ACADEMIC REGULATIONS
B.Tech. Regular Four Year Degree Programme
(For the batches admitted from the academic year 2013-14)
and
B.Tech. Lateral Entry Scheme
(For the batches admitted from the academic year 2014-15)

The following rules and regulations will be applicable for the batches of 4 year B.Tech degree admitted from the academic year 2013-14 onwards.

1. ADMISSION:

1.1. Admission into first year of Four Year B.Tech. Degree programme of study in Engineering:

As per the existing stipulations of A.P State Council of Higher Education (APSCHE), Government of Andhra Pradesh, admissions are made into the first year of four year B.Tech Degree programme as per the following pattern.

a) Category-A seats will be filled by the Convener, EAMCET.
b) Category-B seats will be filled by the Management as per the norms stipulated by Govt. of Andhra Pradesh.

1.2. Admission into the Second Year of Four year B.Tech. Degree programme (lateral entry):

As per the existing stipulations of A.P State Council of Higher Education (APSCHE), Government of Andhra Pradesh.

2. PROGRAMMES OF STUDY OFFERED BY AITS LEADING TO THE AWARD OF B.Tech DEGREE:

Following are the four year undergraduate Degree Programmes of study offered in various disciplines at Annamacharya Institute of Technology and Sciences, Rajampet (Autonomous) leading to the award of B.Tech (Bachelor of Technology) Degree:

1. B.Tech (Computer Science & Engineering)
2. B.Tech (Electrical & Electronics Engineering)
3. B.Tech (Electronics & Communication Engineering)
4. B.Tech (Information Technology)
5. B.Tech (Mechanical Engineering)
6. B.Tech (Civil Engineering)

And any other programme as approved by the concerned authorities from time to time.

3. ACADEMIC YEAR:

The institute shall follow Year-wise pattern for First year course and Semester pattern for II, III and IV years. An academic year shall consist of a first semester and a second semester from second year onwards.

The first year of four year B.Tech programme shall have duration to accommodate a minimum of 180 instruction days. From second year onwards each semester shall have a minimum of 90 instruction days.

4. COURSE STRUCTURE:

Each programme of study shall consist of:

4.1 General Courses comprising of the following: (5 to 10%)

i. Language / Communication Skills
ii. Humanities and Social Sciences: Environmental Science
iii. Economics and Accounting
iv. Principles of Management

4.2 Basic Science Courses comprising of the following: (15 to 25%)

i. Computer Literacy with Numerical Analysis
ii. Mathematics
iii. Physics
iv. Chemistry

4.3 Basic Engineering Courses comprising of the following (depending on the branch): (15 to 25%)

i. Engineering Drawing
ii. Engineering and IT Workshop
iii. Engineering Mechanics
iv. Basic Mechanical Engineering
v. Electrical and Electronics Engineering
vi. Basic civil Engineering
vii. Computer Programming

4.4 Compulsory Discipline Courses: (45 to 55%)

The lists of professional subjects are chosen as per the suggestions of the experts, to impart broad based knowledge needed in the concerned branch of study.

4.5 Elective Courses: (10 to 15%)

Electives will be offered to the students to diversify the spectrum of knowledge, based on the interest of the student to broaden his individual skill and knowledge.

4.6 In the final year first semester subject like comprehensive Electrical & Electronics Engineering, with 2 hours / week is to be introduced.

4.7 Every programme of study shall be designed to have 42-44 theory courses and 19-22 laboratory/seminar/comprehensive courses.

4.8 Contact Hours: Depending on the complexity and volume of the course, the number of contact hours per week will be assigned.

5. CREDIT SYSTEM:

Credits are assigned based on the following norms.

	Year Pattern		Semester Pattern	
	Period(s)/ Week	Credits	Period(s)/ Week	Credit(s)
Theory	01	02	01	01
Practical	03	04	03	02
Comprehensive Electrical & Electronics Engineering	--	--	02	02
Seminar	--	--	01	01
Final Year Project	--	-	12	12

6. EXAMINATION SYSTEM: All components in any programme of study will be evaluated continuously through internal evaluation and an external evaluation component conducted as year-end/semester-end examination.

6.1 Distribution of Marks:

S. No		**Marks**	**Examination and Evaluation**	**Scheme of Evaluation**
1.	Theory	70	Year-end / Semester-end examination.	The question paper shall be of descriptive type with 8 questions out of which 5 are to be answered in 3 hours duration of the examination.
		30	Mid - Examination of 120 Min. duration - Internal evaluation-**20 marks**. 5 questions - 1st question compulsory – having short answer questions, 4 descriptive out of which 3 are to be answered.	**For I B Tech:** Three (03) mid exams, each for 20 marks are to be conducted. Average of best two performances to be considered. **Mid-I:** After first spell of instructions (II Units).

S. No		Marks	Examination and Evaluation		Scheme of Evaluation
			Remaining **10 marks** for Assignments, 3-5 in number will be given and each assignment will be evaluated for 10 marks and average considered.		**Mid-II:** After second spell of instructions (III to V Units) **Mid-III:** After third spell of instructions (VI to VIII Units) **For a Semester**: Two mid-exams, 20 marks each, are to be conducted. Better one to be considered. **Mid-I:** After first spell of instructions (IV Units). **Mid-II:** After second spell of instructions (V to VIII Units).
2	Laboratory, Design and / or drawing	70	Year-end / Semester-end Lab Examination.		**For laboratory courses:** **3** hours duration – two examiners. For drawing and/ or Design: like for the theory examination.
		30	20	Day to Day evaluation.	Performance in laboratory experiments.
			10	Internal evaluation.	Practical Tests (For first year average of best two out of three tests and for semester better one out of two tests)
3	Soft Skills – I and II	70	External Evaluation		The question paper shall be of objective type with 100 questions to be answered in 3 hours duration.
		30	20	Day to Day evaluation.	Performance in tests conducted at the end of every topic.
			10	Internal Evaluation.	Two mid-exams, 10 marks each, are to be conducted. Better one to be considered.

S. No		Marks	Examination and Evaluation		Scheme of Evaluation
4	Seminar	100	Internal Evaluation: 20 Marks for Report. 20 Marks for subject content. 40 Marks for presentation. 20 Marks for Question and Answers.		Continuous evaluation during a semester by the Departmental Committee (DC).
5	Comprehensive Electrical & Electronics Engineering	100	The marks can be allotted based on the performance in viva-voce conducted by Head of the department and two senior faculty members in the department.		
6	Project Work	100	70	External evaluation	Semester-end Project Viva-Voce Examination by Committee as detailed under 6.2
			30	Internal evaluation	Continuous evaluation by the DC 15 Marks by DC as detailed under 6.2.1 15 Marks by Supervisor.

6.2 Project Work Evaluation:

6.2.1 The Internal Evaluation shall be made by the Departmental Committee, on the basis of average of two seminars presented by each student on the topic of his project. The presentations shall be evaluated by the Departmental Committee (DC) consisting of Head of the Department, supervisor and a senior faculty member.

6.2.2 The Semester-End Examination (viva-voce) shall be conducted by a Committee consisting of External examiner nominated by the Chief Controller of Examinations, HOD and Supervisor. The evaluation of project work shall be conducted at the end of the IV year.

6.3. Eligibility to appear for the year-end / Semester-End examination:

6.3.1 A student shall be eligible to appear for end examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects in the year/ semester.

6.3.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in first year or each semester may be granted by the Institute Academic Committee, if the reason for shortage is convincing.

6.3.3 Shortage of Attendance below 65% in aggregate shall in no case be condoned.

6.3.4 A stipulated fee shall be payable towards condonation of shortage of attendance to the Institute.

6.3.5 Students whose shortage of attendance is not condoned in First year/any semester are not eligible to take their End examination of that class and their registration for

that semester / year shall stand cancelled.

6.3.6 A student will not be promoted to the next semester unless he satisfies the attendance requirements of the current year/semester, as applicable.

6.3.7 A student detained due to shortage of attendance, will have to repeat that year/semester when offered next.

6.4 Revaluation / Recounting:

Students shall be permitted to request for recounting/ revaluation of the end theory examination answer scripts within a stipulated period after payment of prescribed fee.

After recounting or revaluation, records are updated with changes if any and the student will be issued a revised memorandum of marks. If there are no changes, the student shall be intimated the same through a letter or a notice.

6.5 Supplementary Examination:

All Regular examinations are understood as Regular/Supplementary examinations. The supplementary students have to appear for the supplementary examinations along with their regular examinations conducted at the end of each semester. However, separate supplementary examinations will be conducted for the II-Semester subjects at the end of I-Semester and vice-versa. For seminar, a seminar will be given by the supplementary candidate as per the separate schedule given by the exam section.

7. ACADEMIC REQUIREMENTS FOR PROMOTION/ COMPLETION OF REGULAR B.TECH PROGRAMME OF STUDY:

The following academic requirements have to be satisfied in addition to the attendance requirements for promotion/ completion of regular B.Tech Programme of study.

7.1 For students admitted into B.Tech. (Regular) programme:

7.1.1 A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical, design, drawing subject or project if he secures not less than 35%of marks in the End examination and a minimum of 40% of marks in the sum total of the internal evaluation and End examination taken together. For the seminar he should secure a minimum of 40% marks.

7.1.2 For promotion from I B.Tech to II B.Tech a student must satisfy the attendance requirements in I year.

7.1.3 A Student shall be promoted from II year to III year, if he fulfills the academic requirements of securing a minimum of 56 credits from I year, II year I-Semester and II year II-Semester examinations conducted till that time.

7.1.4 A student shall be promoted from III year to IV year if he fulfills the academic requirements of securing a minimum of 86 credits from I year, II year I and II-Semesters and the III year I and II-Semester examinations conducted till that time.

7.1.5 **A student shall register for all the subjects and earn all the 236 credits**. Marks obtained in all the credits shall be considered for the calculation of the class based on CCPA.

7.1.6 A student who fails to earn all the 236 credits as indicated in the course structure within **eight** academic years from the year of his admission shall forfeit his seat in B.Tech. Programme and his admission stands cancelled.

7.2 For Lateral Entry Students (batches admitted from 2012-2013):

7.2.1 Academic requirements for pass in a subject are the same as in 7.1.1 and attendance requirements as in 6.3.

7.2.2 A student shall be promoted from II year to III year if he fulfills the academic requirements of securing a minimum of 28 credits from II year I and II-Semesters examinations conducted till that time.

7.2.3 A student shall be promoted from III year to IV year if he fulfills the academic requirements of securing a minimum of 58 credits from II year I and II-Semesters and the III year I and II-Semester examinations conducted till that time.

7.2.4 A student shall register for all the subjects and earn all such credits. Marks obtained in all such credits shall be considered for the calculation of the class based on CCPA.

7.2.5 A student who fails to earn all the 180 credits as indicated in the course structure within **six** academic years from the year of his admission shall forfeit his seat in B.Tech. Programme and his admission stands cancelled.

8. TRANSITORY REGULATIONS:

Students who got detained for want of attendance (or) who have not fulfilled academic requirements (or) who have failed after having undergone the course in earlier regulations (or) have discontinued and wish to continue the course are eligible for admission into the unfinished semester/year from the date of commencement of class work for the next batch or later batches with the same (or) equivalent subjects as and when subjects are offered and they continue to be in the academic regulations of the batch he is joining later.

9. CREDIT POINT AVERAGE (CPA) AND CUMULATIVE CREDIT POINT AVERAGE (CCPA):

9.1 For a semester/year:

$$CPA = \frac{1}{10} \frac{\sum_{i} (C_i M_i)}{(\sum_{i} C_{ri})}$$

C_i– Credits obtained in the Course i.

M_i*–Marks obtained in the Course i.*

C_i–Credits registered for Course i.

9.2 For the entire programme:

$$CCPA = \frac{1}{10} \frac{\sum_{n} \left(\sum_{i} (C_{ni} M_{ni}) \right)}{\sum_{n} \left(\sum_{i} C_{rni} \right)}$$

n- Semester/Year number

C_{ni}– Credits obtained in the Course i of semester/year n.

M_{ni}*–Marks obtained in the Course i.of semester/year n.*

C_{rni}– Credits registered for Course i of semester/year n.

9.3 Overall Performance:

CCPA	Classification of final result
7.0 and above	First Class with distinction
6.0 and above but below 7.0	First class
5.0 and above but below 6.0	Second class
4.0 and above but below 5.0	Pass class

10. TRANSCRIPTS:

After successful completion of the entire programme of study, a transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued, if required, after payment of requisite fee. Partial transcript will also be issued up to any point of study to a student on request.

11. ELIGIBILITY:

A student shall be eligible for the award of B.Tech Degree if he fulfills all the following conditions:

(i) Registered and successfully completed all the components prescribed in the programme of study to which he is admitted.

(ii) Successfully acquired all **236 credits** as specified in the curriculum corresponding to the branch of study within the stipulated time.

(iii) No disciplinary action is pending against him.

12. AWARD OF B.TECH DEGREE:

The B.Tech Degree will be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Anantapur on the recommendations of the Principal of Annamacharya Institute of Technology and Sciences (Autonomous).

13. AMENDMENTS TO REGULATIONS:

The chairman, Academic Council of Annamacharya Institute of Technology and Sciences, Rajampet (Autonomous) reserves the right to revise, amend, or change the Regulations, Scheme of Examinations, and / or Syllabi or any other policy relevant to the needs of the society or industrial requirements etc., without prior notice.

14. GENERAL:

Where the words "he", "him", "his", "himself" occur in the regulations, they include "she", "her", "herself".

15. All Legal matters are subjected to Rajampet Jurisdiction only.

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Curriculum for the Programmes under Autonomous Scheme	
Regulation	R 2013
Department	Department of Electrical and Electronics Engineering
Programme Code & Name	G2, **B.Tech-Electrical & Electronics Engineering**

I Year B.Tech

Subject Code	Subject Name	Hours/ Week			C	Maximum marks		
		L	T	P		Internal	External	Total
1GC11	English	2	0	0	4	30	70	100
1GC12	Engineering Physics	2	0	0	4	30	70	100
1GC13	Engineering Chemistry	2	0	0	4	30	70	100
1GC14	Mathematics – I	3	1	0	6	30	70	100
1G311	Electronic Devices and circuits	3	1	0	6	30	70	100
1G112	C Programming and Introduction to Data Structures	3	1	0	6	30	70	100
1G513	Engineering Drawing	1	0	3	6	30	70	100
1G312	Electronic Devices and circuits Lab	0	0	3	4	30	70	100
1G114	C Programming and Data Structures Lab	0	0	3	4	30	70	100
1GC16	Engineering Physics and Chemistry Lab**	0	0	3	4	30	70	100
1GC17	English Language and Communication Skills Lab	0	0	3	4	30	70	100
1G411	Engineering and IT Workshop#	0	0	3	4	30	70	100
Total		**16**	**3**	**18**	**56**	**360**	**840**	**1200**

Note: L - Lecture; T-Tutorial; P – Practical; C - Credits

** The students attend the Engineering Physics and Engineering Chemistry lab in alternate week i.e. 3/2 per week. The end exam shall be conducted separately and average of two exams will be recorded by examiners.

The students attend the Engineering and IT Work Shop in alternate week i.e. 3/2 per week. The end exam shall be conducted separately and average of two exams will be recorded by examiners.

Curriculum for the Programmes under Autonomous Scheme	
Regulation	R 2013
Department	Department of Electrical and Electronics Engineering

Programme Code & Name	G2, **B.Tech-Electrical & Electronics Engineering**

II Year B.Tech I Semester

Subject Code	Subject Name	Hours/ Week			C	Maximum marks		
		L	T	P		Internal	External	Total
1GC32	Engineering Mathematics	4	0	0	4	30	70	100
1G231	Switching Theory and Logic Design	4	1	0	4	30	70	100
1G232	Electrical Machines-I	4	1	0	4	30	70	100
1G233	Electrical Circuits-I	4	1	0	4	30	70	100
1G536	Fluid Mechanics and Hydraulic Machines	4	1	0	4	30	70	100
1G234	Electromagnetic Fields	4	1	0	4	30	70	100
1G537	Fluid Mechanics and Hydraulic Machines Lab	0	0	3	2	30	70	100
1G238	Electrical Machines-I Lab	0	0	3	2	30	70	100
1G23B	Seminar - I	0	0	2	2	100	00	100
Total		**24**	**5**	**8**	**30**	**340**	**560**	**900**

Curriculum for the Programmes under Autonomous Scheme	
Regulation	R 2013
Department	Department of Electrical and Electronics Engineering
Programme Code & Name	G2, **B.Tech-Electrical & Electronics Engineering**

II Year B.Tech II Semester

Subject Code	Subject Name	Hours/ Week			C	Maximum marks		
		L	T	P		Internal	External	Total
1G241	Electrical Machines-II	4	1	0	4	30	70	100
1G242	Electrical Circuits-II	4	1	0	4	30	70	100
1G343	Pulse and Digital Circuits	4	1	0	4	30	70	100
1G243	Generation of Electric Power	4	1	0	4	30	70	100
1G244	Linear Control Systems	4	1	0	4	30	70	100
1GC41	Mathematics – III	4	0	0	4	30	70	100
1G247	Electrical Circuits and Simulation Lab	0	0	3	2	30	70	100
1G248	Control Systems Lab	0	0	3	2	30	70	100
1GC44	Soft Skills – I	2	0	0	2	30	70	100
Total		**26**	**5**	**6**	**30**	**270**	**630**	**900**

Curriculum for the Programmes under Autonomous Scheme	
Regulation	R 2013
Department	Department of Electrical and Electronics Engineering
Programme Code & Name	G2, **B.Tech-Electrical & Electronics Engineering**

III Year B.Tech I Semester

Subject Code	Subject Name	Hours/ Week			C	Maximum marks		
		L	T	P		Internal	External	Total
1G356	Linear and Digital Integrated Circuits Applications	4	1	0	4	30	70	100
1G251	Electrical Machines-III	4	1	0	4	30	70	100
1G252	Transmission of Electric Power	4	1	0	4	30	70	100
1G253	Power Electronics	4	1	0	4	30	70	100
1G254	Electrical and Electronics Measurements	4	1	0	4	30	70	100
1GC52	Environmental Science	4	0	0	4	30	70	100
1G255	Electrical Machines-II Lab	0	0	3	2	30	70	100
1GC51	Advanced English Communication Skills Lab	0	0	3	2	30	70	100
1G256	Seminar - II	0	0	2	2	100	00	100
Total		**24**	**5**	**8**	**30**	**340**	**560**	**900**

Curriculum for the Programmes under Autonomous Scheme	
Regulation	R 2013
Department	Department of Electrical and Electronics Engineering
Programme Code & Name	G2, **B.Tech-Electrical & Electronics Engineering**

III Year B.Tech II Semester

Subject Code	Subject Name	Hours/ Week			C	Maximum marks		
		L	T	P		Internal	External	Total
1GA61	Managerial Economics and Financial Analysis	4	0	0	4	30	70	100
1G261	Power System Analysis	4	1	0	4	30	70	100
1G262	Utilization of Electrical Energy	4	1	0	4	30	70	100
1G366	Microprocessors and Microcontrollers	4	1	0	4	30	70	100
1G468	Computer System Architecture	4	1	0	4	30	70	100
1G263	Power System Operation and Control	4	1	0	4	30	70	100
1G264	Electrical Measurements Lab	0	0	3	2	30	70	100
1G265	Power Electronics and Simulation Lab	0	0	3	2	30	70	100
1GC62	Soft Skills – II	2	0	0	2	30	70	100
Total		**26**	**5**	**6**	**30**	**270**	**630**	**900**

Curriculum for the Programmes under Autonomous Scheme	
Regulation	R 2013
Department	Department of Electrical and Electronics Engineering
Programme Code & Name	G2, **B.Tech-Electrical & Electronics Engineering**

IV Year B.Tech I Semester

Subject Code	Subject Name	Hours/ Week			C	Maximum marks		
		L	T	P		Internal	External	Total
1GA71	Management Science	4	1	0	4	30	70	100
1G271	Fundamentals of HVDC & FACTS Devices	4	1	0	4	30	70	100
1G272	Switch Gear and Protection	4	1	0	4	30	70	100
1G372	Digital Signal Processing	4	1	0	4	30	70	100
Elective-I								
1G273	Instrumentation	4	1	0	4	30	70	100
1G274	High Voltage Engineering							
1G275	Renewable Energy Sources							
Elective-II								
1G47C	Soft Computing Techniques	4	1	0	4	30	70	100
1G276	Reliability Engineering and Applications To Power Systems							
1G57E	Optimization Techniques							
1G37B	Microprocessors & Microcontrollers Lab	0	0	3	2	30	70	100
1G277	Power Systems Lab	0	0	3	2	30	70	100
1G278	Comprehensive Electrical and Electronics Engineering	0	0	2	2	100	00	100
Total		**24**	**6**	**8**	**30**	**340**	**560**	**900**

Curriculum for the Programmes under Autonomous Scheme	
Regulation	R 2013
Department	Department of Electrical and Electronics Engineering
Programme Code & Name	G2, **B.Tech-Electrical & Electronics Engineering**

IV Year B.Tech II Semester

Subject	Subject Name	Hours/	C	Maximum marks

Code		Week						
		L	T	P		Internal	External	Total
1G281	Power Semiconductor Drives	4	1	0	4	30	70	100
1G282	Distribution of Electrical Power	4	1	0	4	30	70	100
Elective-III								
1G283	Modern Control Theory	4	1	0	4	30	70	100
1G284	Special Electrical Machines							
1G285	Principles of Power Quality							
Elective-IV								
1G389	Embedded Systems	4	1	0	4	30	70	100
1G286	Design of Electrical Systems							
1G287	Energy Auditing and Demand side Management							
1G288	Seminar - III	0	0	2	2	100	00	100
1G289	Project work	0	0	12	12	30	70	100
Total		**16**	**4**	**14**	**30**	**250**	**350**	**600**

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)

B.Tech. I Year

(1GC11)ENGLISH

(Common to all branches)

INTRODUCTION

The sweeping changes in the world have elevated English to the status of a tool of global communication and transformed it into e-English. The syllabus has been drafted to improve the competence of students in communication in general and language skills in particular. The books prescribed serve as students' handbooks.

The teacher should focus on developing LSRW (Listening, Speaking, Reading and Writing) skills of students while using the prescribed text and exercises. The classes should be interactive. The students should be encouraged to participate in the classroom proceedings and also to write short paragraphs and essays. The main aim is to encourage two-way communication in place of one-sided lecture.

The text for non-detailed study is meant for extensive reading by the students. They may be encouraged to read some select topics on their own, which could lead into a classroom discussion. In addition to the exercises from the texts done in the class, the teacher can bring variety by using authentic materials such as newspaper articles, advertisements etc.

OBJECTIVES

- To improve the language proficiency of the students in English with an emphasis on LSRW skills.
- To equip the students to study academic subjects with greater facility through theoretical and practical components of the syllabus.
- To develop study skills as well as communication skills in formal and informal situations.

SYLLABUS

Listening Skills:

Objectives

- To enable students to develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
- To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and dialects.

Students should be given practice in listening and identifying the sounds of English language and to mark stress, right intonation in connected speech.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills:

Objectives

- To make students aware of the role of ability to speak fluent English and its contribution to their success.
- To enable students to express themselves fluently and appropriately in social and professional contexts.
- Oral practice
- Describing objects/situations/people
- Role play - Individual/Group activities
- Just A Minute (JAM) Sessions(Using exercises from all units of the prescribed text)

Reading Skills:

Objectives

- To develop an awareness in the students about the significance of silent reading and comprehension.
- To develop the ability to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.
- Skimming the text
- Understanding the gist of an argument
- Identifying the topic sentence
- Inferring lexical and contextual meaning
- Understanding discourse features
- Recognizing coherence/sequencing of sentences

The students shall be trained in reading skills using the prescribed text for detailed study. They shall be examined in reading and answering questions using 'unseen' passages which may be taken from the non-detailed text or other authentic texts, such as articles from magazines/newspaper.

Writing Skills:

Objectives

- To develop an awareness in the students the skill to write exact and formal writing
- To equip them with the components of different forms of writing
- Writing sentences
- Use of appropriate vocabulary
- Paragraph writing
- Coherence and cohesiveness
- Narration / description
- Note Making
- Formal and informal letter writing
- Editing a passage

TEXTBOOKS:

For Detailed study: **ENJOYING EVERYDAY ENGLISH**, Sangam Books (India) Pvt Ltd Hyderabad, 2009.

For Non-detailed study: **INSPIRING LIVES**, Maruti Publications, Guntur, 2009.

UNIT -I

a) "Heaven's Gate" from **ENJOYING EVERYDAY ENGLISH.**

b) "MokshagundamVisvesaraya" from **INSPIRING LIVES.**

c) Parts of Speech (apart from the Language Work from prescribed text).

