GITAM UNIVERSITY

(Declared as Deemed to be University U/S 3 of UGC Act, 1956)

REGULATIONS & SYLLABUS

OF

B.Tech. (Electronics & Instrumentation Engineering)

(w.e.f 2008 -09 admitted batch)

Gandhi Nagar Campus, Rushikonda

VISAKHAPATNAM – 530 045

Website: www.gitam.edu

REGULATIONS
(w.e.f. 2008-09 admitted batch)

1.0 ADMISSIONS

1.1 Admissions into B.Tech (Electronics & Instrumentation Engineering) programme of GITAM University are governed by GITAM University admission regulations.

2.0 ELIGIBILTY CRITERIA

2.1 A pass in 10+2 or equivalent examination approved by GITAM University with Physics, Chemistry and Mathematics.

2.2 Admissions into B.Tech will be based on an All India Entrance Test (GAT) conducted by GITAM University and the rule of reservation, wherever applicable.

3.0 STRUCTURE OF THE B.Tech. PROGRAMME

3.1 The Programme of instruction consists of:

(i) A general core programme comprising Basic Sciences, Basic Engineering, Humanities & Social Sciences and Mathematics.
(ii) An engineering core programme imparting to the student the fundamentals of engineering in the branch concerned.
(iii) An elective programme enabling the students to take up a group of departmental/interdepartmental courses of interest to him/her.

In addition, a student has to

(i) carry out a technical project approved by the department and submit a report
(ii) undergo summer training in an industry for a period prescribed by the department and submit a report

3.2 Each academic year consists of two semesters. Every branch of the B.Tech programme has a curriculum and course content (syllabi) for the courses recommended by the Board of Studies concerned and approved by Academic Council.

4.0 CREDIT BASED SYSTEM

4.1 Each course is assigned certain number of credits which will depend upon the number of contact hours (lectures & tutorials) per week.

4.2 In general, credits are assigned to the courses based on the following contact hours per week per semester.

One credit for each Lecture / Tutorial hour.
One credit for two hours of Practicals.
Two credits for three (or more) hours of Practicals.

4.3 The curriculum of B.Tech programme is designed to have a total of 190 to 200 credits for the award of B.Tech degree.

4.4 Every course of the B Tech programme will be placed in one of the nine groups of courses with minimum credits as listed in the Table 1.

Table 1: Group of Courses

S.No,	Group of Courses	Code	Minimum credits
1	Humanities & Social Sciences	HS	12
2	Basic Sciences	BS	17
3	Mathematics	MT	10
4	Basic Engineering	BE	26
5	Core Engineering	CE	68
6	Departmental Elective	DE	9
7	Inter Departmental Elective	IE	8
8	Project Work	PW	8
9	Industrial Training	IT	2
Total			160

5.0 MEDIUM OF INSTRUCTION

The medium of instruction (including examinations and project reports) shall be English.

6.0 REGISTRATION

Every student has to register himself/herself for each semester individually at the time specified by the Institute / University.

7.0 CONTINUOUS ASSESSMENT AND EXAMINATIONS

7.1 The assessment of the student's performance in each course will be based on continuous internal evaluation and semester-end examination. The marks for each of the component of assessment are fixed as shown in the Table 2.

Table 2: Assessment Procedure

S.No	Component of assessment	Marks allotted	Type of Assessment	Scheme of Examination
1	Theory	40	Continuous evaluation	(i)Two mid semester examinations shall be conducted for 10 marks each. (ii) Two quizzes shall be conducted for 5 marks each. (iii) 5marks are allotted for assignments (iv) 5 marks are allotted for attendance
	Total	60	Semester-end examination	The semester-end examination in theory courses will be for a maximum of 60 marks.
		100		

2	Practicals	100	Continuous evaluation	(i) 40 marks are allotted for record work and regular performance of the student in the lab. (ii)One examination for a maximum of 20 marks shall be conducted by the teacher handling the lab course at the middle of the semester (iii)One examination for a maximum of 40 marks shall be conducted at the end of the semester (as scheduled by the Head of the Department concerned).
3	Project work (VII & VIII semester)	100	Project evaluation	(i) 50 marks are allotted for continuous evaluation of the project work throughout the semester by the guide. (ii) 50 marks are allotted for the presentation of the project work & viva-voce at the end of the semester.*
4	Industrial Training (VII semester)	100	Industrial training evaluation	(i) 50 marks are allotted for report submission and seminar presentations after completion of the training. (ii) 50 marks are allotted for the viva-voce at the end of the semester.*
5	Comprehensive Viva (VIII semester)	100	Viva-voce	100 marks are allotted for comprehensive viva to be conducted at the end of programme.*

*** Head of the Department concerned shall appoint two examiners for conduct of the examination.**

8.0 RETOTALLING, REVALUATION & REAPPEARANCE

8.1 Retotalling of the theory answer script of the end-semester examination is permitted on a request made by the student by paying the prescribed fee within ten days of the announcement of the result.

8.2 Revaluation of the theory answer script of the end-semester examination is also permitted on a request made by the student by paying the prescribed fee within fifteen days of the announcement of the result.

8.3 A Student who has secured 'F' Grade in any theory course / Practicals of any semester shall have to reappear for the semester end examination of that course / Practicals along with his / her juniors.

8.4 A student who has secured 'F' Grade in Project work / Industrial Training shall have to improve his report and reappear for viva – voce Examination of project work at the time of special examination to be conducted in the summer vacation after the last academic year.

9.0 SPECIAL EXAMINATION

9.1 **A student who has completed the stipulated period of study for the degree programme concerned and still having failure grade ('F') in not more than 5 courses (Theory / Practicals), may be permitted to appear for the special examination, which shall be conducted in the summer vacation at the end of the last academic year.**

9.2 **A student having 'F' Grade in more than 5 courses (Theory/practicals) shall not be permitted to appear for the special examination.**

10.0 ATTENDANCE REQUIREMENTS

10.1 **A student whose attendance is less than 75% in all the courses put together in any semester will not be permitted to attend the end - semester examination and he/she will not be allowed to register for subsequent semester of study. He /She has to repeat the semester along with his / her juniors.**

10.2 **However, the Vice Chancellor on the recommendation of the Principal / Director of the University College / Institute may condone the shortage of attendance to the students whose attendance is between 66% and 74% on genuine medical grounds and on payment of prescribed fee.**

11.0 GRADING SYSTEM

11.1 **Based on the student performance during a given semester, a final letter grade will be awarded at the end of the semester in each course. The letter grades and the corresponding grade points are as given in Table 3.**

Table 3: Grades & Grade Points

Grade	Grade points	Absolute Marks
O	10	90 and above
A+	9	80 – 89
A	8	70 – 79
B+	7	60 – 69
B	6	50 – 59
C	5	40 – 49
F	Failed, 0	Less than 40

11.2 **A student who earns a minimum of 5 grade points (C grade) in a course is declared to have successfully completed the course, and is deemed to have earned the credits assigned to that course. However, a minimum of 24 marks is to be secured at the semester end examination of theory courses in order to pass in the theory course.**

12.0 GRADE POINT AVERAGE

12.1 **A Grade Point Average (GPA) for the semester will be calculated according to the formula:**

$$GPA = \frac{\Sigma [C \times G]}{\Sigma C}$$

Where

C = number of credits for the course,
G = grade points obtained by the student in the course.

12.2 Semester Grade Point Average (SGPA) is awarded to those candidates who pass in all the courses of the semester.

12.3 To arrive at Cumulative Grade Point Average (CGPA), a similar formula is used considering the student's performance in all the courses taken in all the semesters completed up to the particular point of time.

12.4 The requirement of CGPA for a student to be declared to have passed on successful completion of the B.Tech programme and for the declaration of the class is as shown in Table 4.

Table 4: CGPA required for award of Degree

Distinction	**≥ 8.0***
First Class	**≥ 7.0**
Second Class	**≥ 6.0**
Pass	**≥ 5.0**

*** In addition to the required CGPA of 8.0, the student must have necessarily passed all the courses of every semester in first attempt.**

13.0 ELIGIBILITY FOR AWARD OF THE B.TECH DEGREE

13.1 Duration of the programme:
A student is ordinarily expected to complete the B Tech. programme in eight semesters of four years. However a student may complete the programme in not more than six years including study period.

13.2 However the above regulation may be relaxed by the Vice Chancellor in individual cases for cogent and sufficient reasons.

13.3 A student shall be eligible for award of the B.Tech degree if he / she fulfils all the following conditions.

a) Registered and successfully completed all the courses and projects.
b) Successfully acquired the minimum required credits as specified in the curriculum corresponding to the branch of his/her study within the stipulated time.
c) Has no dues to the Institute, hostels, Libraries, NCC / NSS etc, and
d) No disciplinary action is pending against him / her.

13.4 The degree shall be awarded after approval by the Academic Council.

RULES

1. **With regard to the conduct of the end-semester examination in any of the practical courses of the programme, the Head of the Department concerned shall appoint one examiner from the department not connected with the conduct of regular laboratory work, in addition to the teacher who handled the laboratory work during the semester.**

2. **In respect of all theory examinations, the paper setting shall be done by an external paper setter having a minimum of three years of teaching experience. The panel of paper setters for each course is to be prepared by the Board of Studies of the department concerned and approved by the Academic Council. The paper setters are to be appointed by the Vice Chancellor on the basis of recommendation of Director of Evaluation / Controller of Examinations.**

3. **The theory papers of end-semester examination will be evaluated by internal/external examiner**

4. **Panel of examiners of evaluation for each course is to be prepared by the Board of Studies of the department concerned and approved by the Academic Council.**

5. **The examiner for evaluation should possess post graduate qualification and a minimum of three years teaching experience.**

6. **The appointment of examiners for evaluation of theory papers will be done by the Vice Chancellor on the basis of recommendation of Director of Evaluation / Controller of Examinations from a panel of examiners approved by the Academic Council.**

7. **The attendance marks (maximum 5) shall be allotted as follows :**

Percentage of Attendance	Marks
76% to 80%	1
81% to 85%	2
86% to 90%	3
91% to 95%	4
96% to 100%	5

SYLLABUS

Programme Code: EPREI 200800

B.Tech. (EIE) I Semester

Course code	Name of the Course	Category	*Credits*	Marks			Hours per week			
				Semester End Exam	Con. Eval.	Total	L	T	P	Total
EUREG 101	English Language skills	Humanities	3	60	40	100	3	0	-	3
EURMT 102	Engg. Mathematics - I	Maths	4	60	40	100	3	1	-	4
EURPH 103	Engg. Physics - I	Basic Sc	4	60	40	100	3	1	-	4
EURCH 104	Engg. Chemistry – I	Basic Sc	4	60	40	100	3	1	-	4
EURCS 105	Programming with C	BasicEngg	3	60	40	100	3	0	-	3
EURPH 112/212	Engg. Physics Lab	Basic Engg	3	-	100	100	-	-	4	4
EURCS 113	Programming with C Lab	Basic Sc	2	-	100	100	-	-	4	4
EURME115/215	Engineering Graphics Lab	Basic Engg	2	-	100	100	-	-	3	3
Total			25	300	500	800	15	3	11	29

B.Tech. (EIE) II Semester

Course code	Name of the Course	Category	*Credits*	Marks			Hours per week			
				Semester End Exam	Con. Eval.	Total	L	T	P	Total
EUREG 201	English writing skills	Humanities	3	60	40	100	3	0	-	3
EURMT 202	Engg. Mathematics - II	Maths	3	60	40	100	3	0	-	3
EURMT 203	Engg. Mathematics - III	Maths	3	60	40	100	3	0	-	3
EURPH 204	Engg. Physics - II	Basic Sc	3	60	40	100	3	0	-	3
EURCH 205	Engg. Chemistry – II	Basic Sc	3	60	40	100	3	0	-	3
EURCS 206	Object Oriented prog-ramming with C+ +	Basic Engg	3	60	40	100	3	0	-	3
EURCS 213	Objected oriented prog-ramming with C++ Lab	Basic Sc	2	-	100	100	-	-	4	4
EURCH214/114	Engg. Chemistry Lab	Basic Engg	2	-	100	100	-	-	3	3
EUREE218/118	Electrical & Electronic Workshop Lab	Basic Engg	2	-	100	100	-	-	3	3
Total			24	360	540	900	18	0	10	28

B.Tech. (EIE) III Semester

Course Code	Name of the Course	Cate-gory	*Credits*	Marks			Hours per week			
				Semester End Exam	Con. Eval.	Total	L	T	P	Total
EUREI301	Advanced Engg Mathematics	MT	3	60	40	100	3	0	-	3
EUREI302	Thermal Engg. and Fluid Mechanics	CE	3	60	40	100	3	0	-	3
EUREI303	Network Theory	BE	4	60	40	100	3	1	-	4
EUREI304	Electronic Devices and Circuits	BE	4	60	40	100	3	1	-	4
EUREI305	Electrical Machines	BE	3	60	40	100	3	0	-	3
EUREI306	Sensors and Transducers	CE	3	60	40	100	3	0	-	3
EUREI311	Networks and Electrical machines Lab	BE	2	-	100	100	-	-	3	3
EUREI312	Electronic Devices and Circuits lab	BE	2	-	100	100	-	-	3	3
Total			24	360	440	800	18	2	6	26

B.Tech. (EIE) IV Semester

Course Code	Name of the Course	Cate-gory	*Credits*	Marks			Hours per week			
				Semester End Exam	Con. Eval.	Total	L	T	P	Total
EUREI401	Digital Electronics	CE	3	60	40	100	3	0	-	3
EUREI402	Electronic Circuits and Analysis	CE	4	60	40	100	3	1	-	4
EUREI403	Electrical and Electronic Measurements	CE	4	60	40	100	3	1	-	4
EUREI404	Signals & Systems	CE	3	60	40	100	3	0	-	3
EUREI405	Environmental Studies	HS	4	60	40	100	3	1	-	4
EUREI406	Data Structures Using C	CE	3	60	40	100	3	0	-	3
EUREI411	Sensors and Transducers lab	CE	2	-	100	100	-	-	3	3
EUREI412	Electronic Circuit Analysis lab	CE	2	-	100	100	-	-	3	3
EUREI413	English Communication Skills Lab	HS	2	-	100	100			3	3
EUREI414	Industrial Tour	IT	Non-Credit Audit Course							
Total			27	360	540	900	18	3	9	30

B.Tech. (EIE) V Semester

Course code	Name of the Course	Cate-gory	*Credits*	Marks			Hours per week			
				Semester End Exam	Con. Eval.	Total	L	T	P	Total
EUREI501	Microprocessors & Interfacing	CE	4	60	40	100	3	1	-	4
EUREI502	Linear IC's & Applications	CE	3	60	40	100	3	0	-	3
EUREI503	Industrial Instrumentation	CE	3	60	40	100	3	0	-	3
EUREI504	Control Systems	CE	4	60	40	100	3	1	-	4
EUREI505	Principles of Communication Engg.	CE	3	60	40	100	3	0	-	3
EUREI506	Digital Signal Processing	CE	3	60	40	100	3	0	-	3
EUREI511	Digital ICs Lab	CE	2	-	100	100	-	-	3	3
EUREI512	Linear ICs Lab	CE	2	-	100	100			3	3
EUREI513	Measurements Lab	CE	2	-	100	100	-	-	3	3
EUREI514	Personality Development	HS	Non Credit Audit Course						3	3
Total			26	360	540	900	18	2	12	32

B.Tech. (EIE) VI Semester

Course code	Name of the Course	Cate-gory	*Credits*	Marks			Hours per week			
				Semester End Exam	Con. Eval.	Total	L	T	P	Total
EUREI601	Industrial Electronics	CE	3	60	40	100	3	0	-	3
EUREI602	Analytical Instrumentation	CE	4	60	40	100	3	1	-	4
EUREI603	Computer Architecture & Organization	CE	3	60	40	100	3	0	-	3
EUREI604	Digital System Design Using VHDL	CE	3	60	40	100	3	0	-	3
EUREI605	Engg Economics & Management	HS	3	60	40	100	3	0	-	3
EUREI606	Process Control	CE	4	60	40	100	3	1	-	4
EUREI611	Process Control Lab	CE	2	_	100	100	-	-	3	3
EUREI612	Microprocessor Lab	CE	2	_	100	100	-	-	3	3
Total			24	360	440	800	18	2	6	26

B.Tech. (EIE) VII Semester

Course code	Name of the Course	Cate-gory	*Credits*	Marks			Hours per week			
				Semester End Exam	Con. Eval.	Total	L	T	P	Total
EUREI701	Bio Medical Instrumentation	CE	3	60	40	100	3	0	-	3
EUREI702	Microcontrollers and Applications	CE	3	60	40	100	3	0	-	3
EUREI703	Computer Control of Processes	CE	3	60	40	100	3	0	-	3
EUREI 721-723	Departmental Elective I	DE	4	60	40	100	3	1	-	4
EUREI 731-733	Departmental Elective II	DE	4	60	40	100	3	1	-	4
EUREI711	Bio Medical Instrumentation Lab	CE	2	-	100	100	-	-	3	3
EUREI712	Microcontrollers Lab	CE	2	-	100	100	-	-	3	3
EUREI713	Project I	PW	3	50	50	100	-	-	6	6
EUREI714	Industrial Training	IT	2	-	100	100	-	-	-	-
Total			26	350	550	900	15	2	12	29

B.Tech. (EIE) VIII Semester

Course code	Name of the Course	Cate-gory	*Credits*	Marks			Hours per week			
				Semester End Exam	Con. Evl.	Total	L	T	P	Total
EUREI801	Embedded Systems	CE	3	60	40	100	3	-	-	3
EUREI 841 - 843	Departmental Elective III	DE	4	60	40	100	3	1	-	4
EUREI 851-8516**	Inter Departmental Elective I	IE	4	60	40	100	3	1	-	4
EUREI 861-8619**	Inter Departmental Elective II	IE	4	60	40	100	3	1	-	4
EUREI811	Virtual Instrumentation Lab	CE	2	-	100	100	-	-	3	3
EUREI812	Project II	PW	5	50	50	100	-	-	9	9
EUREI813	Comprehensive Viva	CE	2	100	-	100	-	-	-	-
Total			24	390	310	700	12	3	12	27

***** Inter Departmental Elective will be from other departments. The list of courses that would be offered by the department in any semester will be notified from which student may select a course.***

B.Tech. (EIE)

DEPARTMENTAL ELECTIVE-I

Course Code	Name of the Course	Category	Credits
EUREI721	Optimal Control	DE	4
EUREI722	Robotics and Automation	DE	4
EUREI723	Data Communication & Networks	DE	4

DEPARTMENTAL ELECTIVE-II

Course Code	Name of the Course	Category	Credits
EUREI731	Virtual Instrumentation	DE	4
EUREI732	Neural Networks & Fuzzy Logic	DE	4
EUREI733	Digital Image Processing	DE	4

DEPARTMENTAL ELECTIVE-III

Course Code	Name of the Course	Category	Credits
EUREI841	Fiber Optics & Laser Instrumentation	DE	4
EUREI842	Instrumentation for Petrochemical Industry	DE	4
EUREI843	Digital Control Systems	DE	4

INTER-DEPARTMENTAL ELECTIVE-I

Course Code	Name of the Course
EUREI 851	Remote Sensing& GIS
EUREI 852	Data Base Management Systems
EUREI 853	Software Engineering
EUREI 854	Systems Modeling and Simulation
EUREI 855	Software Project Management
EUREI 856	Artificial Intelligence
EUREI 859	Power Electronics
EUREI 8510	Project Planning and Management
EUREI 8512	Introduction to Micro Electro Mechanical Systems (MEMS)
EUREI 8513	Entrepreneurship
EUREI 8514	Public Administration
EUREI 8516	Equipment for construction Industry

INTER-DEPARTMENTAL ELECTIVE-II

Course Code	Name of the Course
EUREI 861	Environmental Impact Assessment
EUREI 862	Operating Systems
EUREI 863	Web Technologies
EUREI 865	Computer Aided Design
EUREI 867	Mechatronics
EUREI 868	Education Research & Methodologies
EUREI 869	Professional Ethics
EUREI 8611	Thermodynamics
EUREI 8614	Very Large Scale Integrated System Design (VLSI)
EUREI 8615	Fundamentals of Civil Engineering
EUREI 8616	Engineering Materials
EUREI 8617	Computer Networks
EUREI 8619	Managerial & Engineering Economics

B.Tech. (EIE)

Details of category wise minimum credits as per AICTE norms and actual credits allocated are as follows:

S.No.	Category	Code	Credits	Minimum credits
01.	Humanities & Social Sciences	HS	15	12
02.	Basic Sciences	BS	18	17
03.	Maths	MT	13	10
04.	Basic Engg.	BE	30	26
05.	Core Engg.	CE	94	68
06.	Departmental Electives	DE	12	09
07.	Inter-Departmental Elective	IE	08	08
08.	Project Work	PW	08	08
09.	Industrial Training	IT	02	02
Total			200	160

B.Tech.(EIE) I SEMESTER

English Language Skills

Code	Category	Scheme of Instruction		Scheme of Examination			Credits to be awarded
		Hours per week		Sem. End Exam Duration in Hrs.	Maximum Marks (100)		
		L/T	D/P		Sem. End Exam	Con.Eval.	
EUREG 101	HS	3	---	3	60	40	3

The fundamental aim of this course is to help the student to become a confident and competent communicator in written and spoken English. The methodology in teaching and evaluation shall be oriented towards this end, rather than rote memorization.

Prerequisite: Acquaintance with basic High School Grammar and Composition.

I. A TEXT WITH COMMUNICATIVE APPROACH.

The aim of the text is to provide interesting new approach to learning English by providing stimulating and motivating material and a wide range of activities that are meaningful, natural, authentic, and useful in day-to-day life. : "Creative English for Communication" by N. Krishnaswamy & T. Sri Raman – Macmillan India Ltd. –(2005 version)
(Section – I Communicate - units 1-6 only)

Unit-I **Textual Lessons 1 & 2** **(8 Hours)**

Synonyms & Antonyms, One word substitutes,
Words often confused, Phrasal Verbs

Unit-II **Textual Lesson – 3** **(8 Hours)**

Foreign Phrases, Tenses, Concord

Unit-III **Textual Lesson – 4** **(8 Hours)**

Error Analysis, Single Sentence Definition, Paragraph Writing,

Unit-IV **Textual Lesson – 5** **(8 Hours)**

Essay Writing, Dialogue writing, Reading Comprehension

Unit-V **Textual Lesson – 6** **(8 Hours)**

Note Making, Précis Writing

Text Prescribed: Part – I (Communicate - Units 1 to 6 only) of

- ***Creative English for Communication*, N. Krishna Swamy & T. Sriraman. Macmillan India Ltd (2005 version)**

Supplementary Reading :

***Current English for Colleges*, N. Krishna Swamy & T. Sri Raman. Macmillan.**

***Examine Your English*, Margaret Maison. Macmillan.**

Note : Figures in parentheses indicate number of approximate expected hours of instruction

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B.Tech.(EIE) I SEMESTER

ENGINEERING MATHEMATICS – I

Code	Category	Scheme of Instruction		Scheme of Examination			Credits to be Awarded
		Hours per week		Sem. End Exam Duration in Hrs.	Maximum Marks (100)		
		L/T	D/P		Sem. End Exam	Con. Eval.	
EURMT 102	MT	4	---	3	60	40	4

The objective of the course is to impart knowledge in Basic concepts of Mathematics relevant to Engineering applications.

