Syllabus for Academic Year 2014-2015

Department of Electrical & Electronic Engineering (EEE)

Undergraduate Program

Bachelor of Science in Electrical & Electronic Engineering

LEADING UNIVERSITY
SYLHET, B A N G L A D E S H

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Syllabus for B.Sc. in Electrical & Electronic Engineering
Academic year 2014-2015

Faculty of Modern Science

Leading University

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Introduction

The establishment of the Leading University in Sylhet, a holy place of the country, was exclusively a noble idea of a distinguished personality, Dr. Ragib Ali, who is well known for his philanthropic contributions to educational institutions all over the country. Dr. Ragib Ali is a pioneer in establishing the first private university in Bangladesh named North South University. He is the founder vice chairman of North South University and the chairman of Asia Pacific University. On his proposal for establishing Leading University to the Ministry of Education on 24th August 1996, the Ministry issued permission on 28th August 2001 to establish this university. Leading University was inaugurated on 4th March, 2002. It started its first semester that day. It had on its rolls 106 students in the first semester at undergraduate program. The large number of students in the initial semester itself was a milestone and a source of inspiration to the organizers of the University. In the sequel of the continuous development of the university, Department of Electrical and Electronic Engineering was established in 2010. It started programs for regular and evening batch in Fall-2010.

Objective and Goal

The Department of Electrical and Electronic Engineering offers Bachelor of Science in Electrical and Electronic Engineering since fall-2010. Electronics plays a crucial and in fact, obligatory role in all fields of modern sciences. Electrical and Electronic Engineering has established itself as one of the most important branches of engineering. All the students of Electrical and Electronic Engineering are requested to have a balanced knowledge of digital electronics, computers, micro-processors and programming. The new generation of electrical engineers is encouraged to undertake research and development activities in the above areas and this department is committed to the study and analysis of fundamental as well as applied problems. Problems in the fields of electric power generation, Transmission and distribution, high voltage transients, power system stability, economic operation of power systems, system planning, design. Throughout the study programs, considerable emphasis is placed on the development of methodical procedure for analysis and design, and on the responsible use of technology.

Degree offered by the faculty

Our degree-offering department is the Department of Electrical and Electronic Engineering, which is under Faculty of Science and Technology.

Duration of a semester

University's academic programs operate on semester system (14 weeks per academic semester including exam). For 1 credit theory course will be equal to minimum 13 hours of actual lecture time per semester of a tri-mister system. For 1 credit lab course minimum of 26-hours of actual lab works per semester of a tri-mister system will be required that means **theory class will have a duration of 1 hour for 1 credit hour and each lab class will have a minimum duration of 2-hours for 1 credit hour and 3 hours for 1.5 credit hour**. Course credit is assigned according to the number of in-class contact hours associated with the course.

Requirements for admission into the EEE program

For EEE program, students passed H.S.C. /A level with mathematics, physics and chemistry are eligible for the admission.

At least a second division or minimum CGPA 2.5 out of 5.0 GPA in the S.S.C and H.S.C. examination, or five subjects O-level and two major subjects in A-level where grade B in at least

4 subjects and grade C in remaining subjects are required for admission into EEE program of the Leading university. Students obtaining diploma in engineering from Bangladesh Technical Education Board (BTEB) or equivalent with a GPA of 2.5 or above, or at least second division are eligible for admission.

Grading System

All course work is graded according to a unified grading system[*] as shown in the following chart.

Numerical Grade	Letter Grade		Grade Point
80% and above	A+	(A Plus)	4.0
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 80%	F		0.00

[*]**Uniform grading system is provided by UGC**

Degree requirement and graduation time

Minimum requirement to obtain B.Sc. in EEE degree is 157 credits. Student may complete the EEE program in four (4) years unless otherwise permitted for the extension for the study. Students have to complete the program with at least CGPA of 2.00 in all university courses. In addition, a minimum CGPA of 2.50 should be maintained in all core and advanced courses.

Grade Points

A student's semester grade point average is determined by dividing the total number of grade points by the total number of credit hours attempted. Grade point totals are calculated by multiplying the number of credit hours of a course by the number of points for the corresponding grade received. A student's grade point average will be determined by dividing the total number of grade points by the total number of hours attempted with the exception of courses in which marks of "W", "R", and "I" are received. The letters correspond to withdrawal, retake and incomplete respectively.

- The grade withdrawal (W) is given when a student officially drops a course during the period as noticed by the registrar office. A "W" does not affect the students CGPA.
- The grade incomplete (I) is given when a student absent in the semester final examination in special circumstances. The student may also be given "I" grade if he/she does not complete the mandatory assessment sections such as viva, assignment and lab report. However, the student will be given appropriate grade as soon as he /she complete the required assessment within period noticed by the registrar office.
- The grade retake (R) is given to a student when he/she opt to repeat a course. There are two conditions applied to this grade as follows :
  - if the student achieves a "F" grade and later he/she register for the same course again.
  - Students with a grade of "B" or above will not be allowed to repeat the course.

Academic Policy

Right to change Rules
The University reserves the right to change or revise requirement, rules, and fees. Such regulations shall come into force whenever the proper authorities may determine.

Right to dismiss students
Students are individually responsible to read and know regulations contained in the LU prospectus. Failure to read and comply will not exempt students from liabilities.

Conducts of Students
LU strives to maintain a healthy academic atmosphere in its campus. They should read and grasp students' conduct rules. All students are expected to actively contribute to achieving this goal by attending classes regularly and making appropriate use of all campus facilities. They shall endeavor to enhance their academic atonements, maintain discipline, and keep the campus clean. In short, students are expected to be good citizens. The university does not prescribe any dress requirement, but students are expected to be dressed properly.

Academic Honesty
Any material plagiarized or otherwise dishonestly prepared that a student submits as original work is taken to be cheating and constitutes grounds for disciplinary actions. Any student judged to have engaged in cheating might receive a reduced grade for the work in question, a failing grade in the course, or such other lesser penalty, as the teacher deems appropriate. Serious instance of discipline shall be dealt with more severity.

Medium of Instruction
English is the medium of instruction and examination. It is also the campus language. A remedial English course has been introduced for the students who are deficient in English.

Course Load
The normal load of eighteen-hour class lectures and lab session per week is generally expected of the students by accepted standard. In addition, there will be assignments, homework and examinations each week. Moreover, the faculty will hold consultation and/or tutorial. Thus raising contact hours to twenty two. Students will have to access to the computer lab to prepare their papers and other assignments under supervision for up to 30 hours each semester. Preparation of papers and other assignments under supervision will raise workload to 30 hours a week. A student can graduate with the minimum requirements of 157 credits in four years.

Semester
The University offers three semesters in each academic year namely, Spring, Summer and Fall Semesters. Each semester lasts for 13 weeks. Spring semester starts in January, Summer in May and Fall in September.

Class Attendance

Regular class attendance is a prerequisite for successful completion of course works. Teacher shall be responsible to inform students of the consequences of absence from class. The student shall be responsible to inform the teachers of possible absence from classes. Absence does not exempt students from obligations of class assignments and examinations. The teacher concerned will determine the manner in which missed assignments and examinations may be made up. A student may be dropped from a course for consecutive three absences. Attendance is regarded as a part of the course requirement. The expected attendance is 90% of classes being held. A student may be debarred from appearing at the course Final Examinations if his/her attendance falls below 75%. Students are given marks on class attendance.

Student Classification (class)

A student is called a freshman, sophomore, junior, Senior or graduate. Students are classified in accordance with credits earned. The credits earned are used to establish class standing as follows:

Credits Earned	Class
0 to 30	Freshman
31 to 60	Sophomore
61 to 90	Junior
Over 90	Senior
Earned	Graduate

Change of Degree Program

Students who wish to change their degree program must submit a request to the Chair of the Department. Upon recommendation of the Chairperson of the academic department to which the student intends to change, the office of the registrar shall make the necessary changes to a student's record.

Student Dismissal

Students are dismissed from the program, for failing to maintain the required CGPA (2.00) in two consecutive semesters. Students dropped out of the program may appeal to the Dean/Head of the Department for re-admission. Re-admission will not be granted without strong evidence of significant change in students' ability to complete the requirements satisfactorily.

Grading and Performance Evaluation Process

ITEM	% OF MARKS
Class Attendance	5
Assignment, Presentation and Viva Voce	15
Tutorial Examination	10
Mid-term Examination	30
Semester Final Examination	40
Total	100

- The nature of questions should be of varied nature such as MCQ, short type, Broad type, Case Study; Specific problems etc. or in any other form as the tutors deem it necessary to judge the comprehensive study as well as the merit of the students.
- Questions for semester final will be submitted in two sets in different form at least two weeks ahead of Exam dates as these questions will be sent to Moderation Board.
- Duration of the Mid-Term exam is 1.5 hour and Final Examination is 2 hour.
- According to the schedule of examinations final examinations are held in all courses upon the completion of each semester's work. No one is to be excused from the final examinations.
- Course Instructor/Tutor shall conduct their respective tests and Exams.

Program Structure

Bachelor of Science in Electrical and Electronic Engineering

Minimum duration of the program is four academic years and the minimum number of credit hours to be completed is 157. There are several types of courses included in the program.

• **English (6 Credit Hour):** English Reading, English Composition, Spoken English, English Reading and Speaking.

• **General Education Courses (GED) (15 Credit Hour):** Students will have to complete five GED Courses in the following academic areas: History, Anthropology, Geography, Sociology, Political Science, Psychology, International Relations, Art, Literature, Music, and Philosophy. There is a list of our GED courses from where five courses are offered.

• **Basic Sciences (09 Credit Hour):** Courses in the following academic areas qualify as science credits: Chemistry, Physics I & II with labs.

• **Interdisciplinary Engineering Courses (17 Credit Hour):** Students will have to complete interdisciplinary Engineering Courses in the following academic areas: Computer Science, Mechanical Engineering, and Civil Engineering.

• **Mathematics (15 Credit Hour):**
There are five mathematics courses in different mathematical area such as Differential and Integral Calculus, Linear Algebra and Complex Analysis, Differential Equations and Fourier analysis, Co-ordinate Geometry and Vector Analysis, Probability and Statistics.

• **Program Core Courses (95 Credit Hour):** Students will have to complete 95 credit hours of core courses including 30 credit hours of elective courses based on different field of electrical and electronic engineering.

Course outline and detailed course description are given in following section.

Course Outline for Bachelor of Science in Electrical and Electronic Engineering

Summary of Courses

Types of Courses	No. of Courses	Credit Hours
English Courses	2	6
GED courses	5	15
Basic Science Courses	3	9
Mathematics Courses	5	15
Computer Courses	4	11
Inter disciplinary Engineering Courses	2	6
Program core courses	31	65
Elective courses	10	30
Total	**62**	**157**

List of Courses

Interdisciplinary Courses				
Course Code	Course Title	Credit Hours	Contact Hours / Week	Prerequisite Courses
English Courses (6 credit hours)				
ENG-1113	English Reading and Speaking	3	3	N/A
ENG-1213	English Composition / Writing	3	3	ENG-1111
Total		6	6	
List of General Education Courses (15 credit hours)				
ART-1111	Bangladesh Studies	3	3	N/A
ART-1213	Introduction to Sociology	3	3	N/A
ART- 2213	Professional Ethics	3	3	N/A
ECON-2311	Principals of Economics	3	3	N/A
MGT-2315	Introduction to Business	3	3	N/A
ACC-2111	Principles of Accounting	3	3	N/A
MGT-3211	Industrial Management	3	3	N/A
Basic Science Courses (9 credit hours)				
PHY-1311	Physics I	2	2	N/A

PHY-1312	Physics I Lab	1	2	N/A
PHY-2213	Physics II	2	2	PHY-1311
PHY-2214	Physics II Lab	1	2	PHY-1312
CHEM-2311	Chemistry	2	2	N/A
CHEM-2312	Chemistry Lab	1	2	N/A
Total		**09**	**12**	

Mathematics Courses (15 credit hours)

MATH-1111	Differential and Integral Calculus	3	3	N/A
MATH-1213	Linear Algebra and Complex Analysis	3	3	MATH-1111
MATH-1315	Differential Equations and Fourier Analysis	3	3	MATH-1213
MATH-2111	Co-ordinate Geometry and Vector Analysis	3	3	MATH-1315
MATH-2213	Probability and Statistics	3	3	N/A
Total		**15**	**15**	

Computer courses (11 credit hours)

Course Code	Course Title	Credit Hours	Contact Hours / Week	Prerequisite Courses
CSE-1111	Introduction to Computers	2	2	N/A
CSE-1213	Computer Programming	2	2	CSE-1111
CSE-1214	Computer Programming Lab	1	2	CSE-1112
CSE-2111	Numerical Methods	2	2	N/A
CSE-2112	Numerical Methods Lab	1	2	N/A
CSE-3115	Computer Networks	2	2	CSE- 1111
CSE-3116	Computer Networks Lab	1	2	CSE- 1112
Total		**11**	**22**	

Other Engineering Discipline Courses (6 credit hours)

