite: EEE 2410 Numerical Technique Sessional]

Internal data representation; Abstract data types; Elementary data structures: arrays, lists, stack, queue Trees, graphs; Advanced data structures: heaps, B-trees; Recursion; Sorting; Searching; Hashing; Storage management.

CSE-4794 Data Structures Sessional
Credit Hours: 1.5
Contact Hours: 3 per Week

Stacks and queues. Implementation of different kinds of linked lists like one way, two ways, circular linked lists. Tree and graph implementation. Implementation of recursion in various applications. Different kinds of sorting searching techniques. Hashing technique. Implementation of various storage management. To perform other experiments relative to this course.

EEE 4795 Software Engineering
Credit Hours: 3
Contact Hours: 3 per week
[Pre requisite: EEE 2410 Numerical Technique Sessional]

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. 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. Requirements and Specification: requirement engineering process, software requirements document, requirement validation and evolution, requirement analysis process model, system contest, social and organizational factors, data-flow models,

semantic data models, object models, Data dictionaries, requirement definition, requirement specification and non-functional requirements, software Prototyping, Basic concepts of different formal software specification techniques. 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. 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. Software Evolution: Software maintenance, characteristics of maintainable software, re-engineering, legacy systems, Software reuse and configuration. 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

CSE 4891 Computer Networks:
Credit Hours: 3
Contact Hours: 3 per week
[Pre requisite: EEE 2410 Numerical Technique Sessional]

Switching and multiplexing: ISO, TCP-IP and ATM reference models. Different data communication services: physical layer wired and wireless transmission media. Cellular radio: communication satellites; data link layer: Elementary protocols. Sliding window protocols. Error detection and corrections. HDLC. DLLL of Internet. DLLL of ATM: Multiple Access protocols. IEEE.802 Protocols for LANs and MANs. Switches. Hubs and bridges. High speed LAN Network Layer: Routing, congestion control, internetworking, network layer in Internet: IP protocol. IP addresses. ARP; NI in ATM transport layer; transmission control protocol. UDP. ATM adaptation layer; Application layer; Network security; email, domain name system; simple network management protocol; HTTP and world wide web.

CSE 4892 Computer Network Sessional
Credit Hours: 1.5
Contact Hours: 3 per week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in CSE 4891. In the second part students will design systems using the principles learned in CSE 4891

CSE 4893 Computer Architecture
Credit Hours: 3
Contact Hours: 3 per week
[Pre requisite: EEE 3505 Microprocessor & Interfacing]

Instructions and data access methods: Arithmetic Logic Unit (ALU) design; arithmetic and logical operations, floating-point operations; Processor design: data paths- single cycle and multi cycle implementations; control unit design; hardware and micro-programmed: pipeline; pipelined data path and control. Hazards and exceptions; memory organization: cache, virtual memory; buses; multiprocessors, type of multiprocessor performance, single bus multiprocessors, clusters.

CSE 4895 Multimedia Communication
Credit Hours: 3
Contact Hours: 3 per week
[Pre requisite: EEE 2410 Numerical Technique Sessional]

Types of media. Multimedia signal characteristic: sampling, digital representation, signal formats. Signal coding and compression: entropy coding, transform coding, vector quantization. Coding standards: H.26x, LPEG, MPEG. Multimedia communication networks: network topologies and layers, LAN, MAN, WAN, PSTN, ISDN, ATM, internetworking devices, the internet and access technologies, enterprise networks, wireless LANs and wireless multimedia. Entertainment networks: cable, satellite and terrestrial TV networks, ADSL and VDSL, high speed modems. Transport protocols: TCP, UDP, IP, Ipv4, Ipv6, FTP, RTP and RTCP, use of MPLS and WDMA. Multimedia synchronization, security, QOS and resource management. Multimedia applications: The WWW, Internet telephony, teleconferencing, HDTV, email and e-commerce

EEE 4897 Microprocessor System Design
Credit Hours: 3
Contact Hours: 3 per week
[Pre requisite: EEE 3505 Microprocessor & Interfacing]

Review of 80x86 family of microprocessors. Instructions and data access methods in a 32-bit microprocessor; Representation of operands and operators; Instruction formats; Designing Arithmetic Logic Unit; Processor design: single bus, multi-bus architecture; Control Unit Design: hardwired, micro-programmed and pipe line; VLSI implementation of a microprocessor or part of a microprocessor design.

