DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

College Vision: "To provide the society with Center of Learning in Technical Education and Research that motivates the students to evolve into dynamic professionals."

College Mission:

- Providing quality education, student centered teaching Learning process and state of the art infrastructure for professional aspirants hailing from both rural and urban areas.
- Evolving this organization into a center of Academic and Research Excellence.
- Imparting Technical Education that encourages independent thinking, develops strong domain knowledge and positive attitude towards holistic growth of young minds.

Vision of the Department: To be a leader in developing creative and entrepreneurial engineers and thereby, leading the development in Electrical Engineering & Technology of our new Andhra Pradesh state and our country.

Mission of the Department:

- Promoting graduates to discover, disseminate, apply knowledge related to the broad aspects of Electrical Engineering through innovative pedagogic methods centered on Learning-to-Learn (L2L) principles.
- Providing Graduates to develop their skills and seek knowledge after graduation by adopting advanced technology.
- Equipping our students to adapt themselves to global needs while upholding professional ethics and to contribute their might in transforming India into a world leader.
- To be a Center of Excellence in preparing the students in developing research, entrepreneurial and employability capabilities.

PROGRAM EDUCATIONAL OBJECTIVIES:

PEO-1: Preparing the graduates with strong foundation in freshman-ship, discipline major and able to converse effectively their investigation on experiments.

PEO-2: Producing graduates who are creative with an appropriate mastery in analyzes, design, and implementation of modern engineering tool through continuing education.

PEO-3: Instilling graduates capabilities to demonstrate knowledge of the professional and ethical responsibilities incumbent upon the practicing Electrical Engineer as well as, concern towards the society, cultures and environment sustainability.

PEO-4: To produce graduates who are capable to promote research in multidisciplinary environment and encouraging entrepreneurialism towards the sustainable development of new Andhra Pradesh state as well India.

PROGRAM OUTCOMES

1.Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2.Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3.Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4.Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5.Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6.The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7.Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8.Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9.Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10.Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11.Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12.Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

1. INTRODUCTION

Academic Programmes of the institute are governed by rules and regulations approved by the Academic Council, which is the highest Academic body of the Institute. These academic rules and regulations are applicable to the students admitted during the academic year 2014-15 into first year of four year undergraduate programme offered by the college leading to Bachelor of Technology (B.Tech) degree in the disciplines viz., Computer Science and Engineering, Electronics and Communication Engineering, Electrical and Electronics Engineering, Information Technology, Mechanical Engineering & Civil Engineering.

- **EXTENT:** All the rules and regulations, specified herein after will be read as a whole for the purpose of interpretation and when a doubt arises, the interpretation of the Chairman, Academic Council, Swarnandhra College of Engineering & Technology (Autonomous) is the final. As per the requirements of the Statutory Bodies, Principal, Swarnandhra College of Engineering & Technology (Autonomous), will be the Chairman of the College Academic Council.

2. ADMISSIONS:

2.1. Admission into first year of any Four Year B.Tech Programmes of study in Engineering: Admissions into first year of B.Tech Programme of Swarnandhra College of Engineering & Technology (**Subsequently referred to as SCET**) will be as per the norms stipulated by Jawaharlal Nehru Technological University Kakinada & Govt. of Andhra Pradesh. Admissions in each programme in the Institution are classified into **CATEGORY - A** (70% of intake) through convener, EAMCET and **CATEGORY- B** (30% of intake) filled by the college management.

2.2. Admission into the Second year (Lateral Entry) of any Four year B.Tech Programme of study in Engineering: The candidates should have passed the qualifying exam. (B.Sc. graduation & Diploma holders) for admission into the 3rd semester directly, based on the rank secured by the candidate at Engineering Common Entrance Test [ECET for (FDH)] in accordance with the instructions received from the Convener, ECET and Government of Andhra Pradesh.

The candidate has to satisfy the other eligibility requirements stipulated by the JNT University Kakinada and / or the Government of Andhra Pradesh from time to time.

2.3. Admissions with advance standing: These may arise in the following cases:

a) When a student seeks transfer from other colleges to SCET and disireous to pursue the study at SCET in an eligible branch of study.

b) When students of SCET get transferred from one regulation to another regulation or from previous syllabus to revised syllabus.

c) When a student after long discontinuity rejoins the college to complete his/her Programme of study for the award of degree.

d) When a student is not able to pursue his/her existing Programme of study but wishes to get transferred to another Programme of study.

These admissions may be permitted by the Academic Council of SCET as per the norms stipulated by the statutory bodies and Govt. of Andhra Pradesh. In all such cases for admission, when needed, permissions from the statutory bodies are to be obtained and the Programme of study at SCET will be governed by the transitory regulations.

3. PROGRAMMES OFFERED (UNDER GRADUATE)

Presently, the college is offering Under Graduate Programmes in the following disciplines:

- Computer Science and Engineering (CSE)
- Electronics and communication Engineering (ECE)
- Electrical and Electronics Engineering (EEE)
- Information Technology (IT)
- Mechanical Engineering (ME)
- Civil Engineering (CE)

3.1 Structure of the Programme:

Each Programme of a Discipline or branch of study will consist of:

i). General core courses in Basic Sciences, Engineering & Technology, Humanities, Mathematics and Management.

ii). Interdisciplinary courses in Engineering, to impart the fundamentals of Engineering.

iii). Compulsory core courses to impart broad based knowledge needed in the concerned branch of study.

iv). Elective courses from either the discipline or interdisciplinary areas / industry related opted by the student based on his/her interest in specialization.

v). Seminars, Technical Paper, Comprehensive Viva-Voce, Mini Project and Major Project approved by the Department to be submitted in the course of study.

Each Programme of study will be designed to have 40-45 theory courses and 16-18 laboratory courses. The distribution and types of courses offered from the above is indicated in the following table.

General Core courses	25-30%
Interdisciplinary courses in engineering	15-20%
Compulsory Core courses in the branch of study	45-50%
Elective Courses	5-10%

Note: All components prescribed in the curriculum of any Programme of study will be conducted and evaluated.

Contact hours: Depending on the complexity and volume of the course the number of contact hours per week will be determined (4 to 6 hours per week per course).

Credits: Credits are assigned to each course as per norms mentioned in the following table.

Subject	Credits
Theory Course	03
Laboratory Course	02
Seminar/ Technical Paper	02
Soft Skills / Aptitude Lab	01
Comprehensive Viva	02
Mini Project	02
Major Project	06

3.2 Curriculum for each Programme of study:

- The Four year curriculum of any B.Tech Programme of study in any branch of Engineering is formulated based on the guidelines mentioned in 3.1 and will be recommended by the concerned Board of Studies and is approved by the Academic council of the college.
- In case of students admitted under lateral entry, the respective regular curriculum contents from 3rd semester onwards are to be pursued by them.

- In case of students admitted under advanced standing, the Programme of curriculum will be prepared by the concerned Board of Studies and the Academic Council has to approve the same.
- After approval from the Academic Council, Programme of curriculum for the same will be prepared and made available to all the students along with the academic regulations.

3.3 Maximum duration of study and cancellation of admission:

Maximum duration permitted for any student to successfully complete the four year B.Tech. Programme of study will be:

- Eight academic years in sequence from the year of admission for a normal student admitted into first year of any Programme.
- Six academic years in sequence from the year of admission for a Lateral entry student admitted into second year of any Programme.
- For students admitted with advanced standing, the maximum time for completion of Programme of study, will be twice the period in terms of academic years in sequence, stipulated in the Programme curriculum defined at the time of admission.

