Barishal Engineering College-BEC

Department of Electrical & Electronics Engineering

Semester-I

Sl. No	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
1	EEE 101	Electrical Circuits I	3	-	3
2	CSE 101	Computer Programming	3	-	3
3	CSE 102	Computer Programming Sessional	-	3	1.5
4	PHY 111	Waves & Oscillations, Optics , Thermal Physics	3	-	3
5	PHY 112	Physics Sessional	-	3	1.5
6	MATH 111	Calculus I	3	-	3
7	MATH 113	Calculus II	3	-	3
8	CE 102	Engineering Drawing	-	3	1.5
9	SS 101	Social Studies	2	-	2
		Subtotal =	**17**	**9**	**21.5**

Subject	Credit
Engineering	9
Science & General	12.5
Total =	**21.5**

Semester-II

Sl. No	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
1	EEE 201	Electrical Circuits II	3	-	3
2	EEE 202	Electrical Circuits Laboratory	-	3	1.5
3	EEE 204	Electrical Circuits Simulation Laboratory	-	3	1.5
4	PHY 211	Electricity and Magnetism, Modern Physics and Mechanics	3	-	3
5	PHY 212	Physics Sessional	-	3	1.5
6	CHEM 211	Chemistry I	3	-	3
7	CHEM 212	Inorganic and Quantitative Analysis Laboratory	-	3	1.5
8	MATH 215	Ordinary and Partial Differential Equations	3	-	3
9	ENG 201	English Language	2	-	2
10	ENG 202	Communication in English (Practice)	-	2	1
		Subtotal =	**14**	**14**	**21**

Subject	Credit
Engineering	6
Science & General	15
Total =	**21**

Semester-III

Sl. No	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
1	EEE 301	Electronics I	3	-	3
2	EEE 302	Electronic Circuit Simulation Laboratory	-	3	1.5
3	EEE 303	Energy Conversion I	3	-	3
4	MATH 317	Linear Algebra	3	-	3
5	SS 301	Managerial Economics	2	-	2
6	SS 303	Govt. & Public Administration	2	-	2
7	SS 305	Sociology and Industrial Law	2	-	2
		Subtotal =	**15**	**3**	**16.5**

Subject	Credit
Engineering	7.5
Science & General	9
Total =	**16.5**

Semester-IV

Sl. No	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
1	EEE 403	Electronics II	3	-	3
2	EEE 404	Electronics II Laboratory	-	3	1.5
3	EEE 405	Energy Conversion II	3	-	3
4	EEE 406	Energy Conversion Laboratory	-	3	1.5
5	EEE 407	Engineering Electromagnetic	3	-	3
6	EEE 410	Numerical Technique Laboratory	-	3	1.5
7	ME 401	Mechanical Engineering Fundamentals	3	-	3
8	ME 402	Mechanical Engineering Fundamentals	-	3	1.5
9	MATH 419	Probability and Statistics	3	-	3
		Subtotal =	**15**	**12**	**21**

Subject	Credit
Engineering	18
Science & General	3
Total =	**21**

Semester-V

Sl. No	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
1	EEE 501	Continuous Signals and Linear Systems	3	-	3
2	EEE 503	Digital Electronics	3	-	3
3	EEE 504	Digital Electronics Laboratory	-	3	1.5
4	EEE 505	Power System I	3	-	3
5	EEE 506	Power System I Laboratory	-	3	1.5
6	EEE 507	Electrical Properties of Materials	3	-	3
7	EEE 510	Electrical Services Design	-	3	1.5
8	SS 507	Financial Management and Accounting	3	-	3
9	SS 510	Project Planning & Management	-	2	1
		Subtotal =	**15**	**11**	**20.5**

Subject	Credit
Engineering	16.5
Science & General	4
Total =	**20.5**

Semester-VI

Sl. No	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
1	IPE 601	Industrial Management	3	-	3
2	EEE 601	Communication Theory	3	-	3
3	EEE 602	Communication Laboratory	-	3	1.5
4	EEE 603	Digital Signal Processing I	3	-	3
5	EEE 604	Digital Signal Processing I Laboratory	-	3	1.5
6	EEE 605	Microprocessor and Interfacing	3	-	3
7	EEE 606	Microprocessor and Interfacing Laboratory	-	3	1.5
8	EEE 607 EEE 609 EEE 611	Power System II (Power Group) Analog Integrated Circuits (Electronics Group) Random Signals and Processes (Communication Group)	3	-	3
		Subtotal =	**15**	**9**	**19.5**

Subject	Credit
Engineering	19.5
Science & General	0
Total =	**19.5**

Semester-VII

Sl. No	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
1	EEE 700	Project/Thesis	3	-	3
2	EEE 701	Solid State Devices	3	-	3
3	EEE 703	Control System I	3	-	3
4	EEE 704	Control System I Laboratory	-	3	1.5
5	EEE 705 EEE 707 EEE 709	Energy Conversion III (Power Group) Processing and Fabrication Technology (Electronics Group) Multimedia Communications (Communication Group)	3	-	3
6	EEE 711 EEE 713 EEE 715	Power Electronics (Power Group) VLSI I (Electronics Group) Microwave Engineering (Communication Group)	3	-	3
7	EEE 712 EEE 714 EEE 716	Power Electronics Laboratory (Power Group) VLSI I Laboratory (Electronics Group) Microwave Engineering Laboratory (Communication Group)	-	3	1.5
8	EEE 717 EEE 719 EEE 721	Power Plant Engineering (Power Group) Compound Semi Conductor and Heterojunction Devices (Electronics Group) Optical Fiber Communication (Communication Group)	3	-	3
		Subtotal =	**18**	**6**	**21**

Subject	Credit
Engineering	21
Science & General	0
Total =	**21**

Semester-VIII

Sl. No	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
1	EEE 800	Project/Thesis	3	-	3
2	EEE 801 EEE 803 EEE 805	Power System Protection/High Voltage Engineering (Power Group) VLSI II (Electronics Group) Digital Communication (Communication Group)	3	-	3
3	EEE 802 EEE 804 EEE 806	Power System Protection Laboratory/High Voltage Engineering Laboratory (Power Group) VLSI II Laboratory (Electronics Group) Digital Communication Laboratory (Communication Group)	-	3	1.5
4	EEE 807 EEE 809 EEE 811	Power System Reliability (Power Group) Optoelectronics (Electronics Group) Mobile Cellular Communication (Communication Group)	3	-	3
5	EEE 813 EEE 815 EEE 817	Power System Operation and Control (Power Group) Semi-Conductor Device Theory (Electronics Group) Tele Communication Engineering (Communication Group)	3	-	3
6	EEE 819 EEE 821 EEE 823	Control System II (Power Group) Numerical Methods (Electronics Group) Measurement and Instrumentation (Communication Group)	3	-	3
7	EEE 820 EEE 822 EEE 824	Control System II Laboratory (Power Group) Numerical Methods Laboratory (Electronics Group) Measurement and Instrumentation Laboratory (Communication Group)	-	3	1.5
		Subtotal =	**15**	**6**	**18**

Subject	Credit
Engineering	18
Science & General	0
Total =	**18**

Summary

Semester	Subject		Total Credit
	Engineering (Credit)	Science & General (Credit)	
Semester- 1	9	12.5	21.5
Semester- 2	6	15	21
Semester- 3	7.5	9	16.5
Semester- 4	18	3	21
Semester- 5	16.5	4	20.5
Semester- 6	19.5	0	19.5
Semester- 7	21	0	21
Semester- 8	18	0	18
Total =	**115.5**	**43.5**	159

Elective Course

Elective- I

Sl. No	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
1	EEE 371	Power System II	3	-	3
2	EEE 351	Analog Integrated Circuits	3	-	
3	EEE 331	Random Signals and Processes	3	-	

Elective- II

Sl. No	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
1	EEE 471	Energy Conversion III	3	-	3
2	EEE 451	Processing and Fabrication Technology	3	-	
3	EEE 431	Digital Signal Processing II	3	-	
4	CSE 491	Multimedia Communications	3	-	

Elective- III

Sl. No	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	

1	EEE 473	Power Electronics	3	-	3+1.5=4.5
2	EEE 474	Power Electronics Laboratory	-	3	
3	EEE 453	VLSI I	3	-	
4	EEE 454	VLSI I Laboratory	-	3	
5	EEE 433	Microwave Engineering	3	-	
6	EEE 434	Microwave Engineering Laboratory	-	3	
7	EEE 493	Microprocessor System Design	3	-	
8	EEE 494	Microprocessor System Design Laboratory	-	3	

Elective- IV

Sl. No	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
1	EEE 475	Power Plant Engineering	3	-	3
2	EEE 455	Compound Semiconductor and Hetero-Junction Devices	3	-	
3	EEE 435	Optical Fiber Communication	3	-	
4	EEE 495	Real Time Computer System	3	-	

Elective- V

Sl. No	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
1	EEE 477/ EEE 483	Power System Protection/ High Voltage Engineering	3	-	3+1.5=4.5
2	EEE 478/ EEE 484	Power System Protection Laboratory/ High Voltage Engineering Laboratory	-	3	
3	EEE 457	VLSI II	3	-	
4	EEE 458	VLSI II Laboratory	-	3	
5	EEE 437	Digital Communication	3	-	
6	EEE 438	Digital Communication Laboratory	-	3	
7	CSE 451	Computer Networks	3	-	
8	CSE 452	Computer Networks Laboratory	-	3	