Unit - I.

Linear Differential Equations of Higher order (12 hours)

Definition, Complete solution, Operator D, Rules for finding complementary function, Inverse operator, Rules for finding particular integral, Method of variation of parameters.

Unit-II

Equations reducible to Linear Differential Equations and Applications (08 hours)
Cauchy's and Legendre's linear equations, Simultaneous linear equations with constant coefficients and applications of linear differential equations to Oscillatory Electrical circuits L-C, LCR – Circuits, Electromechanical Analogy.

Unit –III
Multiple Integrals and its Applications : (08 hours)

Double integrals, Change of order of integration, Double integrals in Polar coordinates, Areas enclosed by plane curves, Triple integrals, Volume of solids, Change of variables, Area of a curved surface.

Unit –IV

Special Functions and its Applications: (08 hours)

Beta function, Gamma function, Relation between beta and gamma functions, Dirichlet integrals of type I and type II.

Unit-V

Infinite Series (12 hours)

Definitions of convergence, divergence and oscillation of a series, General properties of series, Series of positive terms, Comparison tests, Integral test, D' Alembert's Ratio test, Raabe's test, Cauchy's root test, Alternating series, Leibnitz's rule, Power series, Convergence of exponential, Logarithmic and binomial series (without proofs).

Text Prescribed :

Higher Engineering Mathematics, **Dr.B.S Grewal. Khanna Publishers.**

References :

Advanced Engineering Mathematics, **Erwin Kreyszig. Wiley Eastern Pvt. Ltd.**

Textbook of Engineering Mathematics, **N.P.Bali. Laxmi Publications (P) Ltd.**

Higher Engineering Mathematics, **Dr.M.K.Venkata Raman. National Pub. Co.**

Note: The figures in parentheses indicate approximate number of expected hours of instruction.

B.Tech.(EIE) I SEMESTER
ENGINEERING PHYSICS – I

Code	Category	Scheme of instruction		Scheme of Examination			Credits to be awarded
		Hours per week		Sem. End Exam	Maximum Marks (100)		
		L/T	D/P	Duration in Hrs.	Sem. End Exam	Con. Eval.	
EURPH 103	BS	4	---	3	60	40	4

The aim of the course is to impart knowledge in Basic Concepts of Physics relevant to Engineering applications.

Unit – I (9 hours)

Thermodynamics: Heat and Work - First Law of Thermodynamics and Applications- Reversible and Irreversible Processes - Carnot's Cycle and Efficiency - Second Law of Thermodynamics - Carnot's Theorem - Entropy - Entropy in Reversible and Irreversible Processes - Entropy and Second Law - Entropy and Disorder - Entropy and Probability - Third Law of Thermodynamics.

Unit – II (9 hours)

Ultrasonics: Introduction - Production of Ultrasonics by Magnetostriction and Piezo-electric Effects – Detection and Applications of Ultrasonics.
Electric Field: Calculation of E – Line of Charge, Ring of Charge, Dipole - Dipole in an Electric Field -Concept of Electric Flux – Gauss's Law , Gauss's Law and Coulomb's Law , Gauss's Law-Applications, Capacitance- Parallel Plate Capacitor- Dielectrics and Gauss Law-RC Circuit.

Unit – III (11 hours)

Electromagnetism: Magnetic Field - Magnetic Force on Current – Torque on a Current Loop – Hall Effect – Ampere's Law. Magnetic Induction for a Solenoid and a Toroid - Force between two Parallel Conductors – Biot & Savart's Law – Magnetic Induction Near a Long Wire - Magnetic Induction for a Circular Loop. Faraday's Law of Induction – Lenz's Law – Inductance – Calculation of Inductance – Inductance for a Solenoid & Toroid - LR Circuit – Induced Magnetic Fields – Displacement Current – Maxwell's Equations.

Unit-IV (8 hours)

Dielectric Properties: Introduction - Fundamental Definitions - Local Field - Claussius-Mossotti Relation, Different Types of Electric Polarizations (electronic - ionic and dipolar polarizations) - Frequency and Temperature Effects on Polarization - Dielectric Loss - Dielectric Breakdown - Determination of Dielectric Constant - Properties and Different Types of Insulating Materials - Ferroelectric Materials, Spontaneous Polarization in $BaTiO_3$, Electrets.

Unit-V (8 hours)

Magnetic Properties: Introduction - Fundamental Definitions - Different Types of Magnetic Materials - Weiss Theory of Ferromagnetism - Domain Theory of Ferromagnetism – Hysteresis - Hard and Soft Magnetic Materials - Ferrites – Microwave Applications - Magnetic Bubbles.

Prescribed Books :

***Physics part I & II*, Robert Resnick and David Halliday. Wiley- Eastern Limited.**
***Solid State Physics*, P.K. Palanisamy. Scitech Publications (India) Pvt. Ltd, Chennai.**

Reference Books:

***Engineering Physics*, R.K.Gaur and S.L.Gupta. Dhanpat Rai & Sons, Delhi.**
***Solid State physics*, S. O. Pillai. New Age International (P) Limited, New Delhi.**
***Materials Science*, Dr. M. Arumugam. Anuradha Agencies, Kumbhakonam.**
***The Feynman Lectures on Physics*. Addison-Wesley.**

Note: The figures in parentheses indicate approximate number of expected hours of instruction.

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B.Tech.(EIE) I SEMESTER
ENGINEERING CHEMISTRY-I

Code	Category	Scheme of Instruction		Scheme of Examination			Credits to be awarded
		Hours per week		Sem. End Exam Duration in Hrs.	Maximum Marks (100)		
		L/T	D/P		Sem. End Exam	Con. Eval.	
EURCH 104	BS	4	---	3	60	40	4

Unit –I

Water Technology - Sources And Purification Of Water: (8 hours)
Sources of Water – Impurities in Water- Hardness of Water – Temporary and Permanent Hardness-Units. Municipal Water treatment- Sedimentation – Coagulation–Filtration- Sterilisation - Desalination of Brackish Water - Reverse Osmosis and Electrodialysis.

Unit – II

Water Technology-Softening Methods And Boiler Troubles: (8 hours)

Industrial Water treatment- Lime - Soda Ash Method - Chemical reactions –Problems - Zeolite and Ion exchange processes. Boiler Troubles –- Scale and Sludge formation - Caustic Embrittlement and Boiler corrosion - Internal conditioning methods – phosphate and carbonate conditionings- Priming and Foaming

Unit – III

Crystal Structure, Metals And Alloys: (9 hours)

Classification of solids – Amorphous and Crystalline solids. Types of Crystal Imperfections – point defects – line defects and surface defects. Liquid crystals – properties and applications.

properties of Aluminium, Iron and Titanium

Selective ferrous alloys: Composition and applications of cast iron, steels, heat resisting steels, stainless steel,

Selective non- ferrous alloys: Brass, bronze, aluminium alloys and titanium alloys.

Unit – IV

Polymers: (9 hours)

Types of Polymerization– Mechanism of addition polymerization-Moulding constituents. Differences between Thermo Plastic and Thermosetting Resins. Preparation and Properties of Polyethylene, PVC, Polystyrene, Polyamides (Nylon-6:6), Polycarbonates and Bakelite – Engineering applications of Plastics. Examples of simple composite materials – metal matrix and polymer matrix.

Unit – V

Engineering Material Science : (11 hours)

Refractories:– Classification - criteria of a good refractory. Preparation and properties of silica, magnesite and silicon carbide refractories - clay bond, silica nitride bond and self bond in silicon carbide.
Glass: – Manufacture of glass – types of glasses: Soft glass, hard glass and pyrex glass.
Ceramics: – Structural clay products, white wares and chemical stone wares.
Cement : Chemical composition of Portland cement. Manufacture, Setting and Hardening of Cement.

Text Books Prescribed :

***Engineering Chemistry*,P.C. Jain and M. Jain. Dhanapat Rai & Sons, Delhi.**

***Engineering Chemistry*, B.K.Sharma. Krishna Prakashan, Meerut.**

***A Textbook of Engineering Chemistry*, Sashi Chawla. Dhanapath Rai & Sons, Delhi.**

Reference Books :

***A Textbook of Engineering Chemistry*, S.S.Dara. S.Chand & Co. New Delhi.**

***Material Science and Engineering*, V.Raghavan. Prentice-Hall India Ltd.**

Note: The figures in parentheses indicate approximate number of hours of Instruction.

B.Tech.(EIE) I SEMESTER
EURCS105: PROGRAMMING with C

Code.	Category	Scheme of Instruction		Scheme of Examination			Credits to be awarded
		Hours per week		Sem. End Exam Duration in Hrs.	Maximum Marks (100)		
		L/T	D/P		Sem. End Exam	Con. Eval.	
EURCS 105	BE	3	---	3	60	40	3

The Aim of the course is to acquaint the student with C and the applications of C.

UNIT – I (8 periods)

Variables, Expressions and Basic Input-Output:
Introduction to C, Historical Development of C, Features of C, Compilers, Linker, Preprocessor, Character Set, Constants, Variables, Data Types and Keywords, Typedef statement, Operators, Operator – Precedence and Associativity, Typecasting.
Basic Input-Output: Introduction, Single Character Input-Output, String Input-Output, Types of Character in format String, Search sets.

UNIT – II (8 periods)

Control Structures: Introduction, the if statement, if-else statement, Multiway decision, Compound statements, Loops-for Loop, While Loop, do-while Loop, Break statement, Switch statement, Continue statement, Goto statement, simple examples algorithms and flowcharts.

UNIT – III (8 periods)

Functions: Introduction, Function main, where are functions useful, Functions accepting more than one parameter, User Defined and Library functions, Concepts Associated with Functions, Function Parameters, Call by Value and Call by Reference, Return Values, Recursion, Comparison of Iteration and Recursion, Variable Length Argument Lists.
Storage classes: Automatic, Register, Static and external storage classes.

UNIT – IV (8 periods)

Arrays And Strings: Introduction to Arrays, Initialization of Array, How arrays are useful, Multi dimensional Arrays.
Strings: What are Strings, Arrays of Strings and Standard Library String Functions.
Pointers: Introduction, Definition and use of pointers, Address operator, Pointer variables, Dereferencing Pointers, Void Pointers, Pointer Arithmetic, Pointers to Pointers, Pointers and Arrays, Passing arrays to Functions, Pointers and Functions.

UNIT – V (8 periods)

Structures, Unions And Files:
Introduction, Declaring and Using Structures, Structure initialization, Structure within a Structure, Operations on Structures, Array of Structures, Array within Structure, Pointers to Structures, Pointers Within Structures, Structures and Functions,
Unions:, Differences between Unions and Structures, Operations on Unions, Scope of a Unions, Bit fields.
Files: Introduction, File Structure, File handling functions, File Types, Unbuffered and Buffered Files, Error Handling.

Text Books:
MASTERING C, by K R Venugopal, S R Prasad published by Tata McGraw Hill.

Reference Books:
Programming with ANSI and Turbo C by Ashok N. Kamthane, published by PEARSON Education

Let us C by Yashwant Kanetkar, published by BPB Publications.

Note: The figures in parentheses indicate approximate number of expected hours of Instruction.

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B.Tech. (EIE) I SEMESTER
ENGINEERING PHYSICS LAB

Code	Category	Scheme of Instruction		Scheme of Examination			Credits to be awarded
		Hours per week		Sem. End Exam Duration in Hrs.	Maximum Marks (100)		
		L/T	D/P		Sem. End Exam	Con. Eval.	
EURPH 112/212	BS	---	3	3	-	100	2

The main aim of the course is to acquaint the students with basic concepts in Engineering Physics using the following illustrative list of experiments.

1. **J – by Callender and Barne's Method.**
2. **Thermal Conductivity of a Bad Conductor – Lee's Method.**
3. **Magnetic Field Along the Axis of a Circular Coil Carrying Current – Stewart and Gee's Galvanometer.**
4. **Hall Effect- Measurement of Hall Coefficient.**
5. **Carey Foster's Bridge – Laws of Resistance and Specific Resistance.**
6. **Calibration of Low Range Voltmeter – Potentiometer Bridge Circuit.**
7. **Thickness of a Paper Strip- Wedge Method.**
8. **Newton's Rings – Radius of Curvature of a Plano Convex Lens.**
9. **Diffraction Grating – Normal Incidence.**
10. **Determination of Refractive Indices (o and e) of a Bi-Refringent Material (Prism).**
11. **Cauchy's Constants – Using a Spectrometer.**
12. **Dispersive Power of a Prism – Using a Spectrometer.**
13. **Determination of Rydberg Constant.**
14. **LASER – Diffraction.**
15. **Determination of Band Gap in a Semiconductor.**
16. **Optical Fibres – Numerical Aperture and Loss of Signal.**

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B.Tech. (EIE)I SEMESTER
PROGRAMMING WITH C LAB

Code	Category	Scheme of Instruction		Scheme of Examination			Credits to be awarded
		Hours per week		Sem. End Exam Duration in Hrs.	Maximum Marks (100)		
		L/T	D/P		Sem. End Exam	Con. Eval.	
EURCS 113	BE	---	3	3	-	100	2

The aim of the Lab is to acquaint the students with C language. The illustrated list of experiments is as follows:

1. **Write a Program to Read X, Y Coordinates of Three Points and then Calculate the Area of the Triangle formed by them and Print the Coordinates of the Three Points and the Area of the Triangle. What will be the Output from your Program if the Three Given Points are in a Straight Line?**
2. **Write a Program to Find the Roots of a Quadratic Equation using if else and Switch Statements.**
3. **Write a Program which Generates One Hundred Random Integers in the Range of 1 To 100, store them in an array and then prints the average. write three versions of the program using Different Loop Constructs (e.g for, while and do. while).**
4. **Write a Program for Multiplication of Square Matrices.**
5. **Write a Program to Find Max & Min Elements with their Positions in a Given Array and then Sort the Above Array.**
6. **Write a Program to Insert an Element into an Array.**
7. **Write a Function for Transposing a Square Matrix in Place. (In Place Means that You are Not Allowed To have Full Temporary Matrix).**
8. **Write a Program to Print Fibonacci Series Using Functions.**
9. **Write a Program to Find the Factorial of a Given Number using Recursion.**
10. **Write a Program to Find "$^{n}c_{r}$" using Non Recursive Function while Finding the Factorial Value Using Recursive Function.**
11. **Write a Program to find whether the Given String is Palindrome or not without using string functions.**
12. **Given an Array of Strings Write a Program to Sort the String in Dictionary Order.**
13. **Develop a program to implement a structure to read and display the Name, Birth date and Salary of ten Employers.**
14. **Develop a program to display the Name, Marks in five subjects and total marks of ten students. (Using array of structures).**
15. **Develop a program to read and write to a file.**
16. **Develop a program to create and count number of characters in a file.**

B.Tech. (EIE) I SEMESTER
ENGINEERING GRAPHICS LAB

Code	Category	Scheme of Instruction		Scheme of Examination			Credits to be awarded
		Hours per week		Sem. End Exam Duration in Hrs.	Maximum Marks (100)		
		L/T	D/P		Sem. End Exam	Con. Eval.	
EURME 115/215	BE	---	3	3	-	100	2

1. **Introduction to AutoCAD, Beginning a new drawing, exploring and interacting with the drawing window, saving and opening a file, Coordinate systems (Cartesian ,polar and relative co-ordinate system) (1 hr practice)**

2. **Introduction to draw commands – line, circle, rectangle, polygon etc. (1 hr practice)**

3. **Introduction to modify commands – extend, trim, chamfer, rotate, etc. (1 hr practice)**

4. **Introduction to dimensioning and object properties. (1 hr practice)**

5. **Engineering Curves – Conics –general method, cycloid, epicycloids, hypocycloid, involutes. (1 hr practice)**

6. **Projection of planes (2 hr practice)**

7. **Sections and sectional views of solids – prism, pyramid, cylinder, cone (2 hr practice)**

8. **Developments of solids- prism, pyramid, cylinder, cone. (2 hr practice)**

9. **Intersection of solids- prism to prism, cylinder to cylinder (1 hr practice)**

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B.Tech. (EIE) II SEMESTER

English Writing Skills

Code	Category	Scheme of Instruction		Scheme of Examination			Credits to be awarded
		Hours per week		Sem. End Exam Duration in Hrs.	Maximum Marks (100)		
		L/T	D/P		Sem. End Exam	Con. Eval.	
EUREG 201	HS	3	---	3	60	40	3

This course is specially designed to teach the elements of effective writing and communicative methods, while imparting the essential skills that help personality development.

A Text with communicative and contemplative approach "Creative English for communication" By N. Krishnaswamy & T. Sri Raman – Macmillan India Ltd-(2005 version) (Section – II contemplate) Units 7-13)

Unit – I **Textual Lessons - 7 & 8**
Preparation of Abstract/Synopsis **(8 hours)**
Technical Paper writing

Unit - II **Textual Lesson – 9**
Notices, Minutes of the meeting **(8 hours)**

Unit -III **Textual Lesson - 10**
Letter Writing---(Letters of enquiry, Permission, Regret, Reconciliation, Complaint, Breaking the ice.) **(8 hours)**

Unit -IV **Textual Lessons - 11 & 12**
Drafting Curriculum Vitae, Resume and Covering Letters. Job Applications **(8 hours)**

Unit - V **Textual Lesson -13**
Memo, E-mail Etiquette, **(8 hours)**

References :

Technical Communication – Principles and Practice, **Meenakshi Raman & Sangeeta Sharma. oxford University press.**

Communication Skills for Engineers & Professionals, **Prasad. S.K.Kataria & Sons.**

Creative English for Communication, **N.Krishna Swamy & T.Sriraman. Macmillan.**

Business Communication and Report Writing, **G.S.R.K. BabuRao. Himalaya Publishing House.**

Effective English Communication For You, **V.Shyamala. Emerald Publishers.**

Communicative Skills for Technical Students, **M.Faratullah. Orient Longman.**

Practical English Grammar, **Thompson & Martinet. Oxford University Press.**

Note : Figures in parentheses indicate number of approximate expected hours of instruction.

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B.Tech. (EIE) II SEMESTER
ENGINEERING MATHEMATICS – II

Code	Category	Scheme of Instruction		Scheme of Examination			Credits to be awarded
		Hours per week		Sem. End Exam Duration in Hrs.	Maximum Marks (100)		
		L/T	D/P		Sem. End Exam	Con. Eval.	
EURMT202	MT	3+1	---	3	60	40	3

The objective of the course is to impart knowledge in Basic concepts of Mathematics relevant to Engineering applications.

Unit – I

Partial Differentiation: (10 hours)

Introduction to Partial differentiation, Total derivative, Differentiation of implicit functions, Geometrical interpretation, Tangent plane and normal to a surface, Change of variables, Jacobians, Taylor's theorem for functions of two variables.

Unit –II

Applications Of Partial Differentiation : (08 hours)

Total differential, Maxima and minima of functions of two variables, Lagrange's method of undetermined multipliers, Differentiation under the integral sign, Leibnitz's Rule.

Unit-III

Partial Differential Equations : (10 hours)

Introduction, Formation of partial differential equations, Solutions of a partial differential equation, Equations solvable by direct integration, Linear equations of the first order, Non-linear equations of the first order, Homogeneous linear equations with constant coefficients, Rules for finding the complementary function, Rules for finding the particular integral.

Unit-IV

Linear Algebra-1: (08 hours)

Rank of Matrix, Elementary transformations, Elementary matrices, Inverse, Normal form, Consistency of linear system of equations, Linear transformations.

Unit-V

Linear Algebra – 2: (10 hours)

Eigen value and eigen vectors of a matrix, Cayley-Hamilton theorem, Reduction to diagonal form, Quadratic forms and canonical forms, Hermitian and Skew Hermitian matrix, Unitary matrix.

Text Books Prescribed :

Higher Engineering Mathematics, Dr.B.S Grewal. Khanna Publishers.

References :
Advanced Engineering Mathematics, Erwin Kreyszig. Wiley Eastern Pvt. Ltd.
Textbook of Engineering Mathematics, N.P. Bali. Laxmi Publications (P) Ltd.
Higher Engineering Mathematics, Dr.M.K.Venkata Raman. National Pub. Co.

Note: The figures in parentheses indicate approximate number of expected hours of Instruction.

B.Tech. (EIE) II SEMESTER
ENGINEERING MATHEMATICS – III

Code	Category	Scheme of Instruction		Scheme of Examination			Credits to be awarded
		Hours per week		Sem. End Exam	Maximum Marks (100)		
		L/T	D/P	Duration in Hrs.	Sem. End Exam	Con. Eval.	
EURMT203	MT	3+1	---	3	60	40	3

The objective of the course is to impart knowledge in Basic concepts of Mathematics relevant to Engineering applications.

Unit-I

Fourier Series: (12 hours)

Euler's formulae, Conditions for a Fourier expansion, Functions having points of discontinuity, Change of interval, Odd and even functions, Expansions of odd or even periodic functions, Half range series and practical Harmonic Analysis.

Unit-II

Laplace Transforms: (8 hours)

Transforms of elementary functions, Properties of Laplace transforms, Existence conditions, Inverse transforms, Transforms of derivatives, Transforms of integrals, Multiplication by t^n, Division by t, Convolution theorem.

Unit-III

Applications Of Laplace Transforms: (8 hours)

Applications to ordinary differential equations and simultaneous linear equations with constant coefficients, Unit step function, Unit impulse function, Periodic functions (without proofs).

Unit-IV

Vector Calculus (Differentiation) : (8 hours)

Scalar and vector fields, Gradient, Divergence, Curl, Directional derivative, Identities, Irrotational and Solenoidal fields.

Unit-V

Vector Calculus (Integration) : (12 hours)

Line integral, Surface integral, Volume integral, Green's theorem in the plane, Stoke's and Gauss divergence theorems with proofs, Introduction of orthogonal curvilinear co-ordinates, Cylindrical co-ordinates, Spherical polar co-ordinates (without proof)

Text Prescribed :

Higher Engineering Mathematics, **Dr.B.S Grewal. Khanna Publishers.**

References :

Advanced Engineering Mathematics, **Erwin Kreyszig. Wiley Eastern Pvt. Ltd.**
Textbook of Engineering Mathematics, **N.P.Bali. Laxmi Publications (P) Ltd.**
Higher Engineering Mathematics, **Dr.M.K.Venkata Raman. National Pub. Co.**

Note: The figures in parentheses indicate approximate number of expected hours of Instruction.

B.Tech. (EIE) II SEMESTER
ENGINEERING PHYSICS – II

Code	Category	Scheme of instruction		Scheme of Examination			Credits to be awarded
		Hours per week		Sem. End Exam Duration in Hrs.	Maximum Marks (100)		
		L/T	D/P		Sem. End Exam	Con. Eval.	
EURPH 204	BS	3+1	---	3	60	40	3

The aim of the course is to impart knowledge in basic concepts of physics relevant to engineering applications.

Unit – I (9 hours)

Interference: Introduction – Interference in Thin Films – Wedge Shaped Film – Newton's Rings – Michelson's Interferometer and Applications.