In case, any student fails to meet the above applicable/eligible conditions for the award of degree, his/her admission stands cancelled.

4. **DURATION OF THE PROGRAMME AND MEDIUM OF INSTRUCTION:** The duration of the B.Tech. Programme is four academic years consisting of eight semesters. The medium of instruction and examinations is in English. Students, who fail to fulfill all the academic requirements for the award of the degree within minimum of eight academic years, will forfeit their admission in B.Tech course**.**

5. **MINIMUM INSTRUCTION DAYS:** Each semester will consist of 22 weeks duration with minimum of 110 working days which includes instruction, Mid examinations and Final examinations. The no. of contact periods per week are 42 to 48.

6. **TRANSITORY REGULATIONS:**

   For students admitted under advance standing, these transitory regulations will provide the modus of operandi. At the time of such admission, based on the Programme pursued (case by case)

- Equivalent courses completed by the student are established by the BOS of concerned discipline.
- Marks/Credits are transferred for all such equivalent courses and treated as successfully completed in the Programme of study prescribed by SCET.
- A Programme chart of residual courses not completed will be derived and a Programme of study with duration specified will be prescribed for pursuit at SCET.
- Marks obtained in the previous system, as the case maybe, are converted to grades and CGPA is calculated.

All other modalities and regulations governing will be the same as those applicable to the stream of students with whom, such a candidate is merged with current regulations.

7. DISTRIBUTION AND WEIGHTAGE OF MARKS:

(i) In each semester the course of study consists of 5/6 theory subjects + 2/3 laboratories. However, in the 8^{th} semester there will be only 3 theory subjects in addition to the major project work and comprehensive viva-voce.

(ii) The performance of a student in each semester will be evaluated subject wise with a maximum of 100 marks for theory and 75 marks for practical subject, In addition Seminar, Technical Paper and Mini Project at the end of 7^{th} semester. (Mini Project, Technical paper and Seminar is for 50 marks each Main Project during 8^{th} Sem for 200 marks) are evaluated.

(iii) **Seminar/Technical Paper:** The Seminar/Technical paper has two components of study one from the topics of current study (course work) and the other component is suggested by the staff advisor, like as reproduction of the concept in any standard research paper or an extension of concept from earlier course work. A hard copy of the information on Seminar/Technical paper topic in the form of a report is to be submitted for evaluation along with presentation. The two components of the Seminar/Technical paper are evaluated for 50 marks each. in the semester. The average of the two components shall be taken as the final score. A minimum of 50% of maximum marks shall be obtained to earn the corresponding credits.

(iv) **Mini Project:** The mini project shall be carried out during the summer break for a minimum of 4 weeks after the 6th semester and to be completed before the start of the 7th Semester. A report has to be submitted at the beginning of the 7th semester for assessment by an internal evaluation committee comprising Head of the Department and two faculty of the department including the project Supervisor for 50 Marks. A minimum of 50% maximum marks shall be obtained to earn the corresponding credits.

(v) For each theory subject the distribution will be 30 marks for internal evaluation and 70 marks for the end semester examination. The internal evaluation of 30 marks consists of descriptive text for 20 marks and objective text for 10 marks.

(vi) As part of internal assessment for each theory subject there will be 3 cycles of examinations. Each cycle consists of one descriptive test and one objective test which will be conducted after completion of two units of syllabus. **Weighted average of three cycle's** performance will be considered for award of internal assessment. A weight age of 50% for the first best cycle performance, 35% for second best cycle performance and reaming 15% for the third cycle performance are given for internal evaluation.

(vii) The **descriptive** examination consists of 4 questions and three questions need to be answered in 90 minutes. The **objective** examination consists of 20 multiple choice questions and all are to be answered in 20 min of duration.

(viii)The **end semester** examination will be conducted for 70 marks covering total syllabus of the concerned subjects. In end examination pattern, Part – A consists of a compulsory question from all units (Brainstorming/Thought provoking/Case study) for 22 marks. Part – B has 6 questions (one question from each unit) of which four questions to be answered and valued for 48 marks.

(ix) End practical examination will be conducted for 50 marks by the teacher concerned and external examiner. For practical subjects there will be a continuous assessment during the semester for 25 internal marks with 15 marks for day-to-day work, including record valuation and 10 marks for two internal tests (80% of first best + 20% of second).

(x) For the subjects of design and/or drawing (such as Engineering Drawing, machine drawing etc.) and estimation, the distribution will be 30 marks for internal evaluation with 10 marks for day-to-day work, 20 marks for three internal test (50% of first best +35% of second best+15% of third). End examination will be conducted for 70 marks.

(xi) **Main Project:** The project work carried out by the students during 8th semester is evaluated for internal assessment and external examination.

a) Internal Assessment: Internal Assessment will be carried out by Projects internal assessment committee consisting of 1) Head of the Department 2) Supervisor and 3) Senior faculty member appointed by the Principal.

b) External Examination: External Examination will be conducted by Project external examination committee consisting of 1) Head of the Department 2) Supervisor and 3) External member selected from the panel of examiners.

(xii) Total marks to be awarded for Project work is 200, of which 60 marks will be for Internal Evaluation and 140 marks for External examination through presentation / viva - voice by / of the student. The internal evaluation will be on the basis of two seminars on the topic of the project.

(xiii) The comprehensive viva will be conducted for 50 marks in 8^{th} Semester. The comprehensive viva will be conducted evaluated in the topics covering the core aspects of the subjects in which the candidate is likely to be graduated.

8. ATTENDANCE REGULATIONS AND CONDONATION:

(i) A student will be eligible to appear for end semester examinations, if he/she acquired a minimum of 75% of attendance in aggregate of all the subjects.

(ii) Condonation of shortage of attendance in aggregate up to 10% on medical grounds (Above 65% and , below 75%) in any semester may be granted by the College Academic Committee. However, the subject of granting is totally at the discretion of the College Academic Committee.

(iii) A Student will not be promoted to the next semester unless he/she satisfies the attendance requirement of the present semester as applicable. They may seek re-admission for that semester as and when offered consecutively by the Department.

(iv) Shortage of Attendance below 65% in aggregate in no case be condoned

(v) Students with less than 65% of attendance in any semester are not eligible to take up their end examination of that particular semester and their registration for examination will be cancelled.

(vi) A stipulated fee will be payable by the student towards attendance condonation.

(vii) Attendance may also be condoned for those who participate in Intercollegiate/university sports, co- and extracurricular activities provided their attendance is in the minimum prescribed range for the purpose ($>65^0$) and recommended by the concerned authority condonation fees in to be paid.

(viii) A student will be condoned only twice during his entire course of study.

9. MINIMUM ACADEMIC REQUIREMENTS:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in **S.No.8.**

(i) A student will be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical design or drawing subject or project if he/she secures not less than a minimum of 35% of marks exclusively in the end semester examinations in each of the subjects, for which the candidate had appeared. However, the candidate should have secured a minimum of 40% marks in both external and internal components put together to declare eligible for pass in the subject.

(ii) A student will be promoted from first sem to second sem , second sem to third and third to fourth sem, if he/she satisfies the minimum attendance requirement.

(iii) A student will be promoted from 4^{th} Semester to 5^{th} Semester, if he/she fulfills the academic requirements of 50% of the credits up to 4^{th} Semester from all the examinations (Regular and supplementary) whether or not the candidate takes the examinations.