UNIT -II

a) "Sir C.V.Raman" from **ENJOYING EVERYDAY ENGLISH.**

b) "Mother Teresa" from **INSPIRING LIVES.**
c) Articles and Prepositions (apart from the Language Work from prescribed text).

UNIT -III

a) "The Connoisseur" from **ENJOYING EVERYDAY ENGLISH.**
b) "Vikram Sarabhai" from **INSPIRING LIVES.**
c) Tenses (apart from the Language Work from prescribed text).

UNIT -IV

a) "The Cuddalore Experience" from **ENJOYING EVERYDAY ENGLISH.**
b) "Sam Pitroda" from **INSPIRING LIVES.**
c) Active and Passive Voice (apart from the Language Work from prescribed text).

UNIT -V

a) Bubbling Well Road from **ENJOYING EVERYDAY ENGLISH.**
b) Vishwanathan Anand from **INSPIRING LIVES.**
c) Transformation of Sentences (apart from the Language Work from prescribed text).

UNIT-VI

a) Odds Against Us from **ENJOYING EVERYDAY ENGLISH.**
b) Charlie Chaplin from **INSPIRING LIVES.**
c) Common Errors in English (apart from the Language Work from prescribed text).

UNIT – VII Exercises on

Reading Comprehension, Note-taking and Note-making, Paragraph Writing, Letter Writing, Precise Writing and Technical Report Writing.

UNIT – VIII Exercises on

Spelling and Punctuation, Synonyms and Antonyms, One-word substitutes, Prefixes and Suffixes, Idioms and Phrases, Words often confused Evaluation.

REFERENCES:

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4. English for Technical Communication, Aysha Viswamohan, Tata Mc-Graw Hill.
5. English Grammar and Composition, David Green, McMillan India Ltd.
6. Murphy's English Grammar, Raymond Murphy, CAMBRIDGE.
7. Everyday Dialogues in English by Robert J. Dixson, Prentice-Hall of India Ltd., 2006.
8. Communication Skills for Technical Students, Farhathullah, T.M., Orient Blackswan, 2008.
9. Developing Communication Skills, 2/e. by Krishna Mohan, and MeeraBanerji , Macmillan, 2009.
10. English for Technical Communication, Vol. 1 and 2, by K. R. Lakshmi Narayanan, Sci tech. Publications.
11. Longman Dictionary of Contemporary English with DVD, Pearson Longman.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

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B.Tech I-Year

(1GC12) ENGINEERING PHYSICS

(Common to all branches)

UNIT I: OPTICS: Interference - Interference in thin films by reflection - Newton's rings - Diffraction -Fraunhofer diffraction at a single slit - Fraunhofer diffraction at a double slit - Diffraction grating -Grating spectrum - polarization - Nicol prism -Theory of circular and elliptical polarized light - Quarter and half wave plates.

UNIT II: CRYSTAL STRUCTURES AND X-RAY DIFFRACTION: Introduction -Space lattice -Basis - Unit cell - Lattice parameter - Bravais lattices - Crystal systems - Structure Simple cubic - Body Centered Cubic - Face Centered Cubic crystals - Miller indices of planes and directions in crystals -Separation between successive (h k l) planes - X-ray diffraction by crystal planes - Bragg's law - Laue and Powder methods.

UNIT III: PRINCIPLES OF QUANTUM MECHANICS: Waves and Particles - de-Broglie's hypothesis - Heisenberg's uncertainty principle -Schroedinger's one dimensional wave equation (Time Independent) - Particle in a one dimensional potential box .

THE ELECTRON THEORY OF METALS & BAND THEORY: Postulates of Classical and Quantum free electron theory-Fermi-Dirac distribution and effect of Temperature (qualitative treatment only) - Source of electrical resistance - Kronig-Penney model (qualitative treatment only) - energy bands - metals, semi conductors & insulators.

UNIT IV: SEMICONDUCTORS: Intrinsic and extrinsic semiconductors - Law of mass action - Drift & diffusion - Einstein's relation - Hall effect - Direct & indirect band gap semiconductors - p-n junction - Band diagram of p-n junction diode - Diode Equation-LED, LCD & Photo diode.

UNIT V: MAGNETIC PROPERTIES: Introduction - Origin of magnetic moment - Classification of magnetic materials - Dia, Para , Ferro, anti-Ferro and Ferri magnetism - Hysteresis - Soft and hard magnetic materials.

Dielectric Properties: Introduction - Dielectric constant - Electronic, Ionic and Orientation polarizations (qualitative treatment only) - Local field - Clausius-Mossotti equation - Frequency dependence of polarisability (qualitative treatment only) - Ferro electricity- $BaTio_3$.

UNIT VI: SUPERCONDUCTIVITY: General properties - Meissner effect - Type I and Type II superconductors - Penetration depth - BCS theory - Flux quantization - Josephson effects - Applications of superconductors.

Lasers: Introduction - Characteristics of laser - Spontaneous and stimulated emission of radiation -Einstein's coefficients - Population inversion - Ruby Laser - Helium-Neon Laser - GaAs Laser -Applications of Lasers in Industry, Scientific and Medical fields.

UNIT VII: FIBER OPTICS: Introduction - Principle of optical fiber - Acceptance angle and Acceptance cone - Numerical aperture - Types of Optical fibers and refractive index profiles - Optical fiber communication systems - Application of optical fibers. **Holography:-** Introduction-construction and reconstruction of hologram-Applications.

UNIT VIII: NANOMATERIALS: Introduction - Basic principles of nano materials - Fabrication of nanomaterials - ball milling -plasma arching - Chemical vapour deposition method - sol-gel methods -properties of nanomaterials - carbon nanotubes - properties and applications of carbon nanotubes -Applications of nanomaterials.

TEXT BOOKS:

1. V. Rajendran and K.Thyagarajan, Engineering Physics, Tata McGraw-Hill Co. Ltd.
2. P.K.Palanisamy, Engineering Physics, Scitech Publications.
3. M.R.Srinivasan, Engineering Physics, New Age Publications.

REFERENCES:

1. Halliday, Resnick and Krane, Physics Volume 2, John Wiley India.
2. S.O. Pillai, Applied physics, New Age International.
3. R. K. Gaur and S.L. Gupta, Engineering Physics, Dhanpat rai publications
4. M. N. Avadhanulu, and P.G. Kshirasagar, Engineering Physics, S. Chand publications.
5. C.Kittel, Solid State Physics, John Wiley India.
6. P.K. Mittal, Engineering Physics, I.K.International.
7. K.K Chattopadhyay and A.N. Banarjee, Introduction to Nanoscience and Nano Technology, Prentice - Hall of India Pvt. Ltd.

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B.Tech I-Year

(1GC13) ENGINEERING CHEMISTRY

(Common to all branches)

UNIT-I: WATER TECHNOLOGY: Sources of water, Hardness of water-Temporary and Permanent hardness. Units. Estimation of hardness by EDTA Method. Analysis of Water - Dissolved Oxygen. Disadvantages of Hard Water. Problems on hardness of water. Methods of Treatment of Water for Domestic Purpose - Disinfection: Chlorination, Ozonisation.

Water For Industrial Purpose - Water for Steam Making, Boiler Troubles - Carry Over (Priming and Foaming), Boiler Corrosion, Scales and Sludge, Caustic Embrittlement. Water Treatment: - Internal Treatment - Colloidal, Phosphate, Calgon, Carbonate, Sodium aluminates Conditioning of Water. External Treatment - Ion- Exchange Process.

UNIT II: ELECTRO CHEMISTRY: Conductance - Equivalent Conductance - Molecular Conductance, Conductometric Titrations - Applications of Conductivity Measurements.
Electrochemical Cells: Measurement of EMF, Standard electrode potential, concentration cells, batteries (Ni-Cd cell). Fuel cell: hydrogen oxygen fuel cell and methanol fuel cell.
Insulators - Definition, Properties and Characteristics of Insulating Materials; Engineering Applications.

UNIT III: SCIENCE OF CORROSION: Definition, Types of corrosion: Dry Corrosion, (Direct Chemical attack), Wet Corrosion, Theories of Corrosion and Mechanism, Electro Chemical Theory of Corrosion. Galvanic Series, Galvanic Corrosion, Concentration Cell Corrosion, Oxygen absorption type. Factors Influencing Corrosion. Control of Corrosion - Cathodic Protection - Sacrificial anode and Impressed Current. Uses of Inhibitors. Electro Plating, and Electro less plating (copper and nickel).

UNIT IV: POLYMERS: Definition & Classification of polymers, Functionality. Types of Polymerization - Addition and Condensation Polymerization. Plastics-Thermoplastics and Thermosetting plastics. Properties and Engineering Uses of the Following: Teflon, Bakelite, Nylon. Rubber - Processing of Natural Rubber and Compounding of rubber. Elastomers - Buna S, Buna-N, Silicone Rubber.

UNIT V: EXPLOSIVES AND PROPELLANTS: Explosives, Classification, precautions during storage, blasting fuses, important explosives. Rocket propellants, classification of propellants.
Lubricants :Principles and function of lubricants - Classification and properties of lubricants - Viscosity, flash and fire points, cloud and pour points, aniline point, Neutralization Number and Mechanical Strength.

UNIT VI: PHASE RULE: Definition, Terms involved in Phase Rule and Phase rule equation. Phase diagrams - one component system (water system), two component system (lead- silver system) Eutectics.

UNIT VII: FUELS AND COMBUSTION: Definition and Classification of fuels. Solid, liquid & gaseous fuels, Characteristics of a good fuel. Metallurgical Coke - Characteristics & Manufacture (Otto-Hoffmann). Petroleum - Refining - Synthetic Petrol. Calorific Value & its determination (Bomb Calorimeter). Combustion: Flue gas analysis by Orsat's apparatus. Combustion calculations.

UNIT VIII: INORGANIC ENGINEERING MATERIALS: CEMENT: composition of Portland cement, analysis, setting and hardening of cement (reactions).
Refractory Materials: Definition, Classification with Examples; Criteria of a Good Refractory Material; Causes for the failure of a Refractory Material.

TEXT BOOKS:

1. K.N.Jayaveera, Dr.G.V.Subba Reddy and Dr.C. Ramachandraiah,Chemistry for Engineers, McGraw Hill Higher Education Hyd., 2009.
2. S.S. Dara, A textbook of Engineering Chemistry S.Chand and Co, New Delhi, 2008.
3. Jain and Jain, Text book of Engineering Chemistry, Dhanpat Rai Publishing Company, 15th edition New Delhi, 2008.

REFERENCE:

1. Dr. K. B. Chandrasekhar, Dr. U.N. Dash, Dr. Sujatha Mishra, Engineering Chemistry, Scitech Publications (India) Pvt. Limited, Hyderabad, 2009.
2. B.Viswanath, M.Aulice Scibioh, Fuel Cells principles and applications, Universities press.
3. C.V. Agarwal, Chemistry of Engineering Materials, Tara Publication, Varanasi, 2008.
4. J C Kuriacose and J. Rajaram, Engineering Chemistry (Vol.l and 2) Tata McGraw-Hill Co, New Delhi, 2004.
5. G.D. Gesser, Applied Chemistry: A Text Book for chemistry for Engineers and Technologists, Springer, 2000.
6. S. Glasstone and David Lewis, Physical Chemistry, Van Nostrand, 1960.

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B.Tech. I Year

(1GC14) MATHEMATICS – I

(Common to all branches)

UNIT I: Differential equations of first order and first degree – Exact, linear and Bernoulli equations. Applications of Newton's law of cooling, law of natural growth and decay, orthogonal trajectories.

UNIT II: Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax}, Sinax, cosax, polynomials in x, e^{ax} V(x), xV(x), method of variation of parameters.

UNIT III: Rolle's Theorem – Lagrange's Mean Value Theorem – (excluding proof). Simple examples of Taylor's and Maclaurin's Series - Functions of several variables – Jacobian – Maxima and Minima of functions of two variables, Lagrangian method of Multipliers with three variables only.

UNIT IV: Curve tracing – Cartesian, polar and parametric curves. Applications of integration to lengths, volume and surface area of solids of revolution in Cartesian and polar coordinates.

UNIT V: Multiple integral: –Double integral– Evaluation-Change of Variables and Change of order of integration. Triple integral -Evaluation.

UNIT VI: Laplace transform of standard functions – Inverse transform – First shifting Theorem,–Second shifting theorem – Convolution theorem – Laplace transform of Periodic function.

UNIT VII: Transforms of derivatives and integrals-Application of Laplace transforms to ordinary differential equations of first and second order.

UNIT VIII: Vector Calculus: Gradient – Divergence – Curl - Vector integration –Line integral - Area, Surface and volume integrals. Vector integral theorems: Verification of Green's theorem – Stoke's theorem and Gauss's Divergence Theorem (excluding their proof).

TEXT BOOKS:

1. T.K.V. Iyengar, B. Krishna Gandhi and others, A Text Book of Engineering Mathematics, Vol – 1, S. Chand & Company.
2. E. Rukmangadachari, E. Keshava Reddy,A Text Book of Engineering Mathematics-1, PearsonEducation.

REFERENCES:

1. B.V. Ramana, A Text Book of Engineering Mathematics, Tata McGraw Hill.B.S.Grewal, Higher Engineering Mathematics, 40thed, Khanna publishers.

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B.Tech. I Year

(1G311) ELECTRONIC DEVICES AND CIRCUITS

(Common to EEE & ECE)

UNIT I: INTRODUCTION TO SEMICONDUCTORS - Insulators, conductors and semiconductors – Semiconductor Types – Law of Mass Action – Continuity equation – Hall Effect – Fermi level in intrinsic and extrinsic Semiconductors.

UNIT II: SEMICONDUCTOR DIODES - Introduction to Semiconductor Diode – Ideal Diode – Characteristics of PN Junction Diode and Temperature Dependency – Drift and Diffusion Currents – Transition and Diffusion Capacitances – Breakdown mechanisms in semiconductor diodes – Zener diode characteristics.

UNIT III: DIODE APPLICATIONS - Introduction – Load Line Analysis – Rectifier Circuits: Half Wave and Full Wave Rectifiers – General Filter Considerations – Capacitor Filter – RC Filter – Other filter configurations – Zener diode as a Regulator.

UNIT IV: BIPOLAR JUNCTION TRANSISTORS - Transistor Construction – Transistor Operation – BJT Characteristics – Transistor Amplifying Action – Load Line – Operating Point – CB, CE and CC Configurations.

UNIT V: BIASING AND BIAS STABILITY - Introduction – Fixed Bias – Emitter Bias – Voltage Divider Bias – Other Bias Configurations – Bias Stabilization: Need for Stabilization – Stabilization Factors – Thermal Stability and Thermal Runaway – Heat Sinks.

UNIT VI: FIELD EFFECT TRANSISTORS - Construction of JFETs – Transfer Characteristics – FET Biasing: Fixed Bias Configuration – Self Bias Configuration – Voltage Divider Biasing – Construction and Characteristics of MOSFETs – Depletion type MOSFETs – Enhancement type MOSFETs – Biasing in MOSFETs.

UNIT VII: SMALL SIGNAL ANALYSIS OF AMPLIFIERS - Small Signal model of BJT – h-parameter model of BJT – Analysis of CB, CE and CC configurations using h-parameters – simplified hybrid model – miller's theorem – dual of miller's theorem – Small signal model of JFET and MOSFET – Common source and common Drain amplifiers, using FET.

UNIT VIII: OTHER SEMICONDUCTOR DEVICES - Light Emitting Diodes – LCD – Varactor Diodes – Tunnel Diodes – Photo Diodes – Silicon Controlled Rectifier – Diac – Triac – Unijunction Transistor – Phototransistors – Opto-Isolators – Solar Cells.

TEXT BOOKS:

1. “Electronic Devices and Circuit Theory” RoberBoylestad and Louis Nashelsky, 9th Edition, PHI.
2. “Electronic Devices and Circuits” J. Millman and Halkias, 1991 edition, 2008, TMH.
3. “Electronic Devices and Circuits” David A Bell, Fifth Edition 2008, Oxford University Press.

REFERENCES:

1. “Integrated Electronics, Analog and Digital Circuits and Systems” J. Millman and Halkias, TMH.
2. “Micro Electronic Circuits” Sedra and Smith, Oxford University Press.
3. “Electronic Devices and Circuits” G.K. Mithal, Khanna Publishers.
4. “Electronic Devices and Circuits” A.K. Maini, VarshaAgarwal, Wiley India Pvt Ltd.

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B.Tech. I Year

(1G112) C PROGRAMMING AND INTRODUCTION TO DATA STRUCTURES
(Common to CIVIL, EEE, ME & ECE)

UNIT I: OVERVIEW OF COMPUTERS AND PROGRAMMING - Electronic Computers then and Now, Computer Hardware, Computer Software, Algorithm, Flowcharts, Software Development Method, Applying the Software Development Method, Number Systems.

UNIT II: INTRODUCTION TO C LANGUAGE - C Language Elements, Variable Declarations and Data Types, Executable Statements, General Form of a C Program, Expressions, Precedence and Associativity, Expression Evaluation, Operators and Expressions, Type Conversions, Decision Statements - If and Switch Statements, Loop Control Statements - while, for, do-while Statements, Nested for Loops, Other Related Statements -break, continue, goto.

UNIT III: ARRAYS - Declaring and Referencing Arrays, Array Subscripts, Using for Loops for Sequential Access, Using Array Elements as Function Arguments, Arrays Arguments, Multidimensional Arrays.

Functions - Library Functions, Functions with and without Arguments, Communications Among Functions, Scope, Storage Classes - Auto, Register, Static, Extern, Scope rules, Type Qualifiers, Recursion - Recursive Functions, Preprocessor Commands.

UNIT IV: STRINGS - String Basics, String Library Functions, Longer Strings, String Comparison, Character operations, String-To-Number and Number-To- String Conversions,

Pointers - Introduction, Features of Pointers, Pointer Declaration, Arithmetic Operations With Pointers, Pointers and Arrays, Pointers and Two-Dimensional Arrays, Array of Pointers, Pointers to Pointers, Void Pointers, Dynamic Memory Allocation, Programming Applications, Pointer to Functions, Pointers and Strings.

UNIT V: STRUCTURES AND UNIONS – Introduction, Features of Structures. Declaration and Initialization of Structures, Structure within Structure, Array of Structures, Pointer to Structure, Structure and Functions, typedef, Bit Fields, Enumerated Data Type, Union, Union of Structures.

UNIT VI: FILES - Introduction, Streams and File Types, Steps for File Operations, File I/O Structures, Read and Write, Other File function, Searching Errors in Reading/Writing of Files, Low Level Disk I/O, Command Line Arguments, Application of Command Line Arguments, File Status functions (error handling).

UNIT VII: DATA STRUCTURES - Overview of Data Structure, Representation of a Stack, Stack Related Terms, Operation on a Stack, Implementation of a Stack, Representation of Arithmetic Expressions, Infix, Prefix, and Postfix Notations, Evaluation of Postfix Expression, Conversion of Expression from Infix to Postfix, Recursion, Queues - Various Positions of Queue, Representation of Queue, Insertion, Deletion, Searching Operations.

Linked List - Singly Linked List, Linked List with and without header, Insertion, Deletion and Searching Operations.

UNIT VIII: SEARCHING AND SORTING - Exchange (Bubble) Sort, Selection Sort, Quick Sort, Insertion Sort, Merge Sort. Searching- Linear and Binary Search Methods.

TEXT BOOKS:

1. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education
2. C and Data Structures, E.Balaguruswamy, Tata Mc Graw Hill
3. C and Data Structures, A snapshot oriented treatise with live engineering examples, Dr. N.B.Venkateswarlu, Dr. E.V.Prasad, S. Chand.

REFERENCES

1. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. LETUS C, Yeswanth Kanitkar, Ninth Edition, BPB Publication.
3. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI, Eighth Edition.

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B.Tech I Year

(1G513) ENGINEERING DRAWING
(Common to EEE, ECE, CSE and IT)

UNIT I: Introduction to engineering drawing – geometrical constructions - construction of ellipse, parabola and hyperbola. (General method and Special methods)

UNIT II: CYCLOIDAL CURVES – Cycloid, Epi-cycloid, Hypo cycloid.

UNIT III: ORTHOGRAPHIC PROJECTIONS OF POINTS AND LINES – inclined to one reference plane and inclined to both the reference planes.

UNIT IV: ORTHOGRAPHIC PROJECTIONS OF PLANES – inclined to one reference plane and perpendicular to other reference plane and inclined to both the reference planes.

UNIT V: ORTHOGRAPHIC PROJECTIONS OF SOLIDS- Cylinder, cone, prism, pyramid and sphere for different positions and axis inclined to both the reference planes.

UNIT VI: ISOMETRIC PROJECTIONS: Isometric projections of lines, planes and simple solids.

UNIT VII: Conversion of orthographic views into isometric views.

UNIT VIII: Conversion of isometric views into orthographic views.

TEXT BOOKS :

1. Engineering drawings by N.D.Bhatt
2 Engineering graphics by K.L. Narayana & P.Kannayya

REFERENCES:-

1. Engineering drawing and graphics by Venugopal/ New age
2. Engineering drawing by Johle / TMI

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B.Tech. I Year

(1G312)ELECTRONIC DEVICES AND CIRCUITS LAB
(Common to EEE & ECE)

ELECTRONIC WORKSHOP PRACTICE (in 4 lab sessions):

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCBs.
2. Identification, Specifications and Testing of Active Devices, Diodes, BJTs, Low power JFETs, MOSFETs, Power Transistors, LEDs, LCDs, SCR, UJT.
3. Study and operation of

- Multimeters (Analog and Digital)
- Function Generator
- Regulated Power Supplies
- CRO.

(For Laboratory examination – Minimum of 14 Experiments)

1. Forward and Reverse Bias Characteristics of PN junction Diode.
2. Zener Diode Characteristics and Zener as Voltage Regulator.
3. Input and Output Characteristics of Transistor CB Characterstics.
4. Input and Output Characteristics of Transistor CE Characterstics.
5. Input and Output Characteristics of Transistor CC Characterstics.
6. Half Wave Rectifier with and without filter.
7. Full Wave (Center trapped) Rectifier with and without filter.
8. Full Wave (Bridge) Rectifier with and without filter.
9. JFET Characteristics.
10. Measurement of h-parameters of BJT in CB, CE and CC configurations.
11. Frequency response of CE Amplifier.
12. Frequency response of CB Amplifier.
13. Frequency response of CC Amplifier.
14. Frequency response of Common Source FET Amplifier.
15. VI Characteristics of LED.
16. Application of LED (7 SEGMENT DISPLAY).
17. SCR Characteristics.
18. UJT Characteristics.

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B.Tech I year

(1G114) C PROGRAMMING AND DATA STRUCTURES LAB
(Common to CIVIL, EEE, ME& ECE)

Objectives:

• To make the student learn a programming language.

• To teach the student to write programs in C to solve the problems.
• To introduce the student to simple linear data structures such as lists, stacks, queues.

Recommended Systems/Software Requirements:

• Intel based desktop PC with ANSI C Compiler and Supporting Editors

Exercise l.

a) Write a C program to calculate Simple Interest by accepting principle amount, rate of interest and time.

b) Write a C program to find the roots of a quadratic equation.

c) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Exercise 2.

a) Write a C program to find the sum of individual digits of a positive integer.

b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Exercise 3.

a) Write a C program to find the given number is Armstrong number or not.
($153 = 1^3 + 5^3 + 3^3$)

b) Write a C program to find the given number is Strong number or not.
(145 = 1!+4!+5!)

c) Write a C program to generate all the Armstrong numbers between 1 and n, and Strong number between 1 and n where n is a value supplied by the user

Exercise 4.

a) Write a C program to calculate the following Sum: $Sum = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \frac{x^8}{8!} - \frac{x^{10}}{10!}$

b) Write a C program to read in two numbers, x and n, and then compute the sum of the geometric progression: $1 + x + x^2 + x^3 + \ldots\ldots\ldots\ldots\ldots\ldots + x^n$

For example: if n is 3 and x is 5, then the program computes 1+5+25+125. Print x, n, the sum Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Find if any values of x are also illegal? If so, test for them too.

Exercise 5.

a) Write a C program to generate Pascal's triangle.

b) Write a C program to construct a pyramid of numbers.

Exercise 6.

a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.

b) Write a C program to convert a Roman numeral to its decimal equivalent.

Exercise 7.

a) Write a C program to find both the largest and smallest number in a list of integers.

b) Write a C program that uses functions to perform the following:

i) Addition of Two Matrices ii) Multiplication of Two Matrices

Exercise 8.

Write C programs that use both recursive and non-recursive functions

i) To find the factorial of a given integer.

ii) To find the GCD (greatest common divisor) of two given integers.

iii) To solve Towers of Hanoi problem.

Exercise 9.

a) Write a C program that uses functions to perform the following operations:

i) To insert a sub-string in to a given main string from a given position.

ii) To delete n Characters from a given position in a given string.

b) Write a C program to determine if the given string is a palindrome or not

Exercise 10.

a) Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn't contain T.

b) Write a C program to count the lines, words and characters in a given text.