Course Code	Course Title	Credit Hours	Contact Hours / Week	Prerequisite Courses
CE-2112	Computer Aided Engineering Drawing	2	4	N/A
ME-2211	Mechanical Engineering Fundamentals	3.0	3.0	N/A
ME-2212	Mechanical Engineering Fundamentals Lab	1.0	2.0	N/A
Total		**6**	**9**	

EEE Core Courses (65 credit hours)

Course Code	Course Title	Credit Hours	Contact Hours	Prerequisite Courses
EEE-1111	Electrical Circuits I	3.0	3.0	N/A
EEE - 1112	Electrical Circuits I Lab	1.0	2	N/A

EEE-1213	Electrical Circuits II	3.0	3.0	EEE-1111
EEE-1214	Electrical Circuits II Lab	1.5	3.0	EEE-1111 & EEE-1112
EEE-1315	Electronics I	3.0	3.0	EEE-1111 & EEE-1213
EEE-1316	Electronics Circuit Simulation Lab	1.5	3.0	EEE-1214 & EEE-1112
EEE-1317	Energy Conversion I	3.0	3.0	EEE-1111 & EEE-1213
EEE-2213	Energy Conversion II	3.0	3.0	EEE-1317
EEE-2214	Energy Conversion Lab	1.5	3.0	EEE-1214
EEE-2315	Electronics II	3.0	3.0	EEE-1315
EEE-2316	Electronics II Lab	1.5	3.0	EEE-1316
EEE-2317	Digital Electronics	3.0	3.0	EEE-2315
EEE-2318	Digital Electronics Lab	1.5	3.0	EEE-2316
EEE-3111	Signals and Linear Systems	2.0	2.0	MATH- 1213
EEE-3112	Signals and Linear Systems Lab	1.5	3.0	CSE- 2112 & EEE- 1316
EEE-3113	Electromagnetic Field and Waves	2.0	2.0	PHY-3111 & MATH- 2111
EEE-3115	Power System I	3.0	3.0	EEE-2213
EEE-3116	Power System I Lab	1.0	2.0	EEE-1214 & EEE-2214
EEE-3217	Basic Communication Engineering	2.0	2.0	EEE-3111
EEE-3218	Basic Communication Engineering Lab	1.0	2.0	EEE-3112
EEE-3221	Microprocessor, Assembly Language & Computer Interfacing	3.0	3.0	EEE-2317
EEE-3222	Microprocessor, Assembly Language & Computer Interfacing Lab	1.0	2.0	EEE- 2318
EEE-3324	Electrical Services Design	1.0	2.0	EEE- 1213 & EEE-1214
EEE-3325	Electrical Properties of Materials	2.0	2.0	PHY- 2213
EEE-3327	Digital Communication	3.0	3.0	EEE-3217
EEE-3328	Digital Communication Lab	1.0	2.0	EEE-3218
EEE-3219	Control System I	2.0	2.0	EEE-3111
EEE-3220	Control System I Lab	1.0	2.0	EEE-3112
EEE-3329	Digital Signal Processing I	2.0	2.0	EEE-3327
EEE-3330	Digital Signal Processing I Lab	1.0	2.0	EEE-3328
EEE 4800	Project/Thesis	6.0	12.0	
	Total	**65**	**88**	

List of Elective courses (30 credit hours)

Communication group				
Course Code	**Course Title**	**Credit Hours**	**Contact Hours**	**Prerequisite Courses**
ECE-4111	Random Signals and Processes	3	3	EEE-3329
ECE-4113	Digital Signal Processing II	3	3	EEE-3329
ECE-4115	Microwave Engineering	2	3	EEE-3313 & EEE- 3327
ECE-4116	Microwave Engineering Lab	1	2	EEE-3328
ECE-4117	Optical Fiber Communication	3	3	EEE-3327
ECE-4221	Cellular Mobile & Satellite Communication	3	3	EEE-3327
ECE-4223	Telecommunication Engineering	3	3	EEE-3327
ECE-4225	Control System II	2	2	EEE-3219
ECE-4226	Control System II Lab	1	2	EEE-3220
ECE-4227	RF and Microwave Engineering	3	3	EEE- 3313 & EEE- 3327
ECE-4229	Data Communication	2	2	N/A
ECE-4230	Data Communication Lab	2	1	N/A
ECE-4331	Remote Sensing Technology	2	2	EEE- 3219
ECE-4332	Remote Sensing Technology Lab	2	1	EEE-3220
ECE-4335	Wireless Communication	3	3	EEE-3327
ECE-4337	Broadband Communication Networks	2	2	EEE- 3327
ECE-4338	Broadband Communication Networks Lab	2	1	EEE- 3328

Computer group				
Course Code	**Course Title**	**Credit Hours**	**Contact Hours**	**Prerequisite Courses**
CSE-2231	Operating Systems	2	2	CSE-1111
CSE-2232	Operating Systems Lab	1	2	CSE-1112
CSE-4361	Multimedia Communications	3	3	EEE-3329
EEE-4125	Microprocessor System Design	2	2	EEE-3221
EEE-4126	Microprocessor System Design Lab	1	2	EEE-3222
EEE-4211	Web Technologies	2	2	N/A
EEE-4212	Web Technologies Lab	1	2	N/A
CSE-4253	Computer Architecture	3	3	EEE- 3221
CSE-2340	Database Management System	2	2	N/A
CSE-2341	Database Management System Lab	1	2	N/A
CSE-3350	System Analysis, Design and Development	3	3	N/A
CSE-3370	Management Information System	3	3	N/A

Power group				
Course Code	Course Title	Credit Hours	Contact Hours	Prerequisite Courses
EEE-4011	Power System II	3	3.0	EEE-3115
EEE-4113	Energy Conversion III	3	3.0	EEE-2213
EEE-4115	Power Electronics	3	3.0	EEE-2315
EEE-4116	Power Electronics Lab	1	2.0	EEE-2316
EEE-4117	Power Plant Engineering	3	3.0	EEE-4011
EEE-4119	Renewable Energy Conversion	2	2.0	EEE-2213
EEE-4229	Switchgear and Protection	3	3.0	EEE-4011
EEE-4230	Switchgear and Protection Lab	1	2.0	EEE-2214
EEE-4231	High Voltage Engineering	2	2.0	EEE-4011
EEE-4232	High Voltage Engineering Lab	1	2.0	EEE-2214
EEE-4341	Advanced Machines	3	3.0	EEE-2213

Electronics group				
Course Code	Course Title	Credit Hours	Contact Hours	Prerequisite Courses
EEE-4121	Solid State Devices	2	2	EEE-1317
EEE-4123	Analog Integrated Circuits	3	3	EEE-1317
EEE-4125	Processing and Fabrication Technology	3	3	EEE-2317
EEE-4127	VLSI I	2	2	EEE-2315
EEE-4128	VLSI I Lab	1	2	EEE-2316
EEE-4237	Optoelectronics	3	3	EEE-2315
EEE-4343	Biomedical Instrumentation	2	3	N/A
EEE-4344	Biomedical Instrumentation Lab	1	2	N/A
EEE-4345	Measurement and Instrumentation	2	2	EEE- 1213
EEE-4346	Measurement and Instrumentation Lab	1	2	EEE- 1214
ECE-4347	Radio and Television Engineering	2	2	EEE-2315
ECE-4348	Radio and Television Engineering Lab	1	2	EEE-2316
ECE-4349	Robotics & Computer Vision	3	3	EEE- 3219 & EEE- 2315
ECE-4350	Robotics & Computer Vision Lab	1	2	EEE- 3220 & EEE- 2316

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Approximate Course Distribution

First Semester (First Year)

Course No.	Course Title	Credit Hours	Contact Hour/ Week	Prerequisite Courses
ENG-1113	English Reading and speaking	3	3	N/A
ART-1111	Bangladesh Studies	3	3	N/A
MATH-1111	Differential and Integral Calculus	3	3	N/A
CSE-1111	Introduction to Computers	2	2	N/A
EEE-1111	Electrical Circuits I	3	3	N/A
EEE-1112	Electrical Circuits I Lab	1	2	N/A
Total		**15**	**16**	

Second Semester (First Year)

Course No.	Course Title	Credit Hours	Contact Hour/ Week	Prerequisite Courses
ENG-1213	English Writing/ composition	3	3	ENG-1111
ART-1213	Introduction to Sociology	3	3	N/A
MATH-1213	Linear Algebra and Complex Analysis	3	3	MATH-1111
CSE-1213	Computer Programming	2	2	CSE-1111
CSE-1213	Computer Programming Lab	1	2	CSE-1112
EEE-1213	Electrical Circuits II	3	3	EEE-1111
EEE-1214	Electrical Circuits II Lab	1.5	3	EEE-1112
Total		**16.5**	**18**	

Third Semester (First Year)

Course No.	Course Title	Credit Hours	Contact Hour/ Week	Prerequisite Courses
MATH-1315	Differential Equations and Fourier Analysis	3	3	MATH-1213
PHY-1311	Physics I	2	2	N/A
PHY-1312	Physics I Lab	1	2	N/A
EEE-1315	Electronics I	3	3	EEE-1213 & EEE- 1111
EEE-1316	Electronics Circuit Simulation Lab	1.5	3	EEE-1214
EEE-1317	Energy Conversion I	3	3	EEE-1213
Total		**13.5**	**16**	

Fourth Semester (Second Year)

Course No.	Course Title	Credit Hours	Contact Hour/ Week	Prerequisite Courses
ACC-2111	Principles of Accounting	3	3	N/A
MATH-2111	Co-ordinate Geometry and Vector Analysis	3	3	MATH-1315
CSE-2111	Numerical Methods	2	2	N/A
CSE-2112	Numerical Methods Lab	1	2	N/A
CE-2112	Computer Aided Engineering Drawing	2	2	N/A
EEE-2213	Energy Conversion II	3	3	EEE-1317
EEE-2214	Energy Conversion Lab	1.5	3	EEE-1214
Total		**15.5**	**18**	

Fifth Semester (Second Year)

Course No.	Course Title	Credit Hours	Contact Hour/ Week	Prerequisite Courses
ECON-2211	Principles of Economics	3	3	N/A
MATH-2213	Probability and Statistics	3	3	N/A
PHY-2213	Physics II	2	2	PHY-1311
PHY-2214	Physics II Lab	1	2	PHY-1312
ME-2211	Mechanical Engineering Fundamentals	2	2	N/A
ME-2212	Mechanical Engineering Fundamentals Lab	1	2	N/A
Total		**12**	**14**	

Sixth Semester (Second Year)

Course No.	Course Title	Credit Hours	Contact Hour/ Week	Prerequisite Courses
CHEM-2311	Chemistry	2	2	N/A
CHEM-2312	Chemistry Lab	1	2	N/A
MGT-2315	Introduction to Business	3	3	N/A
EEE-2315	Electronics II	3	3	EEE-1315
EEE-2316	Electronics II Lab	1.5	3	EEE-1316
EEE-2317	Digital Electronics	3	3	EEE-2315
EEE-2318	Digital Electronics Lab	1.5	3	EEE-2316
Total		**15**	**19**	

Seventh Semester (Third Year)

Course No.	Course Title	Credit Hours	Contact Hour/ Week	Prerequisite Courses
CSE-3113	Computer Networks	2	2	N/A
CSE-3114	Computer Networks Lab	1	2	N/A
EEE-3111	Signals and Linear Systems	2	2	MATH-1213
EEE-3112	Signals and Linear Systems Lab	1.5	3	CSE-2112
EEE-3113	Electromagnetic Fields & Waves	2	2	PHY-3111
EEE-3115	Power System I	3	3	EEE-2213
EEE-3116	Power System I Lab	1	2	EEE-2214
Total		**12.5**	**16**	

Eighth Semester (Third Year)

Course No.	Course Title	Credit Hours	Contact Hour/ Week	Prerequisite Courses
EEE-3217	Basic Communication	3	3	EEE-3111
EEE-3218	Basic Communication Lab	1	2	EEE-3112
EEE-3219	Control System I	2	2	EEE-3111
EEE-3220	Control System I Lab	1	2	EEE-3112
EEE-3221	Microprocessor, Assembly Language & Computer Interfacing	3	3	EEE-2317
EEE-3222	Microprocessor, Assembly Language & Computer Interfacing Lab	1	2	EEE-2318
Total		**11**	**14**	

Ninth Semester (Third Year)

Course No.	Course Title	Credit Hours	Contact Hour/ Week	Prerequisite Courses
EEE-3324	Electrical Services Design	1	2	EEE-1111& EEE-1213
EEE-3325	Electrical Properties of Materials	2	2	PHY- 2213
EEE-3327	Digital Communication	2	2	EEE-3217
EEE-3328	Digital Communication Lab	1	2	EEE-3218
EEE-3329	Digital Signal I Processing	2	2	EEE-3327
EEE-3330	Digital Signal Processing I Lab	1	2	EEE-3328
	Elective 1	3	4	
Total		**12**	**16**	

Tenth Semester (Fourth Year)

Course No.	Course Title	Credit Hours	Contact Hour/ Week	Prerequisite Courses
	Elective 2	3	4	
	Elective 3	3	4	
	Elective 4	3	4	
	Elective 5	3	4	
Total		**12**	**16**	

Eleventh Semester (Fourth Year)

Course No.	Course Title	Credit Hours	Contact Hour/ Week	Prerequisit-e Courses
EEE-4800	Project / Thesis (Supervisor based)	6	12	
	Elective 6	3	4	
	Elective 7	3	4	
Total		**12**	**20**	

Twelfth Semester (Fourth Year)

Course No.	Course Title	Credit Hours	Contact Hour/ Week	Prerequisite Courses
	Elective 8	3	4	
	Elective 9	3	4	
	Elective 10	3	4	
EEE-4800	Project / Thesis (Finalize & Submission)	-	-	
Total		**9**	**12**	

Course Outline for Bachelor of Science in Electrical and Electronic Engineering for BTEB approved diploma holders

The Diploma holders who study B.Sc. in EEE (for Diploma holders) have to complete 124 credits. However, the total number of credit hours for B.Sc. in EEE (regular) is 157. As the diploma holders have already completed courses equivalent to 33 credits in their diploma programs, those credits are waived for diploma holders.