(iv) A student will be promoted from 6^{th} to 7^{th} Semester, only if he/she fulfills the academic requirements of 50% of the credits up to 6^{th} Semester from, all the examinations (regular and supply) whether or not the candidate takes the examinations.

(v) There will be supplementary examinations along with the regular semester examinations enabling the students to give a fair chance to appear in the subject if any failed.

(vi) Candidate who fails in 8^{th} Semester can appear for Advanced Supplementary Examinations soon after the announcement of result.

10. ELIGIBILITY FOR AWARD OF DEGREE:

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

(i) Pursued a course of study for a stipulated period of four years and not more than eight years.

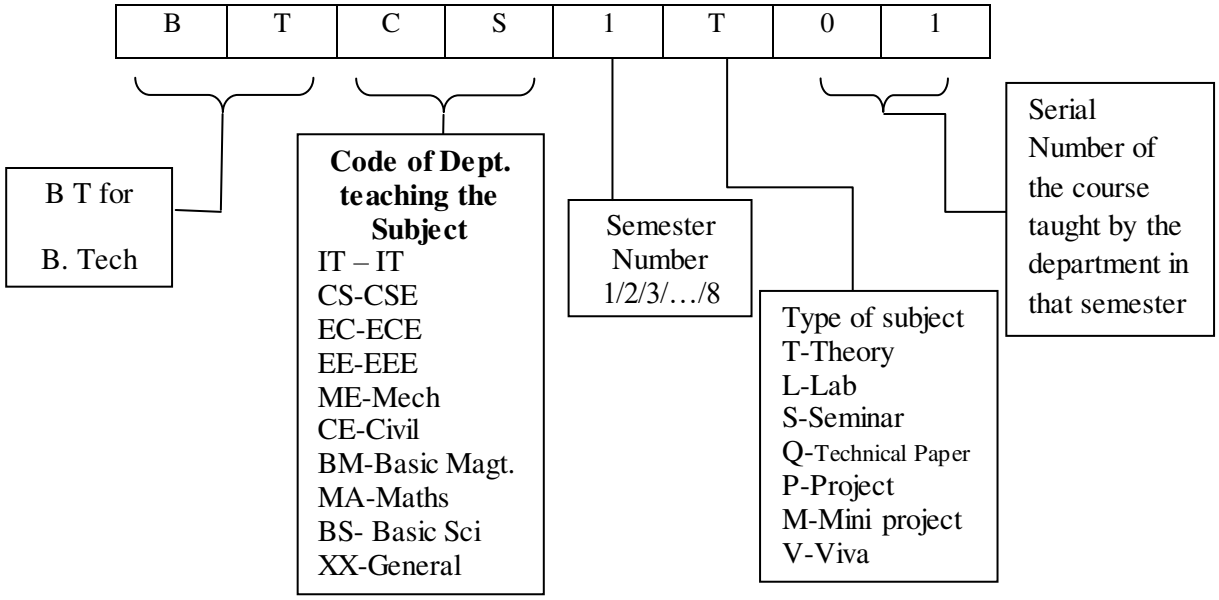
(ii) Registered and successfully completed all the components prescribed in the programme of study to which he/she is admitted.

(iii) Obtained CGPA greater than or equal to 5 (minimum requirements for pass).

(iv) Has no dues to the institute, hostels, libraries, NCC/NSS etc., and No disciplinary action is pending against him/her

11. COURSE CODE & COURSE NUMBERING SCHEME:

The subject codes will be given by the department teaching the subject. Each subject code contains 8 characters. The 8 characters for each subject will be filled as per the following guidelines.



12. GRADING SYSTEM:

12.1 Award of Grade:

(i) Grade Point Average (GPA):

a) The Grade Point Average (GPA) will be calculated according to the formula.

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

Where C_i = number of credits for the subject i

G_i = grade points obtained by the student in the subject.

b) Semester Grade Point Average (SGPA) is awarded to candidates considering all the subjects of the semester. Zero grade points are also included in this computation.

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

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

Where C_i = number of credits for the subject i

G_i = grade points obtained by the student in the subject.

(ii) After a student satisfies the requirements prescribed for the award of UG/PG Program he/she shall be placed in one of the following four grades. The award of the degree is based on CGPA on a grade point scale of 10.

CGPA	Award of Division
≥8.00*	First Class with Distinction
≥7.00	First Division
≥6.00	Second Division
≥5.00	Pass Division
<5.00	Unsatisfactory

* In addition to the required CGPA of 8, the student must have necessarily passed all the courses of every semester in the minimum stipulated period for the programme.

12.2 Award of Grade in Each Semester:

(i) Based on the student performance during a given semester, a final letter grade will be awarded at the end of the semester for each subject. The letter grades and the corresponding grade points are as given in the Table.

Percentage of Marks Scored	Letter Grade	Grade points
>=90	S	10
80 - 89	A	9
70-79	B	8
60-69	C	7
50-59	D	6
40-49	E	5
<40	F	Fail

(ii) A student earns a minimum of 5 grade points (E grade) in a subject is declared to have successfully completed the subject, and is deemed to have earned the credits assigned to that subject. However it should be noted that a pass in any subject/term paper/seminar/project/mini project shall be governed by the rules mentioned in S.No.7.

(iii) Grade Sheet: A grade sheet (memorandum) will be issued to each student indicating his/her performance in all courses taken in that semester and also indicating the grades and SGPA.

(iv) Transcripts: After successful completion of the total programme of study, a Transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued up to any point of study to any student on request and by paying the stipulated fee in force.

(v) Candidates shall be permitted to apply for recounting/revaluation within the stipulated period with payment of prescribed fee.

(vi) The Academic Council has to approve and recommend to the JNTUK, Kakinada for the award of a degree to any student.

13. SUPPLEMENTARY EXAMINATIONS: In addition to the Regular Final Examinations held at the end of each semester, Supplementary Final Examinations will be conducted during the academic year. A student can appear for any number of supplementary examinations till he/she clears all courses which he/she could not clear in the first attempt. However the maximum stipulated period cannot be relaxed under any circumstance.

14. ADVANCED SUPPLEMENTARY EXAMINATIONS: Candidate who fails the subjects in 8^{th} Semester can appear for Advanced Supplementary Examinations.

15. ACADEMIC REGULATIONS FOR B.TECH (LATERAL ENTRY SCHEME):

(i) The students have to acquire 132 credits from 3^{rd} Semester to 8^{th} Semester of B.Tech Programme (regular) for the award of the degree.

(ii) Students, who fail to fulfill the requirement for the award of the degree in 6 consecutive academic years from the year of admission, shall forfeit their seat.

(iii) The same attendance regulations are to be adopted as per the rules mentioned in item No.8.

(iv) **Rules for Promotion in to Next Higher Class:** (6^{th} Semester to 7^{th} Semester): A student shall be promoted from 6^{th} Semester to 7^{th} Semester only if he/she fulfills the academic requirements of 50% credits up to 6^{th} Semester.

16. CONDUCT AND DISCIPLINE:

(a) Students shall conduct themselves within and outside the premises of the institute in a manner befitting to be the student of our institution.

(b) As per the order of Honorable Supreme Court of India, ragging in any form is considered as a criminal offence and is strictly banned. Any form of ragging will be severely dealt with.

(c) The following acts of omission and/or commission shall constitute gross violation of the code of conduct and are liable to invoke disciplinary measures with regard to ragging.

(i) Lack of courtesy and decorum inducement behavior anywhere within or outside the campus.