Exercise 11.

Write a C program that uses functions to perform the following operations:

i) Reading a complex number ii) Writing a complex number

iii) Addition of two complex numbers iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

Exercise 12

a) Write a C program which copies one file to another.

b) Write a C program to reverse the first n characters in a file.

(Note: The file name and n are specified on the command line.)

Exercise 13

a) Write a C programme to display the contents of a file.

b) Write a C programme to merge two files into a third file

(i.e., the contents of the first file followed by those of the second are put in the third file)

Exercise 14

Write a C program that uses functions to perform the following operations on singly linked list.:

i) Creation ii) Insertion iii) Deletion iv) Traversal

Exercise 16

Write C programs that implement stack (its operations) using

i) Arrays ii) Pointers

Exercise 17

Write C programs that implement Queue (its operations) using

i) Arrays ii) Pointers

Exercise 18

Write a C program that uses Stack operations to perform the following:

i) Converting infix expression into postfix expression

ii) Evaluating the postfix expression

Exercise 19

Write a C program that implements the following sorting methods to sort a given list of integers in ascending order

i) Bubble sort ii) Selection sort iii) Insertion sort

Exercise 20

Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers:

i) Linear search ii) Binary search

Exercise 21

Write C program that implements the Quick sort method to sort a given list of integers in ascending order.

Exercise 22

Write C program that implement the Merge sort method to sort a given list of integers in ascending order.

REFERENCE BOOKS

1. The Spirit of C, an introduction to modern programming, M.Cooper, Jaico Publishing House.
2. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.
3. Computer Basics and C Programming, V. Rajaraman, PHI Publications.

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B.Tech I Year

(1GC16) ENGINEERING PHYSICS AND CHEMISTRY LAB

(Common to all branches)

PART A: ENGINEERING PHYSICS LAB

Any TEN of the following experiments are to be performed during the Academic year.

List of Experiments

1. Determination of wavelength of given source - spectrometer - normal incidence method.
2. Dispersive power of the prism - Spectrometer.
3. Determination of wavelength of a laser source - Diffraction Grating.
4. Determination of Frequency of AC source by Sonometer.
5. Determination of thickness of a thin wire using parallel fringes.
6. Newton's Rings.
7. Magnetic field along the axis of a current carrying coil - Stewart and Gee's method.
8. Numerical aperture of an optical fiber.
9. Hall effect.
10. B - H Curve.
11. Energy gap of a material of p-n junction
12. Determination of rigidity modulus of a wire material - Torsional pendulum
13. Determination of dielectric constant.
14. Verification of laws of stretched string - Sonometer.
15. Melde's experiment - Transverse & Longitudinal modes.

Equipment required:

Spectrometer, Grating, Prism, Mercury vapour lamp, Sodium vapour lamp, Travelling Microscope, Wedge arrangement, Newton rings setup, Stewart-Gee's apparatus, He-Ne laser source, Optical fiber, Hall effect kit, B-H loop kit, Energy gap kit (four probe method), Torsional pendulum, Dielectric constant kit, Sonometer, Melde's apparatus

TEXT BOOKS:

1. Laboratory manual of ENGINEERING PHYSICS by Dr. Y. Aparna, Dr. K. VenkateswaraRao.
2. Laboratory Engineering Physics by Dr. K. Palanisamy, Scitech Publications.

PART B: ENGINEERING CHEMISTRY LAB

1. Estimation of Hardness of Water by EDTA method.
2. Estimation of Copper by EDTA method.
3. Estimation of Ferrous ion by dichrometry.
4. Estimation of Copper, by Iodometry.
5. Estimation of dissolved oxygen by Winkler’s method.
6. Determination of strength of the given Hydrochloric acid against standard sodium hydroxide solution by Conductometric titration
7. Determination of eutectic composition and temperature of simple eutectic system (Urea-Benzoic acid).
8. Determination of viscosity of the oils through Redwood viscometer I & II
9. Determination of calorific value of fuel using Bomb calorimeter
10. Determination of Iron in Cement by colorimetric method.

TEXT BOOKS:

1. Chemistry-lab manual by Dr. K.N.Jayaveera and K.B. Chandra Sekhar, S.M. Enterprizes Ltd.
2. Vogel's Book of Quantitative Inorganic Analysis, ELBS Edition.

Equipment Required:

1. Glass ware: Pipettes, Burettes, Volumetric Flasks, Beakers, Standard flasks, Measuring jars, Boiling Test tubes, reagent bottles, (Borosil)
2. Analytical balance (keroy) (15 Nos)
3. Calorimeter
4. Bomb Calorimeter
5. Redwood viscometer No. 1& No.2
6. Conductometer/ Conductivity bridge
7. Potentiometer
8. Wash bottles, test tube stands, burette stands
9. Gas cylinders with Bunsen burners
10. Chemicals: Hydrochloric acid, sodiumhydroxide, EDTA, EBT indicator, FSB-F indicator, methanol, Mohr's salt, copper sulphate, magnesium sulphate, ammonia, ammonium sulphate, calcium sulphate, etc.,

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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B.Tech I Year

(1GC17) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB
(Common to all branches)

The **Language Lab** focuses on the production and practice of sounds of language and equips students with the use of English in everyday situations and contexts.

Objectives:

- To train students to use language effectively in everyday conversations, to participate in group discussions, to help them face interviews, and sharpen public speaking skills
- To expose the students to a varied blend of self-instructional, learner-friendly modes of language learning
- To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm
- To initiate them into greater use of the computer in resume preparation, report- writing, format-making etc.
- To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required ability to face computer-based competitive exams such GRE, TOEFL, GMAT etc.

SYLLABUS:

The following course content is prescribed for the **English Language Laboratory** sessions:

1. **Introduction to the Sounds of English- Vowels, Diphthongs & Consonants**
2. **Introduction to Stress and Intonation**
3. **Situational Dialogues and Role-play**
4. **Telephone Skills**
5. **'Just A Minute' (JAM)**
6. **Oral Presentations**
7. **Describing Objects / Situation / People**
8. **Information Transfer**

Minimum Requirement:

The English Language Lab shall have two parts:

- **The Computer aided Language Lab** for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.
- **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System, a T. V. an LCD projector, a digital stereo –audio & video system and camcorder etc.

System Requirement (Hardware component):

Computer network with LAN with minimum 60 multimedia systems with the following specifications:
i) P – IV Processor
a) Speed – 2.8 GHZ
b) RAM – 512 MB Minimum
c) Hard Disk – 80 GB
ii) Headphones of High quality

Manual cum Record, prepared by the Faculty Members of English of the college will be used by Students.

Suggested Software:
Sky Pronunciation Suite
Connected Speech from Clarity
Clarity Pronunciation Power – Part I
The Rosetta Stone English Library
Mastering English in Vocabulary, Grammar, Spellings, Composition
English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge
Dorling Kindersley - Series of Grammar, Punctuation, Composition etc.
Language in Use, Foundation Books Pvt Ltd with CD
Learning to Speak English - 4 CDs
Microsoft Encarta with CD
Cambridge Advanced Learners' English Dictionary with CD.
Murphy's English Grammar, Cambridge with CD

Books Suggested for English Language Lab Library (to be located within the lab in addition to the

CDs of the text book which are loaded on the systems):

- **English Pronouncing Dictionary,** Daniel Jones Current Edition with CD.
- **Spoken English**, R. K. Bansal and J. B. Harrison, Orient Longman 2006 Edn.
- **Speaking English Effectively,** Krishna Mohan & NP Singh (Macmillan).
- **A Practical Course in English Pronunciation**, (with two Audio cassettes) by J. Sethi, Kamlesh.
- Sadanand& D.V. Jindal, Prentice-Hall of India Pvt. Ltd., New Delhi.
- **Body Language- Your Success Mantra ,DrShaliniVerma, S.Chand& Co,** 2008**.**
- **English Dictionary for Advanced Learners,** (with CD) International edn. Macmillan 2009.
- **A Handbook for Englsih language Laboratories,** E.Sureshkumar, P.Sreehari, Foundation Books, 2009.
- **DELTA's key to the Next Generation TOEFL Test,** 6 audio CDS, New Age International Publishers, 2007.

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B.Tech I Year

(1G411) ENGINEERING & I.T. WORKSHOP
(Common to all branches)

ENGINEERING WORKSHOP

Objectives:

The budding Engineer may turn out to be a technologist, scientist, entrepreneur, practitioner, consultant etc. There is a need to equip the engineer with the knowledge of common and newer engineering materials as well as shop practices to fabricate, manufacture or work with materials. Essentially he should know the labour involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work. Hence engineering work shop practice is included to introduce some common shop practices and on hand experience to appreciate the use of skill, tools, equipment and general practices to all the engineering students.

1. TRADES FOR EXERCISES:

a. **Carpentry shop**– Two joints (exercises) involving tenon and mortising, groove and tongue: Making middle lap T joint, cross lap joint, mortise and tenon T joint, Bridle T joint from out of 300 x 40 x 25 mm soft wood stock.
b. **Fitting shop**– Two joints (exercises): square joint, V joint, half round joint or dove tail joint out of 100 x 50 x 5 mm M.S. stock.
c. **Sheet metal shop**– Two jobs (exercises) from: Tray, cylinder, hopper or funnel from out of 22 or 20 guage G.I. sheet.
d. **House-wiring**– Two jobs (exercises): wiring for ceiling rose and two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, wiring for a water pump with single phase starter.
e. **Foundry**– Preparation of two moulds (exercises): for a single pattern and a double pattern.
f. **Welding** – Preparation of two welds (exercises): single V butt joint, lap joint, double V butt joint or T fillet joint.

2. TRADES FOR DEMONSTRATION:

a. Plumbing
b. Machine Shop
c. Metal Cutting

Apart from the above the shop rooms should display charts, layouts, figures, circuits, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, Plastics, steels, meters, gauges, equipment, CD or DVD displays, First aid, shop safety etc. (though they may not be used for the exercises but they give valuable information to the student). In the class work or in the examination knowledge of all shop practices may be stressed upon rather than skill acquired in making the job.

REFERENCE BOOKS:

1. Engineering Work shop practice for JNTU, V. Ramesh Babu, VRB Publishers Pvt. Ltd., 2009.
2. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers.
3. Engineering Practices Lab Manual, Jeyapoovan, SaravanaPandian, 4/e Vikas.
4. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.

IT WORKSHOP
Objectives:

The IT Workshop for engineers is a training lab course. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, Power Point and Publisher.

PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. The students should work on a working PC (PIV or higher)to disassemble and assemble back to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.

Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace for usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

Productivity tools module would enable the students in crafting professional word documents, excel spread sheets, power point presentations and databases using the Microsoft suite of office tools and LaTeX. (It is recommended to use Microsoft office 2007 in place of MS Office 2003)

PC Hardware

Exercise 1 – Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Exercise 2 – Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video shall be given as part of the course content.

Exercise 3 – Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Exercise 4 – Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Exercise 5 – Task 5:**Hardware Troubleshooting:** Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

Exercise 6 – Task 6:**Software Troubleshooting:** Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

OFFICE TOOLS:

LaTeX and Word:

Exercise 7 – Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task1:**UsingLaTeX and Word to create project certificate**. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Task2: **Creating project** abstract features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task3: **Creating a Newsletter:** Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs

Task4: **Creating a Feedback form** - Features to be covered- Forms, Text Fields, Inserting objects, Mail Merge in Word.

Excel

Exercise 8 - Excel Orientation: The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1:**Creating a Scheduler - Features to be covered**:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task2: **Calculating GPA - Features to be covered**:- Cell Referencing, Formulae in excel – average, std.deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP

Task3: **Performance Analysis** - Features to be covered:- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

LaTeX and MS/equivalent (FOSS) tool Power Point

Exercise 9 - Task1: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this Exercise includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Powerpoint. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Exercise 10 - Task2: Second Exercise helps students in making their presentations interactive. Topic covered during this Exercise includes : Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts

Access

Exercise11 – Task1:Help students in preparing database using Microsoft/ equivalent (FOSS) access tool. Topic covered during this week includes - Access Orientation, Using Templates, Layouts, Inserting data, Editing data, Inserting Tables, Working with menu objects, Renaming, deleting, modifying data and tables.

Internet & World Wide Web

Exercise 12 - Task 1: **Orientation& Connectivity Boot Camp :** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers.

Exercise 13 - Task 2:__Search Engines & Netiquette:__ Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated by the student to the satisfaction of instructors.

Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install an anti virus software, configure their personal firewall and windows update on their computer.

REFERENCES :

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. LaTeX Companion – Leslie Lamport, PHI/Pearson.
3. Introduction to Computers, Peter Norton, 6/e McGraw Hill.
4. Upgrading and Repairing, PC's 18th e, Scott Muller QUE, Pearson Education.
5. Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dreamtech.
6. IT Essentials PC Hardware and Software Companion Guide, Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.

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II Year B.Tech. EEE-I Semester

(1GC32) ENGINEERING MATHEMATICS
(Common to EEE and ECE)

UNIT I: Matrix algebra -Rank-Echelon form, normal form -solutions of linear system of homogenous and non-homogenous equations- -Gauss elimination method-Eigen values-Eigen vectors-Properties.

UNIT II: Solution of algebraic and Transcendental equations-Bisection method-Method of false position-Newton-Raphson method -Numerical solutions of ordinary differential equations-Taylor's series-Euler's methods–Runge-kutta fourth order method-Milne's predictor-corrector method.(Without proofs).

UNIT III: Curve fitting: Fitting a straight line-second degree parabola-Exponential curve – power curve by the method of least squares-Correlation-rank correlation.

UNIT IV: Partial differential equations:Formation of partial differential equations by eliminating arbitrary constants and arbitrary functions-solutions of linear equation–Charpit's method-Method of separation of variables.

UNIT V: Fourier series: Determination of Fourier coefficients-Fourier series of even and odd functions-Fourier series in an arbitrary interval-half range Fourier sine and cosine expansions.

UNIT VI: Fourier transforms: Fourier sine Transforms-Cosine Transforms-Properties-Inverse Transforms-Finite Fourier Transforms.

UNIT VII: Mean-Median-Mode-Range-Standard deviation-Random variables-Discrete and Continuous Random variables –Distribution functions.

UNIT VIII: Probability distributions-Binomial distribution-Poisson distribution–Uniform distribution(Discrete) -Normal distribution.

TEXT BOOKS:

1. B. S. Grewal, *Higher Engineering Mathematics*, Khanna Publishers, New Delhi, 40th edition.
2. Erwin Kreyszig, *Advanced Engineering Mathematics*, New Age International (Pvt) Limited, 8th edition.

REFERENCE BOOKS:

1. B. V. Ramana, *A text book of Engineering Mathematics*, Tata McGraw Hill.
2. T. K. V. Iyengar, B. Krishna Gandhi and Others, *Mathematical Methods*, S.Chand & Company.

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II Year B.Tech. EEE-I Semester

(1G231) SWITCHING THEORY AND LOGIC DESIGN

UNIT I NUMBER SYSTEMS & CODES: Philosophy of number systems – r,(r-1)'s complement, representation of negative numbers, binary arithmetic, binary codes, error detecting & error correcting codes, hamming codes.

UNIT II BOOLEAN ALGEBRA AND SWITCHING FUNCTIONS: Fundamental postulates of Boolean Algebra, Basic theorems (Duality, DeMorgan's, Shannon's)and properties, switching functions-Canonical and Standard forms, algebraic simplification using Boolean theorems, digital logic gates, properties of XOR gate, universal gates,Two level & Multilevel Realization of Boolean Functions using Universal Gates.

UNIT III MINIMIZATION OF SWITCHING FUNCTIONS: k-Map method, Prime implicants, Don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime-Implicant chart, simplification rules.

UNIT IV COMBINATIONAL LOGIC DESIGN : Design using conventional logic gates-Binary Adders, Subtractors, Ripple Adders and subtractor Adders, Look ahead carry Adders, Decimal adder-BCD adder, Binary multiplier, Modular design using IC chips-Magnitude comparator, Encoder, Decoder, Multiplexer- MUX Realization of switching functions, De-Multiplexer, Parity bit generator, Code-converters, Hazards and hazard free realizations.

UNIT V PROGRAMMABLE LOGIC DEVICES: Basic PLD's-ROM, PROM, PLA, PAL, and Realization of Switching functions using PLD's. Comparison between PLA, PLD, ROM.

UNIT VI SEQUENTIAL CIRCUITS - I : Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples),Basic flip-flops, Triggering and excitation tables, flip flop conversions, Steps in synchronous sequential circuit design, Design of modulo-N Synchronous counters – up/down counter, ring counter, Johnson counter, Design of modulo-N Asynchronous counter-Sequence detector, Serial binary adder.

UNIT VII SEQUENTIAL CIRCUITS - II : Finite state machine-capabilities and limitations, Mealy and Moore models and their conversions, minimization of completely specified and incompletely specified sequential machines, Partition techniques and Merger chart methods, concept of minimal cover table.

UNIT VIII ALGORITHMIC STATE MACHINES: Salient features of the ASM chart, Simple examples, System design using data path and control subsystems, control implementations-Decoder, MUX, per state one Flip Flop, PLA. Example: Binary multiplier.

TEXT BOOKS:

1. Morris Mano, *Digital Design*. Prentice Hall India, 3rd Ed.
2. Zvi Kohavi, *Switching & Finite Automata theory*. Tata McGraw Hill, 2nd Ed.
3. A Anand Kumar, *Switching Theory and Logic Design*. Prentice Hall India, 2008.

REFERENCE BOOKS:

1. Charles H. Roth, *Fundamentals of Logic Design*. Thomson Publications, 2004, 5th Ed.
2. Fletcher, *An Engineering Approach to Digital Design*. Prentice Hall India.
3. John M. Yarbrough, *Digital Logic Applications and Design*. Thomson Publications, 2006.

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II Year B.Tech. EEE-I Semester

(1G232) ELECTRICAL MACHINES-I

UNIT I ELECTROMECHANICAL ENERGY CONVERSION: Electromechanical Energy Conversion – forces and torque in magnetic field systems – energy balance – energy and force in a singly excited magnetic field system, determination of magnetic force – co-energy – multi excited magnetic field systems.

UNIT II DC GENERATORS –CONSTRUCTION & OPERATION: D.C. Generators – Principle of operation – Function of commutator – constructional features – armature windings – lap and wave windings – simplex and multiplex windings – single and multi layer windings –equalizer rings and dummy coils - E.M.F Equation- Losses – Constant & Variable losses – calculation of efficiency – condition for maximum efficiency - reduction of losses.

UNIT III TYPES OF DC GENERATORS AND CHARACTERISTICS: Methods of Excitation – separately excited and self excited generators – O.C.C, Internal and External Characteristics - causes for failure of self excitation and remedial measures- Load characteristics.

UNIT IV ARMATURE REACTION IN DC MACHINES: Armature reaction – Cross magnetizing and de-magnetizing AT/pole – compensating winding – Commutation – reactance voltage – methods of improving commutation.

UNIT V PARALLEL OPERATION: Parallel operation of DC generators – use of equalizer bar and cross connection of field windings – load sharing.

UNIT VI DC MOTORS: D.C Motors – Principle of operation – Back E.M.F. - Torque equation – characteristics and applications of shunt, series and compound motors – Armature reaction and commutation.

UNIT VII SPEED CONTROL OF DC MOTORS: Speed control of DC Motors - Armature voltage and field flux control methods. Ward-Leonard system - 3 point and 4 point starters.

UNIT VIII TESTING OF DC MACHINES: Brake test – Swinburne's test – Hopkinson's test – Field's test – Retardation test – separation of stray losses in a DC motor.

TEXT BOOKS:

1. JB Gupta, *Theory and Performance of Electrical Machines(DC machines, Poly phase circuits & AC machines) in SI Units*. S.K. KATARIA & Sons, New Delhi, 2006, 14th Ed.
2. I.J. Nagrath & D.P. Kothari, *Electrical Machines*. Tata Mc Graw – Hill Publishers, New Delhi, 2005, 7th Ed.
3. P.S. Bimbhra, *Electrical Machinery*. Khanna Publishers. Delhi, 2005, 7th Ed.

REFERENCE BOOKS:

1. Albert E Clayton & N N Hancock, *Performance and Design of Direct Current Machines*. CBS Publishers, New Delhi, 2004, 3rd Ed.
2. S.K. Bhattacharya, *Electrical Machines*. Tata McGraw Hill Publishers, New Delhi, 2001.
3. A.E. Fitzgerald, C.Kingsley and S.Umans, *Electric Machinery*. Mc Graw-Hill Companies, New Delhi, 2008, 6th Ed.

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II Year B.Tech. EEE-I Semester

(1G233) ELECTRICAL CIRCUITS-I

UNIT I FUNDAMENTALS OF ELECTRICAL CIRCUITS: Concepts of Charge, current, voltage and power, active & passive elements, Reference concepts of direction for voltages & currents, voltage and current relationships for passive elements, Ohm's law. Kirchhoff Laws, current division and voltage division rules; Network reduction techniques – series, parallel, series-parallel circuits, star-delta and delta-star transformations, Source transformation.

UNIT II BASIC NODAL & MESH ANALYSIS: Basic definitions: Node, Path, Loop, Branch, Nodal analysis and super node concept, Mesh analysis and super mesh concept.

UNIT III FUNDAMENTALS OF AC CIRCUITS: Introduction – Advantages of AC supply, types of waveforms – importance of sinusoidal waveforms – Basic definitions: waveforms, cycle, time period, frequency, amplitude- Determination of average, RMS value, form factor & peak factor for different alternating waveforms – Phase and phase difference.

UNIT IV SINGLE PHASE AC CIRCUITS: Sinusoidal response of R, L, C - Combination of R, L, C circuits – Concept of Impedance and power triangles, power factor - Resonance, bandwidth and quality factor for series and parallel networks - locus diagram.

UNIT V THREE - PHASE SYSTEM: Advantages of Three- phase system over single phase system – Phase sequence - star & delta connections. Relationship between phase and line quantities, Balanced and unbalanced circuits, Power measurement in three phase systems using two wattmeter method.

UNIT VI MAGNETICALLY COUPLED CIRCUITS: Coupled circuits – self & mutual inductance- DOT conventions – coefficient of coupling – Analysis of magnetic circuits: Series, Parallel and Composite circuits - comparison of electrical and magnetic circuits.

UNIT VII NETWORK THEOREMS – I: Thevenin's, Norton's, Maximum Power Transfer and Superposition theorems for D.C. and sinusoidal excitations-Its applications.

UNIT VIII NETWORK THEOREMS – II: Tellegen's, Millman's, Reciprocity, substitution and compensation theorems for D.C. and sinusoidal excitation- Its applications.

TEXT BOOKS:

1. Sudhakar & Shyam Mohan, *Electric Circuits*. Mc Graw Hill Company, 2007, 3rd Ed.
2. Chakrabarthi, *Circuits Theory*. Dhanpat Rai & Co, New Delhi, 2009.

REFERENCE BOOKS:

1. M.E. Van Valkenberg, *Network Analysis*. Pearson Publications, New Delhi 2006, 3rd Ed.
2. William H. Hayt & Jack E. Kemmerly & Steven M. Durbin, *Engineering Circuit Analysis*. TATA Mc Graw Hill Company, 2009, 6th Ed.

3. J.A.Edminister & M.D.Nahvy, *Theory and Problems of Electric Circuits*. Schaums Outline series, New Delhi TATA Mc Graw Hill Company, 2004, 4th Ed.
4. G. K. Mittal, Ravi Mittal, *Network Analysis*., Khanna Publishers, New Delhi, 1997, 14th Ed.
5. C. K. Alexander and M. N. O. Sadiku, *Fundamentals of Electric Circuits*. Tata Mc Graw Hill Publishing Company Limited, New Delhi, 2010, 3rd Ed.

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II Year B.Tech. EEE-I Semester

(1G536) FLUID MECHANICS AND HYDRAULIC MACHINES

UNIT I FLUID STATICS: Dimensions and units: physical properties of fluids- specific gravity, viscosity surface tension- vapor pressure and their influence on fluid motion-atmospheric gauge and vacuum pressure – measurement of pressure- Piezometer, U-tube and differential manometers.

UNIT II FLUID KINEMATICS: Stream line, path line and streak lines and stream tube, classification of flows-steady & unsteady, uniform, non uniform, laminar, turbulent, rotational, and irrotational flows-equation of continuity for one dimensional flow.
Fluid Dynamics: Surface and body forces –Euler's and Bernoulli's equations for flow along a stream line, momentum equation and its application on force on pipe bend.

UNIT III CLOSED CONDUIT FLOW: Reynold's experiment- Darcy Weisbach equation-Minor losses in pipes- pipes in series and pipes in parallel- total energy line-hydraulic gradient line. Measurement of flow: pilot tube, venturimeter, and orifice meter, Flow nozzle, Turbine flow meter.