Summary of Courses:

Types of Courses	No. of Courses	Credit Hours
English Courses	03	09
GED courses	00	00
Basic Science Courses	01	03
Mathematics Courses	05	15
Computer Courses	02	06
Inter disciplinary Engineering Courses	00	00
Program core courses	31	64
Elective courses	09	27
Total	**51**	**124**

List of waived courses:

Course Code	Course Title	Credit Hours
ART-1213	Introduction to Sociology	3
MGT-2315	Introduction to Business	3
ACC-2111	Principles of Accounting	3
MGT-3211	Industrial Management	3
ART-1217	Political Science	3
PHY-1311	General Physics I	2
PHY-1312	General Physics Lab	1
CSE-1111	Introduction to Computers	2
CSE-1112	Introduction to Computers Lab	1
CSE-2113	Object Oriented Programming	2
CSE-2114	Object Oriented Programming Lab	1
CSE-3113	Computer Networks	2
CSE-3114	Computer Networks Lab	1
CHE-2111	Chemical Process Principles	3
CE-2112	Engineering Drawing Lab	2
ME-2212	Mechanical Engineering Fundamentals Lab	1
	Total	**33**

List of Courses:

Interdisciplinary Courses				
Course Code	**Course Title**	**Credit Hours**	**Contact Hours / Week**	**Prerequisite Courses**
English Courses (3 credit hours)				
ENG- 1111	English Reading	3.0	3.0	N/A
ENG-1213	English Composition / Writing	3.0	3.0	ENG-1111
ENG- 1315	English Spoken	3.0	3.0	N/A
	Total	**9.0**	**9.0**	
Basic Science Courses (3 credit hours)				
PHY-2213	General Physics II	2.0	2.0	N/A
PHY-2214	General Physics Lab	1.0	2.0	N/A
	Total	**3.0**	**4.0**	
Mathematics Courses (15 credit hours)				
MATH-1111	Differential and Integral Calculus	3.0	3.0	N/A
MATH-1213	Linear Algebra and Complex Analysis	3.0	3.0	MATH-1111
MATH-1315	Differential Equations and Fourier Analysis	3.0	3.0	MATH-1213
MATH-2111	Co-ordinate Geometry and Vector Analysis	3.0	3.0	MATH-1315
MATH-2213	Probability and Statistics	3.0	3.0	N/A
	Total	**15.0**	**15.0**	

Computer courses (9 credit hours)				
Course Code	**Course Title**	**Credit Hours**	**Contact Hours / Week**	**Prerequisite Courses**
CSE-1213	Computer Programming	2.0	2.0	CSE-1111
CSE-1214	Computer Programming Lab	1.0	2.0	CSE-1112
CSE-2111	Numerical Methods	2.0	2.0	N/A
CSE-2112	Numerical Methods Lab	1.0	2.0	N/A
	Total	**6.0**	**8.0**	

EEE Core Courses (64 credit hours)				
Course Code	**Course Title**	**Credit Hours**	**Contact Hours/week**	**Prerequisite Courses**
EEE-1111	Electrical Circuits I	3.0	3.0	N/A
EEE-1213	Electrical Circuits II	3.0	3.0	EEE-1111
EEE-1214	Electrical Circuits Lab	1.5	3.0	EEE- 1111 & EEE- 1213
EEE-1315	Electronics I	3.0	3.0	EEE-1111 & EEE-1213
EEE-1316	Electronics Circuit Simulation Lab	1.5	3.0	EEE-1214
EEE-1317	Energy Conversion I	3.0	3.0	EEE-1213
EEE-2213	Energy Conversion II	3.0	3.0	EEE-1317
EEE-2214	Energy Conversion Lab	1.5	3.0	EEE-1214
EEE-2315	Electronics II	3.0	3.0	EEE-1317
EEE-2316	Electronics II Lab	1.5	3.0	EEE-1316
EEE-2317	Digital Electronics	3.0	3.0	EEE-2315
EEE-2318	Digital Electronics Lab	1.5	3.0	EEE-2316
EEE-3111	Signals and Linear Systems	2	2.0	MATH-1213

EEE-3112	Signals and Linear Systems Lab	1.5	3.0	CSE- 2112& EEE- 1316
EEE-3113	Electromagnetic Fields & Waves	2.0	2.0	MATH- 2111
EEE-3115	Power System I	3.0	3.0	EEE-1317
EEE-3116	Power System I Lab	1.0	2.0	EEE-1214 & EEE-2214
EEE-3217	Basic Communication Engineering	2.0	2.0	EEE-3111
EEE-3218	Basic Communication Engineering Laboratory	1.0	2.0	EEE-3112
EEE-3219	Control System I	2.0	2.0	EEE- 3111
EEE-3220	Control System I Lab	1.0	2.0	EEE-3112
EEE-3221	Microprocessor, Assembly Language & Computer Interfacing	3.0	3.0	EEE- 2317
EEE-3222	Microprocessor, Assembly Language & Computer Interfacing Lab	1.0	2.0	EEE- 2318
EEE-3324	Electrical Services Design	1.0	2.0	EEE-1213 & EEE-1214
EEE-3325	Electrical Properties of Materials	2.0	2.0	PHY- 2213
EEE-3327	Digital Communication	3.0	3.0	EEE-3217
EEE-3228	Digital Communication Lab	1.0	2.0	EEE-3218
EEE-3329	Digital Signal Processing I	2.0	2.0	EEE-3327
EEE-3330	Digital Signal Processing I Lab	1.0	2.0	EEE-3328
EEE 4800	Project/Thesis	6.0	12.0	
Total		**64.0**	**86.0**	

List of Elective courses (27 credit hours)

Communication group				
Course Code	**Course Title**	**Credit Hours**	**Contact Hours/week**	**Prerequisite Courses**
ECE-4111	Random Signals and Processes	3.0	3.0	EEE-3329
ECE-4113	Digital Signal Processing II	3.0	3.0	EEE-3329
ECE-4115	Microwave Engineering	2.0	3.0	EEE-3313& EEE-3327
ECE-4116	Microwave Engineering Lab	1.0	2.0	EEE-3328
ECE-4117	Optical Fiber Communication	3.0	3.0	EEE-3327
ECE-4221	Cellular Mobile & Satellite Communication	3.0	3.0	EEE-3327
ECE-4223	Telecommunication Engineering	3.0	3.0	EEE-3327
ECE-4225	Control System II	2.0	2.0	EEE-3219
ECE-4226	Control System II Lab	1.0	2.0	EEE-3220
ECE-4227	RF and Microwave Engineering	3.0	3.0	EEE-3313& EEE-3327
ECE-4229	Data Communication	3.0	3.0	N/A
ECE-4230	Data Communication Lab	1.0	2.0	N/A
ECE-4331	Remote Sensing Technology	2.0	2.0	EEE-3219
ECE-4332	Remote Sensing Technology Lab	2.0	1.0	EEE-3220
ECE-4335	Wireless Communication	3.0	3.0	EEE-3327
ECE-4337	Broadband Communication Networks	2.0	2.0	EEE-3327
ECE-4338	Broadband Communication Networks Lab	2.0	1.0	EEE-3328

Computer group				
Course Code	**Course Title**	**Credit Hours**	**Contact Hours**	**Prerequisite Courses**
CSE-2231	Operating Systems	2.0	2.0	CSE-1111

CSE-2232	Operating Systems Lab	1.0	2.0	CSE-1112
CSE-4361	Multimedia Communications	3.0	3.0	EEE-3329
EEE-4125	Microprocessor System Design	2.0	2.0	EEE-3221
EEE-4126	Microprocessor System Design Lab	1.0	2.0	EEE-3222
CSE-4253	Computer Architecture	3.0	3.0	EEE-3221
CSE-2340	Database Management System	2.0	2.0	N/A
CSE-2341	Database Management System Lab	1.0	2.0	N/A
CSE-3350	System Analysis, Design and Development	3.0	3.0	N/A
CSE-3370	Management Information System	3.0	3.0	N/A

Power group				
Course Code	Course Title	Credit Hours	Contact Hours	Prerequisite Courses
EEE-4011	Power System II	3.0	3.0	EEE-3115
EEE-4113	Energy Conversion III	3.0	3.0	EEE-2213
EEE-4115	Power Electronics	3.0	3.0	EEE-2315
EEE-4116	Power Electronics Lab	1.0	2.0	EEE-2316
EEE-4117	Power Plant Engineering	3.0	3.0	EEE-4011
EEE-4119	Renewable Energy Conversion	2.0	2.0	EEE-2213
EEE-4229	Switchgear and Protection	3.0	3.0	EEE-4011
EEE-4230	Switchgear and Protection Lab	1.0	2.0	EEE-3116
EEE-4231	High Voltage Engineering	2.0	2.0	EEE-4011
EEE-4232	High Voltage Engineering Lab	1.0	2.0	EEE-3116
EEE-4341	Advanced Machines	3.0	3.0	EEE-2213

Electronics group				
Course Code	Course Title	Credit Hours	Contact Hours	Prerequisite Courses
EEE-4121	Solid State Devices	2.0	2.0	EEE-1317
EEE-4123	Analog Integrated Circuits	3.0	3.0	EEE-1317
EEE-4125	Processing and Fabrication Technology	3.0	3.0	EEE-2317
EEE-4127	VLSI I	2.0	2.0	EEE-2315
EEE-4128	VLSI I Lab	1.0	2.0	EEE-2316
EEE-4237	Optoelectronics	3.0	3.0	EEE-2315
EEE-4343	Biomedical Instrumentation	2.0	3.0	N/A
EEE-4344	Biomedical Instrumentation Lab	1.0	2.0	N/A
EEE-4345	Measurement and Instrumentation	3.0	3.0	EEE-1213
EEE-4346	Measurement and Instrumentation Lab	1.0	2.0	EEE-1214
ECE-4347	Radio and Television Engineering	2.0	2.0	ECE-2111
ECE-4348	Radio and Television Engineering Lab	2.0	1.0	EEE-2315
ECE-4349	Robotics & Computer Vision	3.0	3.0	EEE-3219 & EEE-2315
ECE-4380	Robotics & Computer Vision Lab	1.0	2.0	EEE-3220 & EEE-2316

Approximate Course Distribution

First Semester (First Year)

Course No.	Course Title	Credit Hours	Contact Hour/ Week	Prerequisite Courses
ENG-1111	English Reading	3.0	3.0	N/A
MATH-1111	Differential and Integral Calculus	3.0	3.0	N/A
CSE-1213	Computer Programming	2.0	2.0	CSE-1111
CSE-1213	Computer Programming: Lab	1.0	2.0	CSE-1112
EEE-1111	Electrical Circuits I	3.0	3.0	N/A
EEE-1213	Electrical Circuits II	3.0	3.0	
EEE-1214	Electrical Circuits Lab	1.5	3.0	N/A
	Total	**16.5**	**19**	

Second Semester (First Year)

Course No.	Course Title	Credit Hours	Contact Hour/ Week	Prerequisite Courses
ENG- 1213	English Composition/Writing	3.0	3.0	ENG-1111
PHY-2213	General Physics II	2.0	2.0	N/A
PHY-2214	General Physics II Lab	1.0	2.0	N/A
MATH-1213	Linear Algebra and Complex Analysis	3.0	3.0	MATH-1111
EEE-1315	Electronics I	3.0	3.0	EEE-1213
EEE-1316	Electronics Circuit Simulation Lab	1.5	3.0	EEE-1214
CSE-2111	Numerical Methods	2.0	2.0	N/A
CSE-2112	Numerical Methods Lab	1.0	2.0	N/A
	Total	**16.5**	**20.0**	

Third Semester (First Year)