Elective- VI

Sl. No	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
1	EEE 479	Power System Reliability	3	-	3
2	EEE 459	Optoelectronics	3	-	
3	EEE 439	Mobile Cellular Communication	3	-	
4	CSE 453	Computer Architecture	3	-	

Elective- VII

Sl. No	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
1	EEE 481	Power System Operation and Control	3	-	3
2	EEE 461	Semiconductor Device Theory	3	-	
3	EEE 441	Telecommunication Engineering	3	-	
4	CSE 491	Multimedia Communication	3	-	

Elective- VIII

Sl. No	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
1	EEE 421	Control System II	3	-	3+1.5=4.5
2	EEE 422	Control System II Laboratory	-	3	
3	EEE 423	Numerical Methods	3	-	
4	EEE 424	Numerical Methods Laboratory	-	3	
5	EEE 425	Biomedical Instrumentation	3	-	
6	EEE 426	Biomedical Instrumentation Laboratory	-	3	
7	EEE 427	Measurement and Instrumentation	3	-	
8	EEE 428	Measurement and Instrumentation Laboratory	-	3	

DEPARTMENTAL SUBJECTS

Semester- I

	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
	EEE 101	Electrical Circuits I	3	-	3
	CSE 109	Computer Programming	3	-	3
	CSE 110	Computer Programming Sessional	-	3	1.5
	CE 152	Engineering Drawing	-	3	1.5
		Subtotal =	**6**	**6**	**9**

Semester- II

	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
	EEE 105	Electrical Circuits II	3	-	3
	EEE 106	Electrical Circuits Laboratory	-	3	1.5

	EEE 110	Electrical Circuits Simulation Laboratory	-	3	1.5
		Subtotal =	**3**	**6**	**6**

Semester- III

	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
	EEE 201	Electronics I	3	-	3
	EEE 210	Electronic Circuit Simulation Laboratory	-	3	1.5
	EEE 203	Energy Conversion I	3	-	3
		Subtotal =	**6**	**3**	**7.5**

Semester- IV

	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
	EEE 205	Energy Conversion II	3	-	3
	EEE 206	Energy Conversion Laboratory	-	3	1.5
	EEE 207	Electronics II	3	-	3
	EEE 208	Electronics II	-	3	1.5
	EEE 209	Engineering Electromagnetics	3	-	3
	EEE 212	Numerical Technique Laboratory	-	3	1.5
	ME 267	Mechanical Engineering Fundamentals	3	-	3
	ME 268	Mechanical Engineering Fundamentals	-	3	1.5
		Subtotal =	**12**	**12**	**18**

Semester- V

	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
	EEE 301	Continuous Signals and Linear Systems	3	-	3
	EEE 303	Digital Electronics	3	-	3
	EEE 304	Digital Electronics Laboratory	-	3	1.5
	EEE 305	Power System I	3	-	3
	EEE 306	Power System I Laboratory	-	3	1.5
	EEE 307	Electrical Properties of Materials	3	-	3
	EEE 314	Electrical Services Design	-	3	1.5
		Subtotal =	**12**	**9**	**16.5**

Semester- VI

	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
	IPE 493	Industrial Management	3	-	3
	EEE 309	Communication Theory	3	-	3
	EEE 310	Communication Laboratory	-	3	1.5
	EEE 311	Digital Signal Processing I	3	-	3
	EEE 312	Digital Signal Processing I Laboratory	-	3	1.5
	EEE 315	Microprocessor and Interfacing	3	-	3
	EEE 316	Microprocessor and Interfacing Laboratory	-	3	1.5
	EEE 3**	Elective I	3	-	3
		Subtotal =	**15**	**9**	**19.5**

Semester- VII

	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
	EEE 400	Project/Thesis	3	-	3
	EEE 413	Solid State Devices	3	-	3
	EEE 401	Control System I	3	-	3
	EEE 402	Control System I Laboratory	-	3	1.5
	EEE 4**	Elective II	3	-	3
	EEE 4**	Elective III	3	-	3
	EEE 4**	Elective III Laboratory	-	3	1.5
	EEE 4**	Elective IV	3	-	3
		Subtotal =	**18**	**6**	**21**

Semester- VIII

	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
	EEE 400	Project/Thesis	3	-	3
	EEE 4**	Elective V	3	-	3
	EEE 4**	Elective V Laboratory	-	3	1.5
	EEE 4**	Elective VI	3	-	3
	EEE 4**	Elective VII	3	-	3
	EEE 4**	Elective VIII	3	-	3
	EEE 4**	Elective VIII Laboratory	-	3	1.5
		Subtotal =	**15**	**6**	**18**

Grand Total =	**87**	**57**	**115.5**

SCIENCE & HUMANITIES SUBJECT

Semester- I

	Course Number	Course Name	Hours/Week		Credit
			Theory	Practical/ Sessional	
	PHY 121	Waves and Oscillations, Optics and Thermal Physics	3	-	3
	PHY 102	Physics Sessional	-	3	1.5
	MATH 157	Calculus I	3	-	3
	MATH 159	Calculus II	3	-	3
	SS 101	Social Studies	2	-	2
		Subtotal =	**11**	**3**	**12.5**

Semester- II

	PHY 123	Electricity and Magnetism, Modern Physics and Mechanics	3	-	3
	PHY 104	Physics Sessional	-	3	1.5
	CHEM 101	Chemistry	3	-	3
	CHEM 114	Inorganic and Quantitative Analysis Laboratory	-	3	1.5
	MATH 257	Ordinary and Partial Differential Equations	3	-	3
	ENG 201	English Language	2	-	2
	ENG 202	Communication in English	-	2	1
		Subtotal =	**11**	**8**	**15**

Semester- III

	MATH 259	Linear Algebra	3	-	3
	HUM 277	Fundamentals of Economics	3	-	3
		Subtotal =	**6**	**-**	**6**

Semester- IV

	MATH 357	Probability and Statistics	3	-	3
		Subtotal =	**3**	**-**	**3**

Semester- V

	HUM 279	Financial and Managerial Accounting	3	-	3
	SS 501	Project Planning and Management	-	2	1
		Subtotal =	**3**	**1**	**4**

Semester- VI

		Subtotal =			

Semester- VII

		Subtotal =			

Semester- VIII

		Sub total =			

Grand Total =	**34**	**12**	**40.0**

***gqgbwmsn* BwÄwbqvwis K‡jR Gi B‡jKwUªK¨vj GÛ B‡jKUªwb· BwÄwbqvwis wefv‡Mi wm‡jevm**

cÖYq‡bi evsjv‡`k cÖ‡KŠkj wek¦we`¨vjq (ey‡qU) Gi B‡jKwUªK¨vj GÛ B‡jKUªwb· wefv‡Mi wm‡jev‡mi †µwW‡Ui Zzjbvg~jK Av‡jvPbv t

cÖwZôv‡bi bvg	cÖwZôv‡bi we`¨gvb wefv‡Mi bvg	Uvg©m/ †mwgóvi	‡µwWU msL¨v			Avbylvw½K wel‡qi †gvU †µwWU	gš—e¨
			w_Dix	‡mkbvj	‡gvU †µwWU		
evsjv‡`k cÖ‡KŠkj wek¦we`¨vjq, XvKv|	B‡jKwUªK¨vj GÛ B‡jKUªwb· BwÄwbqvwis	1.	15	9	157.5 (115.5+42)	42	
			2.	15	12			
			3.	15	6			
			4.	15	12			
			5.	15	9			
			6.	15	9			
			7.	18	6			
			8.	15	6			
			‡gvU =	123	69			

1) Social Studies T P C

2 0 2

Sl. No	Topics
1	Anthropological Background of Bangladesh & Evolution of Bangla Literature
2	Archaeological Heritage of Bangladesh
3	History & Culture of Bangladesh
4	Social Structure of Bangladesh
5	Bangladesh Profile
6	Emotional intelligence and behavior
7	Gender issues

2) Government & Public Administration T P C

2 0 2

Sl. No	Topics
1	Constitution of Bangladesh
2	Fundamental Rights as Enunciated in Bangladesh Constitution
3	Forms of Government of Bangladesh.
4	Organs of Government a) Legislative Assembly: Composition, Powers and Functions b) Judiciary- Composition, Powers and Functions c) Executive Public Administration
5	Role of Government
6	Good Governance, Accountability and Transparency of the public servant
7	Local Government
8	Human Resource Management and Planning

3) Financial Management & Accounting **T P C**

3 0 3

Sl. No	Topics
1	Budgetary System
2	Drawing and Disbursing Activities
3	Financial Powers
4	Public Procurement Rules/Act
5	Store Management
6	Financial Accounting
7	Auditing System a) Audit Procedure, Objection, Reply and settlement b) Performance and Accounts Audit
8	Cost Accounting

Sociology

2 Hours in a week, 2.00 Credit

Sociological perspective : definition, nature, scope and importance of sociology; Sociology and scientific approach: methods of social research, stages of social research; Primary concepts of sociology: society, community, association, institution, group; Social evolution: stages in the evolution of human civilization; Culture: definition, characteristics, culture contents (material and non-material), cultural lag, culture and civilization: Industrial revolution: the growth of capitalism, features and social consequences, socialism; Social organization: family, forms and functions of family, functions of family. In modern industrial society, marriage, forms of marriage, functions of marriage; Social stratification: main types of social stratification-slavery-caste and social class and status, social stratification and social mobility; Social control: religion and morality, custom and public opinion, taboo-law, state and education; Social change: change evolution-progress-development, factors in social change; Society and population: human migration, population and resources; Some current social problems: crime, deviance, juvenile delinquency, youth unrest; Technology and society: effects of technological factors on social life.