(ii) Willful damage or distribution of alcoholic drinks or any kind of narcotics or of fellow students/citizens.

(d) Possession, consumption or distribution of alcoholic drinks or any kind of narcotics or hallucinogenic drugs.

(e) Mutilation or unauthorized possession of library books.

(f) Noisy and unseemly behavior, disturbing studies of fellow students.

(g) Hacking in computer systems (such as entering into other person's areas without prior permission, manipulation and/or damage of computer hardware and software or any other cybercrime etc).

(h) Usage of cells phones and cameras in the class room/campus.

(i) Plagiarism of any nature in any academic report of submission.

(j) Any other act of gross indiscipline as decided by the academic council from time to me.

(k) Commensurate with the gravity of offense, the punishment may be reprimand, fine, expulsion from the institute / hostel, debarment from examination, disallowing the use of certain facilities of the institute, suspension for a specified period or even outright expulsion from the institute, or even handing over the case to appropriate law enforcement authorizes or the judiciary, as required by the circumstances.

(l) For an offence committed in (i) a hostel (ii) a department or in a class room and (iii) elsewhere, the chief Warden, the Head of the Department and the principal respectively, shall have the authority to reprimand or impose fine.

(m) Cases of adoption of unfair means and/or any malpractice in an examination shall be reported to the principal for taking appropriate action.

(n) All cases of serious offence, possible requiring punishment other than reprimand, shall be reported to the Academic council.

(o) The Institute Level Standing Disciplinary Action Committee constituted by the academic council, shall be the authority to investigate the details of the offence, and recommend disciplinary action based on the nature and extent of the offence committed.

(p) The Principal shall deal with any academic problem, which is not covered under these rules and regulations, in consultation with the Programmes Committee in an appropriate manner, and subsequently such action shall be placed before the academic council for ratification, Any emergency modification of regulation, approved by the academic council earlier, shall be reported to the academic council for ratification.

(q) **"Grievance and Redressal Committee" (General)** constituted by the principal shall deal with all grievances pertaining to the academic / administrative/disciplinary matters.

(r) All the students must abide by the code and conduct rules of the college.

17. MALPRACTICES: The Principal shall refer the cases of malpractices in internal assessment tests and Semester-End Examinations, to a Malpractice Enquiry Committee, constituted by him/her for the purpose. The principal will take necessary action, against the erring students basing on the recommendations of the committee and shall deal with any academic problem, which is not covered under these rules and regulations, in consultation with the Heads of the Departments in an appropriate manner, and subsequently such actions shall be placed before the academic council for ratification. Any emergency modification of regulation, approved in the Heads of the Departments meetings, shall be reported to the academic council for ratification.

18. AMENDMENTS TO REGULATIONS:

The Academic Council of Swarnandhra College of Engineering & Technology (Autonomous) reserves the right to revise, amend or change the Regulations, Schemes of Examinations, and/or Syllabi or any other matter pertained suitable to the needs of the students, society, industry without any notice.

Semester: I									
S. No	Course Code	Course Name	L	T	P	C	I	E	TM
THEORY									
1	BTBS1T01	English-I	3	1		3	30	70	100
2	BTMA1T01	Differential Equations	3	1		3	30	70	100
3	BTMA1T02	Numerical Methods & Integral Transforms	3	1		3	30	70	100
4	BTBS1T02	Engineering Chemistry	3	1		3	30	70	100
5	BTBS1T04	Environmental Studies	3	1		3	30	70	100
6	BTCS1T01	C. Programming	3	1		3	30	70	100
PRACTICAL									
7	BTBS1L01	English Communication Skills Lab-I			3	2	25	50	75
8	BTBS1L02	Engineering Chemistry Lab			3	2	25	50	75
9	BTCS1L01	C. Programming Lab			3	2	25	50	75
Total			**18**	**6**	**9**	**24**	**255**	**570**	**825**

Semester: II									
S. No	Course Code	Course Name	L	T	P	C	I	E	TM
THEORY									
1	BTBS2T01	English-II	3	1		3	30	70	100
2	BTMA2T01	Linear algebra & Vector Calculus	3	1		3	30	70	100
3	BTEE2T01	Networks & Synthesis	3	1		3	30	70	100
4	BTBS2T03	Engineering Physics	3	1		3	30	70	100
5	BTME2T01	Engineering Drawing	1		3	3	30	70	100
6	BTCS2T01	OOPS through C++	3	1		3	30	70	100
PRACTICAL									
7	BTBS2L01	English Communication Skills Lab-II			3	2	25	50	75
8	BTBS2L03	Engineering Physics lab			3	2	25	50	75
9	BTCS2L01	OOPS through C++ Lab			3	2	25	50	75
Total			**16**	**5**	**12**	**24**	**255**	**570**	**825**

Semester: III									
S. No	Course Code	Course Name	L	T	P	C	I	E	TM
THEORY									
1	BTEE3T01	Electrical Circuits	3	1		3	30	70	100
2	BTEE3T02	Electro Magnetic Fields	3	1		3	30	70	100
3	BTEE3T03	Electrical Machines-I	3	1		3	30	70	100
4	BTEC3T01	Electronic Devices and Circuits	3	1		3	30	70	100
5	BTBM3T02	Principles of Economics & Management	3	1		3	30	70	100
6	BTME3T01	Fluid Mechanics & Hydraulic Machinery	3	1		3	30	70	100
PRACTICAL									
7	BTEE3L01	Networks & Simulation Lab			3	2	25	50	75
8	BTME3L01	Fluid Mechanics & Hydraulic Machinery			3	2	25	50	75
9	BTBS3L01	Soft skills /Aptitude Lab-I			2	1	25	--	25
Total			**18**	**6**	**8**	**23**	**255**	**520**	**775**

Semester: IV									
S. No	Course Code	Course Name	L	T	P	C	I	E	TM
THEORY									
1	BTEE4T01	Electrical Machines-II	3	1		3	30	70	100
2	BTEE4T02	Control Systems	3	1		3	30	70	100
3	BTEE4T03	Power System-I	3	1		3	30	70	100
4	BTEC4T05	Pulse & Digital circuits	3	1		3	30	70	100
5	BTEC4T06	Switching Theory & Logic Design	3	1		3	30	70	100
6	BTCS4T05	Computer Organization	3	1		3	30	70	100
PRACTICAL									
7	BTEE4L01	Electrical Machines-I Lab			3	2	25	50	75
8	BTEC4L03	Electronic Devices and Circuits lab			3	2	25	50	75
9	BTBS4L01	Soft skills /Aptitude Lab-II			2	1	25		25
Total			**18**	**6**	**8**	**23**	**255**	**520**	**775**

Semester: V									
S. No	Course Code	Course Name	L	T	P	C	I	E	TM
THEORY									
1	BTEE5T01	Power system-II	3	1		3	30	70	100
2	BTEE5T02	Power Electronics	3	1		3	30	70	100
3	BTEE5T03	Electrical & Electronics Measurements	3	1		3	30	70	100
4	BTEC5T06	Linear & Digital IC Applications	3	1		3	30	70	100
5	BTEE5T04	High Voltage Engineering	3	1		3	30	70	100
PRACTICAL									
6	BTEE5L01	Electrical Machines-II Lab			3	2	25	50	75
7	BTEE5L02	Control system & Simulation Lab			3	2	25	50	75
8	BTEE5L03	Electrical& Electronics Measurements Lab			3	2	25	50	75
9	BTEE5S01	Seminar-I			2	2	50		50
Total			**15**	**5**	**11**	**23**	**275**	**500**	**775**