DIFFRACTION: Introduction - Differences between Fresnel and Fraunhofer Diffractions - Single Slit Diffraction (Qualitative and Quantitative Treatment)– Differences between Interference and Diffraction. Gratings and Spectra-Multiple Slits; Diffraction Grating; X-ray Diffraction; Bragg's Law.

Unit – II (9 hours)

Polarisation: Introduction – Double Refraction –Negative Crystals and Positive Crystals - Nicol's Prism – Quarter Wave Plate and Half Wave Plate – Production and Detection of Circularly and Elliptically Polarised Lights.

LASERS : Introduction - Spontaneous and Stimulated Emissions – Population Inversion – Ruby Laser –He-Ne Laser – Semiconductor Laser – Applications

Unit – III (10 hours)

Modern Physics: Matter Waves–Heisenberg's Uncertainty Principle - Schrodinger's Time Independent Wave Equation – Physical Significance of Wave Function (ψ) – Application to a Particle in one Dimensional Box (Infinite Potential Well) –Free Electron Theory of Metals – Band Theory of Solids (qualitative) – Distinction between Metals, Insulators and Semiconductors – Elementary Concepts of Maxwell - Boltzmann, Bose - Einstein and Fermi – Dirac Statistics (No Derivation).

Unit – IV (8 hours)

Fibre Optics : Introduction – Optical Paths in Fibre - Optical Fibre and Total Internal Reflection – Acceptance Angle and Cone of a Fibre – Fibre Optics in Communications – Applications.

SUPERCONDUCTIVITY:Introduction–BCS Theory–Meissner Effect- Properties of Superconductors - Type-I and Type-II Superconductors – High T_c Superconductors - Applications.

Unit – V (9 hours)

Semiconductors: Introduction, Intrinsic and Extrinsic Semiconductors, Carrier Concentration in Intrinsic Semiconductors - Carrier Concentration in n-Type Semiconductors, Carrier Concentration in p-Type Semiconductors - Hall Effect and Applications -Variation of Carrier Concentration with Temperature -Conductivity of Extrinsic Semiconductor, P-N Junction – Forward Bias – Reverse Bias -V-I Characteristics of a p-n Junction.

Prescribed Books :

Physics Part I & II, **Robert Resnick and David Halliday. Wiley- Eastern Limited.**
Solid State Physics, **P.K. Palanisamy. Scitech Publications (India) Pvt. Ltd, Chennai.**

Reference Books:

Engineering Physics, **R.K.Gaur and S.L.Gupta. Dhanpat Rai & Sons, Delhi.**
Solid State Physics, **S. O. Pillai. New age International (P) Limited, New Delhi.**
Materials Science, **Dr. M. Arumugam. Anuradha Agencies, Kumbhakonam.**
Modern Physics, **Arthur Beiser. Tata Mc Graw-Hill.**
The Feynman Lectures on Physics. **Addison-Wesley.**

Note: The figures in parentheses indicate approximate number of expected hours of instruction.

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B.Tech. (EIE) II SEMESTER
ENGINEERING CHEMISTRY-II

Code No.	Category	Scheme of Instruction		Scheme of Examination			Credits to be awarded
		Hours per week		Sem. End Exam Duration in Hrs.	Maximum Marks (100)		
		L/T	D/P		Sem. End Exam	Con. Eval.	
EURCH205	BS	3+1	---	3	60	40	3

The objective of the syllabus is to provide knowledge in the basic concepts of the Chemistry of Engineering materials.

Unit-I (9 hours)

Non-Conventional Energy Sources And Applications: Chemical:Electrode Potential – Determination of Single Electrode Potential-Reference Electrodes – Hydrogen and Calomel Electrodes. Electrochemical Series and its Applications. Primary Cell–Dry or Leclanche Cell. Secondary Cell – Lead acid storage cell - Fuel Cell:Hydrogen-Oxygen Fuel Cell.

Nuclear : Nuclear Fission and Nuclear Fusion – Applications of Nuclear Energy

Solar : Photoelectric cells –Applications of Solar Cells

Unit-II (11 hours)

Corrosion Engineering: Definition of Corrosion. Theories of Corrosion –Dry Corrosion and Electro Chemical Corrosion Factors Affecting Corrosion- Nature of the Metal and Nature of the Environment. Prevention of Corrosion: Cathodic Protection, Inhibitors, Metallic Coatings – Anodic and cathodic coatings - Galvanising and Tinning, Anodized Coatings. Organic Coatings-Paints –Characteristics, Constituents and their functions, Varnishes.

Unit-III (9 hours)

Fuel Technology : Calorific Value And Solid Fuels: Classifications of Fuels – Characterstics of Fuels- Calorific Value - Units. Determination – Bomb Calorimetric Method- Dulong's formula. Solid Fuels–Coal, Classification of Coal by Rank-Analysis of Coal –Proximate and Ultimate Analysis. Coke : Manufacture of Coke- Beehive oven and Otto Hoffmann's by product oven processes.

Unit-IV (8 hours)

Fuel Technology : Liquid Fuels: Refining of Petroleum - Petroleum products used as Fuels - Gasoline - Knocking and Octane Number of Gasoline. Diesel - Cetane Number High speed and low speed Diesel oil. Synthetic Petrol –Bergius and Fishcher - Tropsch methods. . Power Alcohol - Manufacture, Advantages and Disadvantages - LPG.

Unit-V (8 hours)

Lubricants : Classification-Properties- Viscosity ,Oiliness, Flash and Fire - Points, Cloud and Pour - Points. Aniline point, Saponification number ,Carbon residue, Emulsification number volatility, precipitation number, specific gravity and neutralization number.

Principles and Mechanism of Lubrication - Fluid Film, Boundary and Extreme - Pressure Lubrications.

Text Books Prescribed :

***Engineering Chemistry*, P.C. Jain and M. Jain. Dhanapat Rai & Sons, Delhi.**

***Engineering Chemistry*, B.K.Sharma.Krishna Prakashan,Meerut.**

***A Textbook of Engineering Chemistry*, Sashi Chawla. Dhanapath Rai & Sons, Delhi.**

Reference Books :

***A Textbook of Engineering Chemistry*, S.S.Dara. S.Chand & Co. New Delhi.**

***Material Science and Engineering*, V.Raghavan. Prentice-Hall India Ltd.**

Note: The figures in parentheses indicate approximate number of hours of Instruction.

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B.Tech. (EIE) II SEMESTER
EURCS206: OBJECT ORIENTED PROGRAMMING WITH C++

Code	Category	Scheme of Instruction		Scheme of Examination			Credits to be awarded
		Hours per week		Sem. End Exam Duration in Hrs	Maximum Marks (100)		
		L/T	D/P		Sem. End Exam	Con. Eval.	
EURCS206	BE	3	---	3	60	40	3

The Aim of the course is to acquaint the student with C++ and the applications of C++

UNIT-I.
Basics, Tokens, Expressions: (8 hours)
Software Crisis, Software Evolution, Procedure Oriented Programming, Object Oriented Programming Paradigm, Basic Concepts of OOP, Benefits of OOP, Object Oriented Languages, Features of OOP. How OOP Differ from POP. Applications of OOP, A Simple C++ Program, Structure of C++ Program.
Tokens, Keywords, Identifiers and Constants, Basic Data Types, User Defined Data Types, Derived Data Types, Dynamic Initialization of Variables, Reference Variables, Operators in C++, Scope Resolution Operator, Member Dereferencing Operators, Memory Management Operators.

UNIT-II.
Functions, Classes and Objects: (8 hours)
Introduction of Classes, Specifying a Class, Defining a Member Functions, A C++ Program with Class Access Specifiers, Inline functions, Nesting of Member Functions, Memory Allocation for Objects, Static Data Members, Static Member Functions, Arrays of Objects, Objects as Function Arguments, Default Arguments, Const Arguments, Function Overloading, Friend Functions

UNIT-III
Constructors, Destructors, Inheritance: (8 hours)
Introduction, Constructors, Parameterized Constructors, Multiple Constructors in a Class, Constructors with Default Arguments, Dynamic initialization of Objects, Copy Constructors, Dynamic Constructors, Destructors.
Introduction to inheritance, Defining Derived Classes, Single Inheritance, Multiple Inheritance, Multi Level Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Abstract Classes, Constructors in Derived Classes, Containership, Operator overloading, Rules for Operator overloading, overloading of binary and unary operators .

UNIT-IV
Pointers, Virtual Functions and Polymorphism: (8 hours)
Introduction, Memory Management, new Operator and delete Operator, Pointers to Objects, this Pointer, Pointers to Derived Classes, Polymorphism, compile time polymorphism, Run time polymorphism, Virtual Functions, Pure Virtual Functions, Virtual Base Classes, Virtual Destructors.

UNIT-V.
Templates and Exception handling: (8 hours)
Introduction, Class Templates, Class Templates with Multiple Parameters, Function Templates, Function Templates with Multiple Parameters, Member Function Templates.
Basics of Exception Handling, Types of exceptions, Exception Handing Mechanism, Throwing and Catching Mechanism, Rethrowing an Exception, Specifying Exceptions.

Text Book Prescribed :

Object Oriented Programming in C++ **by E.Balagurusamy., published by Tata McGraw-Hill.**

Reference Book :

1. Mastering C++ by K.R.Venugopal., published by Tata McGraw- Hill.

2. Computer Science A Structural Programming Approach Using C by Behrouz A Forouzan and Richard F. Gilberg, Thomson publishers

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B.Tech. (EIE) II SEMESTER
OBJECTED ORIENTED PROGRAMMING LAB WITH C++

Code	Category	Scheme of Instruction		Scheme of Examination			Credits to be awarded
		Hours per week		Sem. End Exam Duration in Hrs.	Maximum Marks (100)		
		L/T	D/P		Sem. End Exam	Con. Eval.	
EURCS 213	BE	---	3	3	-	100	2

The aim of the Lab is for students to get acquainted with C++ language. The illustrated list of experiments is as follows.

1. **Write a program illustrating Class Declarations, Definition, and Accessing Class Members.**

2. **Write a Program to Implement a Class STUDENT having Following Members:**

   Data members
   Name of the student
   Marks of the student

   Member functions
   to Assign Initial Values
   to Compute Total, Average
   to Display the Data

3. **Write a Program to Demonstrate the Operator Overloading.**

4. **Write a Program to Demonstrate the Function Overloading.**

5. **Write a Program to Demonstrate Friend Function and Friend Class.**

6. **Write a Program to Access Members of a STUDENT Class Using Pointer to Object Members.**

7. **Write a Program to Demonstrate Containership.**

8. **Write a Program to Generate Fibonacci Series by using Constructor to Initialize the Data Members.**

9. **Write a Program to Demonstrate Multiple Inheritance.**

10. **Write a Program to Invoking Derived Class Member Through Base Class Pointer.**

11. **Write a Template Based Program to Sort the Given List of Elements.**

12. **Write a Program to Demonstrate the Catching of All Exceptions.**

13. **Write a Program Containing a Possible Exception. Use a Try Block to Throw it and a Catch Block to Handle it Properly.**

14. **Write a Program to Demonstrate Dynamic Binding through Virtual Functions.**

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B.Tech. (EIE) II SEMESTER
ENGINEERING CHEMISTRY LAB

Code	Category	Scheme of Instruction		Scheme of Examination			Credits to be awarded
		Hours per week		Sem. End Exam Duration in Hrs.	Maximum Marks (100)		
		L/T	D/P		Sem. End Exam	Con. Eval.	
EURCH 214/114	BS	---	3	3	-	100	2

The objective of the Laboratory Practicals is to make the student to acquire the basic concepts in Engineering Chemistry.

1. Calibration of Volumetric Apparatus.

2. Determination of sodium carbonate in soda ash.

3. Estimation of Iron as Ferrous Iron in an Ore Sample.

4. Estimation of Calcium in Portland cement.

5. Estimation of Volume Strength of Hydrogen Peroxide.

6 a) Estimation of Active Chlorine Content in Bleaching Powder.
b) Determination of Hardness of a Ground Water Sample.

7. Determination of Chromium (VI) in Potassium Dichromate.

8. Determination of Copper in a Copper Ore.

9. a) Determination of Viscosity of a Liquid
b) Determination of Surface Tension of a Liquid.

10. a) Determination of Mohr's Salt by Potentiometric Method.
b) Determination of Strength of an Acid by pH metric Method

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B.Tech. (EIE) II SEMESTER

EUREE218/118– Electrical & Electronics Workshop

Category	L	T	P	Total hours	Marks			Credits
					Con. Eval.	End exam	Total	
	-	-	3	3	100	-	100	2

1.	Study of electrical components.
2.	Study of electronic components.
3.	Study of CRO, Signal Generator.
4.	Identification of components with symbols.
5.	One way & two way control.
6	Three way control.
7	Stair case wiring.
8	Godown wiring.
9	Fan connection.
10	Fluorescent tube connection.
11	Volt – Ammeter Method.
12	Half wave diode rectifier.
13	Study of computer components.
14	Soldering Bread-board precautions.
15	Soldering Techniques.
16	PCB Design.

B.Tech. (EIE) III SEMESTER

EUREI301 ADVANCED ENGINEERING MATHEMATICS
(Common with ECE- EUREC301)

Category	L	T	P	Total Hrs	C	S	T	Credits	Dept.
MT	3	--	--	3	40	60	100	3	BSH

Unit-I

Functions of a Complex Variable & Applications: Functions of a complex variable – analytical functions – Cauchy-Riemann equations – elementary functions of z – conformal mappings – bilinear transformation. Special conformal transformation ($w - z^2$, $w= z+1/z$, $w = e^z$, $w= \cosh z$),

Unit-II

Complex Integration: Cauchy's theorem, Cauchy's integral formula – series of complex terms – Taylor's series – Laurent's series – residue theorem – evaluation of real definite integrals

Unit-III

Applications of Partial Differential Equations : Method of separation of variables- partial differential equation of engineering - wave equation. one-dimensional heat flow - two-dimensional heat flow- solution of Laplace equation -Laplace equation in polar co-ordinates – transmission lines.

Unit-IV

Difference Equations: Introduction – definition – order and solution of difference equations – linear difference equations – rules for finding complementary function- rules for finding P.I – Difference equation reducible to linear form – simultaneous difference equation with constant coefficient.

Unit-V

Z-Transforms: z-transform – definition , some standard z-transforms – linearity property – damping rule – some standard results – shifting rules – initial and final value theorems – convolution theorem – evaluation of inverse of transform- application to difference equations.

Text Books :

1. Higher Engineering Mathematics by Dr. B.S.Grewal, Khanna publishers.

References :

1. Kreyszig E., Advanced Engineering Mathematics, Wiley Eastern.

2. Text Book of Engineering Mathematics by N.P.Bali et.al, Laxmi Publications (P) Ltd., New Delhi-110 002.

3. Higher Engineering Mathematics by Dr.M.K.Venkata Raman, National Pub.Co., Madras-1.

B.Tech. (EIE) III SEMESTER

EUREI302 THERMAL ENGG. AND FLUID MECHANICS

Category	L	T	P	Total Hrs	C	S	T	Credits	Dept.
BE	3	--	--	3	40	60	100	3	IPE

Unit-I

Open and closed systems-Thermodynamic properties-Internal energy-enthalpy-Isothermal and adiabatic process- Zeroth law, first law of thermodynamics-applications to open and closed systems-second law of thermodynamics-heat engine-efficiency-coefficient of performance. Vapor compression.

Unit-II

Concept of entropy- Reciprocating I.C. engines-Working of two stroke and four stroke engines-petrol engines-carburetors-ignition system-diesel fuel pump-steam nozzles-classification of steam turbines-impulse and reaction turbine-velocity triangles. Basic concepts of heat transfer-modes of heat transfer-laws of conduction, convection, and radiation-simple problems.

Unit-III

Properties of fluids and fluid statics-density, specific weight, specific volume, specific gravity, viscosity-Newton's law of viscosity-surface tension-real and ideal fluids. Fluid dynamics, Euler's equation of motion-Bernoulli's theorem, limitation, applications-flow measurement using orifice meter, venturi meter and pitot tube.

Unit-IV

Impact of jets and turbines-force of jet on stationary and moving plates-force on curved vanes-classification of hydraulic turbines-velocity triangles-work done, efficiency, specific speed-pelton wheel-reaction turbines-inward and outward flow Francis and Kaplan turbines.

Unit-V

Reciprocating pumps-types-work done-slip and coefficient of discharge-effect of acceleration and frictional resistance. Centrifugal pumps- classification-velocity triangles-specific speed.

Text Books:

1. A course in Thermodynamics and heat engines by Domkundwar, Dhanpatrai & Sons

2. Engineering Fluid Mechanics by K.L.Kumar, Eurasia publications, 1984.

References:

1. Engineering Thermodynamics by Nanchand & Bros, C.P.Gupta & R.Prakash, 1977.
2. A text book of Fluid Mechanics and Hydraulic Machines by R.K.Bansal, Laxmi publishers, 1998.

B.Tech. (EIE) III SEMESTER

EUREI303 NETWORK THEORY

Category	L	T	P	Total Hrs	C	S	T	Credits
BE	3	1	--	4	40	60	100	4

Unit-I

DC Circuits: Active elements, passive elements, reference directions for current and voltage, Kirchoff's laws, voltage and current division, Nodal analysis, Mesh analysis, Linearity and superposition, Thevenin's and Norton's theorem, Source transformation, , Concept of Duality.

Unit-II

DC Transients: Inductor, Capacitor, Source free RL, RC and RLC response, Evaluation of initial conditions, application of Unit-step function to RL, RC and RLC circuits, concepts of Natural, Forced and Complete response.

Unit-III

Sinusoidal Steady State Analysis: Characteristics of sinusoids, forced response to sinusoidal functions, the complex forcing function, the Phasor, impedance and admittance, nodal and mesh analysis, Application of network theorems to AC circuits, Instantaneous Power, average power, effective values of current and voltage, apparent power and power factor, complex power, parallel resonance, series resonance.

Unit-IV

Coupled Circuits: Magnetically coupled circuits, DOT convention, Y, Z, H, T-parameters of two port networks, Reciprocity theorem.

Unit-V

Three Phase Circuit Analysis: – Phasor diagram and power in 3 phase circuit – three phase circuit analysis with star and delta balanced and unbalanced loads – power measurement in 3-phase circuits – star – delta transformation.

Text Books:

1. **Engineering Circuit Analysis, William H. Hayt Jr. and Jack E. Kemmerly, 6th Edition, Tata McGraw Hill, 2004.**
2. **Network Analysis, Vanvalkenberg M.E, 3rd Edition, PHI.**

References:

1. **Circuits and Networks, Sudhakar & Syammohan, TMH**

B.Tech. (EIE) III SEMESTER

EUREI304 ELECTRONIC DEVICES AND CIRCUITS
(Common with ECE-EUREC304)

Category	L	T	P	Total Hrs	C	S	T	Credits
BE	3	1	--	4	40	60	100	4

Unit-I

Semiconductors: Energy bands, Intrinsic and Extrinsic Semiconductors, Fermi level in semiconductors, Carrier Mobility, Conductivity, The Hall effect, Generation and Recombination of charges, Diffusion, The continuity equation, Injected minority carrier charge, The potential variation within a graded semiconductor.

Unit-II

Semiconductor Diodes: Band structure of PN Junction, Quantitative Theory of PN Diode, Volt – Amp. Characteristics, Temperature Dependence, Transition and Diffusion Capacitance of PN Junction, Zener Diode, Tunnel Diode, LED, Varactor Diode, Photo Diode. Diode Rectifiers: Half-wave, Full-wave and Bridge Rectifiers, types of Filters, Capacitor filter, Ripple Factor and Regulation Characteristics.

Unit-III

Bipolar Junction Transistor: NPN and PNP junction Transistors, Transistor current components, CB, CE and CC Configurations and their Characteristics, Saturation, Cutoff and Active Regions, Comparison of CE, CB and CC Configurations, The Ebers-moll model, Maximum voltage rating, The operating point, Various Biasing Circuits and Stabilization, Bias compensation, Thermal Runaway, Thermal Stability, Transistor Hybrid model, The h parameters of the three transistor configurations, High frequency model of a Transistor. Introduction to UJT & SCR.

Unit-IV

Small Signal – Low Frequency Transistor amplifier Circuits: Transistor as an Amplifier, Analysis of Transistor Amplifier Circuits using h – parameters, Linear analysis of a Transistor circuit, Miller's theorem and it's dual, Simplified CE and CC hybrid models, The CE amplifier with emitter resistance, Darlington pair, Analysis of Single Stage Amplifiers.

Unit-V

Field Effect Transistors: JFET and its characteristics, Pinch off Voltage, Drain Saturation Current, Small signal model of FET, MOSFET – Enhancement and Depletion Modes, The low frequency common source and common drain amplifiers, Biasing the FET, The FET as VVR.

Text Books:

1. **Integrated Electronics Analog and Digital Circuits, Jacob Millman and Christos C. Halkias, McGraw Hill.**

References:

1. Electronic Devices and Circuits – RL Boylestad & Louis Nashelsky, Pearson Education.

2. **Electronic Devices & Circuits, Dharma Raj Cheruku & B T Krishna, Pearson Education, 2005.**

B.Tech. (EIE) III SEMESTER

EUREI305 ELECTRICAL MACHINES
(Common with ECE- EUREC305)

Category	L	T	P	Total hrs	C	S	T	Credits	Dept.
BE	3	--	--	3	40	60	100	3	EEE

Unit-I

DC Machines: Constructional Features, Function of Commutator, Induced EMF and Torque Expressions, Relationship Between Terminal Voltage and Induced EMF for Generator and Motoring Action, Different Types of Excitation and Performance Characteristics of Different Types of DC Machines, Starting and Speed Control of DC Motors, Losses and Efficiency, Efficiency by Direct Loading, Swinburne's Test, Applications of DC Machines.

Unit-II

Transformers: Constructional Details, EMF Equation, Equivalent Circuit, Voltage Regulation, Losses and Efficiency, Auto – Transformers, Open/Short – Circuit Tests and Determination of Efficiency and Regulation.

Unit-III

Three – Phase Machines: Induction Machines: Construction, Rotating Magnetic Field and 3 phase Induction Motor, Power Flow Diagram, Torque and Torque-slip Characteristics, Condition for Max. Torque and its value, Starting and Speed Control, Losses and Efficiency.

Unit-IV

Synchronous Machines: Generation of EMF, Constructional Details, Induced EMF, Synchronous Generator on no Load and Load, Synchronous Impedance and Voltage Regulation. V – Curves and Inverted V – Curves: Synchronous Condenser, Starting of Synchronous Motors, Applications of Synchronous Machines.

Unit-V

Single – Phase Motors: Double Revolving Field Theory, Methods of Starting Single Phase Induction Motors, split phase type, capacitor start, capacitor run, shaded pole motors, Universal Motor, Stepper Motor.