Course No.	Course Title	Credit Hours	Contact Hour/ Week	Prerequisite Courses
ENG- 1315	English Spoken	3.0	3.0	ENG-1111
EEE-2315	Electronics II	3.0	3.0	EEE-1315
EEE-2316	Electronics II Lab	1.5	3.0	EEE-1316
MATH-1315	Differential Equations and Fourier Analysis	3.0	3.0	MATH-1213
EEE-1317	Energy Conversion I	3.0	3.0	EEE-1213
	Total	**13.5**	**15.0**	

Fourth Semester (Second Year)

Course No.	Course Title	Credit Hours	Contact Hour/ Week	Prerequisite Courses
MATH-2111	Co-Ordinate Geometry and Vector Analysis	3.0	3.0	MATH-1315
EEE-2213	Energy Conversion II	3.0	3.0	EEE-2213
EEE-2214	Energy Conversion Lab	1.5	3.0	EEE-1214
EEE-2317	Digital Electronics	3.0	3.0	EEE-2315
EEE-2318	Digital Electronics Lab	1.5	3.0	EEE-2316
EEE-3111	Signals and Linear Systems	2.0	2.0	MATH- 1213
EEE-3112	Signals and Linear Systems Lab	1.5	3.0	CSE-2112 & EEE-1316
Total		**15.5**	**20.0**	

Fifth Semester (Second Year)

Course No.	Course Title	Credit Hours	Contact Hour/ Week	Prerequisite Courses
MATH-2213	Probability and Statistics	3.0	3.0	N/A
ECE-3113	Electromagnetic Fields & Waves	2.0	2.0	MATH-2111
EEE-3115	Power System I	3.0	3.0	EEE-2213
EEE-3116	Power System I Lab	1.0	3.0	EEE-1214 & EEE-2214
EEE-3211	Microprocessor, Assembly Language & Computer Interfacing	3.0	3.0	EEE-2317
EEE-3212	Microprocessor, Assembly Language & Computer Interfacing Laboratory	1.0	2.0	EEE-2318
Total		**13.0**	**16.0**	

Sixth Semester (Second Year)

Course No.	Course Title	Credit Hours	Contact Hour/ Week	Prerequisite Courses
EEE-3219	Control System I	2.0	2.0	EEE-3111
EEE-3220	Control System I Lab	1.0	2.0	EEE-3112
EEE-3217	Basic Communication Engineering	2.0	2.0	EEE-3111
EEE-3218	Basic Communication Engineering Lab	1.0	2.0	EEE-3112
EEE-3324	Electrical Services Design	1.0	2.0	EEE-1213 & EEE-1214

Course No.	Course Title	Credit Hours	Contact Hour/Week	Prerequisite Courses
EEE-3325	Electrical Properties of Materials	2.0	2.0	PHY- 2213
	Total	**9.0**	**12.0**	

Seventh Semester (Third Year)

Course No.	Course Title	Credit Hours	Contact Hour/Week	Prerequisite Courses
EEE-3327	Digital Communication	3.0	3.0	EEE-3217
EEE-3328	Digital Communication Lab	1.0	2.0	EEE-3218
EEE-3329	Digital Signal Processing	2.0	2.0	EEE-3327
EEE-3330	Digital Signal Processing Lab	1.0.	2.0	EEE-3328
	Elective 1	3.0	3.0	-
	Elective 2	3.0	3.0	-
	Total	**13.0**	**14.0**	

Eighth Semester (Third Year)

Course No.	Course Title	Credit Hours	Contact Hour/Week	Prerequisite Courses
	Elective 3	3.0	3.0	-
	Elective 4	3.0	3.0	-
	Elective 5	3.0	3.0	-
	Elective 6	3.0	3.0	-
EEE-4800	Project / Thesis (Supervisor based)	-	-	-
	Total	**12.0**	**12.0**	

Ninth Semester (Third Year)

Course No.	Course Title	Credit Hours	Contact Hour/Week	Prerequisite Courses
	Elective 7	3.0	3.0	-
	Elective 8	3.0	3.0	-
	Elective 9	3.0	3.0	-
EEE-4800	Project / Thesis (Finalize & Submission)	6.0	6.0	-
	Total	**15.0**	**15.0**	

COURSE SYNOPSIS

ENGLISH COURSES

Course Code: ENG-1111

Course Title: English Reading

Credit hour: 3

This course focuses on the basic skills of reading. This is designed for students at all reading levels. Emphasis is given in increasing the rate of reading and comprehension and on vocabulary expansion.

Unit-1: Reading Fiction Texts

Materials: fractions of various modern fictions written in easy language, short stories etc.; Skills: making inference, understanding how impressions are created, examining impact of words, examining points of view and reaching a conclusion etc.

Unit-2: Reading Fiction Texts

Reading non-fiction texts: newspapers, prose relating to history, geography, science and technology; Skills: summarizing a text, understanding use of words and their effects, comparing the style of fiction and non-fiction texts etc.

Course Code: ENG-1113

Course Title: English Reading and Speaking

Credit hour: 3

This course focuses on the basic skills of reading and speaking. This is designed for students at all reading levels. Emphasis is given in increasing the rate of reading and comprehension and on vocabulary expansion. Reading fiction texts: fractions of various modern fictions written in easy language, short stories etc.; Skills: making inference, understanding how impressions are created, examining impact of words, examining points of view and reaching a conclusion etc. Reading non-fiction texts: newspapers, prose relating to history, geography, science and technology; Skills: summarizing a text, understanding use of words and their effects, comparing the style of fiction and non-fiction texts etc.

Speaking: introduction to pronunciation, place and manner of articulation, phonetic symbols, the most common mistakes in pronunciation, etc.; Skills: making requests, giving commands, inviting people, giving advice, giving suggestions, agreeing and disagreeing, asking questions, giving opinion, making comments, presenting a paper, addressing an audience, etc.

Course Code: ENG-1315

Course Title: English Spoken

Credit hour: 3

This course focuses on the basic skills of speaking. This is designed for students at all reading levels.

Unit-1: Introduction to pronunciation, place and manner of articulation, phonetic symbols, the most common mistakes in pronunciation, etc.

Unit-2 Skills: making requests, giving commands, inviting people, giving advice, giving suggestions, agreeing and disagreeing, asking questions, giving opinion, making comments, presenting a paper, addressing an audience, etc.

The following contexts may be emphasized: Classroom, shopping center, ticket counter, bus stop, train station, airport, playground, residential hotel etc.

Course Code: ENG-1213

Course Title: English Composition/ Writing

Credit hour: 3

This course aims at building the ability of the students in correct writing, composition and presentation of English. The Emphasis of the course is on correct and independent writing and correct listening to individual phoneme and word pronunciation, listening to monologue, listening to dialogue and conversation

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GENERAL EDUCATION (GED) COURSES

Course Code: ART- 1111

Course Title: Bangladesh Studies

Credit hour: 3

The objectives this study is to create awareness among the students about the History, Geography, Economics, Sociology, Politics, Language, Literature, Philosophy, Art and culture of Bangladesh and such other subjects as are significantly related to the life and society of Bangladesh. Outline: Introduction to the course and its objectives. Outline of geography of Bangladesh. Advent of Islam in Bengal and the Muslim conquest, Its impact on the people .Origin of the Muslims of Bengal (Formation of Muslim society under the Bengal sultanate, Impact of Sufism in Bengal) (Reform Movements) Educational development under the Muslims, The British policy towards the education: A brief discussion Struggle for freedom from the British Colonialism Development of Bengali Prose Literature (New Trend of

Nationalism) Creation of Pakistan and the Emergence of Bangladesh. Political development in Bangladesh: Political parties & Constitutional Development. Economic condition of Bangladesh, Socio-Cultural problems and prospects of Bangladesh.

Course Code: ART- 1213
Course Title: Introduction to Sociology
Credit Hours: 3

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

Course Code: ART- 2213
Course Title: Professional Ethics
Credit Hour: 3

Human values: morals, values and ethics, integrity, work ethic, service learning, civic virtue, respect for others, living peacefully, character, spirituality . Engineering ethics: senses of 'engineering ethics', variety of moral issue, types of inquiry, moral dilemmas, moral autonomy, kohlberg's theory, gilligan's theory, consensus and controversy, models of professional roles, theories about right action, self-interest, customs and religion, uses of ethical theories. Engineering as social experimentation: engineering as experimentation, engineers as responsible experimenters, codes of ethics, a balanced outlook on law, the challenger case study. Safety, responsibilities and rights: safety and risk, assessment of safety and risk, risk benefit analysis and reducing risk, the three-mile-island and chernobyl case studies. Collegiality and loyalty, respect for authority, collective bargaining, confidentiality, conflicts of interest, occupational crime, professional rights, employee rights, intellectual property rights, discrimination. Global issues: multinational corporations, environmental ethics, computer ethics, weapons development, engineers as managers, consulting engineers, engineers as expert witnesses and advisors, moral leadership, sample code of ethics like asme, asce, ieee.

Course Code: ECON- 2311

Course Title: Principle of Economics

Credit hour: 3

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

Course Code: MGT-2315

Course Title: Introduction to Business

Credit Hours: 3

The course outlines the philosophy, objectives, activities and responsibility of business enterprises and familiarizes with business enterprises, business terminology and business environment. Included in the course are forms and procedure of business organization, procedure for business startup, sources of finance, agencies involved in business startup, major business decisions, and 30 associations in business world, major business functions and careers in business. Functional areas of business such as marketing, production, finance, accounting, personnel, etc. are discussed, includes a project work on how to set up a business.

Course Code: ACC-2111

Course Title: Principles of Accounting

Credit Hour: 3

Preliminaries: Introduction to Accounting, History and development of accounting thought, types of accounting, Accounting Principles and ethics, Accounting Equation and Transaction Analysis. Introduction to Financial Statements. Recording Business Transactions: The Accounts and their types. Double-Entry Book keeping system; Invoice, discount from purchase price, purchase return and allowances, Sale of inventory, sales discount, sales returns and allowances; Journals, ledger and Trial

balance. Correcting errors in the trial balance. The Adjusting & Closing Procedure: The adjusting process, Accrual versus cash basis Accounting, Preparation of Adjusted trial balance and financial statements, Closing entries and Reversing entries. Using accounting information in decision-making. Accounting in practice: worksheet, Purchase book, sales book, cashbook, patty cashbook, etc. Control accounts and subsidiary accounts. Bank reconciliation statement. Cost in General: objectives and classifications; Costing Journals; Job order costing, Process costing and Overhead costing, cost sheet; Cost of goods sold statement. Marginal and Relevant costing: Marginal costing tools and techniques, cost-volume-profit analysis. Guidelines for decision-making. Budget: Capital budgeting; Planning, evaluation & control of capital expenditures.

Credit Code: MGT- 3211
Course Title: Industrial Management
Contact Hours: 3
Preliminaries: Definition, Importance of management, Evolution, Functions of management, Introduction to Industry & organizational management, Environmental context of the Organization. Organizing stuffing: Theory & structure, Co-ordination, Span of control, Authority delegation, Formal & Informal Groups, Committee and task force, Manpower planning & Development. Cost & Financial Management: Investment analysis, benefit-cost analysis & it.s implications in decision making. Cost planning & Price Control, budget & budgetary control, development planning process. Marketing management: Concepts, strategy, and sales promotion, Transportation & Storage. Technology management: Management of innovation & changes, technology lifecycle. Production Management: Designing operations system in production and service-oriented industry. Product layout, process layout, & fixed position layout. Organizational technologies: automation, computer-assisted manufacturing, flexible manufacturing system,
and robotics. TQM, bench marking, ISO 9000, SQC. Industrial law: Law of contract, sale of goods, Hire and purchase, Negotiable instrument Act, patent right and validity. Factories act, Industrial relations ordinance, workmen.s compensation act. Professional Practice: Tender documentation, General conditions of tender, Tech. Specification, Purchase & procurement rules-2004, Technical evaluation, Copyright, Intellectual property right.

BASIC SCIENCE COURSES

Course Code: PHY- 1311

Course Title: General Physics I

Credit hour: 2

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

Course Code: PHY-1312

Course Title: General Physics I Lab

Credit hour: 1

Exp.1: Laboratory experiments based on PHY 1311

Course Code: PHY-2213

Course Title: General Physics II

Credit hour: 2

Charge and Matter: Electric charge, conductors and insulators, Coulomb.s law, electric field, electric field strength E, Gauss.s law and its applications, electric potential and potential function, electric dipole, Dielectrics and Gauss.s law, energy storage in an electric field. Current and Resistance: Current and currentdensity, Ohm.s law, Resistively, Electromotive force, potential difference. RC Circuits The Magnetic Field: The definition of B, the magnetic force on a current, magnetic force on current, Ampere.s

law, Biot –Savart law and their application, Lorentz force. Electromagnetic induction: Faraday.s law of induction, Lenz.s law, self and mutual induction, energy density in the magnetic field, generation of alternating current and emf, Interference and Diffraction of light: Definition, Young.s experiment, Newton.s ring, Fresnel and Fraunhofer diffraction, diffraction gratings, Polarization of light and Optical fiber. Relativity and Light waves: Postulates of special relativity, time dilation and length contraction, mass . energy relation, Photoelectric effect, X-ray and Bragg.s law. Compton effect, De Broglie waves. Modern Physics: Bhor.s atom model, atomic spectra and Zeeman effect, atomic nucleus and binding energy, radioactive decays and halflife.