4) Managerial Economics **T P C**

2 0 2

Sl. No	Topics
1	Micro and Macro Economics
2	Market Economy
3	GDP, GNP, NNP with Reference to Bangladesh

4	Globalization
5	World Trade Organization and Bangladesh Economy
6	Sustainable Development
7	Disaster Management in Bangladesh
8	Gender: Concept. and Issues
9	Allocation of Resources
10	Economic Indicators of Development
11	Investment Appraisal criteria for economic decisions, social consideration in investment, present worth, benefit-cost ratio, internal rate of return.
12	Marketing Concepts: Market Orientation, Relationship Marketing, Market Segmentation and measurement, Marketing planning.

5) Communication in English (Sessional Work) T P C

0 2 1

Sl. No	Topics
1	Note taking skill (3 Sessions)
2	Speaking skill (3 Sessions)
3	Reading skill (3 Sessions)
4	Writing skill (3 Sessions)
5	Document Preparing skill (2 Sessions)

6) Project Management & Planning T P C

0 2 1

Sl. No	Topics
1	Basic Concept of PCP, PP, TAPP, DPP and their classifications.
2	Project Identification
3	Project Evaluation (Social, Technical and Financial)
4	Logical Framework-its approach and application
5	CPM, PERT Network application,
6	Impact evaluation Techniques of Development Project/ Programs
7	Preparation of Development Project Proforma (DPP)
8	Administrative and managerial problems in Project Management and implementation
9	Monitoring and its importance to implement projects and role of IMED
10	Annual Development Programme

Chapter 3

RULES AND REGULATIONS FOR UNDERGRADUATE PROGRAMME UNDER COURSE SYSTEM

3.1 Introduction

From the academic session 2008-09, Mymensingh Engineering College is following a course system for undergraduate studies. Given below an extract from the report of the committee for framing

recommendations for implementation and administration of course system of instruction at undergraduate level as approved in the meetings of the academic Council held on September 24 and 30, 1992, and October 4 and 19, 1992. Only relevant sections of the report and the amendments that were subsequently made to it are included so that the students can have a clear understanding about Course System. The rules and regulations administering undergraduate curricula through Course System began applicable for students admitted to Mymensingh Engineering College in First Year classes and subsequent sessions.

3.1.1 The Course System

The undergraduate curriculum at Mymensingh Engineering College is based on the course system. The salient features of the course system are;

i. Reduction of the number of theoretical courses and examination papers around five in each term,
ii. The absence of a pass or a fail on an annual basis, iii. Continuous evaluation of student's performance,
iv. Introduction of Letter Grades and Grade Points instead of numerical grades,
v. Introduction of some additional optional courses and thus enable students to select courses according to his/her interest as far as possible,
vi. Opportunity for students to choose fewer or more courses that the normal course load depending on his/her capabilities and needs,
vii. Flexibility to allow the student to progress at his/her own pace depending on his/her ability or convenience, subject to the regulations on credit and minimum grade point average (GPA) requirements, and
viii. Promotion of teacher-student contact.

In the curriculum for the undergraduate programmes, besides the professional courses pertaining to each discipline, there is a storing emphasis on acquiring a through knowledge in the basic science of Mathematics, Physics and Chemistry. Due importance is also given for the study of several subjects in Humanities and Social Sciences which, it is expected will help the student to interact more positively with the society in which he/she/lives. Thus the course contents of the undergraduate programmes provide a harmonious blend of both basic sciences and their applications as well as their social relevance.

The first two terms of bachelor's degree programmes consist of courses in basic sciences, mathematics, humanities and social sciences, basic engineering and architecture subjects. The third and subsequent terms build directly on the knowledge of the basic subjects gained in the first two terms and go on to develop competence in specific disciplines.

3.2 Students Admission

Students will be admitted in undergraduate curricula in the Departments of Civil Engineering, Computer Science and Engineering, Electrical and Electronic Engineering as per rules of the Mymensingh Engineering College. The Registrar's Office serves Admissions Office and deals with course registration in addition to student admission.

3.3 Number of Semester in a Year

There will be two Semesters (Semester I and Semester II) in an academic year. In addition to these two regular Semester there may be a Short Term in the intervening period between and of Semester II and commencement of Semester I. During this term students, those who need, may take additional courses either to make up deficiencies in credit and GPA requirements or to fulfill the credit requirements for bachelor's degree spending less time than the normal duration; and other students may take vacation.

3.3.1 Duration of Semester

The duration of each of Semester I and Semester II will be 18 weeks which will be used as follows:

Classes 14 weeks
Recess before Term Final Examination 02 weeks

Total = 18 Weeks

The duration of a Short Term will be around 8 weeks of which about 7 weeks will be spent for class lectures and one week for Term Final Examination.

3.4 Course Pattern and Credit Structure

The entire undergraduate programme is covered through a set of theoretical and laboratory/sessional/studio courses.

3.4.1 Course Designation and Numbering System

Each course is designated by a two to four letter word identifying the department, which offers it followed by a three digit number with the following criteria:

(a) The first digit will correspond to the year/level in which the course is normally taken by the studetns.
(b) The second digit will be reserved for departmental use for such things as to identify different areas within a department.
(c) The last digit will usually be odd for theoretical and even for laboratory or sessional courses.

The course designation system is illustrated by two examples.

3.4.2 Assignment of Credits (a)

Theoretical Courses:

One lecture per week per term will be equivalent to one credit.

(b) Laboratory/sessional/Design:

Credits for laboratory/sessional or design courses will be half of the class hours per week per term.

Credits are also assigned to project and thesis work taken by students. The amount of credits assigned to such work may vary from discipline to discipline.

The curriculum does not demand the same rate of academic progress from all students for obtaining the degree but only lays down the pace expected of a normal student. A student whose background or capacity for assimilation is lower will be permitted to complete the programme at a slower pace by studying a lesser number of courses during a given term (subject to a minimum course load). He may keep pace with his class by taking during the Short Term those courses which he had dropped during the Regular Terms, or by covering the entire degree programme over an extended period without developing any felling of inferiority complex.

3.5 Types of Course

The courses included in undergraduate curricula are divided into several groups as follows:

3.5.1 Core Courses

In each discipline a number of courses will be identified as core courses which form the nucleus of the respective bachelor's degree programme. A student has to complete all of the designated core courses for his/her discipline.

3.5.2 Pre-requisite Courses

Some of the core courses are identified as pre-requisite courses. A pre-requisite course is one which is required to be completed before some other course(s) can be taken. Any such course, on which one or more subsequent courses build up, may be offered in each of the two regular Terms.

3.5.3 Optional Courses

Apart from the core courses, students will have to complete a number of courses which are optional in nature in that students will have some choice to choose the required number of courses from a specified group/number of courses.

3.6 Course Offering and Instruction

The courses to be offered in a particular term will be announced and published in the Course Catalog along with a tentative Term Schedule before the end of the previous term. Whether a course is to be offered in any term will be decided by the respective Board of Undergraduate Studies (BUGS). Respective departments may arrange to offer one or more pre-requisite or core courses in any term depending on the number of students who dropped or failed the course in the previous term.

Each course is conducted by a teacher. The course teacher is responsible for maintaining the expected standard of the course and for the assessment of student's performance. Depending on the strength of registered students (i.e. the number of students) enrolled for the course, the teacher concerned might have course associates and teaching assistants (TA) to help him/her in teaching and assessment.

For a course strength necessitating two or more parallel classes or sections, one of the course teachers or any other member of the teaching staff of the department may be designated as course coordinator. He/She has the full responsibility for coordinating the work of the other members of the department involving in that course.

3.7 Departmental Monitoring Committee

Consistent with its resilient policy to keep pace with new developments in the field of science and technology, the university will update its course curriculum at frequent intervals (at least every three years). Such updating aims not only to include the expanding frontiers of knowledge in the various fields but also to accommodate the changing social, industrial and professional need of the country. This can be done through deletion and modification of some of the courses and also through the introduction of new ones.

BUGS of each department will constitute a Departmental Monitoring Committee with three teachers of the department. This committee will monitor and evaluate the performance of the Course System within the department. In addition to other teachers of the department, the committee may also propose from time to time to the BUGS any changes and modifications needed for upgrading the Undergraduate Curriculum and the Course System.

3.8 Teacher Student Contact

The proposed system encourages students to come in close contact with teachers. For promotion of teacher-student contact, each students is assigned to an Adviser and the student is free to discuss with his/her adviser all academic matters, especially those related to courses taken and classes being attended by him/her. Students are also encouraged to meet with other teachers any time for help on academic matters.