Text Books:

1. **Electrical Machines, S. K. Bhattacharya, TMH Publications, New Delhi, 2003.**

2. **Electrical Machines, P S Bhimbra, Khanna publishers.**

B.Tech. (EIE) III SEMESTER

EUREI306 SENSORS AND TRANSDUCERS

Category	L	T	P	Total hrs	C	S	T	Credits
CE	3	--	--	3	40	60	100	3

Unit-I

Science of Measurement: Measurement systems –methods of measurement-direct-deflection and null type, definition of sensor/transducer-classification of sensors/transducers-selection criteria-static characteristics-dynamic characteristics

Unit-II

Resistive transducers: Resistance potentiometer-loading effect-strain gauges-gauge factor-types of strain gauges-rosettes-resistance thermometers-construction, characteristics-thermistors- thermocouples-thermowells- hot wire anemometer-constant current and constant temperature operation.

Unit-III

Inductive and capacitive transducers: Basic principle-self-inductance- mutual inductance, LVDT -signal conditioning Unit-methods of null reduction- RVDT- synchros-induction potentiometer-variable reluctance transducer.
Capacitive transducers: Introduction-Variable area type-variable air gap type-variable permittivity type-capacitive level sensor-capacitor microphone- frequency response.

Unit-IV

Piezoelectric, Hall Effect and Radiation Sensors: Introduction of piezoelectricity- piezoelectric crystals-accelerometer-charge amplifier-Hall Effect transducers-introduction- applications. Basic characteristics of Radiation Sensors-types of photodetectors-photoemissive cell-photovoltaic cell-photo conductive cell-LDR.

Unit-V

Fiber-optics, Digital and Smart Sensors: Introduction to fiber-optic sensors-temperature sensors-liquid level sensing-fluid flow sensing-Microbend sensors.

Digital Sensors: Introduction to digital encoding transducer- classification-digital displacement transducers- shaft encoder-optical encoder.

Smart Sensors: Introduction-primary sensors-excitation-amplification-filters-compensation-thin film sensors.

Text Books:

1. **Measurement Systems, Application and design, E.O. Doeblin, Tata McGraw Hill, 2004.**
2. **Transducers and Instrumentation, D.V.S.Murthy, PHI, 1995.**
3. **Sensors and Transducers, D.Patranabis, PHI, 2004.**

References:

1. **A course in mechanical measurements and instrumentation, A. K. Sawhney & Puneet Sawhney, Dhanpat Rai & Co., 2001.**

2. **Transducer Engineering, Ranganathan, Allied Publishers, Chennai.**

B.Tech. (EIE) III SEMESTER

EUREI311 NETWORKS AND ELECTRICAL MACHINES LABORATORY

Category	L	T	P	Total hrs	C	S	T	Credits
BE	--	--	3	3	100	--	100	2

*** Minimum Ten Experiments should be conducted from the following**

1. **Verification of KVL & KCL.**
2. **Verification of Superposition Theorem.**
3. **Verification of Thevenin & Norton theorem.**
4. **Measurement of Two port parameters (Z & Y).**
5. **Calibration of Wattmeter.**
6. **Parameters of Choke Coil.**
7. **Open circuit and short circuit tests on transformer.**
8. **Swinburne's test on DC shunt motor.**
9. **OCC and external characteristics of DC shunt generator.**
10. **Load test on 3-phase induction motor.**
11. **Load test on 1 phase induction motor.**
12. **Regulation of alternator by synchronous impedance method.**

B.Tech. (EIE) III SEMESTER

EUREI312 ELECTRONIC DEVICES AND CIRCUITS LAB

Category	L	T	P	Total hrs	C	S	T	Credits
BE	--	--	3	3	100	--	100	2

*** Minimum Ten Experiments should be conducted from the following**

1. **V-I characteristics of a PN junction diode, Zener Diode & LED.**
2. **Zener diode Regulator.**
3. **Half wave Rectifier with and without capacitor filter.**
4. **Full wave Rectifier with and without capacitor filter.**
5. **Bridge Rectifier with and without capacitor filter.**
6. **Characteristics of CB Transistor and its h parameters.**
7. **Characteristics of CE Transistor and its h parameters.**
8. **Analysis of Emitter Follower**
9. **Drain and Transfer Characteristics of JFET.**
10. **Drain and Transfer Characteristics of MOSFET.**
11. **Switching Characteristics of BJT.**
12. **Single stage RC coupled Amplifiers.**

B.Tech. (EIE) IV SEMESTER

EUREI401 DIGITAL ELECTRONICS
(Common with ECE- EUREC401)

Category	L	T	P	Total hrs	C	S	T	Credits
CE	3	--	--	3	40	60	100	3

Unit-I

Introductory concepts Number systems, conversion of bases - binary arithmetic – binary codes weighted and non-weighted codes – Error detecting and error correcting codes. Logic Families: Realization of NAND gate using DTL logic, TTL logic and CMOS logic and their comparison

Unit-II

Minimization of switching functions:
Postulates and theorems - canonical forms of switching functions: SOP and POS forms – Simplification of functions: Karnaugh map and Quine Mc Cluskey methods – prime implicants - minimal functions and their properties – realization of switching functions using minimum no. of gates - multiple output functions

Unit-III

Design of Combinational Circuits: Symbols and truth tables of logic gates: AND, OR, NOT, NAND, NOR and XOR - design using conventional gates – design using MSI and LSI devices – multiplexers, demultiplexers, decoders and priority encoders – logic design of combinational circuits: ripple carry adder, carry look ahead adder, comparator, seven-segment display, code conversion, binary addition, subtraction, ROM, PLA and PAL.

Unit-IV

Sequential Machine Fundamentals: Combinational Vs Sequential circuits - memory elements and their excitation functions: basic RS latch, RS, D, JK and T flip-flops – conversion from one flip-flop – Classification of sequential circuits - registers, shift registers – ripple counters, synchronous counters and their design – lock out in counters

Unit-V

Sequential Circuits:
Synchronous Sequential Circuits: Synchronous Vs asynchronous sequential circuits – synchronous sequential circuit design: state diagram, state table, reduction of state table, state assignment, transition and output table, implementation of sequence detectors, binary counter, serial binary adder etc using various flip-flops
Asynchronous Sequential Circuits: Analysis and design of fundamental mode circuits – reduction of flow table – static and dynamic hazards.

Text Books:

1. **Switching and finite automata theory, 2nd Ed, Zvi Kohavi, Tata McGraw-Hill.**
2. **Digital Design, Morris Mano, 3rd Edition, PHI Publications.**

References:

1. **Introduction to Switching theory and logic design, 3rd Edition, Frederick J. Hill and Gerald R. Peterson, John Willey and sons, 1981**

2. **Fundamentals of Logic design, 5th Edition, Charles H. Roth Jr. Thomson Pub.**

B.Tech. (EIE) IV SEMESTER

EUREI402 ELECTRONIC CIRCUITS AND ANALYSIS

Category	L	T	P	Total hrs	C	S	T	Credits
CE	3	1	--	4	40	60	100	4

Unit-I

Multistage Amplifiers: Cascading of Transistor amplifiers, Choice of transistor configuration in cascade, Frequency response of an amplifier, Bandwidth, RC coupled amplifier, Effect of bypass and coupling capacitors, High frequency current gain, Gain Bandwidth product.

Unit-II

Feedback Amplifiers: Concept of Feedback Amplifiers – Effect of Negative feed back on the amplifier Characteristics. Four Feedback Amplifier Topologies. Method of Analysis of Voltage Series, Current Series, Voltage Shunt and Current Shunt feedback Amplifiers, Design considerations.

Unit-III

Sinusoidal Oscillators: Condition for oscillations –LC Oscillators – Hartley, Colpitts, Clapp and Tuned Collector Oscillators – Frequency and amplitude Stability of Oscillators – Crystal Oscillators – RC Oscillators -- RC Phase Shift and Wien bridge Oscillators, Design considerations.

Unit-IV

Multivibrators & Voltage time-base generators: Analysis of Bistable, Monostable & Astable Multivibrators with BJT. Schmitt trigger circuit, Synchronous and Asynchronous triggering. Different voltage sweep circuits, Exponential charging circuit, Miller sweep, Bootstrap sweep.

Unit-V

Power Amplifiers: Classification of Power Amplifiers – Class A, Class B and Class AB power Amplifiers. Series Fed, Single Ended Transformer Coupled and Push Pull Class A and Class B Power Amplifiers. Cross-over Distortion in Pure Class B Power Amplifier, Class AB Power Amplifier – Complementary Push Pull Amplifier, Class C Amplifiers, Design considerations – Heat Sinks.

Text Books:

1. **Integrated Electronics, Millman and Halkias, TMH, New Delhi,2001**
2. **Electronic Devices and Circuits, G.K. Mittal, Khanna Publishers, 23rd edition,2004**
3. **Pulse, Digital and Switching Waveforms, Millman and Taub, TMH.**

References:

1. **Electronic Devices and Circuit Theory, Boylstead, PHI, 2000.**
2. **Electronic Devices and Circuits, Mottershead, Pearson Education.(for Chapter-4)**
3. **Electronic Devices and Circuits, C.D. Raj, B. T. Krishna, Pearson, 2004.**
4. **Electronic Devices and Circuits, Sanjeev Gupta Dhanapat Rai Pub.**

B.Tech. (EIE) IV SEMESTER

EUREI403 ELECTRICAL AND ELECTRONIC MEASUREMENTS

Category	L	T	P	Total hrs	C	S	T	Credits
CE	3	1	--	4	40	60	100	4

Unit-I

Introduction: Measurement and error – Definitions – performance characteristics-static-dynamic, Types of error – Statistical analysis – Probability of errors – Limiting Errors. Standards of Measurement – Classification of standards – Time and Frequency standards – IEEE standards.

Unit-II

Electronic Instrumentation: Measurement of basic Parameters: Introduction – PMMC Principle – AC Voltmeter – True RMS responding voltmeter – Electronic Multimeter – Alternating current indicating instruments – Electro dynamometer – Instrument Transformers - Considerations in choosing an Analog voltmeter – Digital voltmeter – 3 ½ and 4 ½ digit - Q-meter – Vector Impedance Meter – Vector Voltmeter.

Unit-III

Wattmeters and Energy meters:Single phase wattmeters:- Theory of Dynamometer type, Induction type and Electrostatic type wattmeters - comparison between electrodynamometer type and induction type wattmeter – Energy meters - Single phase Induction type watt hour meter – errors and their compensation - measurement of kilo volt amperes.

Unit-IV

Resistance, Inductance and Capacitance Measurements: Wheatstone bridge, Kelvin Bridge,AC bridges: Maxwell Bridge, Hay Bridge, Schering Bridge, Wien Bridge – Wagner Ground Connection.

Unit-V

Oscilloscopes and wave analyzers: Block diagram– CRT-multiple trace- Oscilloscope probes – Oscilloscope Techniques – Special Oscilloscopes:. Storage, sampling, digital storage oscilloscope. Wave analyzer- Harmonic distortion analyzers- Spectrum Analyzers.

Text Books:

1. **Modern Electronic Instrumentation and Measurement Techniques, A.D. Helfrick and W.D. Cooper, PHI.**

2. **Electrical and Electronic Measurements, A.K.Sawhney, Dhanpat Rai and Co Ltd, 1974.**

References:

1. **Electronic Instrumentation, H.S.Kalsi, TMH, 2nd Edition**

2. **Electrical measurements & measuring Instruments – E.W.Golding & F.C.Widdis, Wheeler publishing, Allahabad, 5th edition.**

3. **Electronic Measurements and Instrumentation, David A Bell, PHI, 2nd edition**

B.Tech. (EIE) IV SEMESTER

EUREI404 SIGNALS AND SYSTEMS
(Common with ECE- EUREC404)

Category	L	T	P	Total hrs	C	S	T	Credits
CE	3	--	--	3	40	60	100	3

Unit-I

Signals: Signals, Classification of signals, Transformation of independent variables, Basic continuous time signals, Basic discrete time signals, systems, classification of systems, properties of systems.

Unit-II

LTI systems: Singularity functions, representation of signals in terms of impulses, discrete time LTI system, the convolution sum, continuous time LTI systems, the convolution integral, systems described by differential and difference equations, properties of systems, causality and stability.

Unit-III

Fourier analysis of continuous time signals and systems: The response of continuous LTI systems to complex exponentials, the continuous time Fourier series, convergence of Fourier series, Aperiodic signals and continuous Fourier transform, periodic signals and continuous Fourier transform, properties of Fourier transform, frequency response characterized by linear constant coefficient differential equation.

Unit-IV

Fourier analysis for discrete time signals and systems: The response of discrete time LTI systems to complex exponentials, discrete time Fourier series, discrete time Fourier transform, properties of DTFT, frequency response characterized by linear constant coefficient difference equation.

Unit-V

Laplace and Z-transform Techniques: Introduction to Laplace transform of the signals, waveform synthesis, Laplace Transforms of typical signals, Response to Unit-Step, Ramp and Impulse functions, Initial and Final value theorem, Convolution integral, time shift and periodic functions. Z-Transfer function: Properties of Z-transform, region of convergence, Inverse Z-transform, relation between Z-transform and Fourier transform.

Text Books:

1. Signals and systems, Alan V. Oppenheim, Alan S. Willsky and Ian, Pearson Edu.

2. Signals & Systems, P Ramesh Babu, Scitech

References:

1. Signals & Systems, B P Lathi, B S Publishers

2. Signals & Systems, Nagrath, Sharan, Rajan et. Al, TMH.

3. Signals & Syatems, Sanjay Sarma, S K Kataria

B.Tech. (EIE) IV SEMESTER
EUREI405: ENVIRONMENTAL STUDIES

Category	L	T	P	Total hrs	C	S	T	Credits	Dept
HS	4	--	--	4	40	60	100	4	Civil Engg.

Unit-I

The Multidisciplinary nature of environmental studies – Definition, scope and importance, need for public awareness. Natural Resources: Renewable and non-renewable resources. Natural resources and associated problems – Forest Resources: Use and over exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. Food resources: world food problems, changes caused by agricultural and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. Energy resources: growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies. Land resources: Land as a resources, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable life styles.

Unit-II

Ecosystems: Concept of an ecosystem. Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystems: Forest ecosystems, Grassland ecosystems, desert ecosystems. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries). Biodiversity and its conservation: Introduction: Definition: genetic, species of ecosystem diversity. Bio-geographical classification of India. Value of Biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, national and local levels. India as a mega-diversity nation. Hotspots of biodiversity, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit-III

Environmental Pollution: Definition, Causes, effects and control measures of Air Pollution, Water Pollution, Soil Pollution, Marine Pollution, Noise Pollution, Thermal Pollution, Nuclear hazards. Solid waste management: causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies, Disaster Management: floods, earthquakes, cyclones and landslides.

Unit-IV

Social Issues and the environment: From unsustainable to sustainable development. Urban problems related to energy, Water conservation, rain water harvesting and watershed management. Resettlement and rehabilitation of people, its problems and concerns. Case studies. Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and Control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness.

Unit-V

Human Population and the Environment: Population growth, variation among nations, Population explosion – Family welfare programme. Environment and human health. Human rights, Value education, HIV / AIDS, Women and Child welfare, Role of information technology in environment and human health. Case Studies. Field Work: Visit to local area to document environmental assets-river / forest / grassland/ hill/mountain. Visit to a local polluted site – Urban / Rural / Industrial / Agricultural. Study of common plants, Insects, birds. Study of simple ecosystems – pond, river, hill slopes, etc.

Text Book:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha. Published by – University Grants Commission, Universities Press, India.

B.Tech. (EIE) IV SEMESTER

EUREI406 DATA STRUCTURES USING C

Category	L	T	P	Total hrs	C	S	T	Credits
CE	3	--	--	3	40	60	100	3

Unit-I

Arrays: Organization and use of one-dimensional arrays, operations, two dimensional and multidimensional arrays – Algorithms of all operations on linear arrays.

Unit-II

Structures, pointers and files: definition of structures and unions, programming examples; pointers, pointer expression, programming examples; file operations, process.

Unit-III

Linear Data Structures: Stack representation, operational algorithms, arithmetic expression: polish notation. Queue representation, operations, algorithms, deques, priority queues, circular queues. Linked list representation operations, algorithms, double linked and circular lists.

Unit-IV

Non-linear Data structures: Tress, Binary tree representation, tree traversals, Huffman's algorithms conversion of general tree to binary tree. Graph representation, Warshall's algorithms, shortest paths, linked representation of a graph, operations of graph, traversing a graph.

Unit-V

Sorting, Searching: Bubble sort, quick sort, hcap sort Linear search. Binary search.
Study of Unix operating system: file system protection, Unix shell programming.

Text Books:

1. **Programming in ANSIC – E Balaguruswamy**
2. **Data Structures using C - A.M. Tanebaum and others**

References:

1. **Data Structures – Schaum's outline series.**
2. **An introduction to data structures with applications – Trembly & Sorenson.**

B.Tech. (EIE) IV SEMESTER

EUREI411 SENSORS AND TRANSDUCERS LABORATORY

Category	L	T	P	Total hrs	C	S	T	Credits
CE	--	--	3	3	100	--	100	2

1. **Response of RTD**
2. **Response of Thermocouple.**
3. **Displacement measurement with LVDT.**
4. **Speed measurement with digital stroboscopic method.**
5. **Pressure measurement with piezo-resistive transmitter**
6. **Characteristics of Hall Effect sensor**
7. **Strain measurement.**
8. **Capacitive Level sensor for liquid level measurement.**
9. **Angular displacement measurement**
10. **Characteristics of Potentiometer**
11. **Measurement of flow using Ultra sonic flow meter**
12. **Measurement of flow using Turbine flow meter**
13. **Characteristics of Solar cell.**

B.Tech. (EIE) IV SEMESTER

EUREI412 ELECTRONIC CIRCUIT ANALYSIS LABORATORY

Category	L	T	P	Total Hrs	C	S	T	Credits
CE	--	--	3	3	100	--	100	2

1. **RC coupled amplifier: frequency response, calculation of gain and bandwidth**
2. **Feed back amplifiers: frequency response calculation of gain**
3. **Colpitts Oscillator.**
4. **RC Phase-Shift Oscillator.**
5. **Wien-Bridge Oscillator.**
6. **Class A Power Amplifier**
7. **Class B Push-Pull Power Amplifier.**
8. **Astable Multivibrator**
9. **Monostable Multivibrator**
10. **Bistable Multivibrator**
11. **Calculation of input, output resistance with and without feedback.**

B.Tech. (EIE) IV SEMESTER
EUREI413 ENGLISH COMMUNICATION SKILLS LABORATORY

Category	L	T	P	Total Hrs	C	S	T	Credits	Dept.
HS	3	--	--	3	100	--	100	2	English

Concept and importance of communication.

Developing Communicative abilities.

Paper Presentation – Planning, preparation and Presentation using Audio-Visual aids.

Proposals and Research Reports.

Oral Presentation:

a. **Group Discussion.**
b. **Interviews**
c. **Conducting a meeting.**
d. **Telephone Etiquette.**

Suggested Texts:

1. **Himstreet, William C., Gerald w.Maxwell, Mary Jean Onorato. Business Communications. A Guide to effective writing, speaking and listening. Gelencoe publishing company. California 1982.**
2. **Murphy, Hurta A etal, Effective Business communications, The McGraWHill companies Inc. 1997.**
3. **Thill, John V., Bove'e, Courland L. Excellence in Business Communication. McGraw Hill Inc. 1996.**
4. **Lesitar & Pettit. Report writing for Business. Irwin – McGraw Hill. 1995. Tenth Edition.**
5. **Paulery and Riordan. Technical report writing today. Houghton Mifflin company. 1999.5th edition. Reprint.**

EUREI414 INDUSTRIAL TOUR

Category	L	T	P	Total Hrs	C	S	T	Credits
IT	--	--	--	--	--	--	--	Non-credit

- **The students will visit core industries like Instrumentation, Automation, Power Plant, Bio-Medical Engg, VLSI etc., or related research establishments.**
- **The industries to be visited should be from the approved list by the Head of the Department. Industry should be large scale to medium scale.**
- **At least five industries are to be visited by the student.**
- **The industrial tour would be a week to 10 days.**
- **The tour will be organized by the Department in the break between two semesters of their second year of study.**
- **Each student will have to submit an individual report on the tour for assessment within 10 days of their return from the tour.**

B.Tech. (EIE) V SEMESTER

EUREI501 MICROPROCESSORS & INTERFACING

Category	L	T	P	Total hrs	C	S	T	Credits
CE	3	1	--	4	40	60	100	4

Unit-I

Intel 8085 microprocessor: Evolution of microprocessors, Architecture of 8085, pin diagram, addressing modes of 8085 and programming with 8085(elementary treatment only).

Unit-II

Architecture of 8086/88 Family: Introduction to Intel 8086/8088 Microprocessors, Architecture, addressing modes, 8086 flag register.

Unit-III

Assembly language programming with 8086: Instruction set of 8086, Assembler directives, assembly Language programming, simple programs, creation of EXE and COM files. DOS calls and BIOS calls, Interrupt 21h functions.

Unit-IV

Memory & I/O Interfacing: 8086-Minimum mode and maximum mode of operation. Timing diagrams of Memory Read/Write and I/O Read/Write machine cycles , Memory organization, Memory interfacing to 8086 (Static RAM and EPROM).

Unit-V

Interrupts and Interfacing: Interrupts of 8086, Programmable peripheral interface (8255), Programmable timer (8253). A/D and D/A converter interfacing and generation of waveforms.

Text Books:

1. **Microprocessor Architecture Programming and applications with the 8085, Ramesh S Goankar, Perman International Pvt.Ltd.**
2. **Advanced Microprocessors and Peripherals, A.K.Ray and K.M.Bhurchandi, 2nd Ed, TMH.**
3. **Microprocessors and Interfacing: Programming and Hardware, Douglas V Hall, 2nd Edition, TMH.**

References:

1. **Micro computer systems, The 8086/8088 Family Architecture, Programming and Design – Y.Liu and G.A. Gibson, PHI, 2nd edition.**
2. **The Intel 8086 Programming, John Uffenbeck, 2nd Ed, PHIndia.**
3. **8086 Micro Processor -Kenneth J. Ayala, Penram International/ Thomson, 1995.**
4. **Assembly language programming the IBM PC by Alan R. Miller, Sybex Inc 1987.**

B.Tech. (EIE) V SEMESTER

EUREI502 LINEAR ICS AND APPLICATIONS
(Common with ECE- EUREC502)

Category	L	T	P	Total Hrs	C	S	T	Credits
CE	3	--	--	3	40	60	100	3

Unit-I

Operational Amplifiers:Concept of Direct Coupled Amplifiers. – Differential Amplifier - Calculation of common mode rejection ratio – Differential Amplifier supplied with a constant current source – Normalized Transfer Characteristics of a differential Amplifier, Ideal Characteristics of an operational Amplifier , Parameters of an Op-Amp, Measurement of Op-Amp Parameters, Frequency Compensation Techniques.

Unit-II

Operational Amplifier Applications: Linear: Inverting and Non-inverting Amplifiers, Differential Amplifiers, Summing, scaling and Averaging amplifiers, Integrators, Differentiators, Logarithmic Amplifiers, Instrumentation Amplifiers, Voltage to Current and Current to Voltage Converters, Rectifiers, Peak Detectors.

Non-linear: Comparators, Schmitt trigger, Multivibrators, Sine wave oscillators (phase-shift, weinbridge, and Quadrature), Waveform generators (triangular and sawtooth) , Sample and Hold circuits, Analog multiplexers.