Semester: VI									
S. No	Course Code	Course Name	L	T	P	C	I	E	TM
THEORY									
1	BTEE6T01	Power system Analysis	3	1		3	30	70	100
2	BTEE6T02	Power Semiconductor Drives	3	1		3	30	70	100
3	BTEE6T04	Utilization of Electrical Energy	3	1		3	30	70	100
4		Elective-I	3	1		3	30	70	100
5	BTEC6T05	Microprocessor & Microcontroller	3	1		3	30	70	100
PRACTICAL									
6	BTEE6L01	Power Electronics& Simulation Lab			3	2	25	50	75
7	BTEC6L02	Microprocessor & Microcontroller Lab			3	2	25	50	75
8	BTEE6L02	Industrial Automation LAB (PLC& SCADA)	1		3	2	25	50	75
9	BTEE6Q01	Technical paper			2	2	50		50
Total			**16**	**5**	**11**	**23**	**275**	**500**	**775**

Elective-I	
BTEE6TE1	Energy audit , conservation and management
BTEE6TE2	Instrumentation Engineering
BTEE6TE3	Non-Conventional Sources of Energy

Semester: VII									
S. No	Course Code	Course Name	L	T	P	C	I	E	TM
THEORY									
1	BTEE7T01	Power System Operation & Control	3	1		3	30	70	100
2	BTEE7T02	Electrical Distribution Systems	3	1		3	30	70	100
3	BTEE7T03	Renewable Energy Systems	3	1		3	30	70	100
4	BTEC7T05	Digital Signal Processing	3	1		3	30	70	100
5		Elective-II	3	1		3	30	70	100
PRACTICAL									
6	BTEE7L01	Power Systems Simulation Lab			3	2	25	50	75
7	BTEE7L02	Renewable Energy Systems Lab			3	2	25	50	75
8	BTEE7M01	Mini Project			3	2	50		50
9	BTBM7T01	Professional Ethics & IPR			3	Mandatory			
Total			**15**	**5**	**12**	**21**	**250**	**450**	**700**

Elective-II	
BTEE7TE1	Special Electrical Machines
BTEC7TE6	Nano science & Technology
BTCS7TE8	Open sources software

Semester: VIII									
S. No	Course Code	Course Name	L	T	P	C	I	E	TM
THEORY									
1	BTEE8T01	Switch Gear & Protection	3	1		3	30	70	100
2		Elective-III	3	1		3	30	70	100
3		Elective-IV	3	1		3	30	70	100
PRACTICAL									
4	BTEE8P01	Project				6	60	140	200
5	BTEE8V01	Comprehensive Viva				2	50		50
6	BTEE8S01	Seminar-II				2	50		50
Total			**9**	**3**		**19**	**250**	**350**	**600**

Elective-III	
BTEE8TE1	FACTS
BTEC8TE3	Embedded Systems
BTCS8TE7	DBMS

Elective-IV	
BTEE8TE2	Electric Power Quality
BTEC8TE2	VLSI Design
BTCS8TE8	OOPS through Java

SEMESTER-I	L	T	P	C
	3	-	-	3
ENGLISH – I				

DETAILED TEXT-I English Essentials : Recommended Topics :

1. **IN LONDON: M.K.GANDHI**

   OBJECTIVE: To apprise the learner how Gandhi spent a period of three years in London as a student.

   OUTCOME: The learner will understand how Gandhi grew in introspection and maturity.

2. **THE KNOWLEDGE SOCIETY- APJ KALAM**

   OBJECTIVE: To make the learners rediscover India as a land of Knowledge.

   OUTCOME: The learners will achieve a higher quality of life, strength and sovereignty of a developed nation.

3. **PRINCIPLES OF GOOD WRITING:**

   OBJECTIVE: To inform the learners how to write clearly and logically.

   OUTCOME: The learner will be able to think clearly and logically and write clearly and logically.

4. **MAN'S PERIL**

   OBJECTIVE: To inform the learner that all men are in peril.

   OUTCOME: The learner will understand that all men can come together and avert the peril.

5. **THE DYING SUN—SIR JAMES JEANS**

   OBJECTIVE: This excerpt from the book "The Mysterious Universe" presents the mysterious nature of the Universe and the stars which present numerous problems to the scientific mind. Sir James Jeans uses a poetic approach to discuss the scientific phenomena.

   OUTCOME: This provides the students to think about the scientific phenomena from a different angle and also exposes the readers to poetic expressions.

6. LUCK—MARK TWAIN

OBJECTIVE: This is a short story about a man's public image and his true nature. The theme of the story is that luck can be a factor of life, so that even if one is incompetent but lucky, one can still succeed.

OUTCOME: The story is humorous in that it contains a lot of irony. Thus this develops in the learner understand humorous texts and use of words for irony.

TEXT BOOK : "English Essentials" by Ravindra Publications

NON-DETAILED TEXT: (From Modern Trailblazers of Orient Blackswan) (Common single Text book for two semesters) [Semester I (1 to 4 lessons)/ Semester II (5 to 8 lessons)]

1. G. D. Naidu

OBJECTIVE: To inspire the learners by G. D. Naidu's example of inventions and contributions.
OUTCOME: The learner will be in a position to emulate G. D. Naidu and take to practical applications.

2. G. R. Gopinath

OBJECTIVE: To inspire the learners by his example of inventions.
OUTCOME: Like G. R. Gopinath, the learners will be able to achieve much at a low cost and help the common man.

3. Sudhamurthy

OBJECTIVE: To inspire the learners by the unique interests and contributions of Sudhamurthy.
OUTCOME: The learner will take interest in multiple fields of knowledge and make life worthwhile through social service.

4. Vijay Bhatkar

OBJECTIVE: To inspire the learner by his work and studies in different fields of engineering and science.
OUTCOME: The learner will emulate him and produce memorable things.

TEXT BOOK: "Trail Blazers" by Orient Black Swan Pvt. Ltd. Publishers

SEMESTER-I	L	T	P	C
	3	1	-	3
DIFFERENTIAL EQUATIONS				

UNIT – I

Differential equations of first order and first degree

Linear-Bernoulli-Exact-Reducible to exact.

Applications: Newton's Law of cooling-Law of natural growth and decay- Orthogonal trajectories.

UNIT – II

Linear differential equations of higher order

Non-homogeneous equations of higher order with constant coefficients with RHS term of the type e^{ax}, sin ax, cos ax, polynomials in x, $e^{ax}V(x)$, $xV(x)$. Method of Variation of parameters for solving second order linear differential equations

Applications: LCR circuit, Simple Harmonic motion

UNIT – III

Laplace transforms

Laplace transforms of standard functions-Shifting Theorems, Transforms of derivatives and integrals – Unit step function –Dirac's delta function-

UNIT – IV

Inverse Laplace transforms

Inverse Laplace transforms -Convolution theorem (without proof).

Application: Solutions of ordinary differential equations of using Laplace transforms.

UNIT – V

Mean value theorems (Without poof) **& Partial Differentiation**

Rolle's Theorem-Lagrange's mean value Theorem –Cauchy's mean value theorem - Taylor series and Maclaurin's series expansions of functions of single variable - Jacobian, Functional dependence.

UNIT – VI

First order Partial differential equations

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation and nonlinear (standard type) equations-Solutions of Linear Partial differential equations with constant coefficients by the method of separation of Variables.