UNIT IV BASICS OF TURBO MACHINERY : Hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes, jet striking centrally and at tip, velocity diagrams, work done and efficiency, flow over radial vanes.

UNIT V HYDROELECTRIC POWER STATIONS: Elements of hydro electric power station-types-concept of pumped storage plants-storage requirements, mass curve (explanation only) estimation of power developed from a given catchment area; heads and efficiencies.

UNIT VI HYDRAULIC TURBINES : Classification of turbines, impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine-working proportions, work done, efficiencies, hydraulic design –draft tube theory- functions and efficiency.

UNIT VII PERFORMANCE OF HYDRAULIC TURBINES: Geometric similarity, Unit and specific quantities, characteristic curves, governing of turbines, selection of type of turbine, cavitation, surge tank, water hammer.

UNIT VIII CENTRIFUGAL PUMPS: Classification, working, work done – manomertic head- losses and efficiencies specific speed- pumps in series and parallel-performance - characteristic curves, NPSH.
Reciprocating pumps: Working, Discharge, slip, indicator diagrams.

TEXT BOOKS:

1. Modi and Seth, *Hydraulics, fluid mechanics and Hydraulic machinery*.
2. Rajput, *Fluid Mechanics and Hydraulic Machines*.

REFERENCE BOOKS:

1. D.S. Kumar, Kotaria & Sons, *Fluid Mechanics and Fluid Power Engineering*.
2. D. Rama Durgaiah, *Fluid Mechanics and Machinery*. New Age International.
3. Banga & Sharma, *Hydraulic Machines*. Khanna Publishers.
4. James W. Dally, William E. Riley, *Instrumentation for Engineering Measurements*. John Wiley & Sons Inc. 2004 (Chapter 12 – Fluid Flow Measurements).

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II Year B.Tech. EEE-I Semester

(1G234) ELECTROMAGNETIC FIELDS

UNIT I ELECTROSTATICS: Electrostatic fields-Coulomb's law - Electric Field Intensity (EFI) - Various Charge Distributions - EFI due to a Continuous volume charge distribution, line and surface charge Electric Flux density-Gauss's Law - Applications of Gauss law to symmetrical charge distributions and differential volume element - Maxwell's first equation (point and integral form).

UNIT II ENERGY & POTENTIAL IN ELECTRIC FIELDS: Energy expended in moving a point charge in an electric field-Potential - Maxwell's second equation (point and integral form) - Potential Gradient-Potential for different charge distributions-energy density in electrostatic fields Electric Dipole-Dipole moment - potential and EFI due to an electrical Dipole-Torque on an Electric Dipole in an electric field.

UNIT III CONDUCTORS, DIELECTRICS AND CAPACITANCE: Current density - conduction and convection current density - Ohm's law in point forms - continuity equation-Conductors and Dielectric materials - Behavior of conductors in an electric field - Boundary Conditions - Polarization.
Capacitance-capacitance of parallel plate, Spherical and Co-axial capacitors with composite dielectric Laplace's and poison's equations - Solutions of Laplace's equation in one variable.

UNIT IV MAGNETOSTATICS: Static magnetic fields-Biot Savart's law - Oesterd's experiment - Magnetic Field Intensity(MFI) - MFI due to a straight current carrying filament, Circular, Square, Solenoid and Toroid current carrying wire, Relation between magnetic flux, Magnetic flux density and MFI.

UNIT V AMPERE'S LAW AND ITS APPLICATIONS: Ampere's Circuital law - Maxwell's third equation(point and integral form) - Applications of Ampere's law to infinite line current, Infinite sheet of current, Infinitely long co-axial transmission line, Solenoid and Toroid - field due to a circular loop, rectangular and square loops. Scalar magnetic potential and its limitations-Vector magnetic potential due to simple configurations - vector Poisson's equation.

UNIT VI FORCE IN MAGNETIC FIELDS: Magnetic Forces-Forces due to magnetic fields-force on charged particles, current element and between two current elements - Lorentz force equation.
Force on a straight and long current carrying conductor in a magnetic field-Force between two straight long and parallel current carrying conductors. Magnetic Dipole and Dipole moment - Torque on a current loop placed in a magnetic field.

UNIT VII MAGNETIC MATERIALS AND INDUCTANCE: Magnetization - Classification of magnetic materials - B-H curve - Magnetic Boundary conditions. Self and Mutual Inductance - Coefficient of coupling(K) - Neumann's formulae - Self-Inductance of a solenoid, Toroid, Co-axial cable, Two wire transmission line - energy stored and density in

magnetic field, Analogy between Electric and Magnetic circuits.

UNIT VIII TIME VARYING FIELDS: Time varying fields - Faraday's laws of electromagnetic induction - Maxwell's fourth equation (point and integral form) - statically and dynamically induced EMF – simple problems. Modifications of Maxwell's equations for time varying fields - displacement current - poynting theorem and poynting vector.

Note: Review of Vector Algebra is an essential before starting the subject covering following topics:
Scalar and vector fields - Vector algebra - Cartesian, Circular Cylindrical and Spherical co-ordinate systems-Divergence Theorem - Stoke's Theorem.
TEXT BOOKS:

1. William H. Hayt & John A. Buck, *Engineering Electromagnetics*. Mc. Graw Hill Companies, 2006, 7th Ed.
2. Sadiku, *Elements of Electro Magnetic Fields*. Oxford Publications, 4th Ed.
3. JP Tewari, *Electromagnetics*. Khanna Publishers.
4. S.Kamakshaiah, *Electromagnetic fields*. Right Publishers, 2007.

REFERENCE BOOKS:

1. J D Kraus, *Electromagnetics*. Mc Graw Hill, 1992, 4th Ed.
2. K.A.Gangadhar & P.M. Ramanathan, *Field Theory*. Khanna publishers, New Delhi, 2003, 5th Ed.
3. D J Griffiths, *Introduction to Electro dynamics*. Prentice-Hall of India Pvt. Ltd, 2nd Ed.
4. Ashutosh Pramanik, *Electromagnetics Theory & Applications*.PHI, 2nd Ed.
5. Ashutosh Pramanik, *Electromagnetics Problems with Solutions*.PHI, 2nd Ed.

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II Year B.Tech. EEE-I Semester

(1G537) FLUID MECHANICS AND HYDRAULIC MACHINES LAB

Any **Ten** of the following experiments are to be conducted

1. Impact of jets on Vanes.
2. Performance Test on Pelton Wheel.
3. Performance Test on Francis Turbine.
4. Performance Test on Kaplan Turbine.
5. Performance Test on Single Stage Centrifugal Pump.
6. Performance Test on Multi Stage Centrifugal Pump.
7. Performance Test on Reciprocating Pump.
8. Calibration of Venturimeter.
9. Calibration of Orifice meter.
10. Determination of friction factor for a given pipe line.
11. Determination of loss of head due to sudden contraction in a pipeline.
12. Turbine flow meter.

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II Year B.Tech. EEE-I Semester

(1G238) ELECTRICAL MACHINES-I LAB

Any **Ten** of the following experiments are to be conducted

1. Magnetization characteristics of DC shunt generator. (Determination of critical field resistance and Critical speed).
2. Load test on DC shunt generator. (Determination of characteristics).
3. Load test on DC series generator. (Determination of characteristics).
4. Load test on DC compound generator (Cumulative and differential connection). (Determination of characteristics).
5. Hopkinson's test on DC shunt machines. (Predetermination of efficiency).
6. Fields test on DC series machines. (Determination of efficiency).
7. Swinburne's test on DC shunt motor. (Predetermination of efficiencies).
8. Speed control of DC shunt motor by
   a. Armature control method.
   b. Field flux control method.
9. Brake test on DC compound motor. (Determination of performance curves).
10. Brake test on DC shunt motor. (Determination of performance curves).
11. Brake test on DC series motor. (Determination of performance curves).
12. Separation of losses in DC shunt machine.

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II Year B.Tech. EEE-II Semester

(1G241) ELECTRICAL MACHINES-II

UNIT I CONSTRUCTION & OPERATION OF SINGLE PHASE TRANSFORMERS: Single phase transformer-types - constructional details- emf equation- operation on no load and on load - phasor diagrams.

UNIT II PERFORMANCE OF SINGLE PHASE TRANSFORMERS: Equivalent circuit – losses-minimization of hysteresis and eddy current losses- and efficiency-regulation, All day efficiency - effect of variations of frequency & supply voltage on iron losses.

UNIT III TESTING OF SINGLE PHASE TRANSFORMER AND AUTOTRANSFORMER: OC and SC tests, Polarity test - Sumpner's test - predetermination of efficiency and regulation-separation of core losses test-parallel operation with equal and unequal voltage ratios - auto transformers-equivalent circuit - comparison with two winding transformers.

UNIT IV THREE - PHASE TRANSFORMERS: Three-Phase transformers - Three-Phase connections - Y/Y, Y/Δ, Δ/Y, Δ/Δ open Δ and Scott connection, Third harmonics in phase voltages-three winding transformers-tertiary windings- Determination of Z_p, Z_s and Z_t – concept of off load and on load tap changing.

UNIT V THREE-PHASE INDUCTION MOTORS: Three-Phase induction motors-construction details of cage and wound rotor machines-production of a rotating magnetic field - principle of operation - rotor emf and rotor frequency - rotor reactance, rotor current and pf at standstill and during operation.

UNIT VI INDUCTION MOTOR CHARACTERISTICS: Rotor power input, rotor copper loss and mechanical power developed and their inter relation-torque equation-deduction from torque equation - expressions for maximum torque and starting torque - torque slip characteristic - double cage and deep bar rotors - equivalent circuit - phasor diagram - crawling and cogging.

UNIT VII CONSTRUCTION OF CIRCLE DIAGRAM: Circle diagram – No-Load and blocked rotor tests - stator resistance test - predetermination of performance - Methods of starting and starting current and torque calculations

UNIT-VIII INDUCTION MOTOR SPEED CONTROL METHODS: Speed control-change of frequency; change of poles and methods of consequent poles; cascade connection. Injection of an emf into rotor circuit (qualitative treatment only) - Induction Generator - principle of operation.

TEXT BOOKS:

1. JB Gupta, *Theory and performance of Electrical Machines. (DC machines, Poly phase circuits & AC machines) in SI Units*, S.K. KATARIA & Sons, Delhi 2009.
2. P.S. Bimbhra, *Electrical Machinery*. Khanna Publishers. Delhi, 2005, 7th Ed.

REFERENCE BOOKS:

1. A.E. Fitzgerald, C.Kingsley and S.Umans, *Electric Machinery*. Mc Graw-Hill Companies, New Delhi, 2008, 6th Ed.
2. I.J.Nagrath & D.P.Kothari, *Electric Machinery*. Tata Mc Graw Hill, 2005, 7th Ed.
3. MG.Say, *Performance and Design of AC Machines*. BPB Publishers.
4. Langsdorf, *Theory of Alternating Current Machinery*. Tata McGraw-Hill Companies, 2nd Ed.
5. BL Theraja & AK Theraja, *A. text of Electrical Technology in SI units* Vol:2. S. Chand, 2010.

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II Year B.Tech. EEE-II Semester

(1G242) ELECTRICAL CIRCUITS-II

UNIT I TWO-PORT NETWORKS: Two port networks – Z-parameters, Y-Parameters, ABCD parameters and h parameters – symmetric and reciprocity property in two port networks – inter relationships of different parameters – interconnection of two port networks.

UNIT II NETWORK TOPOLOGY: Concept of network graph, basic definitions – branch, graph, tree, node, twigs, links – properties of a tree – incidence matrix – properties – reduced incidence matrix- cut set and tie set – examples – dual networks.

UNIT III FOURIER SERIES: Introduction – trigonometric Fourier series - evaluation of Fourier coefficients – waveforms symmetry, exponential form Fourier series, effective value, Fourier transforms & Properties – relationship with Laplace transform.

UNIT IV LAPLACE TRANSFORMS: Definition of Laplace transform – advantages, basic theorems(differentiation and integration) - Laplace transform of important functions – inverse Laplace transform – transform impedance of network elements (R, L & C), application of Laplace transform – series RL, RC, RLC – parallel RLC circuits – initial and final value theorem.

UNIT V D.C TRANSIENT ANALYSIS: Transient response of RL, RC and RLC series circuits –Initial conditions-Solution method using differential equation and Laplace transforms, Response of RL and RC networks to pulse excitation.

UNIT VI A.C TRANSIENT ANALYSIS: Transient response of RL, RC and RLC series circuits –Initial conditions-Solution method using differential equation and Laplace transforms.

UNIT VII NETWORK FUNCTIONS: Introduction-course and terminal pairs-determinants and co factors for determining network functions-network functions – necessary conditions for driving point function-necessary conditions for transfer function-applications of network analysis in deriving network functions-transient response.

UNIT VIII NETWORK SYNTHESIS: Introduction –positive real functions-definitions and properties-synthesis of single port networks (RL, RC and LC networks).

TEXT BOOKS:

1. A. Sudhakar, Shyammohan S Palli, *Circuits and Networks. (Analysis and Synthesis)*. Tata Mc GrawHill Publishing company Ltd., 3rd Ed.
2. D. Roy Choudhury, *Networks and Systems*. New Age international publishers, 1st Ed.

REFERENCE BOOKS:

1. A. Chakrabarthi, *Circuit Theory (Analysis and Synthesis)*. Dhanpat Rai & Co. New Delhi, 2009, 1st Ed
2. M.E. Van Valkenburg, *Network analysis*. PHI, 3rd Ed.
3. William H Hayt, Jr. Jack E. Kemmerly, Steven M. Durbin, *Engineering Circuit Analysis*. Tata Mcgraw Hill publishing company Ltd., 6th Ed.
4. Umesh Sinha, *Network Analysis and Synthesis*. Satyaprakashan, New Delhi, 5th Ed.

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II Year B.Tech. EEE-II Semester

(1G343)PULSE AND DIGITAL CIRCUITS

UNIT I LINEAR WAVE SHAPING: High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square, ramp and Exponential inputs. High pass RC network as differentiator, Low pass RC network as integrator, attenuators, RL and RLC circuits and their response for step input, Ringing circuit.

UNIT II NON-LINEAR WAVE SHAPING: Diode clippers, Transistor clippers, clipping at two independent levels, Comparators, Diode-differentiator comparator ,applications of voltage comparators, clamping operation, clamping circuit taking source and diode resistance into account, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage.

UNIT III SWITCHING CHARACTERISTICS OF DEVICES: Diode as a switch, Diode Switching Times, Transistor as a Switch, transistor-switching times, Break down voltages, Transistor in saturation, Temperature variations of saturation parameters.

UNIT IV MULTIVIBRATORS: Bistable Multivibrators - Fixed Bias Transistor Bistable Multivibrator, Self Bias Transistor Bistable Multivibrator, Emitter Coupled Bistable Multivibrator, Commutating Capacitors, Symmetrical & Un Symmetrical Triggering of Bistable Multivibrator, Monostable Multivibrators - Collector Coupled Monostable Multivibrator, Emitter Coupled Monostable Multivibrator , Astable Multivibrators - Collector Coupled Astable Multivibrator, Emitter Coupled Astable, stable Multivibrator , Schmitt trigger circuit using BJT.

UNIT V TIME BASE GENERATORS: General features of a time base signal, methods of generating time base waveform, Principle and working of Miller and Bootstrap time base generators, Methods of Linearity improvements.

UNIT VI SAMPLING GATES: Basic operation and principle of Sampling gates, Unidirectional diode sampling gate, Bi-Directional diode & Transistor sampling gates, Four diode sampling gate, Six diode sampling gate, Reduction of pedestal in gate circuits, application of sampling gates.

UNIT VII SYNCHRONIZATION AND FREQUENCY DIVISION : Pulse Synchronization of relaxation devices, Frequency division in sweep circuit, astable relaxation circuits, Monostable relaxation circuits, stability of relaxation devices ,Synchronization of a sweep circuit with symmetrical signals, Sine wave frequency division with a sweep circuit, A Sinusoidal divider using regeneration and modulation.

UNIT VIII REALIZATION OF LOGIC GATES AND TYPES OF LOGIC FAMILIES: AND,OR,NOT gates using diodes and transistors, Inhibit operation, NAND & NOR gates using DTL,RTL Logic, DCTL,TTL, and CMOS logic families, comparisons of logic families.

TEXT BOOKS:

1. J. Millman and H. Taub. Pulse, *Digital and Switching Waveforms*. McGraw- Hill, 2007, 2nd Ed.
2. A. Anand Kumar, *Pulse and Digital Circuits*. PHI, 2005, 2nd Ed.

REFERENCE BOOKS:

1. Ronald J.Tocci, *Fundamentals of pulse and digital circuits*. 2008, 3rd Ed.
2. David A.Bell, *Solid state pulse circuits*. PHI, 2002, 4th Ed.

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II Year B.Tech. EEE-II Semester

(1G243) GENERATION OF ELECTRIC POWER

UNIT I INTRODUCTION & THERMAL POWER STATIONS:
Overview of Conventional and Non-Conventional sources of energy - Structure of Electric Power System - Growth of PS in India, Layout of thermal plant –use of lignite and coal - showing paths of coal – steam – water – air - ash and flue gases - brief description of TPS components: economizer – boilers - super heaters - turbines and condenser-chimney and cooling towers.

UNIT II HYDRO ELECTRIC GAS AND POWER STATIONS: Arrangement and location of hydro electric station, principle of working of a hydro – electric plants, components, Advantages and disadvantages
Gas Power Stations: Principle of Operation and Components (Block Diagram Approach Only)

UNIT III NUCLEAR POWER STATIONS: Nuclear fission - chain reaction - principle of operation of nuclear reactor - nuclear fuel – moderator - control rods - reflectors and coolants - shielding and safety precautions - radiation hazards - nuclear reactors – PWR - BWR and breeder reactor
Over view of gas power stations: Principle of operation and components

UNIT IV DISTRIBUTION SYSTEMS: Classification of distribution systems-comparison of DC Vs AC- AC single phase and three phase three wire and four wire systems most economical size of conductor – voltage drop calculations(numerical problems) in AC & DC for radial and ring main distribution.

UNIT V A.C. DISTRIBUTION SYSTEMS: Voltage Drop Calculations (Numerical Problems) in A.C. Distributors for the following cases: Power Factors referred to receiving end voltage and with respect to respective load voltages.

UNIT VI SUBSTATIONS: Classification of substation: Indoor and outdoor substation - substation layouts - various equipment of substations. Bus bar arrangements: single – sectionalized – main and transfer - ring main and group switching schemes. Line diagram of gas insulated substations – working mechanism - comparison of air insulated substations and gas insulated substations.

UNIT VII ECONOMIC ASPECTS OF POWER GENERATION: Load curve - load duration and integrated load duration curve – load – demand – diversity – capacity - utilization and Plant use factors.Costs of generation – depreciation - methods of calculations – Tariffs - flat rate - block rate - two part - three part and power factor tariffs.

UNIT VIII POWER FACTOR AND VOLTAGE CONTROL: Causes of low p.f - Methods of Improving p.f -Phase advancing andgeneration of reactive KVAR using static Capacitors-Most economical p.f. for constant kW load and constant kVA type loads.

TEXT BOOKS:

1. V.K.Mehta and Rohit Mehta, *Principles of Power Systems*. Schand & Company Ltd, New Delhi 2004.
2. M.L.Soni, P.V.Gupta, U.S.Bhatnagar and A.Chakrabarti, *A Text Book on Power System Engineering*. Dhanpat Rai & Co. Pvt. Ltd., 1999.

REFERENCE BOOKS:

1. C.L.Wadhwa, *Electrical Power Systems*. New Age international (P) limited, 2005.
2. M.V.Deshpande, *Elements of Power Station Design And Practice.* Wheeler publishing, 1999.

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II Year B.Tech. EEE-II Semester

(1G244) LINEAR CONTROL SYSTEMS
(Common to ECE and EEE)

UNIT I INTRODUCTION: Concepts of Control Systems-Classification- Open Loop and closed loop control systems and their differences-Examples- Feed-Back Characteristics, Effects of feedback-Mathematical models-differential Equations.

UNIT II TRANSFER FUNCTION REPRESENTATION: Transfer function-Mechanical Translational & Rotational systems, electrical analogy –Transfer function of DC servo motor – AC servo motor -synchro transmitter and receiver – Block Diagram representation of systems considering electrical systems as examples- Block diagram algebra, Signal Flow graph and Mason's gain formula.

UNIT III TIME RESPONSE ANALYSIS: Types of test signals, Type and Order of a systems, Time Response of first and second order system, Time domain specifications- and– steady state error – static error constants – generalized error coefficients.

UNIT IV STABILITY ANALYSIS IN s-DOMAIN: Concepts of stability: Characteristic equation, location of roots in s-plane for stability, asymptotic stability and relative stability, Routh-Hurwitz stability criterion.
Root Locus Technique: Root locus concept - construction of root loci-effects of adding poles and zeros to G(s) H(s) on the root loci.

UNIT V FREQUENCY RESPONSE ANALYSIS: Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.

UNIT VI STABILITY ANALYSIS IN FREQUENCY DOMAIN: Polar Plots-Nyquist plots stability in frequency domain using Nyquist stability criterion–simple problems.

UNIT VII DESIGN AND COMPENSATION OF CONTROL SYSTEMS: Introduction to Compensation networks – Lag, Lead, Lead-Lag controllers Design in Frequency Domain– Effects of PI, PD & PID controllers.

UNIT VIII STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS: Concepts of state, state variables and state model-derivation of state model for physical systems Diagonalization- State transition Matrix and its properties – Solution of linear state equation – Concepts of controllability and Observability.

TEXT BOOKS:

1. I.J. Nagrath and M. Gopal, *Control Systems Engineering*, New Age International (P) Limited, Publishers, 2nd Ed.

2. Xavier .S. P. Eugune, Joseph Cyril Babu, *Principles of control systems*, S.Chand & Company.

REFERENCE BOOKS:

1. Katsuhiko Ogata, *Modern Control Engineering*, 3rd edition, Prentice Hall of India Pvt. Ltd., 1998.
2. NISE, *Control Systems Engg*, 3rd Edition, John wiley.
3. Richard C. Dorf, Robert H. Bishop, *Modern control systems*, 11th Ed, Pearson education, 2007.
4. Graham Goodwin**,** Stefan Graebe and Mario Salgado, *Control System Design*, prentice hall.

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II Year B.Tech. EEE-II Semester

(1GC41)MATHEMATICS - III
(Common to ECE and EEE)

UNIT I: Beta and Gamma Functions – their properties – Evaluation of improper integrals using Beta and Gamma functions.

UNIT II: Functions of a complex variable – Continuity – Differentiability – Analyticity – Properties – Cauchy – Riemann equations in Cartesian and polar coordinates. Harmonic and conjugate harmonic functions – Milne – Thompson method.

UNIT III: Elementary functions: Exponential trigonometric, hyperbolic functions and their properties – General power z^c (c is complex), principle value.

UNIT IV: Complex Integration: Line integral – Evaluation along a path and by indefinite integration – Cauchy's integral theorem – Cauchy's integral formula – Generalized integral formula.

UNIT V: Complex power series: Region of convergence – Expansion in Taylor's series, Maclaurin's series and Laurent series. Singular point – Isolated singular point – Pole of order m – Essential singularity.

UNIT VI: Residue – Evaluation of residue by formula and by Laurent series – Residue theorem. Evaluation of integrals of the type $\int_{-\infty}^{\infty} f(x)dx$ *and* $\int_{0}^{2®} f(\cos^{-}, \sin^{-})d^{-}$

UNIT VII: Argument principle – Rouche's theorem – Determination of number of zeros of complex polynomials — Fundamental theorem of Algebra.

UNIT VIII: Conformal mapping: Definition – Translation, rotation, and inversion – Bilinear transformation -Fixed point – Cross ratio – Determination of bilinear transformation mapping three given points - Transformation by e^z, $\ln z$, z^2, z^n, $\sin z$, $\cos z$.

TEXT BOOKS:

1. B. S. Grewal, *Higher Engineering Mathematics*, Khanna Publication.
2. E. Rukmangadachari, E. Keshava Reddy, *A Text Book of Engineering Mathematics-III*, Pearson Education.

REFERENCE BOOKS:

1. B. V. Ramana, *A Text Book of Engineering Mathematics*, Tata Mc Graw Hill.
2. T.K. V Iyengar, B. Krishna Gandhi and Others, *A Text Book of Engineering Mathematics, Vol – III*, S. Chand & Company.
3. Chruchile and Brown, *Complex Variables*.
4. Schaum's Series, *Complex Variables*.

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II Year B.Tech. EEE-II Semester

(1G247) ELECTRICAL CIRCUITS AND SIMULATION LAB

Any **EIGHT** experiments to be conducted from the following

1. Verification of KCL & KVL.
2. Verification of Maximum Power Transfer Theorem.
3. Verification of superposition and Reciprocity theorem.
4. Verification of Thevenin's theorem.
5. Verification of Norton's theorem.
6. Determination of Self Inductance, Mutual Inductance and Co-efficient of Coupling of a single phase transformer.
7. Series and Parallel Resonance
8. Determination of Impedance and Admittance Parameters
9. Determination of transmission line Parameters
10. Locus diagrams on RL and RC circuits.