Unit-III

Other Linear IC's: 555 Timers – Monostable and Astable modes, 556 Function Generator ICs and their Applications. Three Terminal IC Regulators, IC 566 Voltage controlled oscillators, IC 565 PLL and its Applications.

Unit-IV

A/D & D/A Converters: DAC characteristics, D to A conversion process; multiplying DAC, 8 bit D to A converter, microprocessor compatibility, serial DACs, ADC characteristics, A to D conversion process; successive approximation ADC, microprocessor compatibility, ADCs for microprocessors, frequency response of ADCs.

Unit-V

Active Filters: LPF, HPF, BPF, BEF, All-pass Filters, Higher Order Filters and their Comparison - Switched Capacitance Filters.

Text Books:

1. **Op-Amps and Linear Integrated Circuits, Ramakanth Gayakward, Pearson Education, LPE.**
2. **Op-Amps and Linear Integrated Circuits by R.F Coughlin and F.F Driscoll, Pearson Education, 6th Edn.**
3. **Operational amplifiers, George Clayton, Steve winder, Newnes, 4th edition**

References:

1. **Microelectronics, Jacob Millman and Arwin. W. Grabel, TMH.**
2. **Linear Integrated Circuits, Roy Choudary and Vishal.K.Jain, New Age International.**
3. **Integrated Electronics, Jacob Millman and Christos C. Halkias, Tata McGraw-Hill.**

B.Tech. (EIE) V SEMESTER

EUREI503 INDUSTRIAL INSTRUMENTATION

Category	L	T	P	Total hrs	S	E	T	Credits
CE	3	--	--	3	40	60	100	3

Unit-I

Measurement of speed: Revolution counter, Drag-cup tachometer, stroboscope, AC and DC-tacho-generators, capacitive tachometer, speed measurement using reluctance pick-up, photo-transducer. Measurement of force-load cell-strain gauges – and LVDT load cells – Pneumatic load cell – hydraulic load cell- Torque measurements using strain gauges and magneto-elastic principle – Density measurements for liquids and gases.

Unit-II

Measurement of Pressure: Monometers, Bourdon gauges, Diaphragm gauges, Bellows gauges, Bell gauges, Electrical types – vacuum gauges, McLeod gauge, Knudsen gauge, thermocouple gauge, ionization gauge, Differential pressure transmitter – Pneumatic and electrical types – Calibration of pressure gauges.

Unit-III

Measurement of temperature: Temperature scale, Temperature standard, Bimetallic thermometer, filled-in thermometers, vapour pressure thermometers, resistance thermometers, 3-lead and 4-lead arrangement – thermistor, thermocouples – types and ranges characteristics, laws of thermocouples, cold-junction compensation, thermo well, installation of thermocouples – radiation pyrometer, optical pyrometer.

Unit-IV

Measurement of flow: Variable head flow meters orifice plate, venturi tube, dall tube, flow nozzle, pitot tube, Rota meter, mass flow meter, positive displacement meter, turbine flow meter, electromagnetic flow meter, ultrasonic flow meter, open channel flow measurements, solid flow measurement, flow meters calibration.

Unit-V

Measurement of level: Sight glass, float gauge, displacer, torque tube, bubbler tube, diaphragm box D/P methods, electrical methods – resistance type, capacitance type, ultrasonic level gauging, radiation methods. Miscellaneous measurements: humidity, dew point, psychomotor, hygrometers, moisture measurement in paper, kilns, viscosity, consistency, say bolt viscometer, Rota meter type viscometer

Text Book:

1. Principles of Industrial Instrumentation, D. Patranabis, Tata McGraw Hill Publishing co., 2000.

References:

1. Measurement systems: Application and Design, E. O. Doeblin, TMH Publishing co., 2004.

2. Instrument Engineers handbook, edited by B. G. Liptak., Chilton Book Co., 1974.

EUREI504 CONTROL SYSTEMS

Category	L	T	P	Total Hrs	C	S	T	Credits
CE	3	1	--	4	40	60	100	4

Unit-I

Transfer functions and Mathematical Modeling of linear systems: Block diagram reduction of control systems, signal flow graphs, Introduction to Mathematical modeling of physical systems, Equations and modeling of electrical networks and Mechanical systems.

Unit-II

Time domain Analysis of Control Systems: Time response First and Second order systems with standard input signals, steady state error constants, design of P,I,D,PI,PID controllers

Unit-III

Concepts of stability and necessary conditions for Stability: Routh-Hurwitz criterion, relative stability analysis, the concept and construction of Root loci. Analysis of control systems with Root locus.

Unit-IV

Frequency Response Analysis: Correlation between time and frequency responses, Polar Plots, Bode Plots, Log Magnitude versus Phase Plots, All pass and Minimum phase systems, Nyquist stability Criterion, and Constant M and N circles.

Unit-V

State Space Analysis: Introduction, Concept of state, State variables and State Model, state model for linear continuous time systems, solutions of state equations, demagnetization, concept of controllability and observability.

Textbooks:

1. Control Systems Engineering, I.J.Nagrath and M.Gopal, Wiley Eastern Ltd.

2. Modern Control Engineering, Ogata, PHI publication, 4th edition, 2002.

References:

3. Automatic Control Systems, Benjamin C. Kuo, PHI publication, 7th edition, 2002.

EUREI505 PRINCIPLES OF COMMUNICATION ENGINEERING

Category	L	T	P	Total hrs	C	S	T	Credits
CE	3	--	--	3	40	60	100	3

Unit-I

Linear Modulation Systems: Modulation, Frequency Translation, Amplitude modulation, AM equation, Modulation index, Spectrum of AM Signal, power relations, AM generation and detection, SSB- generation & detection, VSB.

Unit-II

Angle Modulation: Angle modulation, FM, FM Equation, modulation index, frequency deviation, NBFM, WBFM, Spectrum of FM, Bandwidth of FM, Carson's rule, Phase modulation, Comparison of FM and PM, Generation of FM, Pre-emphasis and De-emphasis

Unit-III

Discrete modulation techniques: Sampling, sampling Theorem for low pass and band pass signals, Multiplexing, TDM and FDM systems, PAM, Pulse time modulation - Pulse Width Modulation and Pulse Position Modulation – generation and detection.

Unit-IV

Digital Modulation Techniques: Pulse Code Modulation, Differential Pulse Code Modulation, Delta Modulation, Adaptive Delta Modulation, Companding, ASK, FSK, PSK and higher order modulation techniques.

Unit-V

Telemetry and Telecontrol: TRF Receiver, Super Heterodyne Receiver, General Telemetry system, Landline Telemetry system, RF Telemetry, Voltage Telemetry, Current Telemetry, Position Telemetry systems, Landline Telemetry Feedback systems, Radio frequency Telemetry.

Text Books:

1. **Electronic Communication Systems G. Kennedy, TMH, 2000.**
2. **A Course in Electrical and Electronic Measurements, and Instrumentation – A K Sawhney, Dhanpat Rai & Co. 2005**

References:

1. **Communication Systems (analog&Digital), Sanjay Sharma, S.K. Kataria &Sons,2003**
2. **Principles of Communication Systems, H. Taub and Schilling, TMH, 2000.**
3. **Modern Digital and analog communications, B.P.Lathi, Oxford Press, 2001.**
4. **Telemetry principles, D. Patranabis, TMH, 2000**

EUREI506 DIGITAL SIGNAL PROCESSING

(Common with ECE- EUREC506)

Category	L	T	P	Total hrs	C	S	T	Credits
CE	3	--	--	3	40	60	100	3

Unit-I

Characterization of systems in Discrete Time: Impulse response and system function H(z) of digital systems, Frequency response, Stability analysis, Direct form-I, Direct form-II, Cascade and Parallel realization structures of digital filters, finite word length effects, Limit cycle and Dead band effect.

Unit-II

Discrete Fourier transform (DFT): Discrete-Time Fourier transform, computation of DFT, circular convolution and linear convolution using DFT, overlap-add method, overlap-save method, Fast Fourier Transform (FFT), Radix-2 decimation-in-time and decimation-in -frequency algorithms, Inverse FFT.

Unit-III

Design of IIR filters: Design of IIR filters from analog filters, Butterworth filters, Chebyshev filters, Comparisons, frequency transformations, design examples, Impulse invariant, bilinear transformation method.

Unit-IV

Design of FIR filters: Linear phase characteristics, Fourier series method, window function technique, Frequency sampling method, Comparison between IIR and FIR filter.

Unit-V

DSP Architecture: Harvard architecture, pipelining, multiplier, Accumulator, general-purpose digital signal processors, Fixed-point digital processors, floating point digital signal processors. Applications of DSP in spectrum analysis and filtering, Application of DSP in audio applications, telecommunication and bio-medical.

Text Books:

1. **Oppenheim A.V.& Schafer R.W- digital signal processing, PHI.**
2. **Ifeacher E.C & Jervis B.W, digital signal processing –A practical approach, Second Edition, Pearson Edu.**

References:

1. **Sanjit K.Mitra- Digital signal processing- A computer based approach, Third edition TMH.**
2. **P Ramesh Babu, Digital Signal Processing, Scitech publications.**

EUREI511 DIGITAL ICs LABORATORY

Category	L	T	P	Total hrs	C	S	T	Credits
CE	--	--	3	3	100	--	100	2

1. **Minimization and realization of a given function using gates**
2. **Function generation using decoders and multiplexers**
3. **Experiments on priority encoder using 74LS148**
4. **Applications of multiplexers**
5. **Seven-segment display experiments**
6. **Four bit and eight bit adders and subtractors**
7. **Experiments using 74LS181 and 74LS182 ICs (ALU and Carry look ahead adders)**
8. **Experiments on SR latch and Master-Slave JK flip-flops using SSI gates**
9. **Design and testing of ripple counters using ICs (binary and mod-N)**
10. **Design and testing of Mod-N synchronous counters**
11. **Design and testing of Shift registers, Ring and Johnson Counters**
12. **Experiments using ROMs**

B.Tech. (EIE) V SEMESTER

EUREI512 LINEAR ICs LABORATORY

Category	L	T	P	Total hrs	C	S	T	Credits
CE	--	--	3	3	100	--	100	2

1. **Op-Amp Applications.**
2. **Schmitt Trigger-with IC.**
3. **Active Low Pass Filter.**
4. **Active High Pass Filter.**
5. **555 Timer - Monostable and Astable modes.**
6. **IC Voltage Regulator.**
7. **Instrumentation amplifier.**
8. **A/D Converters.**
9. **D/A Converters.**
10. **PLL and Applications.**

EUREI513 MEASUREMENTS LABORATORY

Category	L	T	P	Total hrs	C	S	T	Credits
CE	--	--	3	3	100	--	100	2

1. Measurement of phase difference by CRO using Lissajous figures.
2. Measurement of resistance using Wheat Stone and Kelvin's Bridge.
3. Measurement of inductance using Anderson Bridge.
4. Measurement of Capacitance using Schering's bridge.
5. Calibration of single-phase energy meter.
6. Calibration of wattmeter.
7. Design, construction and calibration of series and shunt type ohmmeters
8. Measurement of coil parameters Q-meter.
9. Measurement of angular displacement using potentiometer
10. Calibration of Voltmeter.
11. Calibration of Ammeter.

EUREI514 PERSONALITY DEVELOPMENT

Category	L	T	P	Total hrs	C	S	T	Credits
CE	--	--	3	3	-	-	-	Non Credit

Unit-I

HUMAN BEHAVIOUR / PSYCHOLOGY

Unit-II

MOTIVATION

Unit-III

TEAM WORK

- Inter Personal Skills – Group Activities – Group Discussion

Unit-IV

CREATIVITY

- Lateral Thinking – Brain Storming Etc.

Unit-V

PRESENTATION SKILLS

- Public Speaking, Anchoring- Extempore

Unit-VI

INTERVIEW SKILLS

- Non-Verbal Communication – Listening And Answering Skills

Unit-VII

ETHICS AT WORK PLACE

EUREI601 INDUSTRIAL ELECTRONICS

Category	L	T	P	Total hrs	C	S	T	Credits
CE	3	--	--	3	40	60	100	3

Unit-I

Introduction to Thyristors: Basic structure, operation and static V-I characteristics, Turn-on methods, Switching characteristics, gate characteristics, , series and parallel operation of Thyristors. UJT- Basic structure, static emitter characteristics, potential divider equivalent circuit, SCR-Different details. Introduction to SCR , SCR- Basic structure, two transistor model, V-I characteristics, ON and OFF times of Gate, SCR rating, DIAC - Basic structure, V-I characteristics, SCS- Basic structure, two transistor equivalent, Diode transistor equivalent. TRIAC- Basic structure, V-I characteristics, Positive bias and negative bias operations

Unit-II

Polyphase Rectifiers: Three-phase half wave delta-wye rectifier with resistive load. Delta to double wye half rectifier with interphase transformer and with resistive load, Three phase delta wye bridge rectifier with restive load, general m- phase rectifier, D.C power outputs, efficiencies, and ripple factors. Transformer utility factor, rectifier performance, Thyristor commutation.

Unit-III

Controlled Rectifiers: Single phase controlled rectifiers; half wave controlled rectifier with resistance load and RL load, Full wave controlled rectifiers with resistance load and with RL load. Three phase controlled rectifiers; half wave rectifier with resistance load, and with RL load. Six phase half wave controlled rectifiers with resistance load.

Unit-IV

DC motor speed control: Methods of speed control, single-phase SCR drive, and three phases SCR drives. Closed loop motor control systems, Half wave feedback circuit for series motor drive. Half controlled SCR Bridge for series motor drive. Inverters and Choppers: Inverter configuration and applications, Chopper configuration and applications.

Unit-V

AC motor speed control: Methods of speed control, the chopper controlled rotor resistance scheme, speed control by variation of stator voltage using SCRs, closed loop speed control of an induction motor by variation of stator voltage using SCRs. Variable frequency AC motor drive. P.W.M. control scheme, Voltage fed inverter control, Current fed inverter control.

Text Books:

1. **Engineering Electronics, John D. Ryder, TMH.**
2. **Industrial Electronics, G.K. Mithal, Khanna Publishers, 2001.**
3. **Industrial Electronics, Rasheed**

References:

1. **Power Electronics, P. C. SEN, TMH, 1999.**
2. **Thyristors and its Applications, M.Rama Murthy, 1977, East West Publications.**

EUREI602 ANALYTICAL INSTRUMENTATION

Category	L	T	P	Total hrs	C	S	T	Credits
CE	3	1	--	4	40	60	100	4

Unit-I

Classification of analyzers: Classification according to properties, sample-state, signals and methods, Gas analyzers: Thermal conductivity type-, Paramagnetic method-magneto-dynamic, magnetic wind types, Zirconia Oxygen analyzer, electrochemical reaction method, opacity meters-chemiluminescence technique

Unit-II

Liquid analyzers: Potentiometry, ORP, Redox methods, Dissolved Oxygen cell, pH measurement-construction of reference cell, measuring cell, combined cell, pH measurement circuits, Conductivity-cell and circuits, Turbidity and nephelometer.

Unit-III

Spectroscopic techniques: The electromagnetic spectrum, classification of spectroscopic techniques. UV- Visible range spectroscopy: sources, detectors, colorimeters, spectrophotometers. Infra-red spectroscopy: Dispersive, non dispersive, single channel and double channel techniques, sources, detectors, FT IR spectrometer.

Unit-IV

X-ray spectroscopy: Generation and characteristics of X rays, Detectors-ionization chamber, proportional counter, GM counter, scintillation counter; absorption spectroscopy; diffraction spectroscopy , fluorescence spectroscopy; construction of Goniometer and Debye-scherrer camera. Chromatography: Classification, Gas chromatography, schemes, sampling systems, detectors, study and analysis of chromatogram, principles of high pressure Liquid chromatography.

Unit-V

NMR spectroscopy: Techniques and schemes, sweeping magnetic type and cross-coil types. Sampling techniques: Importance, general components, oil traps, steam injected suction system, sample preparation system in steam analysis, Environmental pollution monitoring instruments: gas pollutants- outline and techniques- carbon monoxide, sulphur dioxide, nitrogen oxides, Hydro carbons, ozone; water pollution parameters and monitoring.

Text Book:

1. Hand book of analytical instruments, RS Khandpur, TMH pub. 2002

References:

1. **Principles of Industrial instrumentation, D. Patranabis, TMH publishing co., 2000**
2. **Instrumental methods of analysis–HH Willard,LL Merritt,Jr., JA Dean, FA Settle, JR, CBS publications.**

EUREI603 COMPUTER ARCHITECTURE AND ORGANIZATION

(Common with ECE – EUREC603)

Category	L	T	P	Total Hrs	C	S	T	Credits
CE	3	--	--	3	40	60	100	3

Unit-I

Register Transfer and Micro operations: Register transfer language - register transfer - bus and memory transfers – arithmetic micro operations - logic micro operations – shift micro operations – arithmetic logic shift unit.

Unit-II

Basic Computer Organization: Instruction codes – computer registers – computer instructions – timing and control – instruction cycle – memory reference instructions – input-output and interrupt – complete computer description.

Unit-III

CPU Organization: Introduction - general register organization – stack organization - instruction formats – addressing modes – data transfer and manipulation – program control – Reduced Instruction Set Computer(RISC) – Complex Instruction Set Computer(CISC) .

Unit-IV

Micro programmed Control: Control memory – address sequencing – microinstruction format – vertical and horizontal microinstructions – micro program example – design of control unit

Unit-V

Memory and I/O Organization: Memory hierarchy – main memory – associative memory – cache memory – virtual memory, Peripheral devices – input/output interface – asynchronous data transfer – modes of transfer – priority interrupt – direct memory access.

Text Book:

1. Mano, Morris M., Computer System Architecture, 3rd ed. Pearson Education Asia,2000.

References:

1. Stallings W., Computer Organization and Architecture, 6th ed. Pearson Education Asia, 2000

2. Hamacher, V.C., Z.G.Vranesic, and S.G.Zaky, Computer Organization, 3rd ed, McGraw-Hill, 1990.

EUREI604 DIGITAL SYSTEM DESIGN USING VHDL

Category	L	T	P	Total hrs	C	S	T	Credits
CE	3	--	--	3	40	60	100	3

Unit-I

Introduction to VHDL: Introduction to VHDL, signals and variables, data types, brief introduction to xilinx software, creation of project in VHDL, implementation in FPGA, Entity declaration, architecture body, behavioral style of modeling, data flow style of modeling, structural style of modeling for a half-adder and full-adder, mixed modeling for full adder.

Unit-II

Building Blocks for Digital Design: VHDL models for 4-bit parallel adder using structural model and using for-generate keywords, VHDL model for ALU, 2 to 4 decoder, VHDL model for Encoder, 2x1, 4x1,16x1 Multiplexer VHDL model, VHDL model for Demultiplexer, VHDL model for magnitude Comparator, and Code Converters. VHDL model for RS latch, RS Flip-flop, JK flip flop, D-flip flop ,T-flip flop, 4-bit Asynchronous counter,3-bit synchronous up counter, down counter, M0d-15 synchronous counter with parallel load, Shift Registers-right shift, left shift, universal shift register, Barrel Shifter.

Unit-III

Design Methods: Elements of design style, Top-down design, Separation of Controller and architecture, Refining architecture and control algorithm.

Unit-IV

Introduction to ASM: Algorithmic State Machine (ASM), ASM chart notations, Realizing ASM's: Traditional synthesis for ASM chart, Multiplexer Controller method, One-shot method, ROM based method.

Unit-V

Design Case Studies: Single pulsar, Serial to parallel data conversion.

Text Books:

1. The Art of Digital Design, Prosser and Winkel, 2nd Edition, Prentice-Hall International,1996.

2. VHDL Primer, J. Bhasker, Pearson Education/ PHI, 3rd Edition.

References:

1. Digital System Design Using VHDL, Charles H. Roth Jr., Thomson Learning, 2005.

2. VHDL, Douglas L Perry, Mc Graw-Hill, Singapore.

B.Tech. (EIE) VI SEMESTER

EUREI605 ENGINEERING ECONOMICS AND MANAGEMENT

(Common with ECE- EUREC605)

Category	L	T	P	Total hrs	C	S	T	Credits	Dept.
HS	3	--	--	3	40	60	100	3	Mech.

Unit-I

Fundamentals of Economics – Scarcity and Efficiency Market, Command and Mixed Economics. Basic Elements of Supply and Demand – Law of Demand – Elasticity of Demand.

Unit-II

Business Organizations – Individual Proprietorship – Partnership – The Corporation. Statement of Profit and Loss – The Balance Sheet – Break-Even Analysis – Cost Concepts – Elements of Costs.

Unit-III

Principles and Functions of Management – Evolution of Management Thought – Decision Making Process. Organization Theory and Process – Leadership – Motivation – Communication – Conflict Management in Organization.

Unit-IV

Plant Location – Plant Layout – Production Planning and Control – Product Design and Development – Channels of Distribution. Materials Management – Inventory Control.

Unit-V

Industrial Disputes and their Settlement – Provision of Factories Act and Industrial Disputes Act., Recent Trends in Contemporary Business Environment.

Text Books:

1. **Engineering Economics, Vol.1, Tara Chand, Nem Chand & Bros, 13th ed.**
2. **Industrial Engineering and Management by O.P.Khanna, Khanna publishers Ltd.**

References:

1. **Engineering and Managerial Economics by Maheswari, . Sultan chand& Co, 19th ed.**
2. **A Text book of Economic Theory by Dhingra and Garg, Sultan chand& sons, 2nd ed.**
3. **Cost accounts by Shukla and Grewal, S.Chand& company, 14th ed.**
4. **Principles and Practice of Management by L.M.Prasad, Sulltan Chand & Sons**

B.Tech. (EIE) VI SEMESTER

EUREI606 PROCESS CONTROL

Category	L	T	P	Total hrs	C	S	T	Credits
CE	3	1	--	4	40	60	100	4

Unit – I

Introduction – Definition – History of Process Control – Block Diagram – Process Dynamics – Resistance, Capacitance, Inertia, Time Constant, Study State – First Order – Second Order – Dead time processes – Process Variables – Degrees of Freedom – Process Control objectives – Benefits of Process Control – Levels of Process Control System

Unit – II

Basic Control Schemes – Introduction – Feed Back Control – Classification - Selection of Feed Back Controllers – On/off – P,I,D Controllers – PI, PD, PID Controllers – Response of various controllers to standard inputs – Pneumatic Controllers – Electronic Controllers – Control schemes for Pressure Temperature, Flow, Liquid Process

Unit – III

Actuators and Valves – Introduction – Pneumatic – Hydraulic – Electric Actuators – I/P– P/I Converters – Basic Control Valves – Control Valve Characteristics – Types of Control Valves - Control Valve Sizing - Control Valve selection - Cavitation and Flashing in Control Valves

Unit – IV

Controller tuning – Introduction – Process Reaction Curve Method - Ziegler-Nicholous Method – 1/4th Decay Ratio – Damped Oscillation Method – Auto tuning – Statistical Analysis – Piping and Instrumentation Diagram

Unit – V

Advanced Control schemes – Introduction – Cascade Control – Ratio Control, Feed Forward Control – Predictive Control – Adaptive Control – Intelligent Control – Inferential Control – Optimal Control – Multi variable control

Text Books :

1.Process Control : Dynamics Concepts and Applications – SK Singh, PHI 2009
2.Process Control and Instrumentation: CD Johnson, PHI
3.Principles of Process Control - D Patrnabis, TMH

References:

Handbook of Process Control : BG Liptak

B.Tech. (EIE) VI SEMESTER

EUREI611 PROCESS CONTROL LABORATORY

Category	L	T	P	Total hrs	C	S	T	Credits
CE	--	--	3	3	100	--	100	2

1. ON-OFF Controllers
2. P, I, D and P + I + D Controller
3. Temperature Process Control
4. Pressure Process Control
5. Flow Process Control
6. Level Process Control
7. I/P converter
8. P/I Converter
9. Control valve characteristics.
10. Traffic light controller using PLC
11. Stepper Motor Controller using PLC.