BOOKS:

1. **B.S. GREWAL**, Higher Engineering Mathematics, 42nd Edition, Khanna Publishers
2. **B.V. RAMANA**, Higher Engineering Mathematics, Tata McGraw Hill

REFERENCE BOOK:

1. **ERWIN KREYSZIG**, Advanced Engineering Mathematics, 9th Edition, Wiley-India

SEMESTER-I	L	T	P	C
	3	1	-	3
NUMERICAL METHODS & INTEGRAL TRANSFORMS				

UNIT – I:

Solution of Algebraic and Transcendental Equations

Introduction- Bisection Method – Method of False Position – Iteration Method – NewtonRaphson Method.

UNIT – II:

Interpolation

Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences-Backward differences –Central differences – Symbolic relations and separation of symbols, Differences of a polynomial-Newton's formulae for interpolation – Interpolation with unevenly spaced points – Lagrange's Interpolation formula

UNIT – III:

Numerical solution of Ordinary Differential equations

Solution by Taylor's series-Picard's Method of successive Approximations - Euler's Method– Runge-Kutta Methods

UNIT – IV:

Fourier Series

Introduction- Determination of Fourier coefficients – even and odd functions –change of interval– Half-range sine and cosine series

UNIT – V:

Fourier Transforms

Fourier integral theorem (only statement) – Fourier sine and cosine integrals - sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms

UNIT –V I:

Z-transform

Introduction– properties – Damping rule – Shifting rule – Initial and final value theorems - Inverse z transform- -Convolution theorem.

Applications: Solution of difference equation by Z-transforms.

BOOKS:

1. **B.S. GREWAL**, Higher Engineering Mathematics, 42nd Edition, Khanna Publishers
2. **B.V. RAMANA**, Higher Engineering Mathematics, Tata McGraw Hill
3. **V. RAVINDRANADH, P. VIJAYA LAXMI,** A Text Book on Mathematical Methods by Himalaya Publishing House.

REFERENCE BOOKS

1. **ERWIN KREYSZIG**, Advanced Engineering Mathematics, 9th Edition, Wiley-India
2. **S. S. Sastri (PHI),** Introductory Methods of Numerical Analysis.

SEMESTER-I	L	T	P	C
	3	1	-	3
ENGINEERING CHEMISTRY				

UNIT – I

WATER TECHNOLOGY

Hard Water – Estimation of Hardness By EDTA Method – Potable Water - Sterilization and Disinfection – Boiler Feed Water – Boiler Troubles – Priming And Foaming , Scale Formation, Corrosion, Caustic Embrittlement, Turbine Deposits – Softening of Water – Lime Soda, Zeolite Processes – Ion Exchange Process - Reverse Osmosis – Electro Dialysis.

UNIT – II

ELECTRO CHEMISTRY

Electro Potential –Determination of single electrode potential –Standard electrode potential - Nernst Equation(problems) – Electro Chemical cell (Galvanic Cell) -Reference Electrodes-Standard Hydrogen Electrode, Calomel Electrode -– Ion Selective Electrode –Glass electrode –Determination of pH –conductometric titration- Potentiometric titrations-Batteries – Primary Cell: Dry Cell, Alkaline Battery – Secondary Cell: Lead Acid Accumulator, Lithium Ion Battery – Fuel Cells – Hydrogen – Oxygen Fuel Cell, Methanol – Oxygen Fuel Cell- solar cell - Photovoltaic Cell-Applications.

UNIT – III

CORROSION

Introduction - Theories of Corrosion(i) Dry Corrosion (Pilling Bed worth rule) (ii) Wet Corrosion – Galvanic Series – Types of Corrosion: Galvanic Corrosion, Differential Aeration Corrosion, Pitting Corrosion, Stress Corrosion – Factors Influencing Corrosion – Nature of The Metal , Nature of The Environment – Corrosion Control: Material Selection & Design –Cathodic Protection- Surface Coatings – Methods of Applications on Metals -Hot Dipping, Electroplating, Electroless Plating) – Organic Surface Coating – Paints – Their Constituents & Their Function.

UNIT – IV

FUELS

Introduction to Fuels – Classification – Solid Fuels Merits & Demerits - Calorific Value – HCV and LCV – Bomb Calorimeter - Problems Based on Calorific Values – Analysis of Coal (Proximate and Ultimate Analysis) – Numerical Problems Based on Analysis – Working of Thermal Power Station; Liquid Fuels Merits & Demerits – Petroleum – Refining – Cracking (types) –Petrol – Diesel Knocking – Octane Number, Cetane Number - Gaseous Fuels Merits & Demerits – Natural Gas – LPG, CNG.

UNIT – V

POLYMERS SCIENCES & TECHNOLOGY

POLYMERS – Introduction – Types of Polymers – Mechanism of Polymerization (Addition and Condensation) – Individual Polymers (Preparation Properties and uses of PS, PVC and Bakelite) Conducting Polymers – Biodegradable Polymers – Stereo Specific Polymers, Ziegler Natta Catalysis.

PLASTIC – Types – Compounding of Plastics – Moulding (Four Types) – Fiber Reinforced Plastics - Bullet Proof Plastics – Engineering Applications.

RUBBER &ELASTOMERS: Introduction –Preparation – Vulcanization – Compounding of Rubber – Preparation, Properties and Uses of Buna-S, Buna-N and Thiokol-Engineering Applications.

UNIT – VI

ENGINEERING MATERIALS

Refractories – Ceramics (Types, Properties Applications) – Cement – Hardening and Setting-Deteriorations of cement concrete – Nanomaterials (Preparation, Properties & Applications of Carbon Nano tubes) – Definitions of Green Chemistry – Principle – Engineering Applications.

TEXT BOOKS:

1. Jain and Jain (Latest Edition), Engineering Chemistry, Dhanpat Rai Publishing company Ltd.
2. N. Y. S. Murthy, V. Anuradha, K Ramana Rao" A Text Book of Engineering Chemistry", Matuthi Publications.
3. K.Sesha Maheswaramma and Mridula Chugh (2013) A Text Book of Engineering Chemistry, Pearson Publications.

REFERENCE BOOKS:

1. Shashi Chawal "A Text Book of Engineering Chemistry, Dhanpat Rai Publishing company Ltd,
2. S. S. Dara (2013) Text Book of Engineering Chemistry, S. Chand Technical Series.

SEMESTER-I	L	T	P	C
	3	1	-	3
C-PROGRAMMING				

UNIT-I

INTRODUCTION:

Introduction to Computer System, Hardware and Software, Algorithm, Flowchart, Types of Computer Languages.

FUNDAMENTALS OF C:

C Character Set, Tokens, Identifiers, Constants, Basic Data Types and Sizes, Operators: Arithmetic Operators, Relational Operators, Logical Operators, Conditional Operator, Increment and Decrement Operators, Assignment Operators, Bit-wise Operators, Special Operators, Expressions, Operator Precedence and Order of Evaluation, Evaluation of Expressions, Type Conversions: Implicit and Explicit.

UNIT-II

CONTROL STRUCTURES:

Selection Statements: if-else Statement, null else Statement, nested if Statement, else-if Statement, switch Statement, Applications.

Iterative Statements: break statement, continue statement, counter and event controlled loops, while loop, do-while loop, for loop, Looping Applications.

ARRAYS:

Introduction to arrays, declaration, initialization and accessing array elements of 1-D Arrays, declaration, initialization and accessing elements of 2-D Arrays, Strings, String Functions, Application of Arrays.