EEE 4898 Microprocessor System Design Sessional
Credit Hours: 1.5
Contact Hours: 3 per week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE 4793. In the second part, students will design simple systems using the principles learned in EEE 4793.

Interdisciplinary Fields

EEE 4821 Control System II
Credit Hours: 3
Contact Hours: 3 per Week
[Pre requisite: EEE 4701 Control system I]

Compensation using pole placement technique. State equations of digital systems with sample and hold, state equation of digital systems, digital simulation and approximation. Solution of discrete state equations: by Z transform, state equation and transfer function, state diagrams, state plane analysis. Stability of digital control systems. Digital simulation and digital redesign. Time domain analysis. Frequency domain analysis. Controllability and observability. Optimal linear digital regulator design. Digital state observer. Microprocessor control. Introduction to neural network and fuzzy control, adaptive control. H. Control, nonlinear control.

EEE 4822 Control System II Sessional
Credit Hours: 1.5
Contact Hours: 3 per Week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE 4821. In the second part, students will design simple systems using the principles learned in EEE 4821.

EEE 4823 Numerical Methods
Credit Hours: 3
Contact Hours: 3 per Week
[Pre requisite: EEE 2410 Numerical Technique Sessional]

Introduction: Motivation and errors in numerical techniques. Taylor series. Finite difference calculus: Forward, backward, divided, and central difference and difference of a polynomial. Interpolation: Newton's formula, Lagranage, spline, Chebyshev and inverse. Extrapolation. Nonlinear equations: Iteration, bisection, false position, Raphson, secant and Muller's methods. Simultaneous linear algebraic equations: Cramer's rule, inversion of matrices, Gauss elimination, Gauss-Jordan method, factorization and Gauss-Siedel iteration methods. Curve Fitting: Linear and polynomial regression, fitting power, exponential and trigonometric functions. Ordinary differential equations: Initial value problem, Taylor's series method, Picard's method of successive approximation, Euler's method and Runge Kutta method. Boundary value problems. Numerical integration: general quadrature formula, trapezoidal rule and Simpson's rule. Numerical differentiation.

EEE 4824 Numerical Methods Sessional
Credit Hours: 1.5
Contact Hours: 3 per Week

Students will perform experiments to verify practically the theories and concepts learned in EEE 4823.

EEE 4825 Biomedical Instrumentation
Credit Hours: 3
Contact Hours: 3 per Week
[Pre requisite: EEE 2403 Electronics II]

Human body: Cells and physiological systems. Bioelectricity: genesis and characteristics. Measurement of bio-signals: Ethical issues, transducers, amplifiers and filters. Electrocardiogram: electrocardiography, phonocardiograph, vector cardiograph, analysis and interpretation of cardiac signals, cardiac pacemakers and defibrillator. Blood pressure: systolic, diastolic mean pressure, electronic manometer, detector circuits and practical problems in pressure monitoring. Blood flow measurement: Plethymography and electromagnetic flow meter. Measurement and interpretation: electroencephalogram, cerebral angiograph and cronical X-ray. Brain scans. Electromayogram (EMG). Tomograph: Positron emission topography and computer topography. Magnetic resonance imaging. Ultrasonogram. Patient monitoring system and medical telemetry. Effect of electromagnetic fields on human body.

EEE 4826 Biomedical Instrumentation Sessional
Credit Hours: 1.5
Contact Hours: 3 per Week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE 4825. In the second part, students will design simple systems using the principles learned in EEE 4825.

EEE 4827 Measurement and Instrumentation
Credit Hours: 3
Contact Hours: 3 per Week
[Pre requisite: EEE 2403 Electronics II]

Introduction: Applications, functional elements of a measurement system and classification of instruments. Measurement of electrical quantities: Current and voltage, power and energy measurement. Current and potential transformer. Transducers: mechanical, electrical and optical. Measurement of non-electrical quantities: Temperature, pressure, flow, level, strain, force and torque. Basic elements of dc and ac signal conditioning: Instrumentation amplifier, noise and source of noise, noise elimination compensation, function generation and linearization, A/D and D/A converters, sample and hold circuits. Data

Transmission and Telemetry: Methods of data transmission, dc/ac telemetry system and digital data transmission. Recording and display devices. Data acquisition system and microprocessor applications in instrumentation.

EEE 4828 Measurement and Instrumentation Sessional
Credit Hours: 1.5
Contact Hours: 3 per Week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE 4827. In the second part, students will design simple systems using the principles learned in EEE 4827.