Course Code: PHY-2214
Course Title: General Physics II Lab
Credit hour: 1
Laboratory experiments based on PHY 2213

Course Code: CHEM -2311
Course Title: Chemistry
Credit hour: 2
Atomic structure, periodic table, chemical bonds. Chemistry of cement, silicates and limes. Physical and chemical properties of water. Different types of solutions, concentration units. Chemical equilibria and thermochemistry.

Course Code: CHEM -2311
Course Title: Chemistry Lab
Credit hour: 1
Laboratory experiments based on PHY 2311

MATHEMATICS COURSES

Course Code: MATH- 1111
Course Title: Differential and Integral Calculus
Credit hour: 3
Functions of one variable & their plots, Limit, Continuity, Differentiability, Successive differentiation, Leibnitz's theorem, Rolle's, Mean-value, Taylors, Maclurin's Theorem, Langrange's & Cauchy's forms

of Reaminder, Expansion of functions in Taylor's & Maclaurin's series, Evaluation of Indeterminate form by L'Hospital' rule, Maxima and Minima of a function, Points of inflexion, Tangent, Normal, Curvature & radius of curvature, Functions of several variables, Partial derivatives, Euler's theorem, Jacobians, Directional derivatives. Integral Calculus: Physical meaning of a integration of function, different techniques of integrations, Integration by parts, Definite integration, Integration by summation of series, Fundamental theorem of integral calculus.

Course Code: MATH-1213

Course Title: Linear Algebra and Complex Analysis

Credit hour: 3

Matrix: Definition, Types of Matrices, Rank of the Matrix, Equivalence Matrix, System of linear equations. Linear Algebra : Different types of matrices, Algebraic operations on matrices, Adjoint & inverse of a matrix, Orthogonal & Unitary maatrices, System of linear equations, Vector space, Linear transformations, Characteristic roots & vectors, Diagonalization of matrices. Complex Variable: De-Moiver's theorem & its application, Functions of a complex variable, Limit, Continuity & Differentiability of a function of complex variable, Analytic functions, Cauchy-Riemann equations, Cauchy's theorem, Singularity & poles, Residues, Simple contour integration.

Course Code: MATH-1315

Course Title: Differential Equations and Fourier analysis

Credit hour: 3

Differential equation: Ordinary differential equation, Formation of DE(=Differential equation), Degree & order of DE, Solutions of 1st & 2nd order ordinary DE, Separable equations, Linear equations, Homogeneous linear equations with constant coefficients, Solution by variation of parameters, Undermined coefficients & operator method, Solution by series. Laplace Transformation: Definition of Laplace transform (LT), LT of different functions, First Shift theorem, Inverse transform, Linearity, Use of first shift theorem & Partial functions, Transform of derivative, Transform of an integral, Heaviside unit function, The 2nd shift theorem, Periodic functions, Convolutions, Solution of ordinary differential equation by Laplace transform. Fourier Analysis: Real & Complex form, Finite transform, Fourier integral, Fourier series & convergence of Fourier series, Fourier transform & uses in solving boundary value problem.

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Course Code: MATH- 2111

Course Title: Co-Ordinate Geometry and Vector Analysis

Credit hour: 3

Two dimensional geometry: Transformation of co-ordinates, translation and rotation of axes, invariants, polar co-ordinates, pairs of straight lines, homogeneous second degree equation, general second degree equation, angle between pairs of straight lines, bisectors of angles, general equation of second degree. Three dimensional geometry: Co-ordinates in three dimensions, direction cosines and direction ratios, planes, straight lines, spheres. Vector Analysis: Vector components, Vector components in spherical & cylindrical system, Derivative of vector, Vector operators, Del, Gradient, Divergence and Curl. Their physical significance, Vector integration, Line, Surface & Volume integration, Green's & Stoke's theorem and their applications.

Course Code: MATH- 2213

Course Title: Probability and Statistics

Credit hour: 3

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

COMPUTER COURSES

Course Code: CSE–1111

Course Title: Introduction to computers

Credit Hour: 2

History and development of computer Science, fundamental concepts, types of computers, a variety of computer applications (Word, Excel, Access, LAN). Hardware: CPU, motherboards, storage media, I/O devices. Software: Basic concepts, types of software. Operating system: Types, Importance, components, and basic functions. Application software: Programming languages, Applications Packages. Maintenance: Power supply, UPS, Virus protections

Course Code: CSE–1213

Course Title: Computer Programming

Credit Hour: 2

Introduction Programming Language: Machine language, assembly language, mid-level language, high-level language, language translation, interpreter, assembler and compiler. Programming Concepts: Algorithm and logic, flow-chart, keywords, syntax, data object, data types, declaration, operator, identifier, expressions and statements, structure, functions, built-in-functions, I/O functions, control statements, branching, looping, subprogram, storage management. The objective of this course is to enable the students to know the keywords and basic programming techniques in different structured languages

Course Code: CSE–1214

Course Title: Computer Programming Lab

Credit Hour: 1

Input and output operations, operators and expressions decision making and branching, use of one, two and multi dimensional arrays, decision making and looping, character strings, functions, pointers and dynamic memory allocations,file management, the preprocessor statements

Course Code: CSE–2111

Course Title: Numerical Methods

Credit Hour: 2

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

Course Code: CSE–2112

Course Title: Numerical Methods Lab

Credit Hour: 1

 Laboratory Experiment based on CSE–2111

Course Code: CSE–3113

Course Title: Computer Networks

Credit Hour: 2

An introductory course on theory and practice of computer networking. Topics includes; Introduction: Goals, Applications, Network structures, Network architectures, OSI, Connection oriented and connectionless services. Service primitives. Public networks, ARPANET, SNA. Local Area Networking: Technology, Architecture, Topology, Wireless LAN. LAN system: Ethernet and Fast Ethernet. Token Ring and FDDI. ATM LAN. Wide Area Networking: Circuit switching and Packet switching. ISDN, Frame Relay and cell relay. Data Link Layer: Service provided to the network layer, Framing, Error control, Flow control, Error detection and correction. Communication Architecture and Protocols: Network reference model, TCP/IP protocol, Internetworking, Internet protocol, Routing protocol, Transport protocols. Network Security: Privacy with conventional encryption, Digital signature. Distributed Applications.

Course Code: CSE–3114

Course Title: Computer Networks Lab

Credit Hour: 1

In this course students will perform experiments to verify practically the theories and concepts learned in CSE–3113.

Exp. 01: Study on basic LAN topologies and construction of CAT-5 & CAT-6 cable.

Exp. 02: Study on Subnetting

Exp. 03: Study on VLSM

Exp. 04: Familiarization with Packet Tracer and basic commands

Exp. 05: Configuration of a LAN using both real switch and Packet Tracer

Exp. 06: Study on routing protocols: RIPv2 and OSPF

Exp. 07: Study on Virtual LANs

Exp. 08: Introduction to Wireless Security

Exp. 09: Study on Access Control List

Exp. 10: Study on web servers, mail servers, authentication servers etc.

OTHER ENGINEERING DISCIPLINE COURSES

Course Code: CE- 2112

Course Title: Computer Aided Engineering Drawing

Credit Hour: 2

Introduction - Lines and lettering, Plane geometry: drawing of linear and curved geometric figures, e.g. pentagon, hexagon, octagon, ellipse, parabola, hyperbola. Solid geometry: Projections of cube, prism, cone, cylinder, developments, true shapes and sections of cube, pyramid, cone, prism, isometric and oblique drawings of cube, pyramid, cone. Plan, elevations and sections of one storied buildings and bridges. Computer Aided Design basics.

Course Code: ME-2211

Course Title: Mechanical Engineering Fundamentals

Credit Hour: 3

Introduction to the sources of heat energy, renewable and non-renewable sources and their potential; introduction to steam generation, steam generator; boilers and their classification; Working principle of few common and modern boiler; boiler mounting and accessories; performance of boiler; heat engines;

gas turbines, diesel engines, petrol engines, fuel, lubrication and cooling systems of I.C engines. Energy and first law: systems and surroundings; conservation of energy; different thermodynamic processes; energy transfer as heat for a control volume. Entropy and second law: reversibility and irreversibillity; definition and corollaries of second law of thermodynamics. Entropy: its transfer and change. Characteristics of some thermodynamic cycles: analysis of different thermodynamic cycles, vapor power cycles, representation of various cycles on PV & TS planes. Basic concepts of refrigeration systems: vapor compression refrigeration, absorption refrigeration, cop, refrigerants and their classifications and properties. Air conditioning: introduction, objectives and major components of air conditioning systems; humidity; dew point.

Course Code: ME-2212
Course Title: Mechanical Engineering Fundamentals Lab
Credit Hour: 1
Laboratory Experiment based on ME–2111

EEE CORE COURSES

Course Code: EEE–1111
Course Title: Electrical Circuit I
Credit Hour: 3
S.I. Units, Basic concepts of electric charge, Voltage, current, power, energy, independent and dependent sources, and resistance. Basic laws: Ohm's law, Kirchoff's current and voltage laws. Simple resistive circuits: Series and parallel circuits, voltage and current division, wye-delta transformation. Techniques of circuit analysis: Mesh and Nodal analysis including super mesh and super node. Network theorems: Source transformation, Thevenin's, Norton's and superposition theorems, maximum power transfer condition. Magnetic quantities and variables: Flux, permeability and reluctance, magnetic field strength, magnetic potential, hysteresis, eddy currents, flux density, magnetization curve etc. Laws in magnetic circuits: Ohm.s law and Ampere.s circuital law. Magnetic circuits: series, parallel and series-parallel circuits. Filter analysis, Transient analysis.

Course Code: EEE–1112

Course Title: Electrical Circuits I Lab

Credit Hour: 1

In this course students will perform experiments to verify practically the theories and concepts learned in EEE-1111.

Exp. 01: Study on Ohm's Law

Exp. 02: Study on KCL and KVL

Exp. 03: Study on CDR and VDR

Exp. 04: Study on Super position theorem

Exp. 05: Study on Maximum power transfer theorem

Course Code: EEE–1213

Course Title: Electrical Circuit II

Credit Hour: 3

Energy storage elements: Inductors and capacitors, series parallel combination of inductors and capacitors. Responses of RL and RC circuits: Natural and step responses. Sinusoidal functions: Instantaneous current, voltage, power, effective current and voltage, average power, phasors and complex quantities, impedance, real and reactive power, power factor. Analysis of single-phase ac circuits: Series and parallel RL, RC and RLC circuits, nodal and mesh analysis, application of network.theorems in ac circuits, transients in ac circuits. Resonance in ac circuits: Series and parallel resonance. Analysis of three phase circuits: Three phase supply, balanced and unbalanced circuits, and power calculation. Filters: Fundamental filter equation, Low-pass. High-pass and band-pass filter.

Course Code: EEE–1214

Course Title: Electrical Circuits II Lab

Credit Hour: 1.5

In this course students will perform experiments to verify practically the theories and concepts learned in EEE 1213.

Exp. 01: Study on Charging & Discharging characteristics of capacitor

Exp. 02: Study on frequency effect in resistive, inductive and capacitive circuit

Exp. 03: Study on AC series-parallel circuit

Exp. 04: Study on series resonance and parallel resonance circuit

Course Code: EEE–1315

Course Title: Electronics I

Credit Hour: 3

P-N junction: Intrinsic and extrinsic semiconductors, operational principle of p-n junction diode, contact potential, current-voltage characteristics of a diode, simplified dc and ac diode models, dynamic resistance and capacitance. Diode circuits: Half wave and full wave rectifiers, rectifiers with filter capacitor, characteristics of a Zener diode, Zener shunt regulator, clamping and clipping circuits. Bipolar junction transistor (BJT): current components, BJT characteristics and regions of operation, BJT as an amplifier, biasing the BJT for discrete circuits, B.J.T as a switch Small signal equivalent circuit models: determination of h-parameters of CE, CC and CB configuration and their interrelation amplifier. Junction field-effect-transistor (JFET): Structure and physical operation of JFET, transistor characteristics, pinch-off voltage

Course Code: EEE–1316

Course Title: Electronics Circuit Simulation Lab

Credit Hour: 1.5

In this course students will perform experiments to verify practically the theories and concepts learned in EEE-1315.