UNIT-III

FUNCTIONS:

Introduction to Functions, User-Defined & Library Functions, Parameter Passing, Return Statement Storage Class, Recursion, Recursive Functions and Recursive Solutions for different problems, C Preprocessor, Passing 1-D Arrays and 2-D Arrays to Functions.

UNIT-IV

POINTERS:

Introduction to Pointers, Declaration, Initialization and Accessing a Pointer, Passing by Address, Pointer as Function Argument, Pointer Arithmetic, Pointer to Pointer, Pointer to Multi-dimensional Arrays, Dynamic Memory Management Functions, Command Line Arguments.

UNIT-V

DERIVED TYPES:

Definition, Declaration and Initialization of Structures, Accessing Structures, Nested structures, Array of Structures, Structures and Functions, pointer to structure, Self-Referential Structures,bit-fields, Definition, Declaration and Initialization of Unions, Type-definition.

UNIT-VI

FILES:

Introduction to Files, File Streams: binary and text, Formatted I/O functions: fprintf( ), fscanf( ), and File I/O Functions: feof ( ), rewind( ), ferror ( ), fopen ( ), fclose ( ).

TEXT BOOKS:

The C Programming Language Kernighan &Ritchie		PHI
Programming in C: A Practical Approach	Ajay Mittal	Pearson
Programming in ANSI C	E Balagurusamy	TMH

REFERENCE BOOKS:

Understanding and using C Pointers Richard Reese Oreilly

SEMESTER-I	L	T	P	C
	3	1	-	3
ENVIRONMENTAL STUDIES				

UNIT – I
MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, Scope and Importance –Sustainability: Stockholm and Rio Summit–Global Environmental Challenges: Global warming and climate change, acid rains, ozone layer depletion.

UNIT – II

NATURAL RESOURCES: NATURAL RESOURCES AND ASSOCIATED PROBLEMS

Forest resources – Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people.

Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources

Food resources: World food problems, changes caused by non-agriculture activities-effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity

Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources.

Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil erosion and desertification.

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

UNIT – III

ECOSYSTEM, BIODIVERSITY AND ITS CONSERVATION

Concept of an ecosystem - Structure and function of an ecosystem - Producers, consumers and decomposers - Energy flow in the ecosystem - Ecological succession - Food chains, food webs and ecological pyramids - Introduction, types, characteristic features, structure and function of Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems. Definition: genetic, species and ecosystem diversity- classification - Value of biodiversity: consumptive use, productive use, social-Biodiversity at national and local levels - India as a mega-diversity nation - Hot-spots of

biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts. - Endangered and endemic species of India – Conservation of biodiversity: conservation of biodiversity.

UNIT – IV

ENVIRONMENTAL POLLUTION

Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies.

Solid Waste Management: Sources, classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products.

UNIT – V

SOCIAL ISSUES AND THE ENVIRONMENT

Population growth and explosion, effects. Urban problems related to energy -Water conservation, rain water harvesting-Resettlement and rehabilitation of people; its problems and concerns. Role of information Technology in Environment and human health. Environmental Protection Act - Air (Prevention and Control of Pollution) Act. –Water (Prevention and control of Pollution) Act - Wildlife Protection Act - Forest Conservation Act – Motor Vehicle Act - Issues involved in enforcement of environmental legislation -Public awareness.

UNIT – VI

ENVIRONMENTAL MANAGEMENT

Environmental ethics - Issues and possible solutions and Environmental Education - Impact Assessment and its significance various stages of EIA, preparation of EMP and EIS, Environmental audit. Ecotourism The student should submit a report individually on any issues related to Environmental Studies course and make a power point presentation – Field work: visit to an industrial area/ecosystem area (Forest, Grassland, Desert, and Aquatic)

TEXT BOOK:

1. Environmental Studies by K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada
2. A text book of Environmental Studies by C. P. Kaushik & Anubha Kaushik, New Age International Publishers.

REFERENCE:

1. Text Book of Environmental Studies by Deeshita Dave & P. Udaya Bhaskar, Cengage Learning.
2. A text book of Environmental Studies by Shaashi Chawla, TMH, New Delhi.

SEMESTER-I	L	T	P	C
	-	-	3	2
ENGLISH COMMUNICATION SKILLS LAB – I				

OBJECTIVE: To impart to the learner the skills of grammar as well as communication through listening, speaking, reading, and writing including soft, that is life skills.

BASIC COMMUNICATION SKILLS

UNIT 1 A. Greeting and Introductions
B. Pure Vowels

UNIT 2 A. Asking for information and Requests
B. Diphthongs

UNIT 3 A. Invitations
B. Consonants

UNIT 4 A. Commands and Instructions
B. Accent and Rhythm

UNIT 5 A. Suggestions and Opinions
B. Intonation

Text Book: 'Strengthen your Communication Skills' Part-A by Maruthi Publications

Reference Books:

1. INFOTECH English (Maruthi Publications)
2. Personality Development and Soft Skills (Oxford University Press, New Delhi)

SEMESTER-I		T	P	C
		-	3	2
ENGINEERING CHEMISTRY LAB				

List of Experiments

Student has to do Any Ten Experiments of the Following

Introduction to chemistry lab

Estimation of HCl using standard Na_2CO_3

Analysis of Water

1 Determination of Total hardness of water

2 Estimation of Ferric iron

3 Estimation of $KMnO_4$ using standard $H_2C_2O_4$

4 Estimation of Copper (Iodometry)

5 Estimation of Dissolved Oxygen by Wrinkles Method

6 Determination of pH the of given water sample

7 Conductometric titration of strong acid **Vs** Strong base.

8 Potentiometric Titration of Strong Acid Vs Strong Base

9 Preparation of Phenol-Formaldehyde Resin

Estimation of properties of Oil

10 Acid Number

11 Saponification value

MANUAL:

1. Engineering Chemistry Lab Manual Prepared by Chemistry Faculty.

SEMESTER-I	L	T	P	C
	-	-	3	2
COMPUTER PROGRAMMING LAB				

Exercise 1

a) Write a C Program to calculate the area of triangle, circumference of a circle.

b) Write a C program to find the largest of three numbers using ternary operator.

c) Write a C Program to swap two numbers without using a temporary variable.

Exercise 2

a) Write a C program to find the roots of a Quadratic Equation.

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

Exercise 3

a) Write a C program to find the sum of individual digits of a positive integer and find the reverse of the given number.

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 4

a) Write a C Program to print the multiplication table of a given number n up to a given value, where n is entered by the user.

b) Write a C Program to enter a decimal number, and calculate and display the binary equivalent of that number.

c) Write a C Program to check whether the given number is Armstrong number or not & Perfect number or not.

Exercise 5

a) Write a C program to interchange the largest and smallest numbers in the array.

b) Write a C program to Search and element in the array using linear search.

Exercise 6

a) Write a C program to input two m x n matrices, check the compatibility and perform addition and multiplication of them

Exercise 7

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

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

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

iii. To replace a character of string either from beginning or ending or at a specified location

Exercise 8

a) Write C Programs for the following string operations without using the built in functions - to concatenate two strings - to append a string to another string - to compare two strings

Exercise 9

a) Write C Programs for the following string operations without using the built in functions - to find t he length of a string - to find whether a given string is palindrome or not

Exercise 10

a) Write a C functions to find both the largest and smallest number of an array of integers.

b) Write C programs illustrating call by value and call by reference concept.

Exercise 11

Write C programs that use both recursive and non-recursive functions for the following

i) To find the factorial of a given integer.