3.9 Student Adviser

One Adviser would normally be appointed for a bath of students by the BUGS of the concerned departments(s) who will advise each student on the courses to be taken by a student. Adviser will discuss with the student his/her academic programme and then decide the number and nature of courses for which he/she register/however, it is the student's responsibility to keep contact with his/her adviser who will review and check on subsequent progress. The adviser should be in the rank of an Assistant Professor or above from the concerned department(s).

For a student of second and subsequent terms, the number and nature of courses for which he/she can register will be decided on the basis of his/her academic performance during the previous term. The adviser will advise the students to register for the courses during the next term within the framework of the guidelines with respect to minimum/maximum credit hour limits, etc. Which are elaborated at appropriate places in this booklet. He/She is also authorized to permit the student to drop one or more courses based on his/her academic performance and the corresponding categorization (Art.3.16).

Special provisions exist for academically weak students with regard to make-up courses (Art.3.19).

3.10 Registration Requirements

Any student who makes use of classroom or laboratory facilities or faculty time is required to register formally. Being admitted to the university, each student is assigned to a student adviser. The students can register for courses he/she intends to make during a given term only on the basis of the advise and consent of his/her adviser.

3.10.1 Registration Procedure

Students must register for each class in which they will participate. Each student will fill up his/her Course Registration Form in consolation with and under the guidance of his/her adviser. The original copy of the Course Registration Form will be submitted to the Registrar's Office, and then the requisite number of photocopies will be made by the Registrar's Office for distribution. The date, time and venue will be announced in advance by the Registrar's Office. Much counseling and advising are accomplished at registration time. It is absolutely necessary that all students present themselves at the registration desk at the specified time.

3.10.2 Limits on the Credit Hours to be Taken

A students must be enrolled in at least 15 credit hours. He/She may be allowed to enroll in up to a maximum of 24 credit hours if recommended by his/her Adviser. A student must enroll for the prescribed sessional/laboratory courses in the respective Term within the allowed credit hour limits.

In special cases where a student cannot be allotted the minimum required 15 credit hours in a Term, the relevant BUGS may approve a lesser number of credit hours to suit individual requirements. Such cases shall only be applicable to students needing less than 15 credits for graduation

3.10.3 Pre-condition for Registration

A student will be allowed to register in those courses subject to the capacity constrains and satisfaction of pre-requisite courses. If a student fails in a pre-requisite course in any Term, the concerned BUGS may allow him/her to register for a course which builds on the pre-requisite course provided his/her attendance and grades in continuous assessment in the said pre-requisite course is found to be satisfactory.

Registration will be done at the beginning of each term. The Registration programme with dates and venue will be announced in advance. Late registration is, however, permitted during the first week on payment of a late registration fee. Students having outstanding dues to university or a hall of residence shall not be permitted to register. All students have, therefore, to clear their dues and get a clearance or no dues certificate, On the production of which, they will be given necessary Course Registration Forms and complete the corse registration procedure. Registration Forms will normally be available in the Register's Office. However, for the First Year students, prior department-wise ennoblement/admission is mandatory. An orientation programme will be conducted for them at the beginning of the first term when they will be handed over the registration package on production enrollment slip/proof of admission.

3.10.4 Pre registration

Pre-registration for courses to be offered by the students in a particular term will be done on specified dates before the end of the previous term. All students in consolation with their course advisers are required to complete the pre-registration formalities, failing which a fine of Tk. xxxx (amount may be decided by the authority) will have to be paid before registration in the next term. Further a student who does not pre-register may not get the courses desired by his/her subsequently.

3.10.5 Registration Deadline

Student must register for the courses to be taken before the commencement of each term and no late registration will be accepted after one week of classes. Late registration after this date will not be accepted unless the student submits a written appeal to the Registrar through the concerned Head and can document extenuating circumstances such as medical problems (physically incapacitated and not

able to be presented) from the Chief Medical Officer of the University or some other academic commitments which precluded enrolling prior to the last date of registration.

3.10.6 Penalty for Late Registration

Students who fail to register during the designated dates for registration are charged a late registration fee of Tk. xx.xx (amount may be decided by the authority). This extra fee will not be waived whatever be the reason for late registration.

3.10.7 Course Adjustment Procedure

A student will have some limited options to add or delete courses from his/her registration list, within the first two weeks from the beginning of the term. He/She may add courses only within the first two weeks of a regular Term and only the first week of a short Term. In case of dropping a course a student will be allowed to do so within four weeks after the commencement of a regular Term and two weeks after the commencement of a short Term. Adjustment of initially registered courses in any Term can be done by duly completing the Course Adjustment Form. These forms will normally be available in the Registrar's Office. For freshman students such forms can be included in the registration packet at the of orientation.

Any student willing to add or drop courses will have to fill up a Course Adjustment Form in consultation with under the guidance of his/her adviser. The original copy of the Course Adjustment Form will be submitted to the Registrar's Office, and then the requisite number of photo copies will be made by the Registrar's Office for distribution to the concerned Adviser, Head, Dean, Controller of Examination and the students.

All changes in courses must be approved by the Adviser and the Head of the department concerned. The Course Adjustment Form will have to be submitted to the Registrar's Office after duly filled in the signed by the concerned persons. To add/drop a course, respective teacher's consent will be required.

3.10.8 Withdrawal from a Term

If a student is unable to complete the Term Final Examination due to serious illness or serious accident, he/She may apply to the Head of the degree awarding department for total withdrawal from the Term within a week after the end of the Term Final Examination. However, he/she may choose not to withdraw any laboratory/sessional/design course if the grade obtained in such a course is 'D' or better. The application must be supported by a medical certificate from the Chief Medical Officer of the University. The Academic Council will take the final decision about such application.

3.11 Grading System

The total performance of a student in a given course is based on a scheme of continuous assessment. For theory courses this continuous assessment is made through a set of quizzes/in class evaluation, class participation, homework assignments, and a term final examination. The assessment in laboratory/sessional courses is made through observation of the student at work in class, viva-voce during laboratory hours, and quizzes. For architecture students, assessments in design sessional would be done through evaluation of a number of projects assigned throughout the term. As discussed earlier, each course has a certain number of credits, which describe its weight age. A letter grade with a specified number of grade points is awarded in each course for which a student is registered. A student's performance is satisfactorily and weighted average of the grade points that he/she has maintained. A minimum grade point average is required to be maintained for satisfactory progress. Also a minimum number of earned credits should be acquired in order to qualify for the degree as prescribed under article 3.22.

Letter grades and corresponding grade points will be awarded in accordance with provisions shown below:

Numerical Grade	Letter Grade	Grade Point
80% or above	A+ (A plus)	4.00
75% to less than 80%	A (A regular)	3.75
70% to less than 75%	A- (A minus)	3.50
65% to less than 70%	B+ (B plus)	3.25
60% to less than 65%	B (B regular)	3.00
55% to less than 60%	B- (B minus)	2.75
50% to less than 55%	C+ (C plus)	2.50
45% to less than 50%	C (C regular)	2.25
40% to less than 45%	D	2.00
Less than 40%	F	0.00
Continuation (For project & thesis/design course)	×	-

3.11.1 Distribution or Marks

Thirty percent (30%) of marks shall be allotted for continuous assessment i.e., quizzes and homework assignments, in class evaluation and class participation. The remainder of the marks will be allotted to Term Final examination which will be conducted centrally by the University. There will be internal and external examiners for each course in the Term Final examination of 3 hours duration. The distribution of marks for a given course will be as follows:

i. Class participation 10% ii. Homework Assignment and Quizzes 20% iii. Final Examination (3 hours) 70%

Total = 100%

Basis for awarding marks for class participation and attendance will be as follows:

Attendance	Marks
90% and above	10
85% to less than 90%	9
80% to less than 85%	8
75% to less than 80%	7
70% to less than 75%	6
65% to less than 70%	5
60% to less than 65%	4
Less than 60%	0

The number of quizzes of a course shall be at lest n+1, where n is the number of credits of the course. Evaluation of the performance in quizzes will be on the basis of the best n quizzes. The scheme of

continuous assessment that a teacher proposes to follow for a course will be announced on the first day of classes.

3.12 Earned Credits

The courses in which a student has obtained 'D' or a higher Grade will be counted as credits earned by him/her. Any course in which a student has obtained 'F' grade will not be counted towards his/her earned credits.

A student who obtains 'F' grade in a Core Course in any term will have to repeat the course.

If a student obtain 'F' grade in an Optional Course he/she may choose to repeat the Course or take a Substitute Course if available.

'F' grades will not be counted for GPA calculation but will stay permanently on the Grade Sheet and Transcript. When a student repeat a course in which he/she previously obtained 'F' grade, he/she will not be eligible to get a grade better than 'B' in such a course.

If a student obtains a grade lower than 'B' in a course, he/she will be allowed to repeat the course only once for the purpose of grade improvement by forgoing his/her earlier grade, but he/she will not be eligible to get a grade better than 'B' in such a course. A student will be permitted to repeat for grade improvement purposes a maximum of four courses in B.Sc Engg. and BURP programmes and a maximum of five courses in B Arch programme.

If a student obtains 'B' or a better grade in any course, he/she will not be allowed to repeat the course for the purpose of grade improvement.