Any TWO experiments to be conducted from the following

PSPICE SIMULATION

1. Simulation of DC Circuits
2. DC Transient Response
3. Mesh Analysis
4. Nodal Analysis

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II Year B.Tech. EEE-II Semester

(1G248) CONTROL SYSTEMS LAB

Any **Ten** of the following experiments are to be conducted

1. Time response of Second order system
2. Characteristics of Synchros
3. Programmable logic controller – Study and verification of truth tables of logic gates, simple Boolean expressions and application of speed control of motor.
4. Effect of feedback on DC servo motor
5. Transfer function of DC Machine
6. Effect of P, PD, PI, PID Controller on a second order systems
7. Lag and lead compensation – Magnitude and phase plot
8. Temperature controller using PID
9. Characteristics of magnetic amplifiers
10. Characteristics of AC servo motor
11. PSPICE simulation of Op-Amp based Integrator and Differentiator circuits.
12. Linear system analysis (Time domain analysis, Error analysis) using MATLAB.
13. Stability analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant system using MATLAB.
14. State space model for classical transfer function using MATLAB – Verification.

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II Year B.Tech. EEE-II Semester

(1GC44) SOFT SKILLS I
(Common to ECE and EEE)

APTITUDE AND REASONING SKILLS
QUANTITATIVE APTITUDE:

- Number Systems, Averages, Problems on ages, Allegations, Percentages, Profit and Loss, Simple interest and Compound Interest, Ratio and Propositions and Variation, Time and Work, Time and Distance, Mensuration, Functions, Set Theory, Permutation and Combinations, Probability, Progressions, Inequalities, Coordinate Geometry, Quadratic Equations, Logarithms
- HCF and LCM, Decimal Fractions, Simplification, Square Roots and Cube Roots, Surds and Indices, Pipes and cisterns, Area, Volume and Surface Areas, Races and Games, Calendar, Clocks, Stocks and Shares, True Discount, Banker's Discounts
- Data Interpretation, Tabulation, Bar Graphs, Pie Charts, Line Graphs

REASONING:

- Directions, Blood Relations, Problems on cubes, Series and sequences, odd man out, Coding and decoding, Data Sufficiency, logical deductions, Arrangements and Combinations, Groups and Teams, General Mental Ability, Puzzles to puzzle you, More Puzzles, Brain Teasers, Puzzles and Teasers.

REFERENCE BOOKS:

1. Arun Sharma, *How to Prepare for Quantitative Aptitude*, TMH Publishers, New Delhi, 2003.
2. R.S. Agarwal, *Quantitative Aptitude*, S.Chand Publishers, New Delhi, 2005.
3. Sharon Weiner-Green, Ira K. Wolf, *Barron's GRE*, Galgotia Publications, New Delhi, 2006.
4. R.S Agarwal, *Verbal and Non-Verbal Reasoning*, S. Chand Publishers, New Delhi, 1998.
5. Shakuntala Devi, *Puzzles to Puzzle You*, Orient Paper Backs Publishers, New Delhi, 2005.
6. Shakuntala Devi, *More Puzzles*, Orient Paper Backs Publishers, New Delhi, 2006.
7. Ravi Narula, *Brain Teasers*, Jaico Publishing House, New Delhi, 2005.
8. George J Summers, Puzzles and Teasers, Jaico Publishing House, Mumbai, 2005.

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III Year B.Tech. EEE-I Semester

(1G356) LINEAR & DIGITAL INTEGRATED CIRCUITS APPLICATIONS

UNIT I INTEGRATED CIRCUITS: Integrated circuits-types, classification, package types and temperature ranges ,Characteristics of OP-Amps, power supplies, OP-Amp Block diagram, ideal and practical OP-Amp specifications, DC and AC characteristics, 741 OP-Amp and its features, FET input OP-Amps, OP-Amp parameters and measurement, input and output offset voltages and currents, slew rate, CMRR, PSRR, drift, Frequency compensation technique.

UNIT II LINEAR & NON LINEAR APPLICATIONS OF OP-AMPS: Inverting and non-inverting amplifier, integrator and differentiator, difference amplifier, instrumentation amplifier, AC amplifier, V-I, I-V converters, Buffers, Non-linear function generator, comparators, Multivibrators, Triangular and square wave generators, Log and antilog amplifiers, precision rectifiers.

UNIT III TIMERS AND PHASE LOCKED LOOPS: Introduction to 555 Timer, functional diagram, Monostable and Astable operations and applications, Schmitt Trigger, PLL-Introduction, Block schematic, principles and description of individual blocks,565 PLL ,applications of PLL-Frequency multiplication, frequency translation, AM, FM and FSK demodulators.

UNIT IV D/A AND A/D CONVERTERS: Introduction, Basic DAC techniques, weighted resistor DAC, R-2R Ladder DAC, Inverted R-2R DAC and IC 1408 DAC, different types of ADCs-parallel comparator type ADC, counter type ADC, successive approximation ADC and Dual slope ADC.DAC and ADC specifications.

UNIT V CMOS LOGIC: Introduction to logic families, CMOS logic, CMOS steady state electrical behavior, CMOS dynamic electrical behavior, CMOS logic families.

UNIT VI BIPOLAR LOGIC AND INTERFACING: Bipolar logic, Transistor logic, TTL families, CMOS/TTL interfacing, low voltage CMOS logic and interfacing, Emitter coupled logic, Comparison of logic families, Familiarity with standard 74XX and CMOS 40XX series-ICs – Specifications.

UNIT VII COMBINATIONAL LOGIC DESIGN: Decoders, encoders, three state devices, multiplexers and demultiplexers, Code Converters, EX-OR gates and parity circuits, comparators, adders & subtractors, ALUs, Combinational multipliers.

UNIT VIII SEQUENTIAL LOGIC DESIGN: Flip-flops & their conversions Design of synchronous counters, Decade counter, shift registers & applications, familiarities with commonly available 74XX & CMOS 40XX series of IC counters

TEXT BOOKS:

1. Ramakanth A. Gayakwad, *Op-Amps & Linear ICs*. PHI. 1987.
2. John F. Wakerly, *Digital Design Principles & Practices*. PHI/ Pearson Education Asia, 2005, 3rd Ed.

REFERENCE BOOKS:

1. Floyd and Jain, *Digital Fundamentals*. Pearson Education. 2005, 8th Ed.
2. D. Roy Chowdhury, *Linear Integrated Circuits*. New Age International (p) Ltd. 2003, 2nd Ed.

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III Year B.Tech. EEE-I Semester

(1G251) ELECTRICAL MACHINES-III

UNIT I CONSTRUCTIONAL DETAILS AND PRINCIPLE OF OPERATION OF SYNCHRONOUS GENERATOR: Constructional Features of round rotor and salient pole machines – Armature windings – Integral slot and fractional slot windings; Distributed and concentrated windings – distribution, pitch and winding factors – E.M.F Equation

UNIT II CHARACTERISTICS OF SYNCHRONOUS GENERATOR: Harmonics in generated e.m.f. – suppression of harmonics – armature reaction - leakage reactance – synchronous reactance and impedance – experimental determination - phasor diagram – load characteristics.

UNIT III REGULATION OF SYNCHRONOUS GENERATOR: Regulation by synchronous impedance method, M.M.F. method, Z.P.F. method and A.S.A. methods – salient pole alternators – two reaction analysis – experimental determination of X_d and X_q (Slip test)- Phasor diagrams – Regulation of salient pole alternators.

UNIT IV PARALLEL OPERATION OF SYNCHRONOUS GENERATORS: Synchronizing alternators with infinite bus bars – synchronizing power and torque – parallel operation and load sharing - Effect of change of excitation and mechanical power input. Analysis of short circuit current wave form – determination of sub-transient, transient and steady state reactance's.

UNIT V SYNCHRONOUS MOTORS – PRINCIPLE OF OPERATION AND CIRCLE DIAGRAM: Theory of operation – phasor diagram – Variation of current and power factor with excitation – V and inverted V curves-synchronous condenser – Mathematical analysis for power developed - circle diagram - Excitation and power circles – hunting and its suppression – Methods of starting – synchronous induction motor.

UNIT VI SINGLE PHASE INDUCTION MOTORS: Single phase Motors: Single phase induction motor – Constructional features-Double revolving field theory – Elementary idea of cross-field theory – split-phase motors – shaded pole motor.

UNIT VII SINGLE PHASE MOTORS: Principle & performance of A.C. Series motor-Universal motor – Principle of permanent magnet and reluctance motors.

UNIT VIII SPECIAL MACHINES: Stepper motor – Types of stepper motors - synchros – Types of synchros - servo motors – DC servo motor – AC servo motors

TEXT BOOKS:

1. JB Gupta, *Theory and performance of Electrical Machines*.S.K. Kataria & Sons, New Delhi, 2006, 14th Ed.
2. P.S. Bimbra, *Electrical Machinery*. Khanna Publishers. Delhi, 2005, 7th Ed.

REFERENCE BOOKS:

1. M.G. Say, *The Performance and Design of A.C.Machines*. ELBS publishers, New Delhi, 2002, 3rd Ed.
2. A.E. Fitzgerald, C.Kingsley and S.Umans, *Electric Machinery*. Mc Graw-Hill Companies, New Delhi, 2008, 6th Ed.
3. Langsdorf, *Theory of Alternating Current Machinery*. Tata Mc Graw-Hill, New Delhi, 2005, 2nd Ed.
4. I.J.Nagrath & D.P.Kothari, *Electric Machines*. Tata Mc Graw-Hill Publishers, 2010, 4th Ed.

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III Year B.Tech. EEE-I Semester

(1G252) TRANSMISSION OF ELECTRIC POWER

UNIT I TRANSMISSION LINE PARAMETERS: Types of conductors- calculation of resistance for solid conductors-calculation of inductance for single phase and three phase, single and double circuit lines, concept of GMR and GMD, symmetrical and asymmetrical conductor configuration with and without transposition.

UNIT II VARIOUS FACTORS GOVERNING THE PERFORMANCE OF TRANSMISSION LINE: Calculation of capacitance for 2 wire and 3 wire systems, effect of ground on capacitance, capacitance calculations for symmetrical and asymmetrical single and double circuit lines. Skin and Proximity effects - Ferranti effect - Charging Current.

UNIT III PERFORMANCE OF SHORT AND MEDIUM TRANSMISSION LINES: Classification of transmission lines- short, medium and long lines and their model representations-nominal T, nominal-pie and A, B, C, D constants for transmission lines, numerical problems. Mathematical solutions to estimate regulation and efficiency of all types of lines.

UNIT IV PERFORMANCE OF LONG TRANSMISSION LINES: Long Transmission Line-Rigorous Solution, evaluation of A, B, C, D Constants, Surge Impedance and SIL of Long Lines.

UNIT V POWER SYSTEM TRANSIENTS: Types of transients- travelling or propagation of surges- attenuation, distortion, reflection and refraction coefficients- termination of lines with different types of conditions- open circuited line, short circuited line, T-junction, lumped reactive junctions.

UNIT VI OVER HEAD LINE INSULATORS: Line supports-different types-wooden, RCC poles and steel towers. Types of insulators, string efficiency and methods for improvement, Voltage distribution, calculation of string efficiency, capacitance grading and static shielding.

UNIT VII CORONA AND MECHANICAL DESIGN OF TRANSMISSION LINES: Corona - Description of the phenomenon, factors affecting corona, critical voltages and power loss. Sag and Tension calculations with equal and unequal heights of towers, effect of wind and ice on weight of conductor. stringing chart and sag template and their applications.

UNIT VIII UNDER GROUND CABLES: Types of cables, construction, types of insulating materials, calculations of insulation resistance and stress in insulation. Capacitance of single and 3-core belted cables. Grading of cables- capacitance grading, description of

inter sheath grading.

TEXTBOOKS:

1. M.L.Soni, P.V.Gupta, U.S. Bhatnagar, A.Chakrabarthy, *A text book on power system engineering*. Dhanpat Rai and Co Private Limited, 2007.
2. C.L.Wadhwa, *Electrical Power Systems*. New Age International (P) Limited, publishers, 2005, 3rd Ed.

REFERENCE BOOKS:

1. John J Grainger William D Stevenson, *Power System Analysis*, TMC Companies, 2003, 4th Ed.
2. B.R.Gupta, *Power System Analysis and Design*. Wheeler Publishers, 1999, 3rd Ed.
3. Hadi Saadat, *Power System Analysis*. 6th reprint, TMH Edition, 2005.
4. I.J.Nagarat and D.P.Kothari, *Modern Power System Analysis*, 3rd edition, TATA Mc Graw Hill, Sep 2003.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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III Year B.Tech. EEE-I Semester

(1G253) POWER ELECTRONICS

UNIT I POWER SEMI CONDUCTOR DEVICES: Thyristors – Silicon Controlled Rectifiers (SCR's) – BJT – Power MOSFET – Power IGBT and their characteristics – Basic theory of operation of SCR – Static characteristics of SCR - Dynamic characteristics of SCR - Turn on methods for SCR

UNIT II DEVICES AND COMMUTATION CIRCUITS: Two transistor analogy – SCR – R and RC Triggering - UJT firing circuit –Series and parallel connections of SCRs- Numerical problems–Specifications and Ratings of SCRs - Turn off (Commutation) methods for SCR

UNIT III PROTECTION CIRCUITS: Protection against dv/dt & over voltages-Snubber circuit-Design of Snubber circuit- Metal Oxide Varistors-Improving dv/dt rating with the help of Cathode short di/dt Protection with the help of Inductor-over current Protection-Semi conductor Fuses-Cooling of Semi conductor devices-Types

UNIT IV SINGLE PHASE HALF & FULLY CONTROLLED CONVERTERS: Phase control technique – Single phase Line commutated converters – Midpoint and Bridge connections – Half & Fully controlled converters with Resistive, RL loads and RLE load– Derivation of average load voltage and current -Active and Reactive power inputs to the converters-Effect of Freewheeling Diode

UNIT V THREE PHASE LINE COMMUTATED CONVERTERS: Three phase converters – Three pulse and six pulse converters – Midpoint and bridge connections average load voltage With R and RL loads – Effect of Source inductance–Dual converters (both single phase and three phase)

UNIT VI AC VOLTAGE CONTROLLERS & CYCLO CONVERTERS: AC voltage controllers – Single phase two SCRs in anti parallel – With R and RL loads – modes of operation of Triac – Triac with R and RL loads – Derivation of RMS load voltage, current and power factor –Numerical problems -Cyclo converters – Single phase mid point cyclo converters with Resistive and inductive load– Bridge configuration of single phase cyclo converter

UNIT VII CHOPPERS: Choppers – Time ratio control and Current limit control strategies – Step down choppers Derivation of load voltage and currents with R, RL and RLE loads-Step up Chopper – load voltage expression- Morgan's chopper – Jones' chopper–AC Chopper

UNIT–VIII: INVERTERS: Inverters – Single phase inverter – Basic series inverter – Basic parallel inverter –Voltage Source Inverter & Current Source Inverter- Mc Murray and McMurray-Bedford inverters-Voltage control techniques for inverters- Pulse width modulation techniques.

TEXT BOOKS:

1. M. D. Singh & K. B. Kanchandhani. *Power Electronics*. Tata Mc Graw Hill Publishing Company, 1998.
2. P.C. Sen. *Power Electronics*. Tata Mc Graw-Hill Publishing Company, 2009.

REFERENCE BOOKS:

1. Vedam Subramanyam. *Power Electronics*. 3rd Edition, New Age International (P) Limited, 2008.
2. M. H. Rashid. *Power Electronics Circuits Devices and Applications*. 2nd Edition, Prentice Hall of India, 1998.
3. G. K. Dubey, S. R. Doradla, A. Joshi and R. M. K. Sinha. *Thyristorised Power Controllers*. New Age International (P) Limited Publishers, 1996.
4. John G. Kassakian, Martin F. Schlecht and George.C.Verghese. *Principles of Power Electronics*. Pearson Edition, 2009.
5. P.S.Bimbra. *Power Electronics*. Khanna Publishers.

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III Year B.Tech. EEE-I Semester

(1G254) ELECTRICAL AND ELECTRONICS MEASUREMENTS

UNIT I MEASURING INSTRUMENTS: Methods of measurements - Classification of instruments deflecting, control and damping torques – Ammeters and Voltmeters – PMMC, Dynamometer, moving iron type instruments – expression for the deflecting torque and control torque – Errors and compensations, extension of range using shunts and series resistance. Electrostatic volt meters.

UNIT II INSTRUMENT TRANSFORMERS AND P.F METER: CT and PT – Ratio and phase angle errors – design considerations. Types of P.F. Meters – dynamometer and moving iron type – 1-ph and 3-ph meters-frequency meters – resonance type and Weston type.

UNIT III MEASUREMENT OF POWER / ENERGY: Single phase dynamometer wattmeter, LPF and UPF, Double element and three element dynamometer wattmeter, expression for deflecting and control torques. Single phase induction type energy meter – driving and braking torques – errors and compensations. Three phase energy meter.

UNIT IV POTENTIOMETERS: Principle and operation of D.C. Crompton's potentiometer – standardization – Measurement of unknown resistance, current, voltage.A.C. Potentiometers: polar and coordinate types standardization – applications.

UNIT V D.C & A.C BRIDGES: Method of measuring low, medium and high resistance – sensitivity of Wheatstone's bridge – Kelvin's double bridge for measuring low resistance, measurement of high resistance – loss of charge method. Measurement of inductance - Maxwell's bridge, Anderson's bridge.Measurement of capacitance and loss angle - Desauty bridge. Wien's bridge – Schering Bridge.

UNIT VI MAGNETIC MEASUREMENTS: Ballistic galvanometer – equation of motion – flux meter – constructional details, comparison with ballistic galvanometer. Determination of B-H Loop methods of reversals - six point method – A.C. testing – Iron loss of bar samples.

UNIT VII OSCILLOSCOPE: Cathode Ray Oscilloscope- Cathode Ray tube-Time base generator-Horizontal and Vertical amplifiers – application of CRO – Measurement of phase , frequency, current & voltage- Lissajous pattern.

UNIT VIII DIGITAL METERS: Digital Voltmeter-Successive approximation, ramp and integrating type-Digital frequency meter-Digital multimeter-Digital Tachometer.

TEXT BOOKS:

1. E.W. Golding and F.C. Widdis. *Electrical Measurements and measuring Instruments*. 5th Edition. Reem Publications.
2. A.K.Sawhney. *Electrical & Electronic Measurement & Instruments*. Dhanpat Rai & Co. Publications.

3. R. K. Rajput. *Electrical & Electronic Measurement & Instrumentation*. 2nd Edition. S. Chand & Co.
4. H. S. Kalsi. *Electronic Instrumentation*. Tata Grawhill Mc. 3rd Edition.

REFERENCE BOOKS:

1. Buckingham and Price. *Electrical Measurements*. Prentice – Hall
2. Reissland, M.U. *Electrical Measurements Fundamentals, Concepts, Applications*, New Age International (P) Limited, Publishers.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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III Year B.Tech. EEE-I Semester

(1GC52) ENVIRONMENTAL SCIENCE

UNIT I THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES:
Definition, multidisciplinary nature, Scope &Importance- Need for public awareness -Global environmental crisis-People in Environment –Institutions in Environment.

UNIT II FOREST, WATER AND ENERGY RESOURCES:
Natural resources: definition .Renewable &non-renewable natural resources. Natural resources & their associated problems.
Forest resources: Use & over –exploitation- deforestation , case studies- Timber extraction – Mining-dams & their effects on forest & tribal people. **Water resources:** Use and over utilization of surface and ground water -floods, drought- conflicts over water, dams – benefits & problems.
Energy resources: Growing energy needs- renewable and non – renewable energy resources- use of alternate energy resources, case studies.

UNIT III MINERAL, FOOD & LAND RESOURCES:
Mineral resources: Use and exploitation, environmental effects of extracting & using mineral resources, case studies.
Food resources: World food problems, changes caused by agriculture and over grazing, effects of modern agriculture, fertilizer – pesticide problems, water – logging, salinity, case studies.
Land resources: Land as a resource, land degradation, man – induced landslides, soil erosion and desertification.

- Role of an individual in the conservation of natural resources.
- Equitable use of resources for sustainable life styles.

UNIT IV ENVIRONMENTAL POLLUTION:
Definition, causes, effects & control measures of: Air pollution, Water pollution, Soil pollution, Noise pollution, Thermal pollution, Marine pollution, Nuclear hazards - Pollution case studies- Role of an individual in prevention of pollution.
Solid waste management: Causes, effects and control measures of urban and industrial wastes.
Disaster management: floods, drought, earthquake, cyclone and landslides.

UNIT V ECOSYSTEMS: Concept of an ecosystem. Structure and functions of an ecosystem-Producers, consumers & decomposers - Food chains, food webs & ecological pyramids - Energy flow in the ecosystem - Cycling of nutrients (Bio geo chemical cycles) - Energy production - Ecosystem development & regulation -Ecological succession. Introduction, types, characteristic features, structure and functions of the following ecosystem: (a) Forest ecosystem (b) Grass land ecosystem (c) Desert ecosystem (d) Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT VI BIODIVERSITY & ITS CONSERVATION: Introduction, Definition: genetic, species and ecosystem diversity.
Value of Biodiversity: consumptive value, productive value, social value, ethical value, aesthetic value & option values - Bio-geographical classification of India - Biodiversity at global, national and local levels - India as a mega – diversity nation- Hot spots of biodiversity.
Threats To Biodiversity: habitat loss, poaching of wild life, man-wild life conflicts - Endangered and endemic species of India.
Conservation of biodiversity: In –situ & Ex-situ conservation

UNIT VII SOCIAL ISSUES & THE ENVIRONMENT: From Unsustainable to Sustainable development - Urban problems related to energy - Water conservation, rain water harvesting, watershed management - Resettlement and rehabilitation of people; its problems & concerns, case studies.
Environmental Ethics: Issues & possible solutions-Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents & holocaust, case studies - Wasteland reclamation - Consumerism & waste products - Environment protection Act - Air (Prevention & Control of Pollution) Act.-Water (Prevention & Control of Pollution) Act.-Wildlife Protection Act-Forest Conservation Act-Issues involved in enforcement of environmental legislation-Public awareness.

UNIT VIII HUMAN POPULATION & ENVIRONMENT: Population growth, variation among nations. Population explosion – Family Welfare Program - Environment & human health-Human Rights-Value Education - HIV/AIDS-Women & Child Welfare-Role of Information Technology in Environment and human health-Case studies.

TEXTBOOKS:

1. Erach Bharucha, *Text book of Environmental Studies for Undergraduate Courses* for University Grants Commission, University press.
2. R. Rajagopalan, *Environmental Studies* Oxford University Press.
3. Anubha Kaushik and C. P. Kaushik, *Perspectives In Environmental Studies*. New Age International Publishers.

REFERENCE BOOKS:

1. J. P. Sharma, *Comprehensive Environmental Studies.* Laxmi Publications.
2. Anindita Basak, *Environmental Studies*. Pearson education.
3. Benny Joseph, *Environmental Studies*. Mc. Graw Hill Publications.

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III Year B.Tech. EEE-I Semester

(1G255) ELECTRICAL MACHINES-II LAB

Any **Ten** of the following experiments are to be conducted

1. O.C. & S.C. Tests on Single phase Transformer
2. Sumpner's test on a pair of single phase transformers
3. Scott connection of transformers
4. No-load & Blocked rotor tests on three phase Induction motor
5. Regulation of a three –phase alternator by E.M.F and M.M.F. methods
6. V and Inverted V curves of a three—phase synchronous motor.
7. Equivalent Circuit of a single phase induction motor
8. Determination of X_d and X_q of a salient pole synchronous machine
9. Parallel operation of Single phase Transformers
10. Separation of core losses of a single phase transformer
11. Brake test on three phase Induction Motor
12. Brake test on single phase Induction Motor
13. Regulation of three-phase alternator by Z.P.F. and A.S.A methods
14. Measurement of sequence impedance of a three-phase alternator.

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III Year B.Tech. EEE-I Semester

(1GC51) ADVANCED ENGLISH COMMUNICATION SKILLS LAB
(Common to ECE and EEE)

RESUME PREPARATION

Structure, formats and styles – planning - defining career objective - projecting one's strengths and skills - creative self marketing–sample resumes - cover letter.

INTERVIEW SKILLS

Concept and process - pre-interview planning – preparation - body language - answering strategies – frequently asked questions .

GROUP DISCUSSION

Communicating views and opinions – discussing – intervening – agreeing and disagreeing – asking for and giving clarification - substantiating - providing solution on any given topic across a cross-section of individuals - modulation of voice and clarity - body language – case study.