Exp. 01: Study on forward and reverse characteristics of Diode

Exp. 02: Study on half wave and full wave circuit

Exp. 03: Study on clipper circuits

Exp. 04: Study on BJT transistor biasing

Exp. 05: Study on BJT amplifier circuit

Exp. 06: Study on JFET amplifier circuit

Exp. 07: Study on transistor switching

Course Code: EEE–1317

Course Title: Energy Conversion I

Credit Hour: 3

DC Generator: Working principles, construction, classification/types of generator. Pitch: coil pitch, back pitch, front pitch, resultant pitch, commutator pitch. Lap and wave winding, emf equation of a dc generator, different types of losses in a dc generator, power stages, condition for maximum efficiency, armature reaction, commutation, methods of improving commutation, parallel operation of dc generator, characteristics curve of dc generator, critical resistance and critical speed, Voltage build up of a shunt

generator, external characteristics of dc generator, voltage regulation and uses of dc generators. DC Motor: Working principle, significance of the back emf, voltage equation of a motor, condition for maximum power. Torque: armature torque of a motor, shaft torque. Torque-speed characteristics, characteristics curve of dc series motor and shunt motor, losses and efficiency, power stages and methods of speed control. Transformer: Working principle of transformer, construction, emf equation of a transformer, transformer on no load and on load operation, vector diagrams of a loaded transformer, equivalent circuit, transformer test, voltage regulation, condition for maximum efficiency, auto-transformer. Three-phase transformer: Three-phase transformer connections, current transformer and potential

Course Code: EEE–2213
Course Title: Energy Conversion II
Credit Hour: 3

Synchronous Generator: Basic principle, construction, pitch factor and distribution factor, salient poles and non-salient poles, equation of induced emf, factors affecting alternator size, alternator on load, vector diagram of a loaded alternator, synchronous reactance, voltage regulation, determination of voltage regulation, power developed by a alternator, parallel operation of alternators, synchronizing current and synchronizing power, synchronizing torque, effect of unequal voltages, distribution of load. Three-phase Induction Motor: Working principle, construction, types of rotor, Rotating magnetic field, why does the rotor rotate?, slip, relation between torque and rotor power factor, starting torque, condition for maximum starting torque, torque under running condition, condition for maximum running torque, effect of change in supply voltage on torque and speed, full load torque and maximum torque, starting torque and maximum torque, torque-speed curves, plugging of an induction motor, induction motor operating as a generator, power stages in an induction motor, torque developed by an induction motor, equivalent circuit, vector diagram, no-load test, blocked rotor test, starting of induction motors, speed control of induction motors, Synchronous motor.

Course Code: EEE–2214
Course Title: Energy Conversion Lab
Credit Hour: 1.5

In this course students will perform experiments to verify practically the theories and concepts learned in EEE-2213.
Exp. 01: Study on separately excited DC shunt generator

Exp. 02: Study on series DC motor

Exp. 03: Study on speed control of DC shunt motor

Exp. 04: Study on Induction motor

Exp. 05: Study on Alternator

Exp. 06: Study on single phase and three phase transformer

Exp. 07: Study on capacitor start motor

Course Code: EEE–2315

Course Title: Electronics II

Credit Hour: 3

Metal-oxide-semiconductor field-effect-transistor (MOSFET): 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. Differential and multistage amplifiers: Description of differential amplifiers, small-signal operation, and differential and common mode gains, RC coupled mid-band frequency amplifier. Large signal amplifiers: class A, class B, class AB and class, C amplifiers. Analysis and design tuned and un-tuned power 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. Active filters: Different types of filters and specifications, transfer functions, realization of first and second order low, high and band pass filters using Op-Amps. Signal generators (multi-vibrator): Basic principle of sinusoidal oscillation, Op-Amp RC oscillators, and LC and crystal oscillators.555-timer:

Course Code: EEE–2316

Course Title: Electronics II Lab

Credit Hour: 1.5

In this course students will perform experiments to verify practically the theories and concepts learned in EEE-2315.

Exp. 01: Study on MOSFET amplifier circuit

Exp. 02: Study on push pull amplifier

Exp. 03: Study on PWM using operational amplifiers

Exp. 04: Study on filters using operational amplifiers

Exp. 05: Study on multi-vibrators using 555 timers IC

Exp. 06: Study on sinusoidal oscillators

Course Code: EEE–2317

Course Title: Digital Electronics

Credit Hour: 3

Number systems and codes, Digital logic: signed binary number, binary codes, Boolean algebra: De-Morgan's law, Logic-gates and their truth tables, canonical forms Simplification of Boolean function: minimization techniques, map method, NAND, NOR implementation, don't care condition, determination of prime implicates. Combinational logic circuits: Arithmetic and data handling logic circuit, integrated circuits decoders and encoders.Multiplexers and De-multiplexers. Sequential logic design: Flip-flops, triggering of flip-flop, flip-flop excitation table Counters: Asynchronous and Synchronous counters and their applications. Synchronous and asynchronous logic design: state diagram,State minimization and assignments. Pulse mode logic. Fundamental mode logic design Diode logic gates, transistor switches, transistor-transistor gates, MOS gates, LogicFamilies: TTL, ECL, IIL and CMOS logic with operation details. Propagation delay,Product and noise immunity, Open collector and high impedance gates. Electronic circuit for flip-flops, counters and registers, memory systems. PLAs, A/D and D/A converters with applications.

Course Code: EEE–2318

Course Title: Digital Electronics Lab

Credit Hour: 1.5

Laboratory Experiment based on EEE-2317

Exp. 01: Study on logic gates

Exp. 02: Study on half adder and full adder circuit

Exp. 03: Study on Decoder and Encoder circuit

Exp. 04: Study on multiplexer and demultiplexer

Exp. 05: Study on SR and JK flip flop

Exp. 06: Study on D flip flop and T flip flop

Exp. 06: Study on register

Exp. 07: Study on binary ripple counter

Course Code: EEE–3111

Course Title: Signal and Linear Systems

Credit Hour: 2

Classification of signals and systems: signals- classifications, continuous-time and discrete-time signals, basic operation on signals, signals representation using impulse function, unit step functions; systems-classification. Properties of Linear Time Invariant (LTI): Linearity, causality, time invariance, memory, stability, invariability. Time domain analysis of LTI systems: Differential equations- system representation, order of the systems, properties of the systems; impulse response- convolution integral, determination of system properties. Frequency domain analysis of LTI systems: Fourier series- properties, harmonic representation, system response, frequency response and distortion-less system.

Course Code: EEE–3112

Course Title: Signal and Linear Systems Lab

Credit Hour: 1.5

Exp. 01: Introduction to MATLAB

Exp. 02: Mathematical operations using Signals

Exp. 03: Continuous-Time Signals and Systems- Part I

Exp. 04: Continuous-Time Signals and Systems- Part II

Exp. 05: The Continuous-Time Fourier analysis

Course Code: EEE–3113

Course Title: Electromagnetic Fields and Waves

Credit Hour: 2

Static electric field: Postulates of electrostatics, Coulomb's law for discrete and continuously distributed charges, Gauss's law and its application, electric potential due to charge distribution, conductors and dielectrics in static electric field, flux density - boundary conditions; capacitance - electrostatic energy and forces, energy in terms of field equations, capacitance calculation of different geometries; boundary value problems – Poisson's and Laplace's equations in different co-ordinate systems. Steady electric current: Ohm's law, continuity equation, Joule's law, and resistance calculation. Static Magnetic field: Postulates of magnetostatics, Biot-Savart's law, Ampere's law and applications, vector magnetic potential, magnetic dipole, magnetization, magnetic field intensity and relative permeability, boundary conditions for magnetic field, magnetic energy, magnetic forces, torque and inductance of different geometries. Time varying fields and Maxwell's equations: Faraday's law of electromagnetic induction, Maxwell's equations - differential and integral forms, boundary conditions, potential functions; time

harmonic fields and Poynting theorem. Plane electromagnetic wave: plane wave in loss less media - Doppler effect, transverse electromagnetic wave, polarization of plane wave; plane wave in lossy media – low-loss dielectrics, good conductors; group velocity, instantaneous and average power densities, normal and oblique incidence of plane waves at plane boundaries for different polarization.

Course Code: EEE–3115
Course Title: Power System I
Credit Hour: 3

Inductance of transmission lines: Flux linkage, Inductance due to internal flux, Inductance of single phase two wire lines, Flux linkage of one conductor in a group, Inductance of composite conductor lines. GMD examples; 3 phase lines with equilateral spacing and unsymmetrical spacing. Parallel circuit 3 phase lines. Use of tables. Electrical field; potential difference between points due to a charge, capacitance of a two- wire line. Group of charged conductors. Capacitances of 3 phase lines with equilateral and with unsymmetrical spacing. Effect of earth, parallel circuit lines. Resistance and skin effect: Resistance and temperature, skin effects, influence on resistance, use of table, Current and voltage relation on a transmission line, T- and pi- representation, exact solution. Equivalent circuit of a long line. Mechanical characteristics of transmission line: Sag and stress analysis; Wind and ice loading, supports at different elevation conditions at erection; effect of temperature changes. Generalized line constant: General line equation in terms of A, B, C, D constants. Relation between constants, charts of line constants, constants of combined networks, measurement of line constants.. Voltage and power factor control in transmission systems. Power factor control; static condensers; synchronous condenser. Insulators for overhead lines; types of insulators, their construction and performance. Potential distribution in a string of insulators, string efficiency. Methods of equalizing potential distribution; special types of insulators, testing of insulators. Insulated cables, cables versus overhead lines, insulating materials. Electrostatic stress grading. Three core cables; dielectric losses and heating.

Course Code: EEE–3116
Course Title: Power System I Lab
Credit Hour: 1

Exp. 01: Study on Transmission line
Exp. 02: Phase Sequence Determination of a Three Phase Transmission Line
Exp. 03: Measurement of Real and Reactive Power in a Three Phase Circuit
Exp. 04: Generator Synchronization with Transmission Line using Synchronization Module
Exp. 05: Phase Angle Determination of a Transmission Line

Course Code: EEE- 3217

Course Title: Basic Communication Engineering

Credit Hour: 2

Overview of communication systems: Basic principles, fundamental elements, various signals and tones, transmission media, bandwidth and transmission capacity. Noise: Noise sources, characteristics of noise, types of noise, signal to noise ration, noise figure. Transmission Technique: Amplitude modulation- SSB, DSB, VSB; Angle Modulation- FM, PM; Sampling and PCM- sampling theorem, signal reconstruction aliasing, quantization, PCM. Antenna: Elementary consideration, radiation, antenna parameters, effects of ground on antenna, antenna coupling at medium frequencies, Microwave antennas, wide band and special purpose antennas.

Course Code: EEE- 3218

Course Title: Basic Communication Engineering Lab

Credit Hour: 1

Laboratory experiments based on EEE 3217

Exp. 01: Study on Amplitude modulation (AM) using Emona 101 Trainer

Exp. 02: Study on Double Sideband (DSB) modulation

Exp. 03: Study on Amplitude demodulation

Exp. 04: Study on Double Sideband (DSB) demodulation

Exp. 05: Study on Single sideband (SSB) modulation and demodulation

Exp. 06: Study on Frequency modulation using Emona 101 Trainer

Exp. 07: Study on Frequency demodulation

Course Code: EEE-3219

Course Title: Control System I

Credit Hour: 2

Introduction to feed-back control terminologies with example, Transfer function modeling with DC and AC servo and other familiar systems. Block diagram representation and simplification to canonical form by Mason Rule. Time domain specifications-unit step response. Location poles and stability of routh's criterion. Steady State performance: types of systems,examples,stedy state error and static error co-efficients. Frequency response: Bode, Nyquist and Nichols plots, gain margin, phase margin, maximum

magnitude, resonant frequency and bandwidth, correlation with time response. Stability from nyquist diagram (direct polar plot). Gain adjustment using Nichols chart, Root Locus : construction rules, dominant rules. Stability . P+I, P+D and PID compensation using root locus and Nichols chart. Feed-back compensetionusing Root-locus. Introduction to pole placement compensation. State space representation: formulation of state equations, transfer function from state equation,stability and eigen values of state transition matrix. Introduction to digital control.

Course Code: EEE-3220

Course Title: Control System I Lab

Credit Hour: 1

Laboratory experiments based on EEE-3219

Exp. 01: Study on Steady State Error analysis of different types of systems simulated on a PC using the 'MATLAB' software.

Exp. 02: Study of the Unit Step Response of a Second Order System simulated on a PC using the 'MATLAB' software.

Exp. 03: Study of the Root Locus of a System simulated on a PC using the 'MATLAB' software.

Exp.04:

Course Code: EEE-3221

Course Title: Microprocessor, Assembly Language & Computer Interfacing

Credit Hour: 3

Introduction to different types of microprocessors: 8bit, 16 bit ,32bit and their achitectures ,pin diagrams and junction, Pentium microprocessor and co-processors, RISK and CISK processor.EPROM and RAM, Instruction sets and assembly language programming. Microprocessor Peripherals and their interfacing : Introduction to some available microprocessor peripherals IC's and their application such as 8251,8253,8254,8255,8257,8259,8279 A/D and D/A converter interfacing. Standard for bus architectures and ports: ISA,EISA ,MCA ,PCI,VESA, Accelerated Graphics   port(AGP),Universal Serial Port (USB),RS-232C ,RS-423A,RS-499 and RS-366, IEEE-488 BUS and Bus system in a microprocessor System.