3.13 Honours

Candidates for Bachelor's degree in engineering and architecture will be awarded the degree with honours if their over all GPA is 3.75 or better.

3.13.1 Dean's List

As a recognition of excellent performance, the names of students obtaining a cumulative GPA of 3.75 or above in two regular Terms in each academic year may be published in the Dean's List in each faculty. Students who have received F grade in any course during any of the two regular Terms will not be considered for Dean's List in that year.

3.14 Calculation of GPA

Grade Point Average (GPA) is the weighted average of the grade points obtained in all the courses passed/completed by a student. For example, if a student passes/completes five courses in a semester having credits of C_1, C_2, C_3, C_4 and C_5 and his/her grade points in these courses are G_1, G_2, G_3, G_4 and G_5, respectively then.

$$GPA = \frac{\sum C_i G_i}{\sum C_i}$$

3.14.1 A Numerical Example

Suppose a student has completed five courses in a Term and obtained the following grades:

Course	Credits	Grade	Grade points

EEE 203	3	A +	4.00
EEE 205	3	B	3.00
EEE 207	3	A	3.75
Math 205	2	B +	3.25
Hum	1	A -	3.50

Then his/her GPA for the term will be computed as follows:

$$GPA = \frac{3 \times 4.0 + 3 \times 3.0 + 3 \times 3.75 + 2 \times 3.25 + 1 \times 3.5}{3 + 3 + 3 + 2 + 1} = 3.52$$

3.15 Student Classification

For a number of reasons it is necessary to have a definite system by which to classify students as First Year/Freshman, Second Year/Sophomore, Third Year/Junior and Fourth Year/Senior. At BUET, regular students are classified according to the number of credit hours earned towards a degree. The following classification applies to the students.

Year/ Level	Earned Credit Hours	
	Engineering/URP	Architecture
First Year (Freshman) Level I	0 to 36	0 to 34
Second Year (Sophomore) Level II	37 to 72	>34 to 72
Third Year (Junior Level III	73 to 108	>72 to 110
Fourth year (Senior) Level IV	109 and above	>110 to 147
Fifth Year Level V		>147

3.16 Registration for the Second and Subsequent Terms

A student is normally required to earn at least 15 credits in a Term. At the end of each term, the students will be classified into the following three categories:

Category 1 : Consisting of students who have passed all the courses prescribed for the term and have no backlog of courses. A student belonging to Category 1 will be eligible to register for all courses prescribed for the next term.

Category 2 : Consisting of students who have earned at least 15 credits in the term but do not belong to category 1. A student belonging to Category 2 is advised to take at least one course less in the next term subject to the condition that he/she has to register for such backlog courses as may be prescribed by the adviser.

Category 3 : Consisting of students who have earn 15 credits in the term. A students belonging to Category 3 is advised to take at least two courses less subject to registration for a minimum of 15 credits. However he/she will be required to register for such backlog courses as may be prescribed by the adviser.

3.17 Performance Evaluation

The performance of a student will be evaluated in terms of two indices, viz. Term grade point average, and cumulative grade point average, which is the grade average for all the terms. The term grade point average, which is the grade average for all the terms. The term grade point average is computed dividing the total grade points earned in a term by the number of term hours taken in that term. The overall or cumulative grade point average (CGPA) is computed by dividing the total grade points accumulated up to date by the total credit hours earned. Thus a student who was earned 275 grade points in attempting 100 credit hours of courses would have a cumulative grade point average of 2.75.

Students will be considered to be making normal progress toward a degree if their cumulative or overall GPA for all work attempted is 2.20 or more. Students who regularly maintain Term GPA of 2.20 or better are making good progress toward their degrees and are in good standing with the university. Students who fail to maintain this minimum rate of progress will not be in good standing. This can happen when one or more of the following conditions exist:

i) Term GPA falls below 2.20, ii) Cumulative GPA falls below 2.20, iii) Earned credits fall below 15 times the number of Terms attended/studied.

All such students can make up deficiencies in GPA and credit requirements by completing courses in next terms (s) and backlog courses, if there be any, with better grades. When GPA and credit requirements are achieved, the student is returned to good standing.

3.18 Academic Progress, Probation and Suspension

Academic Progress: Undergraduate students will be considered to be making normal progress toward a degree if their cumulative or overall GPA for all work attempted is not less than 2.20.

Probation and Suspension: Undergraduate students who regularly maintain Term GPA of 2.20 or better are making good progress toward their degrees and are in good standing with the university. Students who fail to maintain this minimum rate of progress may be placed on academic probation.

The status of academic probation is reminder/warning to the student that satisfactory progress towards graduation is not being made. A student may be placed on academic probation when either of the following conditions exists:

i) The Term GPA falls below 2.20, or ii) The cumulative GPA falls below 2.20.

Students on probation are subject to such restrictions with respect to courses and extracurricular activates as may be imposed by the respective Dean of faculty.

The minimum period of probation is one Term, but the usual period is for one academic year. This allows the student an opportunity to improve the GPA through the completion of additional course work during the period that the student is on probation. The probation is extended for additional terms until the student achieves an overall GPA of 2.20 or better. When that condition is achieved, the student is returned to good standing.

Academic probation is not to be taken lightly-it is very serious matter. A student on academic probation who fails to maintain a GPA of at least 2.20 during two consecutive academic years may be suspended from this university. A student who has been suspended may make a petition to the Dean of faculty, but this petition will not be considered until the student has been suspended at least one full Term.

Petitions for reinstatement must set forth clearly the reasons for the previous unsatisfactory academic record and it must delineate the new conditions that have been created to prevent the recurrence of such work. Each such petition is considered individually on its own merits.

After consideration of the petition, and perhaps after consultation with the student, the Dean in some cases, reinstate the student if this is the first suspension. However, a second suspension will be regarded as final and absolute.

3.19 Measures for Helping Academically Weak Students

The following provisions will be made as far as possible to help academically weak students to enable them to complete their studies within the maximum period of seven years in engineering and eight years in architecture student, respectively:

i) All such students whose cumulative grade point average (CGPA) is less than 2.20 at the end of term may be given a load of not exceeding four courses, in the next term.
ii) For other academic deficiencies, some basic and core courses may be offered during the Short Term in order to enable the student to partially make-up for the deduced load during Regular Terms.

Following criteria will be followed for determining academically weak students:

i) CGPA falling below 2.20.
ii) Term grade point average (TGPA) falling below 2.20 points below that of previous term.
iii) Earned credit falling below 15 times the number of terms attended.

3.20 Special Courses

a) These courses, which include self-study courses, will be from amongst the regular theory courses listed in the course catalog, a special course can be run only the exceptional cases.
b) Whether a course is to be floated as a special course will be decided by the Head of the concerned department in consultation with the teacher/course coordinator concerned. Decision to float a course as a special course shall be reported to the Academic Council.
c) The special course may be offered to any student in his/her last term if it helps him/her to graduate in that term. It will be offered only if the course is not running in that term as a regular course.
d) Normally no lecture will be delivered for the special course but laboratory/design classes may be held if they form a part of the course. The course coordinator/course teacher will also assign homework's; administer quizzes and final examination for giving his or her assessments at the end of the term.
e) A student will be allowed to register for a maximum of two courses on self study basis.
f) A special Course shall not be utilized for grade improvement purposes.

3.21 Rules for Courses offered in a Short Term

a) The courses to be run during the Short Term shall be decided on the recommendations of the Departments on the basis of essential deficiencies to be made up by allowed to register in those courses subject to the capacity constrains and satisfaction of prerequisites.
b) Students will be allowed to register in a maximum of two courses during the Short Term.
c) A course may be given a weight age up to 6 credits in any Short Term following a graduating/final Term if he/she is short by a maximum of 6 earned credits only, on a selfstudy basis with no formal instruction. In a self-study course, there will be a Final Examination, besides the continuous assessment.
d) A fee of Tk. XX.XX for each credit hour to be registered is to be borne by the students who enroll during Short Term.

3.22 Minimum Earned Credit and GPA Requirements for Obtaining Graduation

Minimum credit hour requirements for the award of bachelor's degree in engineering and architecture will be decided by the respective BUGS. However, at least 157 credit hours for engineering and 190 credit hours for architecture must be earned to be eligible for graduation, and this must include the specified core courses.

The minimum GPA requirement for obtaining a bachelor's degree in engineering, URP or architecture is 2.20.

Completion of fulltime Studentship: Students who have completed minimum credit requirement for graduation for a Bachelors degree shall not be considered and registered as fulltime students.

A student may take additional courses with the consent of his/her adviser in order to raise GPA, but he/she may take a maximum of 15 such additional credits in engineering and URP and 18 such additional credits in architecture beyond respective credit-hour requirements for bachelor's degree during his/her entire period of study.

3.22.1 Application for Graduation and Award of Degree

A student who has fulfilled all the academic requirements for Bachelor's degree will have to apply to the Controller of Examinations through his/her Adviser for graduation. Provisional degree will be awarded on completion of credit and GPA requirements. Such provisional degrees will be confirmed by the Academic Council.

3.23 Industrial/Professional Training Requirements

Depending on each department's own requirement a student may have to complete a prescribed number of days of industrial/professional training in addition to minimum credit and other requirements, to the satisfaction of the concerned department. 3.24 Time Limits for completion of Bachelor's Degree

A student must complete his studies within a maximum period of seven years for engineering and URP and eight years for architecture.