ORAL PRESENTATIONS (INDIVIDUAL)

Collection of data from various sources –planning, preparation and practice – attention gathering strategies -transition – handling questions from audience.

ORAL PRESENTATIONS (TEAM)

Appropriate use of visual aids – Using PowerPoint for presentation

READING COMPREHENSION

Reading for facts – scanning – skimming - guessing meanings from context– speed reading.

LISTENING COMPREHENSION

Listening for understanding - responding relevantly.

MINIMUM REQUIREMENTS:

Advanced English Language Communication Skills Lab is conducted at two places:

- Computer-aided Language Lab with 60 computer machines, one teacher console, LAN facility and Language Learning software for self-study.
- Communication Skills Lab with movable chairs, a discussion room, Public Address System, a Television, a DVD Player, a camcorder, an LCD Projector and a computer machine.
- Manual cum Record, prepared by Faculty Members of English of the college will be used by students.

SUGGESTED SOFTWARE:

- It's your Job published by Clarity.
- Business Writing published by Clarity.
- Active Listening published by Clarity.
- Active Reading published by Clarity.
- Software published by Globerana.
- Cambridge Advanced Learner's Dictionary.
- Oxford Advanced Learner's Dictionary.

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III Year B.Tech. EEE-II Semester

(1GA61) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Common to CSE and EEE)

UNIT I INTRODUCTION TO MANAGERIAL ECONOMICS: Definition, Nature and Scope of Managerial Economics – Relationship with other functional areas (Accounting, Marketing, HR, Production and Operations) of decision making - Basic Economic Principles - Opportunity Cost, Incremental Concept, scarcity, Marginalism, Equi-marginalism, Time perspective, Discounting principle, Risk and Uncertainty.

UNIT II DEMAND ANALYSIS: Meaning and types of demand – Determinants of demand - Law of Demand and its exceptions. Definition, types and measurement of elasticity of demand – Supply function and Elasticity of Supply - Demand Forecasting methods: Survey Methods - Consumers Survey Method, Sales force opinion method, experts opinion method - Statistical Methods: Trend Projection, Barometric, Regression, Simultaneous Equation method.

UNIT III PRODUCTION AND COST ANALYSIS: Production Function, Cobb - Douglas Production function - Isoquants and Isocosts curves – MRTS - Least Cost Combination of Inputs - Laws of Returns, Internal and External Economies of Scale - Cost concepts, Determinants of cost, cost-output relationship in short run and Long run - Break-even Analysis (BEA): Objectives, Assumptions, Importance, Graphical representation, Limitations (Simple Numerical Problems).

UNIT IV MARKET STRUCTURE AND PRICING METHODS: Competitive structure of markets – Perfect competition - Monopoly, Monopolistic and Oligopoly Markets - Price-output determination under perfect competition and monopoly in Long run and short run.
Pricing Methods: Cost Plus Pricing - Marginal Cost Pricing - Sealed Bid Pricing - Going Rate Pricing - Limit Pricing - Market Skimming Pricing - Penetration Pricing - Two-Part Pricing - Block Pricing - Bundling Pricing - Peak Load Pricing.

UNIT V TYPES OF BUSINESS ORGANIZATIONS: Forms of Business Organizations – Need and role of public and private sector business organization - Types, Features, Merits and Demerits of public and private sector business organizations – Problems and remedies of public sector business organizations.

UNIT VI CAPITAL AND CAPITAL BUDGETING: Capital and its significance - Types of Capital - Sources of Raising Capital – Features of Capital budgeting - Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR), Net Present Value Method, Profitability index and Internal rate of return method (Simple problems).

UNIT VII FINANCIAL ACCOUNTING: Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts - Trading Account, Profit and Loss Account and Balance Sheet

with simple adjustments.

UNIT VIII FINANCIAL ANALYSIS THROUGH RATIOS: Financial Ratios and its significance - Liquidity Ratios: Current Ratio, quick ratio and Absolute quick ratio - Turnover Ratios: Inventory turnover ratio, Debtors Turnover ratio, Working Capital Turnover ratio, Creditors Turnover ratio, Fixed Assets Turnover ratio - Solvency Ratios: Debt- Equity ratio, Interest Coverage ratio and Debt to total funds ratio -Profitability ratios: Gross Profit Ratio, Net Profit ratio and Proprietary ratio.

TEXT BOOKS:

1. Mehta P.L., *Managerial Economics-Analysis, Problems, Cases*. S Chand and Sons, New Delhi, 2001.
2. Dwivedi, *Managerial Economics*. Vikas, 6th Ed.
3. S.N.Maheswari & S.K. Maheswari, *Financial Accounting*. Vikas.
4. M.E.Thukaram Rao, *Accounting for Managers*. New Age International Publishers.

REFERENCE BOOKS:

1. Varshney & Maheswari, *Managerial Economics*, Sultan Chand, 2003.
2. T.S. Reddy and Y.Hari Prasad Reddy, *Accounting and Financial Management*, Margham Publications.
3. Ambrish Gupta, *Financial Accounting for Management*, Pearson Education, New Delhi.
4. S. A. Siddiqui & A. S. Siddiqui, *Managerial Economics & Financial Analysis*, New age International Space Publications.
5. Narayanaswamy, *Financial Accounting—A Managerial Perspective*, PHI
6. Truet and Truet, *Managerial Economics:Analysis, Problems and Cases*, Wiley.

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III Year B.Tech. EEE-II Semester

(1G261) POWER SYSTEM ANALYSIS

UNIT I POWER SYSTEM NETWORK MATRICES-I: Representation of Power system elements, Essential characteristics of a good Algorithm, Steps involved in solving a problem using Digital computer - Graph Theory: Definitions, Bus Incidence Matrices, Y_{bus} formation by Direct and Singular Transformation Methods, Numerical Problems.

UNIT II POWER SYSTEM NETWORK MATRICES-II: Formation of Z_{Bus}: Partial network, Algorithm for the Modification of Z_{Bus} Matrix for addition element for the following cases: Addition of element from a new bus to reference, Addition of element from a new bus to an old bus, Addition of element between an old bus to reference and Addition of element between two old busses (Derivations and Numerical Problems).- Modification of Z_{Bus} for the changes in network (Problems).

UNIT III POWER FLOW STUDIES-I: Necessity of Power Flow Studies – Data for Power Flow Studies – Derivation of Static load flow equations – Load flow solutions using Gauss Seidel Method: Acceleration Factor, Load flow solution with and without P-V buses, Algorithm and Flowchart. Numerical Load flow Solution for Simple Power Systems (Max. 3-Buses): Determination of Bus Voltages, Injected Active and Reactive Powers (Sample One Iteration only) and finding Line Flows/Losses for the given Bus Voltages.

UNIT IV POWER FLOW STUDIES-II: Newton Raphson Method in Rectangular and Polar Co-Ordinates Form: Load Flow Solution with or without PV Buses- Derivation of Jacobian Elements, Algorithm and Flowchart. Decoupled and Fast Decoupled Methods. - Comparison of Different Methods – DC load Flow.

UNIT V SHORT CIRCUIT STUDIES – I: Per – Unit system of representation. Per-unit equivalent reactance network of a three phase power system, Numerical Problems. Symmetrical fault analysis: Short circuit Current and MVA Calculations, Application of Series Reactors, Numerical Problems.

UNIT VI SHORT CIRCUIT STUDIES – II: Symmetrical Component Transformation, positive, negative and zero sequence components: Voltages, Currents and Impedance Sequence Networks: Positive, Negative and Zero sequence Networks, Numerical Problems. Unsymmetrical Fault Analysis: LG, LL, LLG faults with and without impedance, Numerical Problems.

UNIT VII POWER SYSTEM STEADY STATE STABILITY ANALYSIS: Elementary concepts of Steady State, Dynamic and Transient Stabilities. Description of: Steady State Stability Power Limit, Transfer Reactance, Synchronizing Power Coefficient, Power Angle Curve and Determination of Steady State Stability and Methods to improve steady state stability.

UNIT VIII POWER SYSTEM TRANSIENT STATE STABILITY ANALYSIS: Derivation of Swing Equation. Determination of Transient Stability by Equal Area Criterion, Application of Equal Area Criterion, Critical Clearing Angle Calculation - Solution of Swing equation by point by point method - Methods to improve Stability.

TEXT BOOKS:

1. Stagg El – Abiad & Stags. *Computer Methods in Power Systems*. Mc Graw-hill Edition.
2. I.J.Nagrath & D.P.Kothari. *Modern Power system Analysis*. 2nd edition. Tata McGraw-Hill Publishing Company.
3. B.R.Gupta. *Power System Analysis and Design*. 6th Revised Edition. S. Chand & Co. 2010.

REFERENCE BOOKS:

1. Grainger and Stevenson. *Power System Analysis*. Tata McGraw Hill. 2003.
2. M A Pai. *Computer Techniques in Power System Analysis*. 2nd Edition. Tata McGraw Hill. 1994.
3. Dr. S. Sivanagaraju, B. V. Rami Reddy. *Electrical Power System Analysis*. revised edition. Laxmi Publications. 2013.
4. Glovar and Sarma. *Power System Analysis*. Thomson Publishers. 2008.
5. Hadi & Sadath. *Power System Analysis*. Tata McGraw Hill. 2004.

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III Year B.Tech. EEE-II Semester

(1G262) UTILIZATION OF ELECTRICAL ENERGY

UNIT I ELECTRIC DRIVES: Types of electric drives - choice of motor - starting and running characteristics - speed control - Temperature rise – particular applications of electric drives - types of industrial loads - Continuous - intermittent and variable loads - load equalization.

UNIT II ELECTRIC HEATING: Advantages and methods of electric heating - resistance heating - induction heating and dielectric heating.

UNIT III ELECTRIC WELDING: Electric welding - resistance and arc welding - electric welding equipment - comparison between A.C. and D.C. Welding.

UNIT IV ILLUMINATION FUNDAMENTALS: Introduction - terms used in illumination - laws of illumination - polar curves – photometry - integrating sphere - sources of light.

UNIT V VARIOUS ILLUMINATION METHODS: Discharge lamps – mercury vapour and sodium vapour lamps – comparison between tungsten filament lamps and fluorescent tubes – compact fluorescent lamp - Basic principles of light control - Types and design of good lighting system and practice - flood lighting.

UNIT VI ELECTRIC TRACTION–I: System of electric traction and track electrification - Review of existing electric traction systems in India - Special features of traction motor - methods of electric braking-plugging - rheostatic braking - regenerative braking.

UNIT VII ELECTRIC TRACTION – II: Mechanics of train movement - Speed-time curves for different services – trapezoidal and quadrilateral speed time curves.

UNIT VIII ELECTRIC TRACTION -- III: Calculations of tractive effort – power - specific energy consumption for given run effect of varying acceleration and braking retardation - adhesive weight and braking retardation adhesive weight, Coefficient of adhesion.

TEXT BOOKS:

1. J.B. Gupta. *Utilization of Electrical Power and Electric Traction*. S.K. Kataria and Sons.2002.
2. B.R. Gupta. *Generation of Electrical Energy*. Eurasia publishing House (P) Ltd ,New Delhi. 2003.

REFERENCE BOOKS:

1. N.V. Suryanarayana. *Utilization of Electrical Power including Electric drives and*

Electric traction. New Age International (P) Limited Publishers. 1996.
2. C.L. Wadhwa. *Generation, Distribution utilization of Electrical Energy*. New Age International Pvt .Ltd. 2003.
3. E. Openshaw Taylor. *Utilisation of Electric Energy*. Orient Longman, 1971
4. John Andreas. *energy – efficient electric motors*. Marcel Dekker, INC, New York.

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III Year B.Tech. EEE-II Semester

(1G366) MICROPROCESSORS AND MICROCONTROLLERS

UNIT I 8086 ARCHITECTURE: Architecture of 8086 microprocessor, Register organization, Memory organization, Pin diagram of 8086-Minimum mode and maximum mode of operation, Timing diagrams.

UNIT II ASSEMBLY LANGUAGE PROGRAMMING: Machine language instruction formats of 8086, Addressing modes of 8086, instruction set of 8086, Assembler directives, Assembly language programs involving logical, branch and call instructions, sorting, evaluation of arithmetic expressions, string manipulation. Implementation of FOR loop. WHILE, REPEAT and IF-THEN-ELSE features. Procedure and Macros.

UNIT III I/O INTERFACING: I/O Interfacing methods – I/O mapped I/O, Memory mapped I/O Interfacing I/O ports – latches and buffers. 8255 PPI-various modes of operation and interfacing to 8086, Seven segment Displays, stepper motor, D/A, A/D converter and actuators interfacing.

UNIT IV MEMORY AND DMA CONTROLLER: Basic structure of SRAM and DRAM cell, Memory interfacing to 8086 (static RAM and EPROM). Need for DMA, Architecture of 8257 and interfacing with 8086.

UNIT V PROGRAMMABLE INTERRUPT CONTROLLER: Interrupt structure of 8086, Vector interrupt table. Interrupt service routines. 8259 PIC architecture and interfacing, cascading of interrupt controller. simple programs. Architecture of 8253 programmable interval timer/counter, mode of operations, interfacing with 8086.

UNIT VI COMMUNICATION INTERFACE: Asynchronous and synchronous data transfer schemes. Necessity of communication interfaces, 8251 USART architecture and interfacing.. Serial communication standards-, RS-232C, 20mA current loop. TTL to RS232C and RS232C to TTL conversion. Sample program of serial data transfer. Introduction to high-speed serial communications standards, and USB.

UNIT VII 8051 MICROCONTROLLER: Architecture of 8051, pin diagram, Addressing modes, instruction set, simple programs, memory organization, Timer/Counters, Serial Communication features, Interrupts.

UNIT VIII ADVANCED MICROCONTROLLERS: MCS – 96 Microcontrollers, important features, pin diagram, internal architecture, memory map, Addressing modes, instruction set. ARM Microcontrollers: ARM core architecture, Versions of ARM, important features.

TEXT BOOKS:

1. A.K. Ray and K.M.Bhurchandi. *Advanced microprocessor and peripherals*. 2nd edition. TMH. 2000.

2. Raj Kamal. *Microcontrollers Architecture, programming, interfacing and system design*. Pearson Eduction. 2003.

REFERENCE BOOKS:

1. Kenneth J Ayala. *The 8051 Microcontroller programming and Interfacing*
2. Douglas V.Hall. *Microprocessors Interfacing*. 2nd edition. 2007.

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III Year B.Tech. EEE-II Semester

(1G468)COMPUTER SYSTEM ARCHITECTURE
(Common to EEE and ECE)

UNIT I BASIC STRUCTURE OF COMPUTERS: Computer types, Functional units, Basic operational concepts, Bus structures, Software, performance, multiprocessors and multi computers. Data types, Complements, Data representation: Fixed point and floating point representations, Error detection codes.

UNIT II REGISTER TRANSFER LANGUAGE AND MICRO OPERATIONS: Register transfer language, register transfer, Bus and memory transfer, Arithmetic Micro Operations, logic micro operations, shift micro operations, arithmetic logic shift unit, Instruction codes, Computer registers computer instructions-Instruction cycle, memory-reference instructions, input-output and interrupt.

UNIT III CENTRAL PROCESSING UNIT: Stack organization, Instruction formats, Addressing modes, data transfer and manipulation, Program control, reduced instruction set computer.

UNIT IV MICRO PROGRAMMED CONTROL: Control memory, Address sequencing, micro program example, design of control unit-hardwired control, micro programmed control.

UNIT V COMPUTER ARITHMETIC: Addition and subtraction, multiplication algorithms, Divison algorithms, Floating point arithmetic operations, Decimal arithmetic unit, Decimal arithmetic operations.

UNIT VI THE MEMORY SYSTEM: Memory hierarchy, Main memory, Auxiliary memory, Associative memory, Cache memory, virtual memory, memory management hardware.

UNIT VII INPUT-OUTPUT ORGANIZATION: Peripheral devices, input-output interface, Asynchronous data transfer modes of transfer, Priority Interrupt, Direct Memory Access, Input-output processor(IOP), Serial communication.

UNIT VIII PIPELINE AND VECTOR PROCESSING: Parallel processing, pipelining, Arithmetic pipeline, Instruction Pipeline, RISC pipeline vector processing, Array Processing.
Multi Processors: Characteristics of multiprocessors, interconnection structures, Inter processor Arbitration, Inter processor Communication and synchronization, Cache coherence.

TEXT BOOKS:

1. M.Moris Mano. *Computer System Architecture*. PHI/Pearson, 2006, 3rd Ed.
2. Car Hamacher, Zvonks Vranesic, Safwat Zaky. *Computer Organization*. V Edition, McGrawHill, 2002.

REFERENCE BOOKS:

1. William stallings. *Computer Organization and Architecture*. 7th Edition. PHI/Pearson. 2006.
2. John P.Hayes. *Computer Architecture and Organization*. Mc Graw Hill International editions, 1998.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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III Year B.Tech. EEE-II Semester

(1G263) POWER SYSTEM OPERATION AND CONTROL

UNIT I ECONOMIC OPERATION OF POWER SYSTEMS-I: Optimal operation of Generators in Thermal Power Stations, -heat rate curve- Cost curve Incremental fuel and Production costs, Input-Output characteristics, Optimum allocation with line losses neglected.

UNIT II ECONOMIC OPERATION OF POWER SYSTEMS-II: Optimum generation allocation including the effect of transmission losses-Loss Coefficients, General transmission line loss formula

UNIT III HYDROTHERMAL SCHEDULING: Optimal Scheduling of Hydrothermal System: Hydro electric power plant models, Scheduling problems- Short term hydro-thermal scheduling problem, Introduction to Unit Commitment and Optimal power flow.

UNIT IV MODELLING OF TURBINE, GENERATOR AND GOVERNOR: Modelling of Turbine: First order Turbine model, Block diagram representation of Steam Turbines and Approximate Linear Models. Modeling of Governor: Mathematical Modeling of Speed Governing System- Derivation of small signal transfer function-Block Diagram, Modeling of excitation system, IEEE Type-1 excitation system-Block Diagram.

UNIT V SINGLE AREA LOAD FREQUENCY CONTROL: Necessity of keeping frequency constant Definition of control area- Single area control - Block diagram representation of an isolated power system-Steady state response (controlled and uncontrolled case) - Dynamic response (uncontrolled case).Proportional plus Integral Control of single area and its block diagram representation of single area system, steady state response.

UNIT VI TWO AREA LOAD FREQUENCY CONTROL: Load frequency control of two area system- Block diagram - uncontrolled and controlled case, tie-line bias control, Steady-state and Dynamic response- Load Frequency Control and Economic Dispatch Control.

UNIT VII REACTIVE POWER-VOLTAGE CONTROL: Overview of Reactive Power Control-Reactive Power compensation in transmission systems-advantages and disadvantages of different types of compensating equipment for transmission systems; Load compensation-Specifications of load compensator, Shunt and Series Compensation.

UNIT-VIII POWER SYSTEM RESTRUCTURING: Introduction – Need for regulation – motivation for power system restructuring – key issues in deregulation.

TEXT BOOKS:

1. C.L.Wadhwa. *Electrical Power Systems*. New age International, 3rd Ed.
2. I.J. Nagrath & D.P. Kothari. *Modern Power System Analysis*. 2nd Ed, Tata McGraw Hill.

REFERENCE BOOKS:

1. S.N. Singh. *Electric Power Generation, transmission and Distribution*. 2nd Ed. Prentice Hall India.
2. A. Chakrabarthi and S. Halder. *Power System Analysis Operation and Control*. 3rd Edition. Prentice Hall India.
3. Hadi Saadat. *Power System Analysis*. TMH Edition. 2004.
4. S. Sivanagaru & G. Sreenivasan. *Power System Operation and Control*. Pearson Publications.

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III Year B.Tech. EEE-II Semester

(1G264) ELECTRICAL MEASUREMENTS LAB

Any Ten experiments are to be conducted from the following:

1. Calibration and Testing Of Single Phase Energy Meter.
2. Calibration of dynamometer power factor meter.
3. Crompton D.C. Potentiometer – Calibration of PMMC ammeter and PMMC voltmeter.
4. Kelvin's double Bridge and Wheatstone's bridge – Measurement of resistance – Determination of Tolerance.
5. Measurement of % ratio error and phase angle of given C.T. by Silsbee's method.
6. Schering Bridge & Anderson Bridge.
7. Measurement of Three phase reactive power with single-phase wattmeter.
8. Measurement of parameters of a choke coil using three voltmeter and three ammeter methods.
9. Calibration LPF wattmeter – by Phantom testing.
10. Dielectric oil testing using H.T. testing Kit.
11. LVDT and capacitance pickup – characteristics and Calibration.
12. Resistance strain gauge – strain measurements and Calibration.
13. Transformer turns ratio measurement using A.C. Bridge.
14. Measurement of iron loss in a bar specimen using a CRO and using a wattmeter.

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III Year B.Tech. EEE-II Semester

(1G265) POWER ELECTRONICS AND SIMULATION LAB

Any Ten experiments are to be conducted from the following:

1. Gate firing circuits for SCR's(R, RC Triggering, Half bridge & Full bridge converter).
2. Single Phase half-Wave controlled converter with R and RL loads.
3. Single Phase Half controlled bridge converter with R and RL loads.
4. Single Phase fully controlled bridge converter with R and RL loads.
5. Single Phase AC Voltage Controller with R and RL Loads.
6. Forced Commutation circuits (Class A, Class B, Class C, & Class D).
7. DC Jones chopper with R and RL Loads.
8. Single Phase Parallel inverter with R and RL loads.
9. Single Phase Cycloconverter with R and RL loads.
10. Single Phase series inverter with R and RL loads.
11. Single Phase dual converter with RL loads.
12. PSPICE simulation of single-phase full converter using RLE loads.
13. PSPICE simulation of single phase Inverter with PWM control.
14. PSPICE simulation of single-phase AC voltage controller using RLE loads.

REFERENCE BOOKS:

1. M.H.Rashid. *Simulation of Electric and Electronic circuits using PSPICE*. M/s PHI Publications.
2. *PSPICE A/D user's manual* – Microsim, USA.
3. *PSPICE reference guide* – Microsim, USA.
4. *MATLAB and its Tool Books user's manual and – Math works*, USA

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III Year B.Tech. EEE-II Semester

(1GC62) SOFT SKILLS – II
(Common to ECE and EEE)

ENGLISH FOR COMPETITIVE EXAMINATIONS

CORRECT ENGLISH USAGE: Articles – Prepositions – Tenses – Voice – Error spotting and correcting – Sentence improvement.

VOCABULARY: Synonyms – Antonyms – Analogy – Confusable Words.

ENGLISH PROFICIENCY: One-word substitutions – Idioms and Phrases – Homonyms – Spellings.

LOGIC-BASED ENGLISH LANGUAGE: Rearrangement of jumbled words and jumbled sentences – word pairs – sentence completion.

COMPREHENSION ABILITY: Reading comprehension – Cloze tests.

REFERENCE BOOKS:

1. R. S. Agarwal, "*Objective English*", S. Chand Publishers.
2. Hari Prasad, "*Objective English for Competitive Exams*", TMH.
3. Collins Cobuild, "*English Guides: Confusable Words*".

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IV Year B.Tech. EEE-I Semester

(1GA71) MANAGEMENT SCIENCE
(Common to CSE and EEE)

UNIT I MANAGEMENT AND ORGANISATION STRUCTURE: Meaning, Nature, Importance and Functions of Management-Taylor's Scientific Management- Fayol's Principles of Management- Systems Approach to Management- Need of Organisation Structure -Types of Organisation Structure (Line, Line and Staff, Functional and Matrix Organisations) Its Merits, Demerits and Relevance.

UNIT II OPERATIONS MANAGEMENT: Plant Location and Layout - Methods of Production (Job, Batch and Mass Production)- Work Study - Statistical Quality Control: X Chart, R Chart, C and P Chart, (Simple Problems) Objectives of Inventory Management- Need for Inventory Control-Method of Inventory Management : EOQ, ABC Analysis- Purchase Procedure and Stores Management.

UNIT III MARKETING MANAGEMENT: Core Concepts and Functions of Marketing - Market Segmentation and Targeting – Marketing Mix: Product Levels -Product Life Cycle - New Product Development Process – Channels of Distribution - Marketing Communication - Consumer Protection Act 1986.

UNIT IV HUMAN RESOURCES MANAGEMENT (HRM): Concepts Of HRM- Basic Functions of HR Manager : Manpower Planning , Recruitment Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration - Meeting Competitive Challenges Through HRM Practices.

UNIT V PROJECT MANAGEMENT (PERT/CPM): Network Drawing - Programme Evaluation and Review Technique (PERT) - Critical Path Method (CPM) - Probability of Completing The Project Within Given Time - Project Crashing (Simple Problems).

UNIT VI STRATEGIC MANAGEMENT: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps In Strategy Formulation and Implementation.