B.Tech. (EIE) VI SEMESTER

EUREI612 MICROPROCESSORS LABORATORY

Category	L	T	P	Total hrs	C	S	T	Credits
CE	--	--	3	3	100	--	100	2

1. Block manipulation.
2. Arithmetic operations-Addition and multiplication.
3. Hexadecimal and decimal counters.
4. Digital clock
5. Sorting of numbers
6. Familiarization with DEBUGGER and TASM
7. Creation of .EXE and .COM using TASM
8. Assembly language programs using DOS21h interrupts
9. Assembly language programs using BIOS calls.
10. Data Acquisition using PCL 812 card.

B.Tech. (EIE) VII SEMESTER

EUREI701 BIO MEDICAL INSTRUMENTATION

Category	L	T	P	Total hrs	C	S	T	Credits
CE	3	--	--	3	40	60	100	3

Unit-I

Physiological systems and Bio-signals: Physiological systems of the body, Functional structure of the cell, resting and action potentials, functioning of the heart, physiological signal amplifiers.

Unit-II

Electrodes, Sensors, and Transducers: Transduction – Electrodes for biophysical sensing – types of electrodes: surface, needle, micro – inductive, capacitive and temperature transducers.

Unit-III

Measurement of Biological, Physiological parameters: Measurement of blood pressure, blood volume, respiration rate, temperature, ECG, EEG, EMG and PCG, Safety measures implemented in Biomedical Instrumentation.

Unit-IV

Patient Monitoring Systems: Intensive cardiac care units and Central monitoring systems, Patient monitoring through biotelemetry.

Unit-V

Medical Imaging Systems: X-ray machines, Principles of computer tomography (CT), CT number scale Scanning Systems, Detector arrays. Principles of Nuclear Magnetic Resonance (NMR) and MR Imaging, T1 and T2 based imaging, Basic MRI system, Introduction to PET (elementary treatment).

Text Books:

1. **Biomedical Instrumentation and Measurements, Leslie Cromwell, Fred J Weibell, and Erich A Pfeiffer, PHI/Pearson Education, 2003.**
2. **Hand Book of Biomedical Instrumentation, RS Khandpur, TMH, 2003.**

References:

1. **Principles of Medical Imaging, K.Kirk Shung, Benjamin Tsui and Michael. B. Smith, Academic Press Inc., New York.**
2. **Introduction to Biomedical Equipment Technology, Joseph J Carr, John M.Brown, 4th Edition, Pearson Education, Singapore, 2001.**

B.Tech. (EIE) VII SEMESTER

EUREI702 MICROCONTROLLERS AND APPLICATIONS

Category	L	T	P	Total Hrs	C	S	T	Credits
CE	3	--	--	3	40	60	100	3

Unit-I

Introduction to concept of microcontroller, comparison of microprocessor and microcontroller, intel 8051 microcontroller architecture, pin diagram, special function registers, external memory interface with 8051, operation of I/O ports.

Unit-II

Counters and timers in 8051, timer modes, Serial data input, output , serial data modes, interrupts, timer flag interrupt, serial port interrupt, external interrupts, software generated interrupt control, Addressing modes, external data moves, code memory, read only data moves. Push and Pop.

Unit-III

Instruction set of 8051. Data exchange, byte level logical operations, bit level logical operations, rotate and swap operations, instruction affecting flags, incrementing, decrementing, arithmetic operations, jump and recall instruction, assembly language programming of 8051 Calls and subroutines, interrupts and returns. Member of MCS-51 family with special reference to 89C51 IC.

Unit-IV

Applications: stepper motor control, speed/position control of ac/dc motors, control of physical parameters like temp, pressure, flow, level and humidity.

Unit-V

Introduction m 16 bit microcontroller, Intel MCS-96 family, architecture, special interference to member with on chip EPROM, ADC, PWM etc.

Text Books:

1. **The 8051 Microcontroller and Embedded Systems – Mazidi and Mazidi, PHI, 2000.**
2. **The 8051 Microcontroller architecture, programming and applications, Kenneth J.Ayala Penram International Pub, 2nd edition 1996**

References:

1.Microcontrollers (Theory & Applications) – A.V. Deshmuk, WTMH, 2005.

2.Design with PIC Microcontrollers – John B. Peatman, Pearson Education, 2005.

B.Tech. (EIE) VII SEMESTER

EUREI703 COMPUTER CONTROL OF PROCESSES

Category	L	T	P	Total hrs	C	S	T	Credits
CE	3	--	--	3	40	60	100	3

Unit-I

Basics of Computer Aided Process Control and Network Buses: Introduction-role of computers in process control-elements of computer aided process control system-Classification –computer aided process control architecture. RS 232 - RS 485 - RS 422 – ISA- PCI bus– Introduction to CAN bus and MODBUS, HART bus, Field bus, Profi bus.

Unit-II

Direct Digital Control (DDC): Introduction-DDC Structure-DDC Software position algorithm and velocity algorithm. Microcomputer based DDC structure, Elementary treatment of DCS, Block diagram, Mathematical modeling, ZOH and FOH, Mapping between S-plane and Z-plane.

Unit-III

Distributed Digital Control: Introduction-Distributed Control System (DCS) architecture-Sub-systems-Local field station-Presentation and monitoring device-Communication options in DCS-Configuration. Some popular distributed control systems. Display systems-Display parameters-Display in process control environment

Unit-IV

Programmable logic controllers: introduction- evaluation of PLC-PLC architecture-basic structure-PLC programming-ladder diagram-PLC communications-PLC selection-PLC installation

Unit-V

Advanced strategies for Computer Process Control: Introduction-predictive control-Adaptive control-inferential control-Statistical process control Algorithms for processes with dead time-optimal control

Text Books:

1. **Computer-based Industrial Control, Krishna Kant, PHI Publishers, 2003.**
2. **Computer Aided Process Control, S.K.Singh, PHI, 2005.**

B.Tech. (EIE) VII SEMESTER

EUREI721 OPTIMAL CONTROL

Course Code: EUREI721 **Category: Dept Elective I.**

Credits: 4 **Hours: 4 per week**

Unit-I

Introduction:Statement of optimal control problem – Problem formulation and forms of optimal control – Selection of performance measures- Necessary conditions for optimal control – Pontryagin's minimum principle – State inequality constraints – Minimum time problem.

Unit-II

Numerical Techniques for Optimal Control: Numerical solution of 2-point boundary value problem by steepest descent and Fletcher Powell method solution of Ricatti equation by negative exponential and interactive methods.

Unit-III

LQ Control Problems and Dynamic Programming : Linear optimal regulator problem – Matrix Riccatti equation and solution method – Choice of weighting matrices – Steady state properties of optimal regulator – Linear tracking problem – LQG problem – Computational procedure for solving optimal control problems – Characteristics of dynamic programming solution – Dynamic programming application to discrete and continuous systems – Hamilton Jacobi Bellman equation.

Unit-IV

Filtering and Estimation: Filtering – Linear system and estimation – System noise smoothing and prediction – Gauss Markov discrete time model – Estimation criteria – Minimum variance estimation – Least square estimation – Recursive estimation.

Unit-V

Kalman Filter and Properties: Filter problem and properties – Linear estimator property of Kalman Filter – Time invariance and asymptotic stability of filters – Time filtered estimates and signal to noise ratio improvement – Extended Kalman filter – Case study: Boiler optimization and control.

Text Books:

1. **Krik D.E., 'Optimal Control Theory – An introduction', Prentice hall, N.J., 1970**
2. **Sage, A.P., 'Optimum System Control', Prentice Hall N.H., 1968.**

References:

1. **Anderson, BD.O. and Moore J.B., 'Optimal Filtering', Prentice hall Inc., N.J., 1979.**
2. **S.M. Bozic, "Digital and Kalman Filtering", Edward Arnould, London, 1979.**
3. **Astrom, K.J., "Introduction to Stochastic Control Theory", Academic Press, Inc, N.Y., 1970.**

B.Tech. (EIE) VII SEMESTER

EUREI722 ROBOTICS AND AUTOMATION

Course Code: EUREI722 **Category: Dept Elective I.**

Credits: 4 **Hours: 4 per week**

Unit-I

Introduction: Historical robots, robots in science fiction, future trends of robots, Definitions of robots, present application status. Robot End-Effectors : Classification of End-Effectors, Drive Systems for Grippers, Mechanical Grippers, Magnetic Grippers, Vacuum Grippers, Adhesive Grippers, Hooks, Scoops and other miscellaneous devices, Active and Passive Grippers.

Unit-II

Robot Drives, Actuators and Control : Functions of Drive Systems, General Types of control, Pump Classification, I, introduction to Pneumatic Systems, Electrical Drives, DC Motors & Transfer Functions, Stepper Motor, Drive Mechanisms.

Unit-III

Robot Kinematics: Forward and Reverse Kinematics of 3 degrees of Freedom Robot Arm, Forward and Reverse kinematics of a 4 degree of freedom arm manipulator in 3-D, Homogeneous Transformations, Kinematics Equations using Homogenous Transformation.

Unit-IV

Robot Sensors: Need for Sensors, Types of Sensors, Robot Vision Systems, Robot Tactile Systems, Robot Proximity Sensors. Robot Speech and Hearing: Speech Synthesis, Noise Command Systems, Speech Recognition Systems.

Unit-V

Robot Intelligence & Programming the Robots: AI and Robotics, Expert Systems, Interpreting Sensory Inputs, Intelligent Tutoring Systems. Robot Languages, Robot Operating System, Robot Application Programming, Teaching Robots.
Robot Applications: Capabilities of Robots, Materials Handling, Machine, Loading and Unloading, Machining and Fettling, Robot Assembly, Welding, Future Applications.

Text Books:

1. **Robotics Technology and Flexible Automation, Satya Ranjan, TMH, New Delhi, 2001.**
2. **Robotics: Introduction, Programming and Projects, Maxwell Macmillan.International Edition, James L.Fuller, 2000.**

B.Tech. (EIE) VII SEMESTER

EUREI723 DATA COMMUNICATION & NETWORKS

Course Code: EUREI723 **Category: Dept Elective I**

Credits: 4 **Hours: 4 per week**

Unit-I

Introduction to data communications, data communication networking computer communication architecture, the OSI reference model data link controls: line configurations. Flow control, error control, and data link control protocols. Multiplexing: FDM, synchronous TDM, statistical TDM.

Unit-II

Switching Networks: Circuit switching,Single mode networks, Digital Switching concepts, Digital private branch exchange, control signaling packet switching principles, virtual circuits and data grams, routing, traffic control, x.25 packet switching.

Unit-III

Local, Metropolitan Area Networks: LAN/WAN/MAN technology, Bus/Tree and star topologies using metallic media optical fiber bus, the ring topology, medium access control protocols, MAC performance, LAN/WAN/MAN standards, IEE 802.2, 802.4 IEEE 802.5, IEEE 802.6

Unit-IV

Protocols and Architecture: Transport services, protocol mechanism, network services, the TCP/IP protocol suite, TCP, UDP and TP4, a comparison of OSI, TCP/IP and SNA architectures. Internetworking: Principle of internetworking, the bridge, routing with bridges, connection less and connection oriented internetworking. Session layer services, presentation layer facilities, presentation concepts.

Unit-V

ISDN and ATM Networks: ISDN concept – Transmission structures, user access, ISDN protocols, Broadband ISDN, broadband ISDN architecture. Introduction to ATM-concept of ATM-ATM protocol reference model- ATM network reference model-ATM layers-ATM adaption layers- Applications.

Text Books:

1. **Data and Computer communications, William Stallings, PHI, 6/e.**
2. **Computer Networks, A. Tanenbaum, PHI/Pearson Education Asia.**

References Book:

1. **Data communications and Networks, Behrouz. A.Fourouzan, PHI.**

B.Tech. (EIE) VII SEMESTER

EUREI731 VIRTUAL INSTRUMENTATION

Course Code: EUREI731 **Category: Dept Elective II.**

Credits: 4 **Hours: 4 per week**

Unit-I

Introduction: Virtual Instrumentation – Definition, flexibility – Block diagram and Architecture of Virtual Instruments – Virtual Instruments versus Traditional Instruments Data flow techniques-graphical programming in dataflow– Review of Popular softwares in virtual Instrumentation.

Unit-II

VI Programming Techniques: VI- sub VI- Loops-structures-charts- arrays- clusters –graphs- formula node-math script- local and global variable- strings- file I/O-execution control- Instrument drivers.

Unit-III

Data Acquisition in VI: Introduction to data acquisition-signal conditioning-classes of signal conditioning-field wiring and signal measurement-ground loops-A/D, D/A converters, plug-in DAQ boards- Analog input/output cards - Digital Input/Output cards-counter and timer I/o boards-Isolation-techniques- Opt isolation -Data acquisition modules with serial communication.

Unit-IV

Communication networked modules: Introduction to PC Buses – Local bus: ISA – PCI – RS232 – RS422 – RS485 – Interface Bus – USB, PCMCIA, VXI, SCXI, PXI. Instrumentation buses: Modbus – GPIB - Networked bus – ISO/OSI Reference model, Ethernet, and VISA

Unit-V

Real time control and Applications: Design of ON/OFF controller- PID controller -electronic prototyping and testing with ELVIS- real-time data acquisition-transducer analysis-signal processing with DSP module-real-time embedded control with CRIO.

Text Books :

1. LabVIEW based advanced Instrumentation System, PSumathi, Springer science Elsievier 2007.

2. Practical Data Acquisition for Instrumentation and Control Systems, John Park and Steve Mackay, Elsevier Publications.

References:

1.Labview Graphical programming, Gary Jhonson, Mc Graw Hill, Newyork, 1997.

2.Labview for everyone, Lisa K.Wells and Jeffrey Travis, Prentice Hall, NewJersey, 1997.

B.Tech. (EIE) VII SEMESTER

EUREI732 NEURAL NETWORKS AND FUZZY LOGIC

Course Code: EUREI732 **Category: Dept Elective II.**
Credits: 4 **Hours: 4 per week**

Unit-I

Fundamentals of artificial Neural Networks: Biological neurons and their artificial models, Neural processing, learning and Adaptation. Hebbian, perceptron, delta, widrow – hoff, correlation, winner – take –all, outstar learning rules.

Unit-II

Single Layer Perceptions: Multi player Feed forward Networks – Error back propagation training algorithm, problems with back propagation, Boltzmann training, Cauchy training, Combined back propagation/Cauchy training,

Unit-III

Hopfield networks: Recurrent and Bi-directional Associative Memories, Counter Propagation Network, Artificial Resonance Theory (ART).

Unit-IV

Applications of Neural networks: Handwritten digit and character recognition, Traveling salesman problem, Neuro controller – inverted pendulum controller, cerebellar model articulation controller, Robot kinematics, Expert systems for Medical Diagnosis.

Unit-V

Introduction to fuzzy set theory: Classical set Vs fuzzy set, properties of fuzzy sets, operations on fuzzy sets – union, intersection, complement, T-norm and co T-norm. Fuzzy relations: Operations on fuzzy relations, cylindrical extensions Inference rules, compositional rule of inference.

Text Books:

1. **Introduction to Artificial Neural System, S.M.Zurada, Jaico Publishing House,1992.**
2. **Neural Computing–Theory and Practice, Philip D.Wesserman, Van Nostrand Rein hold, New York 1989.**
3. **Fuzzy sets, Uncertainty, and Information, G.J.Klir, T.A.Folger, Prentice Hall of India, New Delhi, 1988.**

References:

1. **Neural Networks and Fuzzy Systems, Bart Kosko, Prentice Hall, NJ, 1992.**
2. **An Introduction to Fuzzy Control, D.Driankov, H.Hellen Doorn, M.Reinfrank, Narosa Publishing House, New Delhi, 1993.**

B.Tech. (EIE) VII SEMESTER

EUREI733 DIGITAL IMAGE PROCESSING

Course Code: EUREI733	**Category: Dept. Elective II.**
Credits: 4	**Hours: 4 per week**

Unit-I

Fundamentals of Image Processing: Image Acquisition, Image Model, Sampling, Quantization, Relationship between pixels, distance measures, connectivity, Image Geometry, Photographic film. Histogram: Definition, decision of contrast basing on histogram, operations basing on histograms like image stretching, image sliding, Image classification. Definition and Algorithm of Histogram equalization.

Unit-II

Image Transforms 2-D FFT, Properties. Walsh transform, Hadamard Transform, Discrete cosine Transform, Haar transform, Slant transform, Hotelling transform

Unit-III

Image Enhancement: (by SPATIAL Domain Methods) Arithmetic and logical operations, point operations, Smoothing filters-Mean, Median, Mode filters. Edge enhancement filters – Directorial filters, Sobel, Laplacian, Robert, KIRSCH Homogeneity & DIFF Filters, Prewitt filter, Contrast Based edge enhancement techniques. Low Pass filters, High Pass filters, sharpening filters. Color image processing, Color fundamentals, color models. Image Enhancement: (By FREQUENCY Domain Methods) Design of Low pass, High pass, EDGE Enhancement, smoothening filters in Frequency Domain. Butter worth filter, Homomorphic filters in Frequency Domain, Advantages of filters in frequency domain, comparative study of filters in frequency domain and spatial domain.

Unit-IV

Image Compression: Definition, A brief discussion on – Run length encoding, contour coding, Huffman code, compression due to change in domain, compression due to quantization Compression at the time of image transmission. Brief discussion on:- Image Compression standards.

Unit-V

Image Segmentation Detection of discontinuities. Edge linking and boundary detection, Thresholding, Region oriented segmentation. Image Restoration: Degradation model, Algebraic approach to restoration, Inverse filtering, Least mean square filters, Constrained Least Squares Restoration, Interactive Restoration.

Text Books:

1. **Digital Image processing – R.C. Gonzalez & R.E. Woods, Addison Wesley/ Pearson Ed., 2nd Education, 2002.**
2. **Fundamentals of Digital Image processing – A.K.Jain, Prentice Hall of India.**

References:

1. **Digital Image processing using MAT LAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Edition, PEA, 2004.**
2. **Digital Image Processing – William K. Pratt, John Wiley, 3rd Edition, 2004.**

B.Tech. (EIE) VII SEMESTER

EUREI711 BIO-MEDICAL INSTRUMENTATION LABORATORY

Category	L	T	P	Total hrs	C	S	T	Credits
CE	--	--	3	3	100	--	100	2

1) **Study and recording of ECG with Unipolar Limb leads**

2) **Study and recording of ECG with Bipolar Limb leads**

3) **Study and recording of EEG and EMG**

4) **Instrumentation amplifier design for ECG,EEG and EMG**

5) **Study and recording of Pulse rate and Respiration rate**

6) **PC based data acquisition**

7) **Study of Biotelemetry system**

MATLAB EXPERIMENTS

1) **ECG waveform generation**

2) **Principal component analysis of ECG**

3) **QRS Detection in ECG**

4) **Noise elimination in ECG signal using**

   a) IIR b) FIR c) NOTCH FILTER d) BAND PASS FILTER

5) **MRI SCAN**

   a) **Thresholding**

   b) **Random transform**

B.Tech. (EIE) VII SEMESTER

EUREI712 MICROCONTROLLERS LABORATORY

Category	L	T	P	Total hrs	C	S	T	Credits
CE	--	--	3	3	100	--	100	2

1. **Study and use of 8051 Microcontroller trainer kit.**
2. **Assembly Language Program for addition of 8 bit numbers stored in array.**
3. **Assembly Language Program for Multiplication by successive addition of two 8bit numbers.**
4. **Assembly Language Program for finding largest number from a given array of 8bit numbers**
5. **Assembly Language program to arrange 8 bit numbers stored in array in ascending order.**
6. **Stepper motor control by 8051 Microcontroller.**
7. **Interfacing of 8 bit ADC 0809 with 8051 Microcontroller.**
8. **Interfacing of 8 bit DAC 0800 with 8051 Microcontroller.**
9. **DC motor control by 8051 Microcontroller.**
10. **Implementation of Serial Communication by using 8051 serial ports.**
11. **Assembly Language Program for use of Timer/Counter for various applications.**

B.Tech. (EIE) VII SEMESTER

EUREI713 PROJECT I

Category	L	T	P	Total hrs	C	S	T	Credits
PW	--	--	6	6	50	50	100	3

- **A summary of the progress of the work carried out is to be submitted at the end of VII Semester.**
- **The progress of the work is to be assessed at the end of the VII semester.**

B.Tech. (EIE) VII SEMESTER

EUREI714 INDUSTRIAL TRAINING

Category	L	T	P	Total hrs	C	S	T	Credits
IT	--	--	--	--	100	-	100	2

- **The student will undergo training in any one of the approved list of industries by the Head of the Dept.**
- **The duration of the training should be 4 to 6 weeks during summer vacation between 3rd & final years of study.**
- **The student will submit a detailed report along with the certificate from the industry where they have undergone training to the Department for assessment within a month of return from the training.**
- **The student will have to give a seminar on the training programme during the VII semester.**

B.Tech (EIE) VIII SEMESTER

EUREI801 EMBEDDED SYSTEMS

Code	L	T	P	Total Hrs	C	S	T	Credits	Dept.
EUREI801	3	--	--	3	40	60	100	3	EIE

UNIT-I (INTRODUCTION TO EMBEDDED SYSTEMS)

Definition and Classification, Overview of Processors and hardware units in an embedded system, Software embedded into the system , Exemplary Embedded Systems, Embedded Systems on a Chip (SoC) and the use of VLSI designed circuits

UNIT II (DEVICES AND BUSES FOR DEVICES NETWORK)

I/O Devices , Device I/O Types and Examples ,Synchronous and Asynchronous Communications from Serial Devices ,Examples of Internal Serial-Communication Devices , UART and HDLC , Parallel Port Devices , Sophisticated interfacing features in Devices/Ports, Timer and Counting Devices , '12C', 'USB', 'CAN' and advanced I/O Serial high speed buses, ISA, PCI, PCI-X, cPCI and advanced buses.

UNIT III (PROGRAMMING CONCEPTS AND EMBEDDED PROGRAMMING IN C, C++)

Programming in assembly language (ALP) vs. High Level Language , C Program Elements, Macros and functions -Use of Pointers - NULL Pointers , Use of Function Calls, Multiple function calls in a Cyclic Order in the Main Function Pointers, Function Queues and Interrupt Service Routines Queues Pointers , Concepts of EMBEDDED PROGRAMMING in C++ - Objected Oriented Programming – Embedded Programming in C++, 'C' Program compilers, Cross compiler, Optimization of memory codes.