3.24 Inclusion of Repeaters from Annual System in Course System

Repeater students including Private students of Annual system will be included in the Course System of curricula as and when such situation will arise.

3.25.1 Equivalence of Courses and Grades

Equivalence of courses passed previously by any repeater student including Private students shall be determined by the respective BUGS for the purpose of:

a) Allowing course exemption, and
b) Conversion of numerical grades into letter grades in exempted courses.

3.25.2 Exemption of Courses

Repeater students including private students may be granted exemption in theoretical course(s) in which he/she secured 45% or more marks and in sessional/laboratory course(s) in which he/she secured 41% or more marks.

3.25.3 Time Limit for Completion of Bachelor's Degree

Time allowed for a student included in Course System from Annual System to complete studies leading to a bachelor's degree will be proportional to the remaining credits to be completed by him/her.

A student in engineering, for example, having earned 40 credit hours through equivalence and exemption (of previously completed courses) out of a total requirement of 160 credits for bachelor's degree will get (7yrs×120/160=5.25) = 5.5 years (rounded to next higher half-a-year) or 11 (eleven) Regular Terms to fulfill all requirements for bachelor's degree. For a student in architecture, time allowed will be calculated in a similar way.

3.25.4 Relaxation of Course Registration for Students Transferred to Course System from Annual System

The requirement of registration of a minimum 15 credit hours in a term shall be waived for only the terms of the level where he/she has been transferred in course system provided that he/she has been granted exemption in some of the courses offered in those terms.

3.26 Attendance, Conduct, Discipline, etc.

3.26.1 Attendance

All students are expected to attend classes regularly. The university believes that attendance is necessary for effective learning. The first responsibility of a student is to attend classes regularly, and one is required to attend at least 60% of all classes held in every course.

3.26.2 Conduct and Discipline

A student shall conform to a high standard of discipline, and shall conduct himself/herself, within and outside the precincts of the university in a manner befitting the students of an university of national importance. He/She shall show due courtesy and consideration to the employees of the university and Halls of Residence, good neighborliness to his/her fellow students and the teachers of the university and pay due attention and courtesy to visitors.

T safeguard its ideals of scholarship, character and personal behaviour, the university reserves the right to require the withdrawal of any student at any time for any reason deemed sufficient.

3.27 Absence During Term

A student should not be absent from quizzes, tests, etc. during the Term. Such absence will naturally lead to reduction in points/marks which count towards the final grade. Absence in Term Final Examination will result in 'F' grades.

A student who has been absent for short periods, up to a maximum of three weeks due to illness, should approach the course teacher(s) or the course coordinator(s) for make-up quizzes or assignments immediately on returning to the classes. Such request should be supported by medical certificate from a university Medical officer. The medical certificate issued by registered medical practitioners (with the Registration Number shown explicitly on the certificates) will also be acceptable only in those cases where the student has valid reasons for his absence from the university).

Chapter 4

COURSES FOR UNDERGRADUATE ELECTRICAL AND ELECTRONIC ENGINEERING PROGRAMME

Course schedule for the undergraduate students of the Department of Electrical and Electronic Engineering is given below. The first digit of a course number represents the level, the second digit is for group. ODD number in the third digit signifies a theory course and even number presents a laboratory/sessional course. For all 3 credit theory and 1.5 credit laboratory/sessional courses, contact hour is 3 hours.

The second digit in the course number has the following meaning:

Digit 0 and 1 is for core course
2 for interdisciplinary
3 and 4 for communication
5 and 6 for electronics
7 and 8 for power
9 for computer

4.1 Core Courses for EEE Undergraduate Programme

4.1.1 Core Courses (EEE)

Table

4.1.2 Core Courses (Humanities)

Table

4.1.3 Core Courses (CSE)

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4.1.4 Core Courses (Mathematics)

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4.1.5 Core Courses (Physics)

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4.1.6 Core Courses (Chemistry)

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4.1.7 Core Courses (ME)

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4.1.8 Core Courses (CE)

Table

4.1.9 Core Courses (IPE)

Table

4.2 Elective Courses

From Level-3, Term-II, EEE Department starts offering elective courses under 4 groups viz. Power, Communication, Electronics and Computer. Besides these, one elective course is to be chosen from interdisciplinary group.

Rules for distributing major and minor groups and elective courses are as follows:

1. Students will be assigned one of the four groups as major and another as minor by taking written options from the students. For regular students, this will be done in Level-3, Term-I.
2. Maximum number of students in any group as major will be N/$, where N is the number of students in a batch. Similarly the maximum number of students in any group as minor will also be N/4.
3. Major and minor group assignment will be based on options and CGPA of first four terms from Level-1, Term-I to Level-2, Term-II.
4. A student will have to take 4 or 5 elective theory courses from the respective major group and remaining (3 or 2) elective theory courses from the respective minor group. A student must also take one theory course along with its corresponding sessional from the interdisciplinary group.
5. Students will be assigned their Level-4 theses/projects from the area of the respective major group.
6. If a student fails in an elective theory course that has a sessional, the student may take that theory course again or may take another theory course together with its corresponding sessional.
7. Maximum class size of an elective course for regular students will be (N/4+5). However, a student who has previously failed in an elective course will be allowed to re-register regardless of the class size.
8. Elective courses to be offered in a term will be distributed in the preceding term.
9. A student will be allowed to choose a course from his/her major group regardless of his/her CGPA. After distribution of the elective courses among the students of the respective major groups, remaining seats of the elective courses will be distributed among the students who have

chosen the subject's group as their minor. The distribution among the 'minor' students will be based on their written options for courses and CGPA at the time of the distriution.

10. In case of any unforeseen situation or ambiguity, the Departmental BUGS will take an appropriate decision.

4.2.1 Power Group

Table

4.2.2 Electronics Groups

Table

4.2.3 Communication Groups

Table

4.2.4 Computer Groups

Table

4.2.5 Interdisciplinary courses

Table

4.3 Courses Offering

Table

4.4 Course Curriculum of the Department of Electrical and Electronic Engineering Core Courses

Course Curriculum of the Department of Electrical and Electronic Engineering

Core Courses

EEE 101 Electrical Circuits I

3 Credits, 3 hours/week

Circuit variables and elements: Voltage, current, power, energy, independent and dependent sources, resistance.

Basic laws : Ohm's law, Kirchoffs 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 super node 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.

CSE 101 Computer Programming

3 credits, 3 horse/week

Introduction to digital computers. Programming languages, algorithms and flow charts.

Structured Programming using C: Variables and constants, operators, expressions, control statements, functions, 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 102 Computer Programming Sessional

1.5 credits, 3 hours/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 109. In the second part, students will learn program design.

CE 102 Engineering Drawing

1.5 credits, 3 hours/week

Introduction-lettering, numbering and heading; instrument and their use; sectional views and isometric views of solid geometrical figures. Plan, elevation and section of multistoried building; building services drawings; detailed drawing of lattice towers.

EEE 201 Electrical Circuits II

3 credits, 3 hours/week

Sinusoidal functions: Instantaneous current, voltage, power, effective current and voltage, average power, phasors and complex quantities, impedance, real and reactive 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, power calculation.

EEE 202 Electrical Circuits Laboratory

1.5 credits, 3 hours/week

In this course students will perform experiments to verify practically the theories and concepts learned in EEE 101 and EEE 105.

EEE 204 Electrical Circuits Simulation Laboratory

1.5 credits, 3 hours/week

Simulation laboratory based on EEE 101 and EEE 105 theory courses. Students will verify the theories and concepts learned in EEE 101 and EEE 105 using simulation software like PSpice and Matlab, Students will also perform specific design of DC and AC circuits theoretically and by simulation.

EEE 301 Electronics I

3 credits, 3 hours/week

P-N junction as a circuit element: Intrinsic and extrinsic semiconductors, operational principle of pn 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 fulter capacitor, characteristics of a Zener diode, Zener shunt regulator, clamping and clipping circuits.

Bipolar Junction Transistor (BJT) as a circuit element: 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, differential and common mode gains, RC coupled mid-band frequency amplifier.

EEE 302 Electronic Circuit Simulation Laboratory

1.5 credits, 3 hours/week

Simulation laboratory based on EEE 201 theory courses. Students will verify the theories and concepts learned in EEE 201 and EEE 207 using simulation software's like Spice and Matlab. Students will also perform specific design of electronic circuits theoretically and by simulation.

EEE 303 Energy Conversion I

3 credits, 3 hours/week

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: Rotation magnetic field, equivalent circuit, vector diagram, torquespeed 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 403 Electronics II

Frequency response of amplifiers: Poles, zeros and Bode plots, amplifier transfer function, techniques of determining 3 dB frequencies of amplifier circuits, frequency 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, gain and frequency response of 741 Op-Amp.

Negative feedback: Properties, basic topologies, feedback amplifiers with different topologies, stability, frequency compensation.

Active filters: Different types of filters and specifications, transfer, 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, LC and crystal oscillators.

Power Amplifiers: Classification of output stages, class A, B and AB output stages.