UNIT VII ADVANCES IN MANAGEMENT PRACTICES: Basic Concepts and Overview of Management Information System (MIS), Enterprise Resource Planning (ERP), Value Analysis, Just –In-Time (JIT), Total Quality Management (TQM) and Supply Chain Management.

UNIT VIII MANAGEMENT ETHICS AND SOCIAL RESPONSIBILITY: Overview of Ethics-Nature And Objectives of Ethics - Relationship Between Ethics and an Organisation - Normative Ethical Theories (Egoism, Utilitarianism and Altruism) Characteristics of an Ethical Organisation- Ethical Issues In Operations Management, Human Resource Management and Information Technology.

TEXT BOOKS:

1. Stoner, Freeman, Gilbert, *Management*, Pearson Education, New Delhi, 2004, 6th Ed.
2. Shridhara Bhat, *Production and operation management*, HPH.
3. Kotler Philip & Keller Kevin Lane, *Marketing Management*. PHI, 2005, 12th Ed.
4. *Personnel and Human Resource Management*. HPH.
5. Thomson Strickland, *Strategic Management*. TMH, 2005.
6. Fernando, *Business Ethics – An Indian perspective*. Pearson Education, 2009.

REFERENCE BOOKS:

1. Harnold Koontz, Cyril 'O' Donnell, *Essentials of Management*. Tata McGraw Hill, New Delhi, 1979.
2. Dessler Gary, *Human Resource Management*. Pearson/Prentice Hall of India 2006, 10th Ed.

3.V.S. Ramaswamy and S. Namakumari, *Marketing Management*. McMillan, 2010, 4th Ed.

4.S K Mukhopadhyay, *Production, Planning and Control Text and Cases*. PHI, New Delhi. 2009.

5. Laura P Hartman , *Perspectives in Business Ethics*. Tata McGraw Hill.
6. Kazmi, *Business Policy and Strategic Management*. 2/e, TMH.

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IV Year B.Tech. EEE-I Semester

(1G271) FUNDAMENTALS OF HVDC & FACTS DEVICES

UNIT I INTRODUCTION: Comparison of AC and DC Transmission systems, Application of D.C. Transmission, Types or DC links, typical layout of a HVDC converter station. HVDC converters, pulse number, Analysis of 3 phase Bridge circuit with and without overlap, converter Bridge characteristics, equivalent circuits or Rectifier and inverter configurations twelve pulse converters.

UNIT II CONVERTER AND HVDC SYSTEM CONTROL: Principles of DC links control, converter control characteristics, system control Hierarchy, Firing angle control, current and extinction Angle control starting and stopping of DC link.

UNIT III HARMONICS, FILTERS AND REACTIVE POWER CONTROL: Introduction, generation of Harmonics, AC and DC Filters, Reactive power requirements at steady state, sources of Reactive power static var systems.

UNIT IV POWER FLOW ANALYSIS IN AC/DC SYSTEMS: Introduction, Modeling of DC/AC converters, controller equations, solutions of AD/DC load flow- simultaneous approach and sequential approach.

UNIT V FACTS CONCEPTS: Flow of power in AC parallel paths and Meshed systems, Basic types of FACTS controllers, Brief description and Definitions of FACTS controllers.

UNIT VI STATIC SHUNT COMPENSATORS: Objectives of shunt compensation, Methods of controllable VAR generation, Static VAR compensators, SVC and STATCOM, comparison.

UNIT VII STATIC SERIES COMPENSATORS: Objectives of series compensation, variable impedance type-thyristor switched series capacitors (TCSC), and switching converter type series compensators – static series synchronous compensator (SSSC) – power angle characteristics – Basic operating control Schemes.

UNIT VIII COMBINED COMPENSATORS: Introduction, unified power flow controller (UPFC), Basic operating principle, Independent real and reactive power flow controller, control structure.

TEXT BOOKS:

1. K.R. Padiyar. *HVDC power Transmission systems*. Wiley Eastern Limited.
2. N.G. Hingorani & L. Gyugyi, *Understanding of FACTS* IEEE Press.
3. Young Huasong & Alian T. hons. *Flexible AC Transmission Systems (FACTS)*. The Institution of Electrical Engineers, IEE Power and Energy Series 30.
4. Abhijit Chakrabarti, D. P. Kothari, A. K. Mukhopadhyay and Abhinandan De, *An Introduction to: Reactive Power Control and Voltage Stability in Power Transmission Systems*, Eastern Economy Edition, 2010.

REFERENCE BOOKS:

1. S. Rao, *EHV - AC, HVDC Transmission & Distribution Engineering*, Khanna publishers, 3rd edition 2003.
2. E Acha. VG Agelidis & O Anaya-Lara. The Miller, *Power Electronic Control in Electrical Systems*, Elsevier, 2009.

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IV Year B.Tech. EEE-I Semester

(1G272) SWITCH GEAR AND PROTECTION

UNIT I CIRCUIT BREAKERS-1: Fuses—Types, ratings-Isolators Circuit Breakers: Elementary principles of arc interruption, Recovery, Restriking Voltage and Recovery voltages.- Restriking Phenomenon, Average and Max. RRRV, Numerical Problems - Current Chopping and Resistance Switching - CB ratings and Specifications: Types and Numerical Problems. – Auto reclosures.

UNIT II CIRCUIT BREAKERS-2: Description and Operation of following types of circuit breakers: Minimum Oil Circuit breakers, Air Blast Circuit Breakers, Vacuum and SF6 circuit breakers.

UNIT III ELECTROMAGNETIC RELAYS: Basic Requirements of Relays – Primary and Backup protection - Construction details of – Attracted armature, balanced beam, induction type and differential relays – Universal Torque equation – Characteristics of over current, Direction and distance relays.

UNIT IV STATIC AND MICROPROCESSOR BASED RELAYS: Static Relays – Advantages and Disadvantages – Definite time, Inverse and IDMT static relays – Comparators – Amplitude and Phase comparators. Microprocessor based relays – Advantages and Disadvantages – Block diagram for over current (Definite, Inverse and IDMT) and Distance Relays and their Flow Charts.

UNIT V PROTECTION OF GENERATOR AND TRANSFORMER: Protection of generators against Stator faults, Rotor faults, and Abnormal Conditions. Restricted Earth fault and Inter-turn fault Protection. Numerical Problems on % Winding Unprotected. Protection of transformers: Percentage Differential Protection, Numerical Problem on Design of CT s Ratio, Buchholtz relay Protection.

UNIT VI PROTECTION OF FEEDERS AND TRANSMISSION LINES: Protection of Feeder (Radial & Ring main) using over current Relays. Protection of Transmission line – 3 Zone protection using Distance Relays. Carrier current protection. Protection of Bus bars.

UNIT VII NEUTRAL GROUNDING: Grounded and Ungrounded Systems- Effects of Ungrounded Neutral on system performance. Methods of Neutral Grounding: Solid, Resistance, Reactance and Peterson coil grounding- Arcing Grounds and Grounding Practices. Applications of Reactors-Numerical Problems.

UNIT VIII PROTECTION AGAINST OVER VOLTAGES: Generation of Over Voltages in Power Systems.-Protection against Lightning Over Voltages - Valve type and Zinc-Oxide Lighting Arresters - Insulation Coordination –BIL.

TEXT BOOKS:

1. Sunil S Rao. *Switchgear and Protection*. Khanna Publlishers.
2. Badri Ram , D.N Viswakarma. *Power System Protection and Switchgear*. TMH Publications.
3. Y. G. Paithankar and S. R. Bhide. *Fundamentals of Power System Protection*. 2nd Edition, PHI.

REFERENCE BOOKS:

1. Y.G. Paithankar,Taylor and Francis. *Transmission network Protection*. 2009.
2. Bhuvanesh Oza. *Power system protection and switch gear*. TMH, 2010.
3. C.L.Wadhwa. *Electrical Power Systems*. New Age international (P) Limited, Publishers. 3nd Ed.
4. C. Christopoulos and A. Wright. *Electrical power System Protection*. 2nd Edition. Springer International Edition.

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IV Year B.Tech. EEE-I Semester

(1G372) DIGITAL SIGNAL PROCESSING
(Common to ECE and EEE)

UNIT I INTRODUCTION: Introduction to digital signal processing: Discrete time signals and sequences, linear shift invariant systems, stability and causality, linear constant coefficient difference equations. Frequency domain representation of discrete time signals and systems.

UNIT II DISCRETE FOURIER SERIES: Properties of discrete Fourier series, DFS representation of periodic sequences, discrete Fourier transforms: properties of DFT, linear convolution of sequences using DFT, computation of DFT. Relation between Z-Transform and DFS.

UNIT III FAST FOURIER TRANSFORMS: Fast Fourier transforms (FFT)-Radix2 decimation in time and decimation in frequency FFT algorithms, inverse FFT and FFT for composite N.

UNIT IV REALIZATION OF DIGITAL FILTERS: Review of Z-transforms, applications of Z-Transforms, solution of difference equations of digital filters, block diagram representation of linear constant-coefficient difference equations, basic structures of IIR systems, transposed forms, basic structures of FIR systems, system function.

UNIT V IIR DIGITAL FILTERS: Analog filter approximations-Butterworth and chebyshev, design of IIR digital filters from analog filters, design examples: analog-digital transformations, Illustrative Problems.

UNIT VI FIR DIGITAL FILTERS: Characteristics of FIR digital filters, frequency response. Design of FIR digital filters using window techniques, frequency sampling technique, comparison of IIR and FIR filters, Illustrative Problems.

UNIT VII MULTIRATE DIGITAL SIGNAL PROCESSING FUNDAMENTALS: Basic sample rate alteration devices, Multirate Structures for sampling rate Converters, Multistage design of decimator and Interpolator, Polyphase Decomposition, Nyquist filters.

UNIT VIII APPLICATIONS OF DIGITAL SIGNAL PROCESSING: Spectral analysis of nonstationary Signals, Musical Sound processing, signal Compression, Transmultiplexers, Discrete Multitone Transmission of digital data.

TEXT BOOKS:

1. John G. Proakis, Dimitris G. Manolakis, *Digital signal processing, principles, Algorithms and applications*. Pearson Education/PHI, 2007, 4th ed.
2. Sanjit K Mitra, *Digital signal processing - A computer base approach*. Tata Mcgraw Hill, 2009, 3rd ed.

REFERENCE BOOKS:

1. Andreas Antoniou, *Digital signal processing*. TATA McGraw Hill, 2006.
2. A.V. Oppenheim and R.W. Schaffer, *Discrete Time Signal Processing*. PHI, 2nd ed.

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IV Year B.Tech. EEE-I Semester

(1G273) INSTRUMENTATION
(ELECTIVE – I)

UNIT I CHARACTERISTICS OF SIGNALS: Measuring Systems, Performance Characteristics, - Static characteristics, Dynamic Characteristics; Errors in Measurement – Gross Errors, Systematic Errors, Statistical Analysis of Random Errors.

UNIT II SIGNALS AND THEIR REPRESENTATION: Signal and their representation: Standard Test, periodic, aperiodic, modulated signal, sampled data, pulse modulation and pulse code modulation.

UNIT III DATA TRANSMISSION AND TELEMETRY: Methods of Data Transmission – General Telemetry System – Land line Telemetry System – Voltage, Current and position. Land line with feedback system. Frequency Modulation System (FM), Pulse Modulation (PM), Pulse Amplitude Modulation (PAM), Pulse Code Modulation (PCM) Telemetry. Comparison of FM, PM, PAM and PCM.

UNIT IV DATA ACQUISITION SYSTEM (DAS): Analog and Digital Acquisition systems – Components of Analog DAS – Types of Multiplexing Systems: Time division and Frequency division multiplexing – Digital DAS – Block Diagram – Use of Recorders in Digital DAS – Digital Recording using Analog Recorder – Complete data logging System - Block diagram and its working – Modern Digital DAS (Block Diagram).

UNIT V SIGNAL ANALYZERS: Wave Analysers- Frequency selective analyzers, Heterodyne, Application of Wave analyzers- Harmonic Analyzers, Total Harmonic distortion, spectrum analyzers, Basic spectrum analyzers, spectral displays, vector impedance meter, Q meter. Peak reading and RMS voltmeters.

UNIT VI TRANSDUCERS: Definition of transducers, Classification of transducers, Advantages of Electrical transducers, Characteristics and choice of transducers; Principle operation of resistor, inductor, LVDT and capacitor transducers; LVDT Applications, Strain gauge and its principle of operation, guage factor, Thermistors, Thermocouples, Synchros, Piezo electric transducers, photovoltaic, photo conductive cells, photo diodes.

UNIT VII MEASUREMENT OF NON-ELECTRICAL QUANTITIES-I: Measurement of strain, Gauge Sensitivity, Displacement, Velocity, Angular Velocity, Acceleration, Force, Torque.

UNIT VIII MEASUREMENT OF NON-ELECTRICAL QUANTITIES-II: Measurement of Temperature, Pressure, Vacuum, Flow, Liquid level.

TEXT BOOKS:

1. D.V.S Murthy, *Transducers and Instrumentation.* Prentice Hall of India.

2. A.K. Sawhney, *A course in Electrical and Electronic Measurements and Instrumentation*. Dhanpat Rai & Co.

REFERENCE BOOKS:

1. D O Doeblin, *Measurements Systems, Applications and Design*. Mc Graw Hill Edition.
2. A.S Morris, *Principles of Measurement and Instrumentation*. Pearson /Prentice Hall of India.
3. H.S.Kalsi, *Electronic Instrumentation*. Tata MCGraw-Hill Edition, 3/e.
4. A.D Helfrick and W.D.Cooper, *Modern Electronic Instrumentation and Measurement techniques*. Pearson/Prentice Hall of India.
5. T. R. Padmanabhan, *Industrial Instrumentation – Principles and Design*. Springer.

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IV Year B.Tech. EEE-I Semester

(1G274) HIGH VOLTAGE ENGINEERING
(ELECTIVE-I)

UNIT I INTRODUCTION TO HIGH VOLTAGE TECHNOLOGY AND APPLICATIONS: Electric Field Stresses, Gas / Vacuum as Insulator, Liquid Dielectrics, Solids and Composites, Estimation and Control of Electric Stress, Numerical methods for electric field computation, Surge voltages, their distribution and control, Applications of insulating materials in transformers, rotating machines, circuit breakers, cable power capacitors and bushings.

UNIT II BREAK DOWN IN GASEOUS AND LIQUID DIELECTRICS : Gases as insulating media, collision process, Ionization process, Townsend's criteria of breakdown in gases, Paschen's law, Liquid as Insulator, pure and commercial liquids, breakdown in pure and commercial liquids.

UNIT III BREAK DOWN IN SOLID DIELECTRICS: Intrinsic breakdown, electromechanical breakdown, thermal breakdown, breakdown of solid dielectrics in practice, Breakdown in composite dielectrics, solid dielectrics used in practice.

UNIT IV GENERATION OF HIGH DC AND AC VOLTAGES: Generation of high DC voltages-rectifiers, voltage doubler circuits, voltage multiplier circuits-voltage drop and regulation, vandegraaf generators, electrostatic generators. Generation of high alternating voltages-cascade transformers resonant transformers, tesla coil- numerical problems

UNIT V GENERATION OF IMPULSE VOLTAGES AND CURRENTS : Generation of impulse voltages-impulse wave shapes theoretical representation, wave shape control, Marx circuit, components of multi stage impulse generator. Generation of impulse currents-impulse current generator, tripping and control of impulse generator.-numerical problems**.**

UNIT VI MEASUREMENT OF HIGH VOLTAGES AND CURRENTS: Measurement of high direct current voltages, measurement of high voltages alternating and impulse, measurement of high currents-direct, alternating and impulse, oscilloscope for impulse voltage and current measurements.

UNIT VII NON-DISTRUCTIVE TESTING OF MATERIAL AND ELECTRICAL APPARATUS: Measurement of D.C Resistivity, Measurement of Dielectric Constant and loss factor, Partial discharge measurements.

UNIT VIII HIGH VOLTAGE TESTING OF ELECTRICAL APPARATUS: Testing of Insulators and bushings, Testing of Isolators and circuit breakers, Testing of cables, Testing of Transformers, Testing of Surge Arresters, Radio Interference measurements.

TEXT BOOKS:

1. M.S.Naidu and V. Kamaraju. *High Voltage Engineering*. TMH Publications, 4th Edition
2. C.L.Wadhwa, *High Voltage Engineering*. New Age Internationals (P) Limited, 1997.
3. R. D. Begamudre. *High Voltage Engineering Problems & Solutions*. New Age International Publishers, First Edt., 2010.

REFERENCE BOOKS:

1. E.Kuffel, W.S.Zaengl, J.Kuffel, *High Voltage Engineering: Fundamentals* , Elsevier 2nd Edition.
2. Ravindra Arora, Wolfgang Mosch, *High Voltage Insulation Engineering*, New Age International (P) Limited, 1995.
3. L. L. Alston, *High Voltage Technology*, OXFORD University Press, Second Edition, 2009.

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IV Year B.Tech. EEE-I Semester

(1G275) RENEWABLE ENERGY SOURCES
(ELECTIVE-I)

UNIT I PRINCIPLES OF SOLAR RADIATION: Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT II SOLAR ENERGY COLLECTION: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

UNIT III SOLAR ENERGY STORAGE AND APPLICATIONS: Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion

UNIT IV WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria.

UNIT V BIO-MASS: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C. Engine operation and economic aspects.

UNIT VI GEOTHERMAL ENERGY: Resources, types of wells, methods of harnessing the energy, potential in India.

UNIT VII OCEAN ENERGY: OTEC, Principles and utilization, setting of OTEC plants, thermodynamic cycles Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT VIII DIRECT ENERGY CONVERSION: Need for DEC, Carnot cycle, limitations, principles of DEC. Thermo-electric generators, Seebeck, Peltier, Joul and Thomson effects. MHD generators – Principle, Fuel cells, principles, faraday's laws, thermodynamic aspects, selection of fuel and operation conditions

TEXT BOOKS:

1. G.D. Rai. *Non-Conventional Energy Sources*. Khanna Publishers, Delhi, 2007.
2. G.N. Tiwari and M.K. Ghosal. *Fundamentals of Renewable energy resources*. Narosa, New Delhi, 2007.

REFERENCE BOOKS:

1. Twidell & Wier, *Renewable Energy Resources*, CRC Press(Taylor & Francis)

2. Ramesh & Kumar, *Renewable Energy Technologies*, Narosa.
3. K Mittal, *Non-Conventional Energy Systems*, Wheeler.
4. D.P.Kothari,K.C.Singhal, *Renewable energy sources and emerging technologies*, Prentice Hall Iindia.
5. G.D. Rai, *Solar Energy Utilization*, Khanna Publishers, Delhi, 2001.

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IV Year B.Tech. EEE-I Semester

(1G47C)SOFT COMPUTING TECHNIQUES
(ELECTIVE – II)

UNIT I INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS: Introduction, Biological Neuron, Model of Artificial, Neural network architectures , Characteristics of neural networks , McCulloch-Pitts Model, Types of neuron activation functions learning methods(supervised, unsupervised, Reinforcement) Historical Developments, Applications of Neural Networks.

UNIT II FEED FORWARD NEURAL NETWORKS: Introduction, Perceptron Models: Discrete, Continuous and Multi-Category, Training Algorithms: Discrete and Continuous Perceptron Networks, Perceptron Convergence theorem, Limitations of the Perceptron Model, Applications.

UNIT III SUPERVISED LEARNING NETWORKS: ADALINE, MADALINE, Back Propagation Network, BP Learning Rule, Input Layer Computation, Hidden Layer Computation, output Layer computation, Radial Basis Function.

UNIT IV ASSOCIATIVE MEMORY NETWORKS: Introduction, Auto associative memory networks, hetero associative memory network, bidirectional associative memory (BAM), Hopfield network, Interactive auto associative memory networks.

UNIT V CLASSICAL & FUZZY SETS: Introduction to classical sets – properties, Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, Properties, fuzzy relations, cardinalities, membership functions.

UNIT VI FUZZY LOGIC SYSTEM COMPONENTS: Fuzzification, Membership Value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

UNIT VII GENETIC ALGORITHMS: Introduction, Basic operators and Terminologies in GA, Traditional Vs Genetic Algorithm, Encoding, Fitness Function, Reproduction, Crossover, Mutation Operators.

UNIT VIII APPLICATIONS TO ELECTRICAL SYSTEMS: ANN Based Short Term Load Forecasting, Load Flow Studies, Fuzzy Logic Based Unit Commitment And Genetic Algorithms Based Economic Dispatch.

TEXT BOOKS:

1. S.N.Sivanadam, S.N.Deepa, *Principles of Soft Computing*. Wiley India publication, 2nd Ed.
2. Rajasekharan and Rai, *Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications.* PHI Publication.

3. JacekM.Zurada, *Introduction to Artificial Neural Systems.* Jaico Publishing House, 1997.

REFERENCE BOOKS:

1. N. Yadaiah and S. BapiRaju, *Neural and Fuzzy Systems: Foundation, Architectures and Applications.* Pearson Education.
2. James A Freeman and Davis Skapura, *Neural Networks*, Pearson, 2002.
3. BrokKosko, *Neural Networks and Fuzzy Logic System*. PHI Publications.

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IV Year B.Tech. EEE-I Semester

(1G276) RELIABILITY ENGINEERING AND APPLICATIONS TO POWER SYSTEMS
(ELECTIVE-II)

UNIT I BASICS OF PROBABILITY THEORY AND DISTRIBUTION: Basic Probability theory – rules for combining probabilities of events – Bernoulli`s trials – Probability density and distribution functions – binomial distribution – expected value and standard deviation of binomial distribution.

UNIT II RELIABILITY FUNCTIONS: Definition of reliability, Component Reliability, Hazard rate, derivation of the Reliability function in terms of the hazard rate, Bath Tub Curve.MTTF, MTTR,MTBF, types of Failures (early failures, chance failures and wear-out failures). Reliability Block Diagrams, Series and Parallel Systems. Series-Parallel Systems, Parallel - Series Systems.

UNIT III NETWORK MODELING: Reliability evaluation of Non - Series-Parallel Systems configurations. Cut-set, Basic Cut-set, Tie-set, and Basic Tie set, Minimal Cut-Set, Minimal Tie set and Decomposition Methods.

UNIT IV MARKOV MODELING: Introduction – Markov Process & Markov chain - STPM - Time Dependant probability - functions - Evaluating limiting state probabilities - Markov process – one component repairable model -Two component repairable model - Three component repairable model.

UNIT V GENERATION SYSTEM RELIABILITY ANALYSIS: Introduction – Generation system model - Identical units- determination of capacity outage probability table - Determination of transitional rates -Non-Identical units- determination of capacity outage probability table - Reducing the states by Combining equal capacity states - Determination of transitional rates -Sequential addition method - Recursive relation for unit addition, unit removal - LOLP , LOLE determination .

UNIT VI FREQUENCY & DURATION TECHNIQUES: Frequency and duration concepts - Two components repairable model (with identical components) - Evaluation of cumulative probability cumulative frequency - Equivalent transition rates.

UNIT VII COMPOSITE SYSTEM RELIABILITY ANALYSIS: Two level representation of daily load modeling - Merging of generation and load models – evaluation of probabilities, transitional rates-Decomposition method– Weather effects on transmission lines-circuit breaker model

UNIT VIII DISTRIBUTION SYSTEM & RELIABILITY ANALYSIS: Basic indices - Customer oriented indices - Load and energy indices - Radial networks – Load point and System Reliability indices – problems

TEXT BOOKS:

1. Roy Billinton and Ronald N Allen. *Reliability Evaluation of Engineering Systems*. Plenum press, New York and London (BS Publications Revised edition), 2007.
2. Roy Billinton and Ronald N Allen. *Reliability Evaluation of Power Systems.* 2nd Edition, Plenum press, New York and London (BS Publications Revised edition), 2007.

REFERENCE BOOKS:

1. Charles E. Ebeling. *An Introduction to Reliability and Maintainability Engineering*. TATA Mc Graw -Hill Edition, 2000.
2. LS Sainath. *Reliability Engineering*. 3rd Edition, Affiliated East West Pvt. Ltd., 1991.
3. Balaguru Swamy. *Reliability Engineering.* TATA Mc Graw Hill Edition. 1984.

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IV Year B.Tech. EEE-I Semester

(1G57E) OPTIMIZATION TECHNIQUES
(ELECTIVE-II)

UNIT I INTRODUCTION TO OPTIMIZATION TECHNIQUES: Statement of an Optimization problem, design vector, design constraints, constraint surface, objective function, objective function surfaces, classification of Optimization problems.

UNIT II CLASSICAL OPTIMIZATION TECHNIQUES: Single variable Optimization, multi variable Optimization without constraints, necessary and sufficient conditions for minimum/maximum, multivariable Optimization with equality constraints, Solution by method of Lagrange multipliers, multivariable Optimization with inequality constraints, Kuhn – Tucker conditions.