Course Code: EEE-3222

Course Title: Microprocessor, Assembly Language & Computer Interfacing Lab

Credit Hour: 1

Laboratory experiments based on EEE 3221

Exp. 01: Perform 16 bit Arithmetic, Logical and Branching operation with 8085 Microprocessor.

Exp. 02: Multiplication and division of two 8 bit numbers using 8085 Microprocessor.

Exp. 03: Familiarization with 8086 Microprocessor kit with additional hardware.

Exp. 04: Addition and Subtraction using 8086 microprocessor kit

Exp. 05: Perform some problems relating shifting and arithmetic operation.

Course Code: EEE-3324

Course Title: Electrical Services Design

Credit Hour: 1

Electrical wiring, Estimating and Costing. Design for illumination and lighting. Electrical installations system design: substation, BBT and protection, air-conditioning, heating and lifts. Design of security systems including CCTV, fire Alarm, smoke detector, burglar alarm, and sprinkler system. A design problem on a multi-storied building

Course Code: EEE-3325

Course Title: Electrical Properties of Materials

Credit Hour: 2

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

Course Code: EEE–3327

Course Title: Digital Communication

Credit Hour: 3

Introduction to digital communication system: classifications of signals, spectral density, auto correlation. Random process: Effect of noise on communication systems, sampling and sampling theorem, Nyquist criterion, analog to digital conversion. Digital modulation techniques: ASK, FSK, PSK, QAM and demodulation techniques. Multiplexing: TDM, FDM, CDMA, OFDM and beyond. Information theory: Discrete message, average information, entropy, information rate, Shanon theorem, channel capacity. Coding: Parity check, coding for error detection and correction, various types of source and channel coding techniques.

Course Code: EEE- 3328

Course Title: Digital Communication Lab

Credit Hour: 1

Laboratory experiments based on EEE 3327

Exp. 01: Study on sampling and reconstruction

Exp. 02: Study on PCM encoding

Exp. 03: Study on PCM decoding

Exp. 04: Study on BW limiting and restoring digital signals

Exp. 05: Study on Amplitude Shift Keying (ASK)

Exp. 06: Study on Frequency Shift Keying (FSK)

Exp. 07: Study on Phase Shift Keying (PSK) and Binary Phase Shift Keying (BPSK)

Exp. 08: Study on Quadrature Phase Shift Keying (QPSK)

Exp. 09: Study on Direct Sequence Spread Spectrum (DSSS) modulation and demodulation

Course Code: EEE-3329

Course Title: Digital Signal Processing I

Credit Hour: 2

Introduction to digital signal processing, Signal, Systems and Signal Processing, Basic Elements of a digital signal processing systems, Advantages of digital over analog signal processing, Classification of signals, The concept of frequency in continuous-time and discrete-time signals, Analog to digital and digital to analog conversion; Discrete-time signals, Discrete time systems, Discrete time systems described by difference equations, Correlation of discrete-time signals; Discrete fourier transform, Inverse discrete fourier transform, 2-radix, 4-radix- DFT, Fast fourier transform, Fast convolution difference equations, Transfer functions and z-transformation; Digital Filters: FIR filters, their design, realization of FIR and IIR filter design, finite precision effects; Adaptive filters: Weiner filters; Introduction to multi-rate filtering and noise shaping.

Course Code: EEE-3330

Course Title: Digital Signal Processing I Lab

Credit Hour: 1

Exp. 01: Discrete-Time Signals and Systems- Part I

Exp. 02: Discrete-Time Signals and Systems- Part II

Exp. 03: Introduction to the Z-Transform

Exp. 04: Study of Convolution, De-convolution and transfer function of Filters using z-transform

Exp. 05: FIR Filtering of Sinusoidal Waveforms

Exp. 06: Filtering Sampled Waveforms

Exp. 07: The Discrete Fourier Transform

ELECTIVE COURSES
COMMUNICATION GROUP

Course Code: ECE-4111

Course Title: Random Signals and Processes

Credit Hour: 2

Probability and random variables. Distribution and density functions and conditional probability. Expectation: moments and characteristic functions. Transformation of a random variable. Vector random variables. Joint distribution and density. Independence. Sums of random variables. Random Processes. Correlation functions. Process measurements. Gaussian and Poisson random processes. Noise models. Stationary and Periodicity. Spectral

Estimation. Correlation and power spectrum. Cross-spectral densities. Response of linear systems to random inputs. Introduction to discrete time processes, Mean-square error estimation, Detection and linear filtering.

Course Code: ECE-4113

Course Title: Digital Signal Processing II

Credit Hour: 2

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

Course Code: ECE-4113

Course Title: Microwave Engineering

Credit Hour: 2

VHF, UHF and microwave frequency ranges, Transmission line, Smith chart, impedance transformation and matching. Waveguides: Parallel, plain, rectangular, coaxial. Waveguide components, cavities, resonators, waveguide tees, directional couplers, circulators and isolators. Microwave tubes: transit time and velocity modulation, Klystron, multifamily Klystron, magnetron to solid state microwave devices. Radiation: dipole and its analysis, radiation pattern, Different types of antennas: Yagi, Vertical, Parabolic antenna. Measurement: measurement of microwave power, Frequency, wavelength, standard wave ratio, impedance and noise factor.

Course Code: ECE- 4116

Course Title: Microwave Engineering Lab

Credit Hour: 1

Laboratory experiments based on EEE -4115

Course Code: ECE- 4117

Course Title: Optical Fiber Communication

Credit Hour: 3

Introduction to Optical Fiber, Ray Theory: Reflection, Refraction, Diffraction, Total Internal Reflection, Acceptance angle, Numerical aperture, Electromagnetic Theory for optical propagation: Electromagnetic waves, Modes, Phase shift, Transmission characteristic of Optical fiber: Attenuation, Material absorption loses, Linear and nonlinear scattering loses, Fiber band loses, Dispersion, Single Mode and Multi-mode fibers: Mode coupling, Step index fiber, Graded index fiber, Optical sources: The Light emitting diode, The Laser, Different types of Laser, Optical detectors: Detection principles, p-i-N and avalanche photo-detectors, Optical fiber connections: joints and couplers: Fiber alignment and joint loss, Fiber splices, Fiber connectors, Fiber couplers. Transmission link analysis: point to point and point to multi point links, system configuration, link power budget, rise time budget and line coding schemes. Optical data buses, optical network, fiber distributed network (SONET), Optical frequency division multiplexing, wavelength division multiplexing.

Course Code: ECE- 4221

Course Title: Cellular Mobile and Satellite Communication

Credit Hours: 3

Introduction: evolution and fundamentals, analog and digital cellular system, Cellular Radio System: Frequency reuse, co-channel interference, cell splitting and components. Mobile radio propagation: Propagation characteristics, models for radio propagation antenna at sell cite and mobile antenna. Frequency management and channel assignment: Fundamentals, spectrum utilization fundamentalof channel assignment fixed channel assignment, non fixed channel assignment traffic and channel assignment: Handoffs and Dropped Calls: reason and types forced handoffs mobile assisted handoffs and dropped call rate, diversity techniques: concept of diversity paths 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.

Orbital Aspects, Tracking and control of communication satellite, Launch vehicle: space shuttle, propagation characteristics: Attenuation and noise, frequency bands, satellite transponders: Intermediation low noise amplifiers, satellite antenna, earth station configuration, high power amplifiers antenna, LNA: Link design, multiple access, Spot beam antenna, INTELSATs, INSAT

Course Code: EEE- 4223

Course Title: Telecommunication Engineering

Credit Hours: 3

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

Course Code: EEE- 4229

Course Title: Data Communication

Credit Hour: 3

Introduction to communication, Analog and digital data, spectrum and bandwidth,   Transmission impairments, data rate channel capacity, Transmission media: twisted pair, coaxial and fiber optic cables, Manchester and differential Manchester encoding, ASK, FSK,PSK,QPSK encoding, modems, error detection techniques, Data encoding, Data transmission, Data link, Data communication networking

Course Code: EEE- 4230

Course Title: Data Communication Lab

Credit Hour: 1

Laboratory experiments based on EEE- 4229

ELECTIVE COURSES
COMPUTER GROUP

Course Code: CSE- 2231

Course Title: Operating System

Credit Hour: 2

 An introduction to the structure of modern operating systems. History of operating systems, Operation system concept, Computer system structure, Operation system structure. Introduction to processes, Inter-

process communication, Threads, CPU scheduling, Deadlocks, Memory management, I/O systems, Storage management, Secondary storage management. Files systems, Protection. Distributed system structure, Distributed coordination, Distributed file systems, Study of a representative operating system : Windows NT, UNIX.

Course Code: CSE- 2232

Course Title: Operating System Lab

Credit Hour: 1

Introduction: UNIX system concepts, History, C programming under UNIX, standard C libraries, Single and multi-module programming, UNIX file dependency system, UNIX archive system, UNIX source code control system, UNIX profiler, UNIX debugging, UNIX system programming. File manipulation process creation, Data manipulation. Inter process communication, communication protocols, UNIX domain protocols, Socket addresses, Elementary and advanced socket. UNIX shells, Shell functionality, Shell programming. System calls, System versus transport layer interface. Transport Endpoint addresses, TLI functions. Standard Routines

Course Code: CSE- 4341

Course Title: Multimedia Communication

Credit Hour: 3

Introduction to multimedia, what is multimedia, multimedia and hypermedia, Graphics and Image representation, Graphics/Image data types, popular file formats, Fundamental concepts in Video. Types of video signals, Analog Video, Digital Video, Basics of Digital Audio, Digitization of Sound, MIDI, Quantization and transmission of audio. Lossless compression algorithms: Run length coding, variable length, coding, Dictionary based coding, Arithmetic coding, lossless image compression. Lossy compression algorithm: Introduction, distortion measures, rate distortion theory, quantization, transform coding, Wavelet based coding, embedded zero tree wavelet coefficients, SPIHT . Image compression standards: The JPEG standard, JPEG 2000 standard, JPEG LS standard, JBIG. MPEG Video coding : Basic video compression techniques H.261, MPEG-1, MPEG-2, MPEG-4.

Course Code: CSE- 4125

Course Title: Microprocessor System Design

Credit Hour: 3

Topics include: Fundamental units of a microcomputer: Input unit, CPU, Microprocessor, Memory unit, Output unit, Bus structures, and Processor clock. Memory devices: ROM, RAM, EPROM, Microcomputer programming concepts and timing. Architecture of a general purpose microprocessor, INTEL 8086 microprocessor, Internal architecture, Register structure, Addressing modes, Pin diagram and pin descriptions, Timing diagram, Instruction sets, Memory interface, I/O interface, Bus interface, DMA, Interrupts, Analog interfacing and industrial control, An overview of Intel 80186 through Pentium models.

Course Code: CSE- 4126
Course Title: Microprocessor System Design Lab
Credit Hour: 1
Laboratory Experiment Based on CSE- 4125

Course Code: CSE- 4253
Course Title: Computer Architecture
Credit Hour: 3
This course introduces the basics of computer organization and assembly language programming. Topics covered include: basic building blocks of a computer, bus system, microprocessor architecture, memory organization, programming model of a microprocessor, instructions set, and assembly language programming concepts. Mnemonics and opcodes, instruction sets for 8085 and 8086, assembly language programming, arithmetic instructions, logical instructions, loops and arrays, procedures, macros, interrupts, use of assembly language for simple system development.

Course Code: CSE- 2340
Course Title: Database Management System
Credit Hour: 2
Introduction- purpose of database systems, view of data, data models, database languages, transaction management, storage management, database users, overall system structure; Entity relationship model- design issues, mapping constraints, keys, ER diagram, weak entities, extended ER features; Relational

model; SQL- basic structures, set operations, aggregate functions, null values, nested subqueries, derived relations, views, joined relations, data definition language, embedded SQL; Integrity constraints- domain constraints, referential integrity, assertions, triggers, functional dependencies; Relational database design- decomposition, normalization, normal forms; Object oriented databases; Indexing and hashing; Concurrency control; Recovery system; Distributed databases;

Course Code: CSE- 2341

Course Title: Database Management System Lab

Credit Hour: 1

The course covers advance topics in databases like query processing and optimization, database security and transaction management, to learn how to develop database applications: Creation of Tables- Simple tables, tables with constraints, use of foreign keys and use of data base triggers; Use of SQL/PLSQL- Usage of SQL commands, usage of built in functions, simple queries, nested queries, procedures and functions; Interfacing with database- Using forms of data entry; Reports- Using report write.

Course Code: CSE- 3350

Course Title: System Analysis, Design and Development

Credit Hour: 3

Scope of system analysis. Information system concepts, System development life-cycle, Requirement analysis, Specification requirements. System design: Selection, Initial design, detailed design, data structure design, design documentation, Implementation and integration, Maintenance, Applications. Requirement and Specifications, Tools and Techniques, Coding, Program Verification, Testing and debugging, Programming environment, Distribution and Maintenance, Metrics, Management, design.