EEE 404 Electronics Laboratory

1.5 credits, 3 hours/week

In this course students will perform experiments to verify practically the theories and concepts learned in EEE 201 and EEE 207.

EEE 405 Energy Conversion II

3 credits, 3 hours/week

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, build-up of a self excited of speed on no-load and load characteristics and voltage regulation.

DC motor: Torque, counter emf, speed, torque-speed characteristics, starting and speed regulation. Introduction to wind turbine generators Construction and basic characteristics of solar cells.

EEE 406 Energy Conversion Laboratory

1.5 credits, 3 hours/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 203 and EEE 205. In the second part, students will design simple systems using the principles learned in EEE 203 and EEE 205.

EEE 407 Engineering Electromagnetic

1.5 credits, 3 hours/week

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; capacitanceelectrostatic 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, 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 Pointing 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 410 Numerical Technique Laboratory

1.5 credits, 3 hours/week

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

ME 401 Mechanical Engineering Fundamentals

3 credits, 3 hours/week

Introduction to sources of energy: Steam generating units with accessories and mountings; steam turbines. Introduction to internal combustion engines and their cycles, gas turbines.
Refrigeration and air conditioning: applications; refrigerants, different refrigeration methods.
Fluid machinery: impulse and reaction turbines; centrifugal pumps, fans, blowers and compressors.
Basics of conduction and convection: critical thickness of insulation.

ME 402 Mechanical Engineering Fundamentals Sessional

1.5 credits, 3 hours/week

Sessional based on ME 401.

EEE 501 Continuous Signals and Linear Systems

3 credits, 3 hours/week

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, invertibility.

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 responseconvolution 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, and frequency response and application.

EEE 503 Digital Electronic

3 credits, 3 hours/week

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, fiesd programmable logic arrays and programmable read only memory. Sequential circuits: different types of latches, flip-flips 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.

EEE 504 Digital Electronics Laboratory

1.5 credits, 3 hours/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 203. In the second part, students will design simple systems using the principles learned in EEE 303.

EEE 505 Power System I

3 credits, 3 hours/week

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 regulation transformer and shunt capacitor.

Faulf 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 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 506 Power System I Laboratory

1.5 credits, 3 hours/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 305. In the second part, students will design simple systems using the principles learned in EEE 305.

EEE 507 Electrical Properties of Materials

3 credits, 3 hours/week

Crystal structures: Types of crystals, lattice and basis, Bravais lattice and Miller indices.

Classical theory of electrical and thermal conduction: Scattering, mobility and resistively, temperature dependence of metal resistivity, Mathiessen's rule, Hall effect and thermal conductivity.

Introduction to quantum mechanics: Wave nature of electrons, Schrödinger's equation, onedimensional 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, 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 magnetic domains.

Introduction to superconductivity: Zero resistance and Meissner effect, Type I and Type II superconductors and critical current density.

EEE 510 Electrical Services Design

1.5 credits, 3 hours/week

Wiring system design, drafting, 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.

IPE 601 Industrial Management

3 credits, 3 hours/week

Management Functions and Organization: Evolution, management function: organization, theory and structure, span of control, authority delegation, manpower planning.
Personal Management: Importance, need hierarchy, motivation, leadership, wage incentives, performance appraisal, participative management.
Operation Management: Production planning and control (PPC) functions, quantitative methods applied in production, quality management, location and layout planning safety and loss management.
Cost and Financial Management: Elements of cost products, cost analysis, investment analysis, benefit cost analysis, risk analysis.
Management Accounting: Cost planning and control, budget and budgetary control.
Marketing Management: Concepts, strategy, sales promotion, patent laws.
Technology Management: Management of innovation and changes, technology life cycle. Case studies.

EEE 601 Communication Theory

3 credits, 3 hours/week

Overview of communication systems: Basic Principles, fundamental elements, system limitations, message source, bandwidth requirements, transmission media types, 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.

Crrier transmission: amplitude modulation-introduction, double side band, single side band, vestigial side band, quadrate, 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 (FDM)-principle, de-multiplexing; wavelength-division multiplexing, multiple-access network-time-division multipleaccess (TDMA), frequency-division multiple access (FDMA); 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 602 Communication Laboratory

1.5 credits, 3 hours/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 309. In the second part, students will design simple systems using the principles learned in EEE 309.

EEE 603 Digital Signal Processing I

3 credits, 3 hours/week

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, ztransformation-properties, transfer function, poles and zeros and inverse z-transform.

Correlation: circular convolution, auto-zeros and inverse z-transform.

Correlation: circular convolution, auto-correlation and cross correlation.

Digital Filters: FIR filters- linear phase filters, specification, design using window, optimal and frequency sampling methods; IIR filters-specifications, design using impulse invariant, bi-linear ztransformation, least-square methods impulse invariant, bi-linear z-transformation, least-square methods and finite precision effects.

EEE 604 Digital Signal Processing I Laboratory

1.5 credits, 3 hours/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 311. In the second part, students will design simple systems using the principles learned in EEE 311.

EEE 605 Microprocessor and Interfacing

3 credits, 3 hours/week

Introduction to microprocessors. Intel 8086 microprocessor: Architecture, addressing modes, instruction sets, assemble language programming, system design and interrupt.

Interfacing: programmable peripheral interface, programmable timer, serial communication interface, programmable interrupt controller, direct momory access, keyboard and display interface. Introduction to micro-controllers.

EEE 606 Microprocessor and Interfacing Laboratory

1.5 credits, 3 hours/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 315. In the second part, students will design simple systems using the principles learned in EEE 315.

EEE 607 Power System II

3 credits, 3 hours/week

Transmission lines cables: overhead and underground.

Stability: swing equation, power angle equation, equal area criterion, multi-machine system, 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 609 Analog Integrated Circuits

3 credits, 3 hours/week

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 regencies: 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 611 Random Signals and processes

3 credits, 3 hours/week

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 Ergodicity. 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 700 project/Thesis

3 credits, 6 hours/week for Semester-7

Study of practical problems in the fields of electrical and electronic engineering.

EEE 701 Solid state Devices

3 credits, 3 hours/week

Semiconductors in equilibrium: Energy bands, intrinsic and extrinsic semiconductors, Fermi levels, electron and hole concentrations, temperature dependence of carrier concentrations and invariance of Fermi level.

Carrier transport processes and excess carriers: Drift and diffusions, generation and recombination of excess carriers, built-in field, Einstein relations, continuity and diffusinon 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 conditons, 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 703 Control System I

3 credits, 3 hours/week

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. Root 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 704 Control System I Laboratory

1.5 credits, 3 hours/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 401. In the second part, students will design simple systems using the principles learned in EEE 401.

EEE 705 Energy Conversion III

3 credits, 3 hours/week

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, electro static motor, repulsion motor, synchros and control transformers. Permanent magnet synchronous motors.

Acyclic machines: Generators, conduction pump and induction pump. Maneto hydrodynamic generators. Fuel Cells, thermoelectric generators, flywheels. Vector control, linear motors and traction.
Photovoltaic systems: stand alone and grid interfaced.
Wind turbine generators: induction generator, AC-DC-AC conversion.

EEE 707 Processing and Fabrication Technology

3 credits, 3 hours/week

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 Gas 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 709 Multimedia Communications

3 credits, 3 hours/week

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 711 Power Electronics

3 credits, 3 hours/week

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, buckboost, boost and Cuk regulators.

AC voltage controllers: single and three phase. Choppers, DC motor control. Single phase cycloconverter.

Inverters: Stepper motor control. Resonance inverters. Pulse width modulation control of static converters.

EEE 712 Power Electronics Laboratory

1.5 credits, 3 hours/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 473. In the second part, students will design simple systems using the principles learned in EEE 473.

EEE 713 VLSI I

3 credits, 3 hours/week

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, arithmetic logic unit. Programmable logic arrays. I/O systems. VLSI testing.

EEE 714 VLSI I Laboratory

1.5 credits, 3 hours/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 453. In the second part, students will design simple systems using the principles learned in EEE 453.

EEE 715 Microwave Engineering

3 credits, 3 hours/week

Transmission lines: Voltage and current in ideal transmission lines, reflection, transmission, standing wave, impedance transformation, Smithy chart, impedance matching and lossy transmission lines.
Waveguides: general formulation, modes of propagation and losses in parallel plate, rectangular and circular waveguides.
Microstrips: Structures and characteristics.
Rectangular resonant cavities: Energy storage, losses and Q.
Radiation: Small current element, radiation resistance, radiation pattern and properties, Hertzian and halfwave dipoles.
Antennas: Mono pole, horn, rhombic and parabolic reflector, array, and Yagi-Uda antenna.

EEE 716 Microwave Engineering Laboratory

1.5 credits, 3 hours/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 433. In the second part, students will design simple systems using the principles learned in EEE 433.

EEE 717 Power Plant Engineering

3 credits, 3 hours/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 719 Compound Semiconductor and Hetero-Junction Devices

3 credits, 3 hours/week

Compound semiconductor: Zincblend crystal structures, growth techniques, alloys, band gap, density of carriers in intrinsic and doped compound semiconductors.

Hetero-Junctions: Band alignment, band offset, Anderson's rule, single and double sided heterojunctions, quantum wells and quantization effects, lattice mismatch and strain and common heterostructure 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 mode, secondary effects and band diagram of a graded alloy base HBT.