UNIT IV (REAL TIME OPERATING SYSTEMS – PART - 1)

Definitions of process, tasks and threads, Clear cut distinction between functions ,ISRs and tasks by their charac-teristics, Operating System Services- Goals, Structures, Kernel, Process Management, Memory Management – Device Management – File System Organisation and Implementation – I/O Subsystems – Interrupt Routines Hand-ling in RTOS, REAL TIME OPERATING SYSTEMS : RTOS Task scheduling models - Handling of task schedu-ling and latency and deadlines as performance metrics – Co-operative Round Robin Scheduling,Cyclic Scheduling with Time Slicing (Rate Monotonics Co-operative Scheduling) ,Preemptive Scheduling Model strategy by a Scheduler, Critical Section Service by a Preemptive Scheduler, Fixed (Static) Real time scheduling of tasks, INTER PROCESS COMMUNICATION AND SYNCHRONISATION , Shared data problem, Use of Semaphore(s), Prio-rity Inversion Problem and Deadlock Situations, Inter Process Communications using Signals – Semaphore Flag or mutex as Resource key, Message Queues, Mailboxes, Pipes–Virtual (Logical) Sockets, Remote Procedure Calls (RPCs).

UNIT V (REAL TIME OPERATING SYSTEMS – PART – 2)

Study of Micro C/OS-II or Vx Works or Any other popular RTOS–RTOS System Level Functions, Task Service Functions, Time Delay Functions, Memory Allocation Related Functions, Semaphore Related Functions, Mailbox Related Functions, Queue Related Functions, Case Studies of Programming with RTOS, Understanding Case Definition ,Multiple Tasks and their functions, Creating a list of tasks, Functions and IPCs, Exemplary Coding Steps.

TEXTBOOKS

1. **Rajkamal, Embedded Systems Architecture, Programming and Design, TATA McGraw-Hill, First reprint Oct. 2003**

REFERENCES

1. **Steve Heath, Embedded Systems Design, Second Edition-2003, Newnes,**
2. **David E.Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint 2000.**
3. **Wayne Wolf, Computers as Components; Principles of Embedded Computing System Design – Harcourt India, Morgan Kaufman Publishers, First Indian Reprint 2001;**
4. **Frank Vahid and Tony Givargis, Embedded Systems Design – A unified Hardware /Software Introduction, John Wiley, 2002.**

B.Tech. (EIE) VIII SEMESTER

EUREI841 FIBRE OPTICS AND LASER INSTRUMENTATION

Course Code: EUREI841		**Category:**	**Dept Elective III.**
Credits:	**4**	**Hours:**	**4 per week**

Unit-I

Optical Fibres and Their Properties:

Principles of light propagation through a fiber - Different types of fibers and their properties - Transmission characteristics of optical fiber- Absorption losses -Scattering losses -Dispersion - Optical fiber measurement.

Unit-II

Optical Sources and Detectors: Introduction to Optical sources LED-structures, Types, characteristics, Applications, LD, PIN structures, Types, characteristics, Applications, APD - Optical detectors, Wavelength Division Multiplexing.

Unit-III

Industrial Application of Optical fibres: Fiber optic sensors- Fiber optic instrumentation system-Different types of modulators –Detectors-Application in instrumentation- Interferometer method of measurement of length-Moiré fringes-Measurement of pressure, Temperature, current, Voltage, liquid level and strain–Fiber optic gyroscope–polarization-Maintaining fibers.

Unit-IV

Laser Fundamentals: Fundamental characteristics of laser-Three level and four level lasers-Properties of lasers-Laser modes-Resonator configuration-Q-switching and mode locking-Cavity dumping-Types of laser-Gas laser, solid laser, liquid laser, semi conductor laser.

Unit-V

Industrial Application of Laser: Laser for measurement of distance, length, velocity, acceleration, current, voltage, and atmospheric effect-Material processing-Laser heating, welding, melting and trimming materials, removal and vaporization. Holography- Basic principle, methods-Holographic interferometer and applications –Holography for non destructive testing-Holographic components-Medical application of lasers-laser and tissue interaction.

Text books:

1. **Optical Fibre Communications, Gerd Keiser, McGraw-Hill, International Edition,2000.**
2. **Introduction to lasers and their applications, D.C.O'shea, Russel Callen, Mc Millan,1977.**
3. **Industrial lasers and their applications, John and Harry, McGraw Hill, 1974.**
4. **Optical communications, John senior, PHI**

References:

1. **Industrial applications of lasers, John F Ready, Academic press, 1978.**
2. **Laser applications, Monte Ross, McGraw Hill, 1968.**
3. **Optical electronics foundation book, Ghatak A.K. and Thiagarajan K, TMH, New Delhi, 1991.**
4. **Fibre Optic Communications, John Palais, Pearson Education**

B.Tech. (EIE)VIII SEMESTER

EUREI842 INSTRUMENTATION FOR PETROCHEMICAL INDUSTRY

Course Code: EUREI842 **Category: Dept Elective III.**

Credits: 4 **Hours: 4 per week**

Unit-I

Petroleum Processing: Petroleum exploration – Recovery techniques – Oil - Gas separation – Processing wet gases -refining of crude oil.

Unit-II

Unit Operations in Petroleum Industry: Thermal cracking – Catalytic cracking – Catalytic reforming – Chemical oxidation – Chemical reduction – Precipitation – Polymerization – Alkylation – Isomerization – Production of ethylene, Acetylene and Propylene from petroleum

Unit-III

Chemical from Petroleum Products: Chemical from petroleum – Methane derivatives – Acetylene derivatives – Ethylene derivatives – Propylene derivatives – Other products

Unit-IV

Measurement in Petrochemical Industry: Parameter to be measured in refinery and petrochemical industry – Selection and maintenance of measuring instruments – Intrinsic safety of instruments

Unit-V

Control Loops in Petrochemical Industry: Process control in refinery and petrochemical industry – Control of distillation column control of catalytic crackers and pyrolysis Unit – Automatic control of polyethylene production – Control on vinyl chloride and PVC production.

Text books:

1. **Process Control Structures and applications, Balchan .J.G. and Mumme K.I., Van Nostrand Reinhold Company, New York, 1988.**

References:

1. **Chemical from petroleum, Waddams A.L, Butter and Janner Ltd., 1968**
2. **Chemical Process Industries, Austin G.T. Shreeves, McGraw-Hill International student edition, Singapore, 1985.**
3. **Instrumentation in process Industries, Liptak B.G. Chilton book Company, 1994.**
4. **Process measurement and analysis, Liptak B.G., Third edition, Chilton book Company,1996.**

B.Tech. (EIE)VIII SEMESTER

EUREI843 DIGITAL CONTROL SYSTEMS

Course Code: EUREI843 **Category: Dept Elective III.**

Credits: 4 **Hours: 4 per week**

Unit-I

Introduction to Discrete time systems, analogous with continuous-time systems, mathematical models for LTI discrete-time systems, convolution representation and difference equations in advanced and delayed form, Z-transformation of difference equations, analysis of first, second, and higher order systems, stability of discrete-time systems, the Jury's criterion.

Unit-II

State space modeling of discrete-time dynamical systems, canonical forms, solution to state space equations, properties of the state transition matrix, analysis of discrete-time state equation.

Unit-III

Equilibrium points and stability definitions, direct method of Lyapunov, definitions of controllability and observability, equivalent controllability/observability conditions. Design of state feedback and output feedback control, Design of observers.

Unit-IV

Numerical Computations, digital simulation of state-space models, QR decomposition, singular value decomposition, digital control using digital signal processors.

Unit-V

Introduction to Optimal Control, statement of the optimal control problem, dynamic programming general introduction to the principle of optimality, application to DTS, discrete-time linear quadratic problem, Riccati equation and its solution, optimal state feedback solution.

Text Books:

1. **Discrete-time Control system, Ogata K., second edition, Prentice Hall Inc., New Jersey, 1992.**
2. **Digital Control Systems, Kuo B.C, Second edition, Saunders College Publishing, Japan, 1992.**

References:

1. **Digital Control System Analysis and Design, Phillips C.L. and Nagle H.T, Third edition, Prentice-Hall, New Jersy, 1995.**
2. **Computer Controlled Systems Theory and Design, Astrom K,J and Wittenmark, second edition, Prentice Hall, New Delhi, 1990.**
3. **Digital Control and State Variable Methods, Gopal M., Tata McGraw Hill, New Delhi, 1997.**

B.Tech. (EIE) VIII SEMESTER

INTER DEPARTMENTAL ELECTIVE-I

Course Code: EUREI 851 – 8516 **Category: Inter-Departmental Elective**

Credits : 4 **Hours : 4 per week**

Department: Other Departments (One of the following)

Course Code	Name of the Course
EUREI 851	Remote Sensing& GIS
EUREI 852	Data Base Management Systems
EUREI 853	Software Engineering
EUREI 854	Systems Modeling and Simulation
EUREI 855	Software Project Management
EUREI 856	Artificial Intelligence
EUREI 859	Power Electronics
EUREI 8510	Project Planning and Management
EUREI 8512	Introduction to Micro Mechanical Systems(MEMS)
EUREI 8513	Entrepreneurship
EUREI 8514	Public Administration
EUREI 8516	Equipment for construction Industry

B.Tech. (EIE)VIII SEMESTER

INTER DEPARTMENTAL ELECTIVE-II

Course Code: EUREI861– 8619 **Category: Inter-Departmental Elective**

Credits: 4 **Hours: 4 per week**

Department: Other Department (One of the following)

Course Code	Name of the Course
EUREI 861	Environmental Impact Assessment
EUREI 862	Operating Systems
EUREI 863	Web Technologies
EUREI 865	Computer Aided Design
EUREI 867	Mechatronics
EUREI 868	Education Research & Methodologies
EUREI 869	Professional Ethics
EUREI 8611	Thermodynamics
EUREI 8614	Very Large Scale Integrated System Design (VLSI)
EUREI 8615	Fundamentals of Civil Engineering
EUREI 8616	Engineering Materials
EUREI 8617	Computer Networks
EUREI 8619	Managerial & Engineering Economics

B.Tech. (EIE) VIII SEMESTER

EUREI811 VIRTUAL INSTRUMENTATION LAB

1. **Simulation and Analysis of various signals using LabVIEW.**
2. **Transducer Characterization**
3. **Signal conditioning of various Sensors/Transducers.**
4. **Design and Testing of various circuits for control and Instrumentation.**
5. **Time response analysis of a model**
6. **Frequency response analysis of a model.**
7. **Study of PID Controller.**
8. **Root locus bode plot and polar plots for given transfer function using LabVIEW.**
9. **FFT and digital filtering using LabVIEW.**
10. **Electrocardiogram using LabVIEW.**

B.Tech. (EIE) VIII SEMESTER

EUREI812 PROJECT II

Category	L	T	P	Total hrs	C	S	T	Credits
CE	--	--	9	9	50	50	100	5

B.Tech. (EIE) VIII SEMESTER

EUREI813 COMPREHENSIVE VIVA

Course Code: EUREI813 **Category: CE**

Credits: 2 **Department: EIE**

The viva voce examination is to be conducted by an external examiner in the final semester.

The syllabus covers all the subjects the student learned in the four year course work.

B.Tech (EIE) VIII Semester

EUREI 851 – Elective-I: Remote Sensing & GIS

UNIT-I: Fundamentals of Remote Sensing:

Introduction, Electromagnetic radiation, Electromagnetic Spectrum, Energy interactions with Earth's surface materials and Atmosphere, Sensors and Platforms, False Colour Composite (FCC) image, Image interpretation techniques, Satellite remote sensing – Indian context.

UNIT-II: Fundamentals of GIS:

Introduction, Elements of GIS, Vectorization, Rasterization, Geo-referencing, Map Projections, Digitization Process, Data Base handling, Types of data structures, overlay analysis, surface terrain models – Digital elevation model (DEM), Triangulated irregular network (TIN), and Slope models.

UNIT-III: RS & GIS Techniques for Natural resources Management:

Landuse/land cover classification systems, Forest cover, agriculture and wasteland management. Water resources management.

UNIT-IV: RS & GIS Techniques for Infrastructure Planning and Management:

Urban utilities, cadastral mapping and transport network. GPS Navigation system for various applications.

UNIT-V: RS & GIS Techniques for Natural Disasters Management:

Earthquakes, Landslides, cyclones and Floods – Hazard Zonation, Risk assessment, Relief and Rehabilitation measures.

Text Books:

1. **P.K. GUHA, Remote Sensing for the Beginner, EWP Ltd.**
2. **M.ANJIREDDY, Text Book of Remote Sensing and Geographical Information Systems, BSP Publishers.**
3. **Lillesand, T.M. and Kiefer, Remote Sensing and Image Interpretation, R.W. John Wiley & Sons Publishers.**

B.Tech (EIE) VIII Semester

EUREI 852: Elective-I: Data Base Management Systems Prerequisite: File processing

UNIT-I

Introduction to DBMS – Overview, File system vs DBMS, Advantages of DBMS, Storage data, queries, Transaction Management, DBMS Structure. E-R model Entities, Attributes and Entity sets, Relation ship and Relation ship sets, Features of ER model, Conceptual database design with ER model.

UNIT-II

Relational model – integrity constraints over relations and enforcement, Querying relation data, Logical database design, views, destroying/altering tables and views. Relational algebra and calculus

UNIT-III

SQL – Basic SQL, Query, union, interest, except, Nested Queries, Aggregated Operation, Null values, Embedded SQL, cursors, ODBC and JDBC, Triggers and Active database, designing active databases

UNIT-IV

Transaction management, concurrency control & crash recovery – Transaction concept, transactions and schedules, concurrent execution of transactions, lock – based concurrency control, crash recovery.

UNIT-V

Case Study: Oracle0i (SQL, PL/SQL & Triggers)

Text Book:

a. **Database Management Systems –Raghu Ramakrishnan and Johannes Gehrke McGraw-Hill**
b. **Data System Concepts – H.F.Korth and A.Silberschatz McGraw-Hill**

Reference Book: 1. Fundamentals of Database System – R.El. Masri and S.B.Navathe

B.Tech (EIE) VIII Semester

EUREI 853: Elective-I: Software Engineering

UNIT I: Introduction -Software problem –Software Engineering Problem –Software Engineering Approach

UNIT II: Software Process – Software Process – Characteristics of Software Process – Software Development Process – Project management process – Software Configuration Management Process – Process Management Process.

UNIT III: Software Requirements Analysis & specification – Software Requirements – Problem Analysis – Requirements Specifications – Validation – Metrics

UNIT IV Planning a Software Project – Cost Estimation – Project Scheduling – Staffing & personnel Planning – Software Configuration Management plans – Quality Assurance Plans

UNIT V: Function Oriented Design – Design Principles – Module Level Concepts – Design Notation and Specifications – Structured Design Methodologies – Verification – Metrics Testing – Testing Fundamentals – Functional Testing – Structural Testing – Testing Procedure

Text Book: An Integrated Approach to Software Engineering by Pankaj Jalot – Narosa Publishers

Reference Book: Software Engineering a practitioner's approach by Pressman

B.Tech (EIE) VIII Semester

EUREI 854: Elective-I: Systems Modeling & Simulation

UNIT-I

SYSTEM MODELS:Concept of a system, System Environment, Stochastic activities, continuous and Discrete Systems, System Modeling, Physical and Mathematical Models for Systems, Static and Dynamic Categorization of these physical and mathematical Models. Principles used in modeling.

SYSTEM SIMULATION: MONTE–CARLO Method: Comparison of Simulation and analytical methods, Experimental nature, Types of Simulation, Numerical Computation Technique for continuous model and for Discrete model, Distributed Lag Models, Cobweb Models.

UNIT-II

CONTINUOUS SYSTEM SIMULATION:Differential Equations, Analog Computers, Analog Models, hybrid Computers, digital – Analog Simulations, Continuous System Simulation Lang-uages (CSSLS), CSMP–III, Hybrid Simulation, Feedback Systems, Simulation of an, Interactive Systems, Real-Time Simulation.
SYSTEM DYNAMICS: Exponential Growth Models, Exponential Decay Models, Logistic Curves, Gene-ralization of Growth Models, Simple System Dynamics Diagrams, Multi-segment Models, Representation of Time Delays, WORLD Models.

UNIT-III

PROBABILITY CONCEPTS IN SIMULATION: Stochastic Variables, Discrete Probability functions, Continuous Probability functions, Measures of Probability functions, Numerical Evaluation of Continuous Probability functions, continuous Uniformly Distributed Random Numbers, A Uniform Random Number Generator, Generating Discrete Distributions.
ARRIVAL PATTERNS AND SERVICE TIMES: Poisson's Arrival patterns, Exponential Distribution, Erlang Distribution, Hyper-Exponential Distribution, Normal Distribution, Queuing Disciplines, Mathematical Solutions of Queuing Problems.

UNIT-IV

INTRODUCTION TO GPSS: GPSS Programs, General Description Action Times, Succession of Events, Choice of Paths, Simulation of a manufacturing Shop, Conditional Transfers, Control Statements, Functions, Simulation of a Super Market, Transfer modes, GPSS Model of a Simple Telephone system.

UNIT-V

RANDOM ACCESS SYSTEMS:Aloha, Slotted Aloha, Carrier Sense Multiple Access, Delay Calculations in CSMA/CD, Performance comparisons, Reservation Techniques.
ROUTING AND FLOW ALLOCATION: Routing Model, Shortest Path Algorithms, Capacity Constrains, Flow control and Routing, Routing in Practice.

Text Books:

1. **System Simulation by GEOFFREY GORDON, PHI, Second Edition.**
2. **Modeling and Analysis of computer Communications Networks. Networks Jeremiah F. Hayes, Khanna Publications.**

References :Geoffrey Gordon

B.Tech (EIE) VIII Semester

EUREI 855: Elective-I: Software Project Management

Unit I: Conventional Software Management, Evaluation of Software Economics.

Unit II: Improving Software Economics.

Unit III: The old way and the new, Life-Cycle Phases.

Unit IV: Artifacts of the Process, Model-Based Software Architectures Workflows of the Process, Checkpoints of the Process, Iterative Process Planning.

Unit V: Project Organisations and Responsibilities, Process Automation.Project Control and Process Instrumentation, Tailoring the process.

Text Book:

1. **Software Project Management, A real world guide to success by Joel Henry.**
1. **Software Project Management by Royce.**
2. **Software Proejct Management in practice by Pankaj Jalote**
3. **Quality Software Project Management by Futrell**

B.Tech (EIE) VIII Semester

EUREI 856: Elective-I: Artificial Intelligence

UNIT I:

Introduction to Artificial Intelligence, Artifical Intelligence Problems, Artificial Intelligence Techniques, problems, problem space and search-defining the problem as a state space search, Production System, Problem Characteristics.

Heuristic Search Technologies Generate & Test Hill Climbing, Best First search, Problem reduction, Constraint satisfaction, Means Endo Analysis

UNIT II:

Knowledge Representation, Knowledge using predicate logic representing simple facts in logic, representing instance and is relationship, computable functions and predicates resolution.

UNIT III:

Representing Knowledge Using Rules: Procedural Vs Declarative knowledge, Logic programming, Forward Vs backward Reasoning, Matching, Control Knowledge.

UNIT IV:

Symbolic Reasoning under uncertainty – Introduction to Non-monotonic Reasoning, logics for Non-monotonic Reasoning, Implementation: depth first search – Dependency – Directed Backtracking. Justification – based truth maintenance, logic based truth maintenance systems Statistical Reasoning –Probability and bayes theorem, Certainity factors and rule – base systems beyesian networks, dempst6er – Shaffer theory.

UNIT-V

Wek & Strong Slot and Filler Structures Sematic nets, Frames, Conceptual dependencies, Scripts

Prescribed Books: Artificial Intelligence – Rich E & Knight K TMH 1991

Reference Book: Artificial Intelligence structures and strategies complex problem solving – George F-Lugar Pearson Education.

B.Tech (EIE) VIII Semester

EUREI 859: Elective-I: Power Electronics

UNIT-I

Power Semiconductor Switches: Power diodes, Power transistors – Thyristor family – SCR – Triac – GTO –Power MOSFET – IGBT – two transistor model – Gate characteristics – static and dynamic characteristics – Turn – ON – Turn – OFF methods – Series and Parallel operation of Thyristors – Gate triggering circuits – UJT as an SCT trigger – Thyristor ratings. Protection circuits.
UNIT-II Phase Controlled Rectifiers: Single phase and three phase – half wave – full wave – and Bridge controlled rectifiers – Daul converters – effect of load and source inductances – Natural commutation.
UNIT-III Choppers: Principle of operation, step up choppers – step down choppers – various types of choppers – Morgan – Jones – Oscillation chopper – commutation circuits.
UNIT-IV Inverters: Claassificatin – series and parallel inverters – single phase and three phase inverters McMurny – McMurray Bedford inverter – Voltage control – Harmonic reduction – current source invertes.
UNIT-V AC to AC Converters: Principle of operation of CYclo-converter – single phase to single phase Cyclo-converter – Cyclo-converter circuits – three phase output.
Single phase and three phase voltage controllers using Thyristor and Traic – AC choppers.
Text Books:
1.Power Electronics, M.Rashid. PHI
2.Power Electronics, P.S. Bimbra, Khanna Publishers
3. Power Electronics, Singh M.D. and Khanchandani. TMH
Reference Books:
1.An introduction to Thyristors and their applications, M.Rama Murthy, East-West Press
2.Power Electronics, R.Ramshaw.
3.Thyristorised Power Controllers, Dubey., Wiley Eastern Ltd.

B.Tech (EIE) VIII Semester
EUREI 8510: Elective-I: Project Planning and Management

UNIT–I
Project Management Systems, Organization, Scope of construction management, Significance, concept of scientific management, qualities of manager, organization – authority policy, recruitment process and training.

UNIT- II
CPM and PERT: Introduction of Pert and CPM, Planning scheduling and controlling, Bar charts, Pert and CPM networks.

UNIT–III
Estimation, Resource Analysis, Justification and Evaluation – Introduction – Costing Proposals – Budgets – Resource analysis – Pricing Projects – Project Risk analysis – Cash Flow Consideration – Strategic Investment Decisions.

UNIT–IV
The role of Management and Leadership in Project environment – Individual Skills and Attitudes – Individual Motivation – Structural implications for Project managers – Cultural Implications – Management Style – Development of Management Thinking.

UNIT–V
Project Review – Project Completion & Handover – Long term Project audit and review – Continuous improvement – Bench Marking of Performance and Process – The role of Project Leader in the World Class Projects.

Text Book:
Harvey Maylor, Mac Millan India Ltd., Delhi
Reference Book:
Punmia: Laxmi Publications

B.Tech (EIE) VIII Semester

EUREI 8512: Elective-I: Introduction to Micro Electro Mechanical Systems(MEMS)

UNIT I

Introduction: History of MEMS, Overview of MEMS Processes, Properties of Silicon, A Sample MEMS Process. Definitions and Terminology, A sample Process, Lithography and Etching.Micromachining: Subtractive Processes (Wet and Dry etching), Additive Processes (Evaporation, Sputtering, Epitaxial growth).Fundamental Devices and Processes: Basic mechanics and electrostatics for MEMS, parallel plate actuators, pull-in point, comb drives. Electrostatic actuators; MEMS foundries, Cronos MUMPs (multi user MEMS process).