Course Code: CSE- 3370

Course Title: Management Information System

Credit Hour: 3

 An introduction to Management Information System, Information System for Management Activity and Functional Sub-systems, Structure of MIS, Organization and management concepts, Concepts of Information, Systems Concepts, Computer Hardware and Software for MIS, Communications technology for MIS, Data Resource Management, Decision making process, Human as information processors, Concepts of Planning and Control, Support systems for planning, control and decision making, Support systems for Management, Development of Information System Plan, Database requirements, User Interface requirements, Developing and Implementing Applications, Quality Assurance and Evaluations of Information systems, Organizing and Managing Information Resources function.

Course Code: CSE- 4211
Course Title: Web Technologies
Credit Hour: 3
Topics include HTML and DHTML concepts, HTML tag emulation, commands, HTML form design, homepage design, online request, dynamic function, buttons, and animation. Common gateway interface programming: Java Script, programming concept using Java Script, embedding Java Script in HTML. Multimedia: Web graphics, animation, compressed graphics, Socket programming, socket for client server architecture, multi socket RMI, servlet programming. Online applications: Monitoring user events, database connectivity, and plug-ins.

Course Code: CSE- 4212
Course Title: Web Technologies Lab
Credit Hour: 1
Laboratory Experiment Based on CSE- 4211

ELECTIVE COURSES
POWER GROUP

Course Code: EEE - 4011
Course Title: Power System II
Credit Hour: 3

Power network representations, per unit system of calculations, reactance of asynchronous generators and its equivalent circuit, voltage characteristics of loads, power and reactive power flow in simple systems, load flow studies of large systems using the Gauss-Seidal methods, control of voltage, power and reactive power, use of network analyzers and digital computers, symmetrical fault calculation, limitations of short circuit current using regulators. Symmetrical components- positive, negative and zero sequence networks of generators, transformers and lines, sequence network of systems, unsymmetrical fault calculations. Power system stability involving two machine systems, swing equation. Equal area criterion of stability and its applications, solution of swing equation, factors affecting transient stability

Course Code: EEE- 4113
Course Title: Energy Conversion III
Credit Hour: 3
Synchronous Motor: Working principle, method of starting, power flow within a synchronous motor, equivalent circuit, power developed by synchronous motor, different excitations, different types of torques, power developed by a salient pole synchronous motor, effects of excitation on armature current and power factor, power stages, construction of V curves, comparison between synchronous motor and induction motor, applications of synchronous motor. Special Machines: Different types of single-phase induction motor, universal motor, and speed control of universal motor, stepper motor, permanent-magnet dc motor, permanent-magnet synchronous motor (PMSM), servomotors.

Course Code: EEE- 4115
Course Title: Power Electronics
Credit Hour: 3
Introduction to power electronic device power transistor tyristor SCR, TRIAC, DIAC, UJT, GTO, IGBT,AC-DC Converters, regulated power supply, chopper, single phase and three phase inverters, switch mode power supply, cyclo-converter, motor control and adjustable speed driver. Electronic timer, magnetic amplifier, di-electric and induction heating.

Course Code: EEE- 4116

Course Title: Power Electronics Lab

Credit Hour: 1

Laboratory Experiments Based on EEE- 4115

Exp. 01: Study on SCR characteristics

Exp. 02: Study on rotation control of DC motor using SCR

Exp. 03: Study on UJT characteristics

Exp. 04: Study on UJT relaxation oscillator

Exp. 05: Study on DIAC and TRIAC characteristics

Exp. 06: Study on SCR inverter

Exp. 07: Study on SCR rectifier circuits

Exp. 08: Study on MOSFET characteristics and speed control

Exp. 09: Study on IGBT characteristics and speed control

Course Code: EEE- 4117

Course Title: Power Plant Engineering

Credit Hour: 3

Planning of power plant: generating capacity and selection of power plants, types of load and their effects. Plant location: site selection for different plants, plant performance. Station performance: efficiency, heat rate and incremental rate, load division between generating units for economy. Generation scheduling, conventional power plant: hydro and thermal power plant, generating cost, nuclear power plant, non conventional power plant, power plant economy.

Course Code: EEE- 4119

Course Title: Renewable Energy Conversion

Credit Hour: 2

Different kinds of renewable energy, solar energy, wind energy Principle of solar cell, PV performance, cost effectiveness, solar radiation, Air mass. Solar cell performance, efficiency limits, Losses and measurements, Modules and Arrays, mismatch of PV cell, Protection of PV cell shading effect, MPPT-PV, Wind power, Wind Turbine & its component.

Course Code: EEE- 4229

Course Title: Switchgear and Protection

Credit Hour: 3

Circuit Breakers: Types, Ratings, Constructions and Selections, arc extinction Maintenance, testing and recovery voltage. Fuse: Commercially available fuses, their constructions, characteristics and

applications. Relays: Types, construction, principle and operating characteristics of over current ,IDMT, reactance, directional, power and impedance relays, balanced current relaying of parallel line, ground fault relaying, pilot relaying principles, protection relay schemes for generators, transformers, line feeders, busses, motor, generator and power systems, reactors, lighting arresters, surge absorbers, ground wire, generator grounding, co-ordination of over current relay. Bus bar protection.

Course Code: EEE- 4230

Course Title: Switchgear and Protection Lab

Credit Hour: 3

Exp. 01: Over Current Protection of a Three Phase Power Transformer

Exp. 02: Over Voltage Protection of a synchronous Generator

Exp. 03: Over Current Protection of a synchronous Generator

Exp. 04: Under Voltage Protection of a Synchronous Generator

Exp. 05: Over Current Protection of a Three Phase Induction Motor

Course Code: EEE- 4231

Course Title: High Voltage Engineering

Credit Hour: 2

High voltage supply: AC: cascaded transformers, tesla coils, DC: Valve rectifier circuits, cascaded rectifiers, Electrostatic generators, Graff generators. Impulse generators: Impulse voltage wave shapes, mathematical analysis and design consideration of impulse generators, triggering of impulse generators, measurement of high voltages: Sphere gap and uniform gap methods. Corona: power loss calculation; break down of solid, liquid and gaseous dielectrics. Insulation testing, standard specifications; High voltage DC. Transmission, merits and demerits over AC transmission; Bridge arrangement. Mathematical analysis of the bridge circuit, Regulation, reactive power, artificial communication. Protection against lighting and insulation co-ordination: lighting phenomena, direct and indirect lighting, transmission line design based on Direct strokes, ground wire; protective devices: lightning arrestors and protector tubes; insulation co-ordination and transformer insulation protection; selection of lighting arrester, BIL.

Course Code: EEE- 4232

Course Title: High Voltage Engineering Lab

Credit Hour: 1

Laboratory Experiments based on EEE-4232

Course Code: EEE- 4341
Course Title: Advanced Machine
Credit Hour: 3

Electrical machine design, Design factors, Design Principles, Transformer design, Design of small single phase transformers, Design of rotating Machines, General concepts and constraints, Design of three phase induction motors, design of single phase induction motors, generalized machines, A.C. commutator machines, classifications of A.C. commutator motors, Single Phase series motors, universal motors, repulsion motors, brush-shifting series motors, brush-shifting polyphase shunt motor, industrial motor controls, brush-less synchronous machines, self synchronous apparatus, self synchronous power drives and special D.C. generators, Rotating regulators, amplidyne, metadyne, synchronous converters, static power converters.

ELECTIVE COURSES
ELECTRONICS GROUP

Course Code: EEE- 4121
Course Title: Solid State Devices
Credit Hour: 2

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

voltage, threshold voltage and control of threshold voltage, static C-V characteristics, qualitative theory of MOSFET operation, body effect and current-voltage relationship of a MOSFET. Junction Field-effect-transistor: Introduction, qualitative theory of operation, pinch-off voltage and current-voltage relationship

Course Code: EEE- 4131

Course Title: Analog Integrated Circuit

Credit Hour: 3

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

Course Code: EEE- 4125

Course Title: Processing and Fabrication Technology

Credit Hour: 3

Substrate materials: Crystal growth and wafer preparation, epitaxial growth technique, molecular beam epitaxy, chemical vapor phase epitaxy and chemical vapor deposition (CVD). Doping techniques: Diffusion and ion implantation. Growth and deposition of dielectric layers: Thermal oxidation, CVD, plasma CVD, sputtering and silicon-nitride growth. Etching: Wet chemical etching, silicon and GaAs etching, anisotropic etching, selective etching, dry physical etching, ion beam etching, sputtering etching and reactive ion etching. Cleaning: Surface cleaning, organic cleaning and RCA cleaning. Lithography: Photo-reactive materials, pattern generation, pattern transfer and metalization. Discrete device fabrication: Diode, transistor, resistor and capacitor.

Course Code: EEE- 4127

Course Title: VLSI I

Credit Hour: 2

VLSI technology: Top down design approach, technology trends and design styles. Review of MOS transistor theory: Threshold voltage, body effect, I-V equations and characteristics, latch-up problems, NMOS inverter, CMOS inverter, pass-transistor and transmission gates. CMOS circuit characteristics and

performance estimation: Resistance, capacitance, rise and fall times, delay, gate transistor sizing and power consumption. CMOS circuit and logic design: Layout design rules and physical design of simple logic gates. CMOS subsystem design: Adders, multiplier and memory system, and arithmetic logic unit. Programmable logic arrays. I/O systems. VLSI testing. VLSI MOS system design: Layout extraction and verification, full and semi-full custom design styles and logical and physical positioning.

Course Code: EEE- 4128

Course Title: VLSI I Lab

Credit Hour: 1

Exp. 1: Introduction to circuit simulation using SPICE

Exp. 2: SPICE simulation of logic gates.

Exp.3: Layout design of a CMOS Inverter using MicroWind (µW)

Exp. 4: Circuit design by using Verilog Code

Exp. 5: Design a 4 bit/8 bit Adder/Subtractor by using DSCH software

Course Code: EEE- 4237

Course Title: Optoelectronics

Credit Hour: 3

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

Course Code: EEE- 4343

Course Title: Biomedical Instrumentation

Credit Hour: 2

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

Course Code: EEE- 4344

Course Title: Biomedical Instrumentation Lab

Credit Hour: 1

Laboratory Experiment Based on EEE -4343

Course Code: EEE- 4345

Course Title: Measurement and Instrumentation

Credit Hour: 2

Measurement: Units and standards, Measurement of resistance, inductance and capacitance, A.C. and D. C. bridge methods, current, power and energy, measurement of frequency and phase difference. Earth resistance measurement and measurement of cable fault location. Instrumentation: indicating instruments and their classifications, moving coil and moving iron instruments. 'Clip on' instruments, Dynamometer and thermal instruments; Vibrating greed instruments, recording instruments, Megger with applications. Magnetic measurements, ballistic galvanometer, flux meter. Cathode ray oscilloscope, Q - meters. Extension of instrument -range. Transistor testers, digital voltmeter and multimeters. A/D and D/A converters.

Course Code: EEE- 4346

Course Title: Measurement and Instrumentation Lab

Credit Hour: 1

Exp. 01: Study on Ammeter-Voltmeter method

Exp.02: Study on substitution method

Exp. 03: Study on Wheatstone bridge method

Exp. 04: Study on Kelvin's Double Bridge method

Exp. 05: Study on fall of potential method for earth resistance measurement

Exp. 06: Study on Murray loop test

Exp. 07: Study on Varley loop test

Course Code: ECE- 4347

Course Title: Radio and Television Engineering

Credit Hour: 2

Television: Monochrome Television: Basic Television systems-vision characteristics and scanning systems. Composite video signals and television standards. Television cameras and picture tubes. Wide band tuner, broadcast television receivers, RF tuners, video. IF amplifiers and detectors. Video amplifier design and synchronization circuits. Horizontal scan, wave form generation and extra high tension D.C., vertical scan, waveform generation and output circuit, sound channel and power supply. Closed circuit television systems: TV wave propagation, TV antenna system, testing, alignment and servicing of TV receivers. Radio: Introduction to radio communication, the history of radio transmission and evolution throughout the years, radio frequency management. Radio receiver, Am and FM super heterodyne receivers, AM and FM demodulators and detectors, communication receivers, radio transmitter and transceivers, block diagram of AM and FM transmitter system and their functional analysis. Direct and indirect methods of modulation. Radio wave propagation and modeling, free space propagation model, plane earth model, radio wave diffractions and reflections, radio wave propagation through troposphere and ionosphere. Link budget calculation for broadcasting systems. High frequency amplifiers: Scattering parameters and array expressions. Radio antenna: Dipole, folded dipole, yagi arrays, log periodic antenna calculations, transmission loss, radiation pattern, gain, directivity of antennas, antenna matching.

Course Code: ECE- 4348

Course Title: Radio and Television Engineering Lab

Credit Hour: 1

Laboratory Experiments Based on EEE- 4345

Course Code: ECE- 4349

Course Title: Robotics and Computer Vision

Credit Hour: 3

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

Course Code: ECE- 4380
Course Title: Robotics and Computer Vision Lab
Credit Hour: 1
Laboratory Experiments Based on EEE- 4349