EEE 721 Optical Fiber Communications

3 credits, 3 hours/week

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 800 project/Thesis

3 credits, 6 hours/week for Semester-8

Study of practical problems in the fields of electrical and electronic engineering.

EEE 801 Power System Protection

3 credits, 3 hours/week

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 selection criteria and ratings of circuit breakers: Principle of are extinction, selection criteria and ratings of circuit breakers, types-air, oil, SF6 and vacuum.

EEE 802 Power System Protection Laboratory

1.5 credits, 3 hours/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 477. In the second part, students will design simple systems using the principles learned in EEE 477.

EEE 803 VLSI II

3 credits, 3 hours/week

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 804 VLSI II Laboratory

1.5 credits, 3 hours/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 457. In the second part, students will design simple systems using the principles learned in EEE 457.

EEE 805 Digital Communication

3 credits, 3 hours/week

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.

Black codes and conventional codes: Linear block codes, convolution codes and coded modulation. Spread spectrum signals and system.

EEE 806 Digital Communication Laboratory

1.5 credits, 3 hours/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 437. In the second part, students will design simple systems using the principles learned in EEE 437.

EEE 807 Power System Reliability

3 credits, 3 hours/week 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 809 Optoelectronics

3 credits, 3 hours/week

Optical properties in semiconductor: Direct and indirect band-gap materials, radioactive and nonradioactive recombination, optical absorption, photo-generated excess carriers, minority carrier life time, 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 amplificaiton: Spontaneous and stimulated emission, Einstein relations, population inversion, 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 811 Mobile Cellular Communications

3 credits, 3 hours/week

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 813 Power System Operation and control

3 credits, 3 hours/week

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 815 Semiconductor Device Theory

3 credits, 3 hours/week

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, scattering mechanisms in different semiconductors, mobility.
Different carrier transport models: Drift-diffusion theory, ambipolar transport, hydrodynamic model, Boltzman transport equations, quantum mechanical model, simple applications.

EEE 817 Telecommunication Engineering

3 credits, 3 hours/week

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 advances features. Switching system: Introduction to analog system, digital switching systems-space division switching, blocking probability and multistage switching, time division switching and two dimensional switching.
Traffic analysis: Traffic characterization, grades of service, network blocking probabilities, delay system and queuing.

Modern telephone services and network: Internet telephony, facsimile, integrated ser vices digital network, asynchronous transfer mode and intelligent networks. Introduction to cellular telephony and satellite communication.

EEE 819 Control System II

3 credits, 3 hours/week

Compensation using pole placement technique. State equations of digital systems with sample and hokd, 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.Contro, nonlinear control.

EEE 820 Control System II Laboratory

3 credits, 3 hours/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 421. In the second part, students will design simple systems using the principles learned in EEE 421.

EEE 821 Numerical Methods

3 credits, 3 hours/week

Introduction: Motivation and errors in numerical techniques.

Taylor series, Finite difference calculus: Forward, backward, divided, and central difference and difference of a polynimial.

Interpolation: Newton's formula, Lagrange, spline, Chebyshev and inverse.

Extrapolation. Nonlinear equations: Iteration, bisection, false position, Raphson, secant and Muller's methods.

Simultaneous linear algebraic equations: Cramer's 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 822 Numerical Methods Laboratory

1.5 credits, 3 hours/week

Students will perform experiments to verify practically the theories and concepts learned in EEE 423.

EEE 823 Measurement and Instrumentation

3 credits, 3 hours/week

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: system and digital data transmission. Recording and display devices. Data acquisition system and microprocessor applications in instrumentation.

EEE 824 Measurement and Instrumentation Laboratory

1.5 credits, 3 hours/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 427. In the second part, students will design simple systems using the principles learned in EEE 427.

PHY 111 Waves and Oscillations, Optics and Thermal Physics

3 credits, 3 hours/week

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

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

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

PHY 112 Physics Sessional

1.5 credits, 3 hours/week

Laboratory experiments based on PHY 111.

PHY 211 Electricity and Magnetis, Modern Physics and Mechanics 3 credits, 3 hours/week

Electricity and Magnetism: electric charge and Coulomb's law, Electric field, concept of electric flux and the Gauss's law-some applications of Gauss's law, Gauss's law in vector form, Electric potential, relation between electric field and electric potential, capacitance and dielectrics, gradient, Laplace's and Poisson's equations, Current, Current density, relativity, the magnetic field, Ampere's law, BiotSavart law and their applications, Laws of electromagnetic induction-Maxwell's equation.

Modern physics: Galilean relativity and Einstein's special theory of relativity; Lorentz transformation equations, Length contraction, Time dilation and mass-energy relation, photoelectric effect, Compton effect; De Broglie matter waves and its success in explaining Bohr's theory, Pauli's exclusion principle, Constituent of atomic nucleus, Nuclear binding energy, different types of radioactivity, radioactive decay law; Nuclear reactions, nuclear fission, nuclear fusion, atomic power plant.

Mechanics: Linear momentum of a particle, linear momentum of a system of particles, conservation of linear momentum of a particle, angular momentum of a system of particles, Kepler's law of planetary motion, the law of universal Gravitation, the motion planets and satellites, introductory quantum mechanics; Wave functio; Uncertainty principle, postulates, Schrodinger time independent equation, expectation value, Prohability, Particle in a zero potential, calculation of energy.

PHY 212 Physics Sessional

1.5 credits, 3 hours/week

Laboratory experiments based on PHY 211.

CHEM 211 Chemistry I

3 credits, 3 hours/week

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

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

CHEM 212 Inorganic, Quantitative Analysis Sessional

1.5 credits, 3 hours/week

Volumetric analysis: acid-base titration, oxidation-reduction titrations, determination of Fe, CU and Ca volumetrically.

MATH 111 Calculus I

3 credits, 3 hours/week

Differential Calculus: Limits, continuity and differentiability. Successive differentiation of various types of functions. Leibnitz's theorem. Rolle's theorem, Mean value theorem, Taylor's and Maclaurin's theorems in finite and infinite forms. Lagrange's form of remainders. Cauchy's form of remainders. Expansion of functions, evaluation of indeterminate forms of L' Hospital's rule. Partial differentiation. Euler's theorem. Tangent and normal. Subtangent and subnormal in Cartesian and polar co-ordinates. Determination of maximum and minimum values of functions. Curvature. Asymptotes. Curve tracing.

Integral Calculus: Integration by the method of substitution. Standard integrals. Integration by successive reduction. Definite integrals, its properties and use in summing series. Walli's formulae. Improper integrals. Beta function and Gamma function. Area under a plane curve an darea of a region enclosed by two curves in Cartesian and polar co-ordinates. Volumes and surface areas of solids of revolution.

MATH 113 Calculus II

3 credits, 3 hours/week

Complex Variable: Complex number system. General functions of a complex variable. Limits and continuity of a function of complex variable and related theorems. Complex differentiation and the Cauchy-Reimann equations. Infinite series. Convergence and uniform convergence. Line integral of a complex function. Cauchy's integral formula. Liouville's theorem. Taylor's and Laurent's theorem. Singular points. Residue. Cauchy's residue theorem.

Vector Analysis: Multiple product of vectors. Linear dependence and independence of vectors. Differentiation and integration of vectors. Differentiation and integration of vectors together with elementary applications. Line, surface and volume integrals. Gradient of a scalar function, divergence and curl of a vector function, various formulae. Integral forms of gradient, divergence and curl. Divergence theorem. Stoke's theorem, Green's theorem and Gauss's theorem.

MATH 215 Ordinary and Partial Differential Equations

3 credits, 3 hours/week

Ordinary Differential Equations: Degree and order of ordinary differential equations, formation of differential equations. Solution of first order differential equations by various methods. Solution of general linear equations of second and higher orders with constant coefficients. Solution of homogeneous linear equations. Solution of differential equations of the higher order when the

dependent or independent variables are absent. Solution of differential equation by the method based on the factorization of the operators. Frobenius method.

Partial Differential Equations: Introduction. Linear and Non-linear first order equations. Standard forms. Linear equations of higher order. Equations of the second order with variable coefficients. Wave equations. Particular solution with boundary and initial conditions.

MATH 317 Linear Algebra

3 credits, 3 hours/week

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 form IR^n to IR^m. Properties of linear transformation from IR^n to IR^m. Real vector spaces and subspaces. Basis and dimension. Rank and nullity. Inner product spaces. Gram-Schmidt process and QR-decomposition. Eigenvalues and eigenvectors. Diagonalization. Liner transformations. Kernel and Range. Application of linear algebra to electric networks.

MATH 419 Probability and Statistics

3 credits, 3 hours/week

Introduction. Sets and probability. Random variable and its probability distributions. Treatment of grouped sampled data. Some discrete probability distributions. Normal distribution. Sampling theory. Estimation theory. Tests of hypotheses. Regression and correlation. Analysis of variance.

ENG 201 English Language

3 credits, 3 hours/week

General discussion: Introduction, various approaches to learning English.

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

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

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

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

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

Listening Skill: The phonemic systems and correct English pronunciation.

Speaking Skill: Practicing dialogue; Story telling; Effective oral presentation.

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

End