UNIT II

MUMPs (Multi User MEMS Process): JDS Uniphase MUMPs processing sequence and design rules. Design rules; applications; micro hinges and deployment actuators. CMOS MEMS: CMOS foundry processes, integrated IC/MEMS, MEMS postprocessing, applications.

UNIT III

Thermal Transducers: bimorphs, "heatuators", cilia arrays. Micro Opto Electro Mechanical Systems (MOEMS): Micro Scanners, Digital Mirror Display, Retinal Scanning Display. Grating light valve, coroner cube retroreflector, optical switches, other micro-optical devices iezoresistivity; Scanning Probe Microscopy: scanning tunneling icroscope (STM), atomic force microscope (AFM)

UNIT IV

Wireless MEMS: mechanical and electrical resonators, Q-factor, switches, filters.Power for MEMS: thin film batteries, micro fuel cells, energy fields,
MEMS Packaging and Assembly: microassembly: serial and parallel, deterministic and stochastic; microgrippers: HexSil process; packaging techniques

UNIT V

The future of MEMS: Biomems – neural implants, gene chips, diagnostic chips; MEMS in space; mechanical computers; invisible and ubiquitous computing

Text Books:

1. **Fundamentals of Microfabrication: The Science of Miniaturization, Second Edition ISBN: 0849308267, CRC Press, 1997 by Marc J Madou**

2. **MEMS a Practical Guide of Design, Analysis, and Applications**
   Korvink, Jan, Paul, Oliver
   2006,Approx. 9800 p., Oliver
   ISBN: 3-540-21117-9

3. **Mechanics of Microelectromechanical Systems**
   Lobontiu, Nicolae, Garcia, Ephrahim
   2004, XII, 405 P.295 illus., Hardcover
   ISBN: 1-4020-8013-1

4. **MEMS & Microsystems TMGH 2002 by Tai-ran Hsu**

5. **Microsensors, MEMS & Smart Devices John Wiley 2002 by JW Gardner & VK Varadan**

B.Tech (EIE) VIII Semester

EUREI 8513: Elective-I: Entrepreneurship

UNIT I

Introduction:

Meaning, importance, benefits of Entrepreneurship-characterizes, factors of Entrepreneurship-Barriers of Entrepreneurship-Difference between Entrepreneurship and management-Evolution of the concept of entrepreneur-Difference between entrepreneur and entrepreneur. Motivational aspects of entrepreneur (McClelland theory)

UNIT II

Project Identification And Selection:

Meaning, classification of projects-Factors involved in project identification. Selection-significance contents, formulation of a project report – specimen of a project report-planning commission's guidelines for formulating a project-Basics of capital budgeting-Pay back period. Net present value. Internal Rate of Return.

UNIT III

Sources Of Finance:

Cost of capital-importance of a capital-Basic concepts, rational assumptions-cost of debt, reference, equity capital-source of finance-internal, external sources-institutional finance to entrepreneurs and institutional support to entrepreneurs.

UNIT IV

Project Appraisal:

Concept project appraisal-Methods of project appraisal, Economic analysis, Financial analysis, Market analysis Technical feasibility and Managerial competence (assessment of working and fixed capital Govt. Policies, qualitative methods of market analysis, Life cycle segmentation).

UNIT V

Ownership Structures & Evaluation Of Edps:

Ownership structures-sole trader, partnership (Partnership deed) types of partnership-Joint stock companies-Difference between private and a public company – Advantage and disadvantages of the ownership structures – Distinction between MDP and EDP – Training methods and Role playing (Games).

Text Books:

1. **Harold Koontz & Heinz Weihrich.** ***Essentials of Management, McGraw Hill International.***
2. **Hirich R.D. & Peters Irwin M.P.,** ***Enterpreneurship, Mc Graw Hill***
3. **Rao T.V. & Deshpande M.V., Prayag Metha, Nadakarni M.S.** ***Developing Entrepreneurship, Hand Book. Learning Systems.***
4. **Donald Kurado & Hodgelts R.M.,** ***Entrepreneurship A Contemporary Appraoch.*** **The Dryden Press.**
5. **Dr Patel V.G. Seven Business Crisis, Tata McGraw Hill**
6. **Timmons J.N. New Venture Creation – Entrepreneurship for 21ST century, Mc Graw Hill International.**

References:

1. Patel J.B .Nold S.S. A Manual on Business Opportunity Identification, Selections, EDH.

2. Rao C.R. Finance for Small Scale Industries.

3. Pandey M.W. Compier Guide to Successful Entrepreneurship. Vikas Publishing

B.Tech (EIE) VIII Semester

EUREI 8514: Elective-I: Public Administration

Definition, nature and scope of public administration; the chief executive; leadership qualities of administrator, principles of organization; organization of Ministries of Home and Finance; personnel administration – bureaucracy; recruitment, promotion, conduct and discipline, employer – employe relations; administration at work-planning, policy formulation, decision making supervision, coordinator, integrity in administration; public corporations in India; financial administration in India; local administration in India.

B.Tech (EIE) VIII Semester

EUREI 8516: Elective-I: Equipment for Construction Industry

Unit I: Earth Work – Introduction, use of available equipment, suitability of job conducting, Excavation equipments, loading and lifting, transporting equipments, compacting equipments.

Unit II: Foundation – Introduction, blasting, Drilling, Piling, Anchoring, Drainage.

Unit III: Concreting – Introduction, Concrete mixtures, types, Concrete batching plants, vibrators, lifts, pumps, slip from shuttering, steel fabrication, cutting, bending, cranes, reinforcement fabrication.

Unit IV: Miscellaneous – Road Pavers, sand blasting, grouting, compressors, gate valves – control equipment for out let – and spillways, types of control gates.

Reference:

1. **Construction equipment and its planning and applications – Varma Mahesh, Metrop Politin books, New Delhi.**
2. **Construction planning ewuipment and methods – Peurifiry R L, Led better WB, Mc Graw – Hill books. Co.**
3. **Hydro power statins, Varshney RS, New Chand & Bros, Roorkee.**

B.Tech (EIE) VIII Semester

EUREI 861: Elective-II: Environmental Impact Assessment

UNIT I: Introduction to EIA. Definition of E IA and EIS.C.E. guidelines in USA, preparation of EIS, Elements of EIA.

UNIT II: Agency Activities, Environmental setting. Environmental attributes, air, water, soil, ecology, noise Socio-Economic aspects, Culture and human aspects (Human settlements – rehabilitations)

UNIT III: Environmental impacts, Identification measurement, Aggregation, Secondary and Cumulative Impacts. Criteria for selection of methodology, impact assessment methodologies, procedure for reviewing environment impact statement.

UNIT IV: Case studies, Economic impact analysis energy production impact analysis, cost benefit analysis, Environmental impact mitigation and control measures.

Reference Books:

1. **Environmental Impact Analysis – Urban & Jain.**
2. **Environmental Impact Analysis – Canter, Mc Graw Hill publishers.**

B.Tech (EIE) VIII Semester

EUREI 862: Elective-II: Operating Systems

UNIT I:Introduction: Operating systems: Fundamentals Definition, Types of O.S, Batch Processing Systems, multiprogramming systems, time sharing systems, distributed systems, real time systems, services, system calls, system programs.

UNIT II:Operating system: Process management, Process concept, Process scheduling, operations on processes, cooperating processes, threads, inter-process communications. CPU Scheduling - Scheduling algorithms, multiple processor and real time scheduling. Process synchronization –Critical section problems, semaphores.

UNIT III: Leadlocks: Characterization, handling, Prevention, Avoidance, Detection & Recovery.

UNIT IV: Storage management: Memory management – swapping, paging, segmentation, segmentation& paging. Virtual memory – What is virtual memory? Demand Paging, Page Relacement, frames, thrashing, demand segmentation.

UNIT V: Case study: UNIX: Fundamental Concepts in UNIX, MS-DOS: Fundamental Concepts in MS-DOS

Text Book: Applied Operating Systems Concepts – Avil Silberschatz &j Peter Galvin, Grey Gagne

Reference: Modern Operating Systems – Andrew S. Tanenbaum, PHI.

B.Tech (EIE) VIII Semester

EUREI 863: Elective-II: Web Technology

UNITI: Introduction to Web Technology: Internet, WWW, Web Browsers, Web Servers, URL.

UNIT II: Introduction to HTML & DHTML: Syntax, Forms, Cascade Style Sheets.

UNIT III: The Basic of java Script, Perl, Primitives, Operator and Expression. Dynamic Document with Java Script.

UNIT IV: Introduction to Java Servelets Programming., Introduction to Applet Programming.

UNIT V: Structure of Web Application, Deploying Web Application.

Text Books:

1. **Programming the World Wide Web by Robert W Sebesta**
2. **Professional Java Servelets 2.3 by John Bell Wrox Publical**
3. **Beginners PHP, Apache, MY Sql, Web Development, by Michael Glass Wrox.**

B.Tech (EIE) VIII Semester

EUREI 865: Elective-II: Computer Aided Design

UNIT I
Fundamentals of CAD – Introduction – The design process- Application of computers for design – Operating systems – Hardware in CAD: The design work station – I/O Devices – CAD system configuration – Creating database for manufacturing – benefits of CAD.

UNIT II
Interactive Computer Graphics – Graphic display devices – Graphics system – Graphics standards – Graphical user interface – Transformation systems – windowing – clipping – 2D and 3D transformations – Linear transformation – Display files for 3D data – Geometric Modeling – Modeling Techniques – Wire frame Modeling – Surface Modeling – 3D Solid Modeling.

UNIT III
Introduction to finite element Analysis – CAD techniques to finite element data preparation – Automatic mesh generation – presentation of results – 3-dimensional shape description and mesh generation – CAD applications of FEM.

UNIT IV
CAD applications and Exposure to CAD packages: Simple examples of computer aided drafting, design and analysis – introduction to simple machine elements – Analysis of cross sectional area, centroid & moment of inertia-Kinematics of crank-slider mechanism and other simple design applications. Introduction to CAD packages like ANSYS, NASTRON, NISA – II.

UNIT V
Introduction to Artificial Intelligence Introduction to Artificial Intelligence – Applications of AI in design and CAD.

Text Books:
1. CAD/CAM- Computer Aided Design & Manufacturing, by M.D. Groover & E.Q.Zimmer, Pearson.
2. Computer Aided Design and Manufacturing by Dr. Sadhu Singh, Khanna Publishers.

References:
1. Computer Aided Design in Mechanical Engineering, by V. Rama Murthy.
2. Elements of Computer Aided Design 7 manufacturing, by Y.C. Rao,
3. Computer Aided Kinetics for Machine Design, by D.L.Ryan.
4. computer Aided Design and Manufacturing, by C.B. Besant & C.W.K. Lui.
5. computer Aided Analysis & Design by S. Ghosal, Prentice Hall of India.
6. CAD/CAM/CIM by Radhakrishna, New age international.

B.Tech (EIE) VIII Semester

EUREI 867: Elective-II: Mechatronics

UNIT I: Introduction: Multi disciplinary Scenaries, Origins, Evolution of Mechatronics. An overview of electronics, Introduction to Manufacturing Design.

UNIT II: Sensors and Transducesrs: Introduction and background, difference between transducer and sensor, tranducers types, transduction principle, photoelectric transducers, thermistors, thermo devices, thermo couple, inductive transducers capacitive transducers, pyroelectric transducers, piezoelectric transducers. Half effect transducers, Fibre optic transducers.

UNIT III: Actuatory: Introduction, types and application areas electromechanical actuators. DC motors AC motors.

UNIT IV: System modeling: Introduction, system making mechanical system, electrical system, fluid system, thermal systems, translational mechanical system with sprin lamper and mass. Modeling electric motor, modeling phenumatic actuator.

UNIT V : Digital logic: Digital logic nuero system

B.Tech (EIE) VIII Semester

EUREI 868: Elective-II: Education Research & Methodologies

Research methodology: An Introduction – meaning of research – objectives of research – motivation in research – types of research – research approaches – significance of research – research methods versus methodology – research and scientific method – importance of knowing how research is done – research process criteria of good research – Defining the research problem – selecting the problem – necessity of the defining problem – technique involved in defining a problem – an illustration – Research design:- meaning of research design – need for research design – features of a good design-important concept relating to research design – different research designs – basic principles of experimental designs.

Interpretation and report writing: Meaning of interpretation – why Interpretation? – technique of interpretation – precaution in interpretation – significance of report writing – different steps in writing report – layout of the research report – types of reports – oral presentation – mechanics of writing a research report – precautions for writing research reports.

Text Books:

1.C.R.Kothari, research methodology –Methods and techniques, Second edition, Wishwa Prak.
2.Research in Education, Best Pearson.

B.Tech (EIE) VIII Semester

EUREI 869: Elective-II: Professional Ethics

Ethics, nature and purpose; ethical theories; ethics in business and management, ethics in engineering, global ethical issues, Professional Ethics concerns one's conduct of behavior and practice when carrying out professional work. Such work may include consulting, researching teaching and writing, codes of Ethics are concerned with a range of issues, including:

1. **Academic Honesty**
2. **Adherence to confidentiality Agreements.**
3. **Data Privacy**
4. **Handling of Human subjects**
5. **Impartiality in data analysis and professional consulting**
6. **Professional accountability**

Reference: http://www/is.cityu.edu.hk/research/resources/isworld/ethics/

B.Tech (EIE) VIII Semester

EUREI 8611: Elective-II: Thermodynamics

UNIT I

Introduction – Basic concepts – Thermodynamic systems, Micro & Macro systems – Homogeneous and heterogeneous systems – Concept of continum – Pure substance – Thermodynamic equilibrium, State Property, Path, Process – Reversible and irreversible cycles – Energy as a property of the systems – energy in state and transition, work Heat, Point function, Path function – Heat transfer. Zeroth Law of thermodynamics – Concept of equality of temperatures – Joule's experiments –

UNIT II

First law of thermodynamics – Corollaries – Isolated systems and steady flow systems – Specific heats at constant volume and pressure – First law applied to flow systems – systems undergoing a cycle and change of state – First law applied to steady flow processes – Limitations of first law of thermodynamics.

UNIT III

Perfect gas laws – Equation of state – Universal gas constant various non-flow processes – Properties of end states – Heat transfer and work transfer – change in internal energy – throttling and free expansion. Second law of thermodynamics – Kelvin Plank statement and Clausius statement and their equivalence, Perpetual motion machines of first kind and second kind – Carnot Cycle – Heat engines and heat pumps – Carnot efficiency – Clausius theorem – Clausius inequality – Concept of entropy – Principles of increase of entropy – Entropy and disorder.

UNIT IV

I.C. engines: Classification, comparison of two stroke and four stroke engines, comparison of SI and CI engines. Air cycles – Otto, Diesel, Dual, Stirling, Ericcson and Atkinson cycles and their analysis. Valve timing and port timing diagrams – Efficiencies – air standard efficiency, indicated thermal efficiency, brake thermal efficiency, mechanical efficiency, volumetric efficiency and relative efficiency. Testing and performances of I.C. engines. Basic principles of carburetion and fuel injection.

UNIT V

Refrigeration & Air Conditioning: Bell-Coleman cycle, Vapor compression cycle-effect of suction and condensing temperature of cycle performance. Properties of common refrigerants, Vapor absorption system, Electrolux refrigerator.

REFERENCE BOOKS:

Engineering Thermodynamics, by P.K.Nag, Tata McGraw Hill Publications company.

References:

1. **Thermal Engineering, by M.L.Mathur and F.S.Mehta, Jain Brothers.**
2. **Applied Thermodynamics-II by R. Yadav**
3. **I.C. Engines, by Mathur and Mehta**
4. **I.C. Engines by V Ganesan.Thermal Engineering by P.L.Ballaney Khanna Publishers.**

B.Tech (EIE) VIII Semester

EUREI 8614: Elective-II: Very Large Scale Integrated System Design (VLSI)

UNIT-I

Review of microelectronics and introduction to MOS technology: Introduction MOS and related VLSI technology, NMOS, CMOS, BICMOS, GaAs Technologies, Thermal aspects of processing, production of E beam masks.

UNIT-II

MOS and BICMOS circuit design process: MOS layers, stick diagrams, design rules and layout, 2i.meter, 1.2i. meter CMOS rules. Layout diagrams, Symbolic diagrams.

UNIT-III

Basic circuit concepts: Sheet resistance, Area capacitance of layers, delay unit, wiring capacitances, choice of layers. Scaling of MOS circuits: Scaling models, Scaling function for device parameters, Limitation of Scalling.

UNIT-IV

Sub system design process: Architectural issues, switch logic, examples of structural design (Combi-national logic), design of ALU sub system, commonly used storage elements, aspects of design rules.

UNIT-V

Test and Testability: Design for testability built in self test (BIST), testing sequential logic, practical design for test guide lines, scan design techniques, etc,

Text Books:

Basic VLSI design bby Douglas A, Pucknell, Kamran Eshraghian, Prantice-Hall, 1996 3rd edition.

Reference:

Mead, C A and Conway, L.A, Introduction to VLSI systems, Wesley-Wesley

B.Tech (EIE) VIII Semester

EUREI 8615: Elective-II: Fundamentals of Civil Engineering

UNIT I: Surveying – classification, general principles of surveying, Basic terms and delimitations in chain, campus, leveling surveying and use of surveying.

UNIT II: Buildings Planning and Drawing: Buildings, definitions of orientation, plan, section, Elevation and site plan, classification according to NBC, Plinth area, Floor area, carpet area, Floor space index, Floor area ratio, Selection of site for residential buildings, Building regulations and Bye laws.

UNIT III: Building materials and Instillations: Construction materials – stone, brick, cement, cement mortar, concrete, steel, their properties – uses, Instillations – water supply – types of pipes, pipe appurtenances, Type of pumps, sanitation services, Lifts, Air conditions, Electrical instillations.

UNIT IV: Units of measurement of different items of works in residential buildings.

Reference:

1. **Surveying by B.C.Punnia**
2. **Planning and Designing by Gurucharan Singh**
3. **Estimation, Costing, Specifications and Valuation in Civil Engineering by M.Chakravarthi.**

B.Tech (EIE) VIII Semester

EUREI 8616: Elective-II: Engineering Materials

UNIT I: Metallic Materials: Ferrous Materials: Iron Materials, Carbon Materials, Phase Distribution. Heat Treatment of steel. Wrought iron. Properties and Classification of Plain Carbon & alloy steels like Marogim Steel, Hard Field Steel. Stainless Steel. Tool Steel. Cast ron and its applications.

UNIT II: Composite Materials: Science: Polymer matrix Composites Cement Matrix Composites, Carbon Matrix Composites, Metal matrix Composites. Ceramic matrix Composites. Applications: Structural applications, Electronic application. Thermal applications. Electro chemical applications. Environmental applications. Biomedical applications.

UNIT III: Polymeric Materials: Types of polymerization, properties of Macro Molecules, Fabrication of Plastics, preparation of epoxy reins and polycarbonates. Carbon fibre reinforced Plastics. Molecular Computers, Rubbers and Elastomers.

UNIT IV: Ceramic & Refractory Materials: Ceramics: Classification of white wears. Manufacturing of white wears. Earthen wear Stine wear. Engineering applications of refractory materials.

UNIT V: Electronic Materials: Introduction: Metallic glasses – surface ecostic view materials – Biometallic ceramics – Cermets – Electrets – Nano Phase Materials. Intermeterial Compounds. SMART Materials, Conducting Polymers, Electronic detectors and Emitters. Logic Structure Materialization Technology.

Text Books:

2. **Composite materials Science & Applications. D.L. Chung, Deborah, Springer Publication.**
3. **Introduction to Physical materials S.H.Aveneer. Tata Mac Grawhill**
4. **Text Book of Engineering Chemistry, Sashi Chawla, Dhopatrai & Sons**
5. **Engineering Chemistry, S.S.Dhara**

B.Tech (EIE) VIII Semester
EUREI8617: Elective-II: Computer Networks

UNIT I: Introduction – Uses of Computer Networks – Network Hardware – Network Software – Reference Models – Example Networks

UNIT II: The Physical Layer – The Theoretical basis for Data Communication – Guided Transmission Media – The Public switched Telephone Network – Community Antenna Television – The local loop:Modems, ADSL and Wireless – Cable Modems

UNIT III: Data link layer – Data link layer design issues – Services provided to the Network Layer – Framing – Error Control – Flow Control – Error detection and correction – Error correction codes – Error – detection codes – Elementary Data link protocols – An unrestricted simplex protocol – A simplex stop and wait protocol – Sliding window protocols – A one-bit sliding window protocol – A protocol using Go Back N – A protocol using selective repeat – Example Data link protocols – HDLC – High level Data Link Control.

UNIT IV: The medium Access Control Sub-layer – The Channel Allocation Problem – Static Channel Allocation in LAN's and MAN's – Dynamic Channel allocation in LANs and MANs – Multiple Access Protocols – ALOHA – Carrier serve Multiple Access Protocol – Collion Free Protocols – Wireless LAN Protocols – Ethernet – Ethernet Cabling – Manchester Encoding – The Ethernet MAC Sub-layer Protocol – IEEE 802.2: Logical Line Control.

UNIT V: Network Layer – Store and forward Packet switching – Store and forward Packet switching – service provided to the Transport by - Implementation of connectionless service – Implementation of connection oriented service – Comparison of virtual circuit and datagram subnets – Routing Algorithms – Optimality principle – Shorter Path routing – Flooding – Link State Routing – Hierarchical routing – Congestion Control Algorithms – General Principles of Congestion Control – Congestion Prevention Policies – Congestion control in virtual – Circuit subnets – Congestion control in datagram subnets – Loan shedding – Internet Working – How networks differ? How networks can be connected?

B.Tech (EIE) VIII Semester
EUREI 8619: Elective-II: Managerial & Engineering Economics

UNIT I: Fundamentals of Economics- Scarcity and Efficiency Market, Command and Mixed Economics, Basic Elements of Supply and Demand – Law of Demand – Elasticity of Demand.

UNIT II: Business Organizations – Individual Proprietorship – Partnership – The Corporation. Statement of Profit and Loss – The Balance Sheet – Break – Even Analysis – Cost Concepts – Elements of Costs.

UNITIII: Principles and Functions of Management – Evolution of Management Thought – Decision Making Process. Organization Theory and Process – Leadership – Motivation – Communication – Conflict Management in Organization.

UNIT IV: Plant Location – Plant Layout – Production Planning and Control – Product Design and Development – channel of Distribution. Materials Management – Inventory Control.

UNIT V: Industrial Disputes and their settlement – Provision of Factories Act and Industrial Disputes Act – Recent Trends in Contemporary Business Environment.

References:
1.Economics – Paul A.Samuelson and William D.Nordhaus.
2.Engineering Economics – Vol.1- Tara Chand
3.Financial Management – S.N.Maheswari
4.Essentials of Management – Koontz and O' Donnel
5.Production and Operation management – B.S.Goel
6.Modern Production / Operation management – Elwood S.Buffa, Rakesh K.Sarin
7.Industrial Law – S.P.Jain
8.Industrial Law – R.P.Maheswari and S.N.Maheswari
9.Labour and Industrial Laws – Singh, Agarwal and Goel.