UNIT III INTRODUCTION TO LINEAR PROGRAMMING: Standard form of a linear programming problem, geometry of linear programming problems, definitions and theorems, solution of a system of linear simultaneous equations, pivotal reduction of a general system of equations, motivation to the simplex method, simplex algorithm, big M-method, dual simplex algorithm.

UNIT IV TRANSPORTATION PROBLEM AND CONVEX PROGRAMMING: Finding initial basic feasible solution by North–West corner rule, least cost method and Vogel's approximation method, Assignment problems, variants, Integer Programming, Branch and bound technique, Convex programming, Applications of Convex Programming – Robust optimization problems with uncertain parameters, mission learning.

UNIT V UNCONSTRAINED NONLINEAR PROGRAMMING: One–dimensional minimization methods: Classification, Fibonacci method, Problems and Quadratic interpolation method, Problems.

UNIT VI UNCONSTRAINED OPTIMIZATION TECHNIQUES: Univariate method, Problems, Powell's Method, Conjugate directions, Algorithms, Problems, Steepest Descent (Cauchy) Method, Problems.

UNIT VII CONSTRAINED NONLINEAR PROGRAMMING: Characteristics of a constrained problem, Classification, Basic approach of Penalty Function method; Basic approaches of Interior and Exterior penalty function methods.

UNIT VIII DYNAMIC PROGRAMMING: Dynamic programming multistage decision processes, types, concept of sub optimization and the principle of optimality, computational procedure in dynamic programming, examples illustrating the calculus method of solution, examples illustrating the tabular method of solution.

TEXT BOOKS:

1. S. S. Rao. *Engineering optimization: Theory and practice*. 3rd edition, New Age International (P) Limited, 1998.

2. Dr. S.D. Sharma, Kedarnath Ram. *Operations Research*. Nath and Co. Publications, Meerut.

REFERENCE BOOKS:

1. H.A. Taha. *Operations Research: An Introduction*. 6th edition, PHI Pvt. Ltd.,
2. Kanthi Swaroop. *Introduction to Operations Research*. Gupta and Mohan.

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IV Year B.Tech. EEE-I Semester

(1G37B) MICRO PROCESSORS AND MICROCONTROLLERS LAB

1. Arithmetic operations
   a) Series of n bytes/words addition
   b) Multi byte Addition and Subtraction
   c) 8/ 16 bit Multiplication and Division
   d) Signed Arithmetic operations
   e) ASCII – arithmetic operation.
   f) Addition of two, 4 digit BCD numbers
2. Logical Operations
   a) Code conversion – BCD ⇔ ASCII, BCD ⇔HEX.
   b) Number of 1's and 0's in a given word.
   c) Packed BCD to unpacked BCD using shift instructions
3. String Operations
   a) Relocate a string of N words/bytes.
   b) Reverse String.
   c) Bubble Sort
   d) Length of the String
   e) String Insertion
   f) String Deletion
   g) String comparison
   h) Scanning a byte/ word.
4. Write near procedure for
   a) Factorial of a given number
   b) Largest/smallest number in an N number of given words.
5. Interfacing with 8255 PPI
   a) DAC Interfacing: Sawtooth, Triangular, Staircase, sinuoidal and square wave generation in BSR mode.
   b) Stepper Motor Interfacing: Rotation in Clock wise and Anti-clock wise direction.
6. 8259 – Interrupt Controller
7. 8279 – Keyboard /Display controller.
8. 8251 - USART Interfacing

<u>Microcontroller 8051:</u>

9. Arithmetic operations – Addition, Subtraction, Multiplication and Division.

10. Reading and writing a port.

11. Serial communication implementation.

12. Square wave generation using Timer.

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IV Year B.Tech. EEE-I Semester

(1G277) POWER SYSTEMS LAB

Any Ten experiments are to be conducted from the following:

POWER SYSTEMS EXPERIMENTS

1. Determination of Sub-transient Reactance of Salient Pole Synchronous Machine.
2. Determination of Sequence Impedances of Cylindrical Rotor Synchronous Machine.
3. Power Angle Characteristics of Salient Pole Synchronous Machine.
4. Determination of Sequence components of Salient Pole Synchronous Machine.
5. Characteristics of Over Current Relay

SIMULATION EXPERIMENTS

1. Formation of **Y-bus** using MATLAB program
2. Formation of **Z-bus** using MATLAB program
3. **Gauss-Seidel** method load flow analysis using MATLAB program
4. **Newton Raphson** method load flow analysis using MATLAB program
5. Development of Matlab simulink model for a synchronous machine with and without **AVR**
6. Development of Matlab Simulink model for a **single area** and **two area** load frequency problem and simulate the same.

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IV Year B.Tech. EEE-II Semester

(1G281) POWER SEMICONDUCTOR DRIVES

UNIT I CONTROL OF DC MOTORS BY SINGLE PHASE CONVERTERS: Introduction to Thyristor controlled Drives, Single Phase semi and fully controlled converters connected to d.c separately excited and d.c series motors – continuous current operation – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque Characteristics- Problems on Converter fed d.c motors.

UNIT II CONTROL OF DC MOTORS BY THREE PHASE CONVERTERS: Three phase semi and fully controlled converters connected to d.c separately excited and d.c series motors – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque characteristics – Problems.

UNIT III FOUR QUADRANT OPERATION OF DC DRIVES: Introduction to Four quadrant operation – Motoring operations, Electric Braking – Plugging, Dynamic and Regenerative Braking operations. Four quadrant operation of D.C motors by dual converters – Closed loop operation of DC motor (Block Diagram Only)

UNIT IV CONTROL OF DC MOTORS BY CHOPPERS: Single quadrant, Two – quadrant and four quadrant chopper fed dc separately excited and series excited motors – Continuous current operation – Output voltage and current wave forms – Speed torque expressions – speed torque characteristics – Problems on Chopper fed d.c Motors – Closed Loop operation (Block Diagram Only)

UNIT V CONTROL OF INDUCTION MOTOR THROUGH STATOR VOLTAGE: Variable voltage characteristics-Control of Induction Motor by Ac Voltage Controllers – Waveforms – speed torque characteristics.

UNIT VI CONTROL OF INDUCTION MOTOR THROUGH STATOR FREQUENCY: Variable frequency characteristics-Variable frequency control of induction motor by Voltage source and current source inverter and cyclo converters- PWM control – Comparison of VSI and CSI operations – Speed torque characteristics – numerical problems on induction motor drives – Closed loop operation of induction motor drives (Block Diagram Only)

UNIT VII CONTROL OF INDUCTION MOTOR FROM ROTOR SIDE: Static rotor resistance control – Slip power recovery – Static Scherbius drive – Static Kramer Drive – their performance and speed torque characteristics – advantages - applications – problems

UNIT VIII CONTROL OF SYNCHRONOUS MOTORS: Separate control & self control of synchronous motors – Operation of self controlled synchronous motors by VSI and CSI cycloconverters. Load commutated CSI fed Synchronous Motor – Operation – Waveforms – speed torque characteristics – Applications – Advantages and Numerical Problems – Closed Loop control operation of synchronous motor drives (Block Diagram Only).

TEXT BOOKS:

1. G K Dubey, *Fundamentals of Electric Drives.* Narosa Publications.
2. M.H.Rashid, *Power Electronic Circuits*, *Devices and applications.* PHI.

REFERENCE BOOKS:

1. MD Singh and K B Khanchandani, *Power Electronics*. Tata McGraw-Hill Publishing Company, 1998
2. B.K.Bose, *Modern Power Electronics and AC Drives.* PHI.
3. Vedam Subramanyam, *Thyristor Control of Electric Drives*. Tata McGraw Hill Publilcations.
4. S K Pillai, *Analysis of Thyristor Power – conditioned motors*. Universities press, 1st Edition.

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IV Year B.Tech. EEE-II Semester

(1G282) DISTRIBUTION OF ELECTRICAL POWER

UNIT I GENERAL CONCEPTS: Introduction to distribution systems, Load modeling and characteristics. Coincidence factor, contribution factor loss factor - Relationship between the load factor and loss factor. Classification of loads (Residential, commercial, Agricultural and Industrial) and their characteristics.

UNIT II DISTRIBUTION FEEDERS: Design Considerations of Distribution Feeders: Radial and loop types of primary feeders, voltage levels, feeder loading, Design practice of the secondary distribution system.

UNIT III SYSTEM ANALYSIS: Voltage drop and power-loss calculations: Derivation for voltage drop and power loss in lines, manual methods of solution for radial networks, three phase balanced primary lines, non three-phase primary lines and load flow analysis of systems.

UNIT IV DISTRIBUTION SYSTEM PROTECTION: Types of common faults and procedure for fault calculation, Objectives of distribution system protection, Principle of operation of fuses, circuit reclosers, line sectionalizer and circuit breakers, Coordination of protective devices.

UNIT V APPLICATION OF CAPACITORS IN DISTRIBUTION SYSTEM: Different types of power capacitors, shunt and series capacitors, effect of shunt capacitors (fixed and switched) power factor correction, economic justification for capacitors, procedure to determine the optimum capacitor allocation.

UNIT VI VOLTAGE CONTROL: Quality of Service and Voltage Standards, voltage fluctuations, voltage control, feeder voltage regulators-effect of series capacitors - effect of AVB/AVR, line drop compensation**.**

UNIT VII DISTRIBUTION SYSTEM PLANNING : Distribution System Planning-Factors Affecting System Planning-Load forecasting- classification of Load forecasting-substation expansion, Distribution System Planning Models, Present Distribution System Planning Techniques.

UNIT VIII AUTOMATION AND REAL TIME MANAGEMENT: Need for Distribution Automation, Distribution System Automation- Distribution Automation and Control Functions, Communication in distribution system, distribution management, functions of

DMS. Distribution automation and management functionalities.

TEXT BOOKS:

1. Turan Gonen. *Electric Power Distribution System Engineering*. McGraw-Hill Book Company, 1986.
2. S.Sivanagaraju, V.Sankar. *Electrical Power Distribution and Automation*. Dhanpat Rai & Co, 2006.

REFERENCE BOOKS:

1. A.S.Pabla, *Electric Power Distribution*. 4th edition, Tata Mc Graw-Hill Publishing Company, 1997.
2. V.Kamaraju. *Electrical Power Distribution Systems*. Right Publishers, 2001.

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IV Year B.Tech. EEE-II Semester

(1G283) MODERN CONTROL THEORY
(ELECTIVE-III)

UNIT I: Review of state space representation of continuous time systems and their solution. State models for Discrete time systems described as difference equations and transfer functions.

UNIT II: Transfer function from state model. State transition matrix and solution of state equation for discrete time systems. Adjoint systems – state space representation of sampled data systems.

UNIT III CONTROLLABILITY AND OBSERVABILITY: Concepts of controllability and Observability, Controllability tests for continuous time, discrete time, time invariant systems, Observability tests for continuous time and discrete time, time invariant systems, controllability and Observability modes in state.

UNIT IV: Jordon's canonical form, controllable and observable companion forms for single input single output systems. Pole placement by state feedback. State observers.

UNIT V NONLINEAR SYSTEMS: Behavior of non-linear systems, Jump resonance, sub-harmonic oscillation, limit cycles, common physical non linearity's, singular points, phase plane method.

UNIT VI: Construction of phase plane trajectories, isocline method, delta method, computation of time.

UNIT VII STABILITY: Liapunov's stability criteria, Theorems. The direct method of Liapunov for linear systems.Methods of constructing Liapunov function Krasovski's method, variable gradient method.

UNIT VIII: Optimal Control – Formulation of optimal control problem, calculus of variations, Minimization of functionals. Formulation of variational calculus using Hamiltonian method.

TEXT BOOKS:

1. Gopal M, *Modern Control System Theory*, New Age International Publishers, 1993.
2. Nagrath I.J and Gopal M, *Control System Engineering*, Wiley Eastern Publishers, 1982.
3. Ogata.K , *Modern Control Engineering*, Prentice Hall.

REFERENCE BOOKS:

1. Donald E. Kirk, *Optimal control Theory*.

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IV Year B.Tech. EEE-II Semester

(1G284) SPECIAL ELECTRICAL MACHINES
(ELECTIVE-III)

UNIT I SPECIAL TYPES OF DC MACHINES-I: Series booster-Shunt booster-Non-reversible booster-Reversible booster.

UNIT II SPECIAL TYPES OF DC MACHINES-II: Armature excited machines-Rosenberg generator-The Amplidyne and Metadyne -Rototrol and Regulex-Third brush generator-Three wire generator-Dynamometer.

UNIT III SYNCHRONOUS RELUCTANCE MOTORS:
Constructional features – Types – Axial and radial air gap motors – Operating principle – Reluctance – Phasor diagram - Characteristics – Vernier motor.

UNIT IV STEPPING MOTORS : Constructional features – Principle of operation – Variable reluctance motor – Hybrid motor – Single and multi stack configurations – Theory of torque predictions – Linear and non-linear analysis – Characteristics – Drive circuits.
.
UNIT V SWITCHED RELUCTANCE MOTORS: Constructional features – Principle of operation – Torque prediction – Power controllers – Non-linear analysis – Microprocessor based control - Characteristics – Computer control.

UNIT VI PERMANENT MAGNET BRUSHLESS D.C. MOTORS: Principle of operation – Types – Magnetic circuit analysis – EMF and torque equations – Power controllers – Motor characteristics and control.

UNIT VII PERMANENT MAGNET SYNCHRONOUS MOTORS: Principle of operation – EMF and torque equations – Reactance – Phasor diagram – Power controllers - Converter - Volt-ampere requirements – Torque speed characteristics - Microprocessor based control.

UNIT VIII LINEAR INDUCTI0N MOTOR: Development of a Double sided LIM from Rotary type IM-a Schematic of LIM Drive for Electric Traction-Development of one sided LIM with back Iron-Field Analysis of DSLIM: Fundamental Assumptions.

TEXT BOOKS:

1. T.J.E. Miller. *Brushless Permanent Magnet and Reluctance Motor Drives*. Clarendon Press, Oxford, 1989.
2. P.P. Aearnley. *Stepping Motors – A Guide to Motor Theory and Practice*. Peter Perengrinus. London, 1982.
3. K.Venkatarathnam. *Special Electrical Machines*. University press.
4. R.K.rajput. *Electrical Machines*. 4th Edition. Laxmi publications.
5. M.G.Say & E.O.Taylor, *DC Machines* , 2nd Edition,EBLS.

REFERENCE BOOKS:

1. T. Kenjo. *Stepping Motors and Their Microprocessor Controls*. Clarendon Press London, 1984.
2. T. Kenjo and S. Nagamori, *Permanent Magnet and Brushless DC Motors*, Clarendon Press, London, 1988.

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IV Year B.Tech. EEE-II Semester

(1G285) PRINCIPLES OF POWER QUALITY
(ELECTIVE-III)

UNIT I INTRODUCTION: What is power quality? power quality-voltage quality, why are we concerned about power quality?, the power quality evaluation procedure, terms and definitions, transients, long-duration voltage variations, short-voltage variations, voltage imbalance, wave form distortion, voltage fluctuation ,power frequency variations, power quality terms CBEMA and ITI curves.

UNIT II VOLTAGE SAGS AND INTERRUPTIONS: Sources of sags and interruptions, estimating voltage sag performance, fundamental principles of protection, solutions at the end-use level, motor-starting sags, utility system fault-clearing issues.

UNIT III TRANSIENT OVER VOLTAGES: Sources of over voltages, principles of over voltage protection, devices for over voltage protection, utility capacitor-switching transients, utility system lighting protection.

UNIT IV FUNDAMENTALS OF HARMONICS: Harmonic distortion, voltage versus current distortion, harmonics versus transients, power system qualities under non sinusoidal conditions, harmonic indices, harmonic sources from commercial loads, harmonic sources from industrial loads.

UNIT V APPLIED HARMONICS: Effects of harmonics, harmonic distortion evaluations, principles of controlling harmonics, devices for controlling harmonic distortion.

UNIT VI LONG-DURATION VOLTAGE VARIATIONS: Principles of regulating the voltage, devices for voltage regulation, utility voltage regulator application, capacitors for voltage regulation flicker.

UNIT VII POWER QUALITY BENCH MARKING: Benchmarking process, RMS Voltage variation indices, harmonic indices, power quality contracts.

UNIT VIII POWER QUALITY MONITORING: Monitoring considerations, power quality measurement equipment, power quality monitoring standards

TEXT BOOKS:

1. Roger C.Dugan, Mark F.McGranaghan, Surya santoso, H.Wayne Beaty, *Electrical power systems quality*. 2nd Edition, TMH Education Pvt. Ltd.
2. C.Sankaran. *Power quality*. CRC press.

REFERENCE BOOKS:

1. J.Arrillaga, N.R.Watson, S.Chen, *Electrical systems quality assessmen*, John Wiley &

Sons.
2. Math H.J.Bollen, *Understanding Power quality problems*. IEEE Press.

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IV Year B.Tech. EEE-II Semester

(1G389) EMBEDDED SYSTEMS
(ELECTIVE – IV)

UNIT I INTRODUCTION TO EMBEDDED SYSTEMS: Embedded System – Definition, Application Areas, and Categories. Overview of embedded system architecture, specialities: reliability, performance, power consumption cost, size, user interface, software upgradation capability, recent trends: processor, power, memory, operating system, communication interface, programming languages, development tools, programmable hardware.

UNIT II ARCHITECTURE OF EMBEDDED SYSTEMS: Hardware Architecture – CPU, Memory, Clock Circuitry, Watch dog Timer/Reset Circuitry, chip select, I/O devices, Debug Port, Communication Interfaces, Power supply Unit. Software Architecture – Services provided by an operating System, Architecture and categories of Embedded Operating Systems, Application Software, Communication software, Process of generating Executable image, Development/Testing tools.

UNIT III 8051 MICROCONTROLLER: Introduction, Architecture, Register Organization, Internal and External Memory, Pin diagram, I/O port structure, Addressing modes, Instruction Set, simple programs.

UNIT IV ON-CHIP PERIPHERALS: 8051 Interrupt Structure, Timer/Counter features, modes and programming, Serial Communication Interface.

UNIT V APPLICATIONS: Interfacing with switches, display – LED, seven segment diplays, LCD. Keyboard interfacing, D/A and A/D interfacing, Stepper motor interfacing, Handling External Interrupts.

UNIT VI COMMUNICATION INTERFACES: Need for Communication interface, RS232/UART, RS 422/RS 485, USB, Infrared, IEEE 1394 fire wire, IEEE 802.11, Blue tooth, I2C and CAN Bus.

UNIT VII REAL TIME OPERATING SYSTEM – I : Architecture of Kernel, Tasks and Task Scheduler, Interrupt Service Routines, Inter process Communication– Semaphores, mutex, message queues, mailboxes, pipes, signals, event registers and timers. Priority Inversion Problem.

UNIT VIII REAL TIME OPERATING SYSTEM – II: Off the Shelf Operating Systems, Embedded Operating Systems, Real Time Operating Systems, And Handheld Operating Systems.

TEXT BOOKS:

1. K.V.K.K. Prasad, *Embedded/ Real Time Systems*, Dreamtech press.
2. Kenneth J Ayala, *The 8051 Microcontroller*, 3rd edition, Thomson Press.

REFERENCE BOOKS:

1. Wyene Wolf, *Computers and Components*, Elseveir.
2. Raj Kamal. *Embedded Systems*. TMH.2nd Edition.2008.

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IV Year B.Tech. EEE-II Semester

(1G286) DESIGN OF ELECTRICAL SYSTEMS (ELECTIVE-IV)

UNIT I DESIGN ASPECTS OF ELECTRICAL SYSTEMS: Role of Statutes in Electrical system design, classification of building services, design aspects of lighting, design aspects of ventilation, design aspects of climate control, design aspects of vertical transportation, design aspects of minor building services.

UNIT II ELECTRICAL INSTALLATIONS IN DOMESTIC BUILDINGS: Classification , estimation of load requirements, selection of type of wiring, special features applicable for high-rise apartment buildings, pre-commissioning tests.

UNIT III INDUSTRIAL INSTALLATIONS-I: Classification of industrial installation ,general characteristics, selection of distribution architecture, selection of transformers and sub stations.

UNIT IV INDUSTRIAL INSTALLATIONS –II: Short circuit studies, fault current calculations, earthing design, selection of switch gears: electrical protection , protection of circuit elements, persons & life stack, Equipment, Electrical isolation, switch gear control, switching devices, uses, selective Co-ordination, circuit breakers and their selection.

UNIT V POWER FACTOR IMPROVEMENT: Nature of reactive energy, power factor, how to improve power factor?, economics of power factor improvement ,location of capacitors, installation features, optimal compensation, PF correction of induction motors, protection and control ,voltage transients, switching considerations.

UNIT VI POWER SYSTEM EARTHING: Introduction, earthing, types of system earthing,reasons for grounding/earthing, TN system, TT system, IT system, protective measures and protective devices in IT system, main characteristics of earthing systems, selection criteria for earthing, design considerations of earthing, measurement of earth resistance, earth leakage protection ,neutral earthing for generators and transformers.

UNIT VII POWER QUALITY ISSUES AND RESONANCE PROBLEMS IN SYSTEMS DESIGN: Power quality issues, harmonics, sources of harmonics, disturbances caused by harmonics, methods to reduce the impact of harmonics, design the detuned capacitor bank, IEEE standard519-1992 and limits.

UNIT VIII ENERGY ECONOMICS IN SYSTEM DESIGN: Introduction, time value of money, single payment compound amount model(SPCA),uniform series compound amount model(USCA),uniform series present worth model(USPW),depreciation, tax considerations, after tax analysis.

TEXT BOOKS:

1. M.K.Giridharan. *Electrical Systems design*. I.K.International Publishing house Pvt.Ltd.
2. Er.V.K.Jain and Er.Amitabh Bajaj. *Design of electrical Installations*. University Science press.

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IV Year B.Tech. EEE-II Semester

(1G287) ENERGY AUDITING AND DEMAND SIDE MANAGEMENT (ELECTIVE-IV)

UNIT I INTRODUCTION: Energy situation – world and India, energy consumption, conservation, Codes, standards and Legislation.

UNIT II ENERGY AUDITING: Energy audit- definitions, concept, types of audit, energy index, cost index, pie charts, Sankey diagrams, load profiles, Energy conservation schemes. Measurements in energy audits, presentation of energy audit results.

UNIT III ENERGY EFFICIENT MOTORS: Energy efficient motors, factors affecting efficiency, loss distribution , constructional details, characteristics - variable speed , variable duty cycle systems, RMS hp- voltage variation-voltage unbalance- over motoring- motor energy audit.

UNIT IV POWER FACTOR IMPROVEMENT: Power factor – methods of improvement, location of capacitors, Pf with non linear loads, effect of harmonics on p.f. , p.f motor controllers.

UNIT V LIGHTING AND ENERGY INSTRUMENTS: Good lighting system design and practice, lighting control ,lighting energy audit - Energy Instrumentswatt meter, data loggers, thermocouples, pyrometers, lux meters, tongue testers ,application of PLC's.

UNIT VI ENERGY ECONOMIC ANALYSIS: The time value of money concept, developing cash flow models, payback analysis, depreciation, taxes and tax credit – numerical problems.

UNIT VII DEMAND SIDE MANAGEMENT – I: Introduction to DSM, concept of DSM, benefits of DSM, different techniques of DSM – time of day pricing, multi-utility power exchange model, time of day models for planning.

UNIT VIII DEMAND SIDE MANAGEMENT – II: Load management, load priority technique, peak clipping, peak shifting, valley filling, strategic conservation, energy efficient equipment. Management and Organization of Energy Conservation awareness Programs.

TEXT BOOKS:

1. Arry C. White, Philip S. Schmidt, David R. Brown. *Industrial Energy Management Systems*. Hemisphere Publishing Corporation, New York.
2. Albert Thumann. *Fundamentals of Energy Engineering*. Prentice Hall Inc, Englewood Cliffs, New Jersey.
3. A S. Pabla, *Electrical Power distribution*, TMH, 5th edition, 2004
4. Jyothi Prakash. *Demand Side Management*. TMH Publishers.

REFERENCE BOOKS:

1. W.R. Murphy & G. Mckay Butter worth. *Energy management*. Heinemann publications.
2. Paul o Callaghan. *Energy management*. Mc-graw Hill Book company-1st edition, 1998
3. John .C. Andreas, Marcel Dekker. *Energy efficient electric motors*. Inc Ltd-2nd edition, 1995-
4. W.C.Turner, *Energy management hand book*, John wiley and sons.
5. *Energy management and good lighting practice : fuel efficiency- booklet12*-EEO.
6. D.P.Sen, K.R.Padiyar, Indrane Sen. *Recent Advances in Control and Management of Energy Systems*. M.A.Pai, Interline Publisher, Bangalore, 1993.
7. Ashok V. Desai, Wiley. *Energy Demand – Analysis, Management and Conservation*. Eastern, 2005.
8. *Hand book on energy auditing*. TERI (Tata Energy Research Institute).