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

iii) To find Fibonacci sequence

Exercise 12

a) Write a C program consisting of Pointer based function to exchange value of two integers using passing by address.

b) Write a C program to swap two numbers using pointers

c) Write a C Program to compare two arrays using pointers

Exercise 13

Examples which explores the use of structures, union and other user defined variables

Exercise 14

a) Write a C program which copies one file to another using command line argument.

b) Write a C program to count the number of characters and number of lines in a file.

c) Write a C Program to merge two files into a third file. The names of the files must be entered using command line arguments.

SEMESTER-II	L	T	P	C
	3	1	-	3
ENGLISH – II				

DETAILED TEXT-II : Sure Outcomes: English for Engineers and Technologists

Recommended Topics :

1. TECHNOLGY WITH A HUMAN FACE

OBJECTIVE: To make the learner understand how modern life has been shaped by technology.

OUTCOME: The proposed technology is people's technology. It serves the human person instead of making him the servant of machines.

2. CLIMATE CHANGE AND HUMAN STRATEGY

OBJECTIVE: To make the learner understand how the unequal heating of earth's surface by the Sun, an atmospheric circulation pattern is developed and maintained.

OUTCOME: The learner's understand that climate must be preserved.

3. EMRGING TECHNOLOGIES

OBJECTIVE: To introduce the technologies of the 20th century and 21st centuries to the learners.

OUTCOME: The learner will adopt the applications of modern technologies such as nanotechnology.

4. WATER- THE ELIXIR OF LIFE

OBJECTIVE: To inform the learner of the various advantages and characteristics of water.

OUTCOME: The learners will understand that water is the elixir of life.

5. THE SECRET OF WORK

OBJECTIVE: In this lesson, Swami Vivekananda highlights the importance of work for any development.

OUTCOME: The students will learn to work hard with devotion and dedication.

6. WORK BRINGS SOLACE

OBJECTIVE: In this lesson Abdul Kalam highlights the advantage of work.

OUTCOME: The students will understand the advantages of work. They will overcome their personal problems and address themselves to national and other problems.

TEXT BOOK: "Sure Outcomes" by Orient Black Swan Pvt. Ltd. Publishers

NON-DETAILED TEXT:

(From Modern Trailblazers of Orient Blackswan)

(Common single Text book for two semesters)

(Semester I (1 to 4 lessons)/ Semester II (5 to 8 lessons)

1. **J.C. Bose**

   OBJECTIVE: To apprise of J.C.Bose"s original contributions.

   OUTCOME: The learner will be inspired by Bose"s achievements so that he may start his own original work.

2. **HomiJehangirBhaba**

   OBJECTIVE: To show Bhabha as the originator of nuclear experiments in India.

   OUTCOME: The learner will be inspired by Bhabha"s achievements so as to make his own experiments.

3. **Vikram Sarabhai**

   OBJECTIVE: To inform the learner of the pioneering experiments conducted by Sarabhai in nuclear energy and relevance of space programmes.

   OUTCOME: The learner will realize that development is impossible without scientific research.

4. **A Shadow- R.K.Narayan**

   OBJECTIVE: To expose the reader to the pleasure of the humorous story

   OUTCOME: The learner will be in a position to appreciate the art of writing a short story and try his hand at it.

TEXT BOOK : "Trail Blazers" by Orient Black Swan Pvt. Ltd. Publishers

SEMESTER-II	L	T	P	C
	3	1	-	3
LINEARALGEBRA & VECTOR CALCULUS				

UNIT I

Linear systems of equations

Rank-Echelon form, Normal form – Solution of Linear Systems – Direct Methods- Gauss Elimination- Gauss Jordon and Gauss Seidal Methods.

Application: Finding the current in an electrical circuit.

UNIT II

Eigen values - Eigen vectors and Quadratic forms

Eigen values - Eigen vectors– Properties (without proof)– Cayley-Hamilton Theorem (without proof) - Quadratic forms- Reduction of quadratic form to canonical form – Rank, index, signature and nature of the Quadratic form.

Applications: Finding Inverse and powers of a matrix by using Cayley-Hamilton theorem.

UNIT III

Multiple integrals

Multiple integrals - Double and triple integrals – Change of variables – Change of order of Integration

Application: Applications of Integration to Lengths, Volumes and Surface areas of solids of revolution in Cartesian and Polar Coordinates.

UNIT IV

Special functions

Beta and Gamma functions- Properties - Relation between Beta and Gamma functions

Application: Evaluation of improper integrals.

UNIT V

Vector Differentiation

Gradient- Divergence- Curl - Laplacian and second order operators -Vector identities

Application: Equation of continuity, potential surfaces

UNIT VI

Vector Integration

Line integral – work done – Potential function – area- surface and volume integrals Vector integral theorems: Greens, Stokes and Gauss Divergence Theorems (without proof) and related problems.

Application: Work done by a force

TEXT BOOKS:

1. **B.S. GREWAL**, Higher Engineering Mathematics, 42nd Edition, Khanna Publishers
2. **B.V. RAMANA**, Higher Engineering Mathematics, Tata McGraw Hill

REFERENCE BOOKS:

1. **ERWIN KREYSZIG**, Advanced Engineering Mathematics, 9th Edition, Wiley-India
2. **S. S. SASTRI (PHI),** Introductory Methods of Numerical Analysis.
3. **V. RAVINDRANADH, P. VIJAYA LAXMI,** A Text Book on Mathematical Methods by Himalaya Publishing House.

SEMESTER-II	L	T	P	C
	3	1	-	3
NETWORKS & SYNTHESIS				

UNIT – I

Introduction to Electrical Circuits: Network elements classification, Electric charge and current, Electric energy and potential, Resistance parameter – series and parallel combination, Inductance parameter – series and parallel combination, Capacitance parameter – series and parallel combination. Energy sources: Ideal, Non-ideal, Independent and dependent sources, Source transformation, Kirchhoff's laws, Mesh analysis and Nodal analysis.

UNIT – II

A.C Fundamentals and Network Topology: Definitions of terms associated with periodic functions: Time period, Angular velocity and frequency, RMS value, Average value, Form factor and peak factor- problem solving, Phase angle, Phasor representation, Addition and subtraction of Phasors, mathematical representation of sinusoidal quantities, explanation with relevant theory, problem solving. Principle of Duality with examples.

Network Topology: Definitions of branch, node, tree, planar, non-planar graph, incidence matrix, Basic Tie-set schedule, Basic Cut-set schedule.

UNIT – III

Steady State Analysis of A.C. Circuits: Response to sinusoidal excitation - pure resistance, pure inductance, pure capacitance, impedance concept, phase angle, series R-L, R-C, R-L-C circuits problem solving. Complex impedance and Phasor notation for R-L, R-C, R-L-C problem solving using mesh and nodal analysis, Star-Delta conversion, Problem solving.

UNIT – IV

Coupled Circuits and Resonance: Coupled Circuits: Self inductance, Mutual inductance, Coefficient of coupling, analysis of coupled circuits, Natural current, Dot rule of coupled circuits, conductively coupled equivalent circuits- problem solving.

Resonance: Introduction, Definition of Q, Series resonance, Bandwidth of series resonance, Parallel resonance, Condition for maximum impedance, current in anti resonance, Bandwidth of parallel resonance, general case- resistance present in both branches, anti resonance at all frequencies.

UNIT – V

Network Theorems: Thevenin's, Norton's, Millman's, Reciprocity, Compensation, Substitution, Max. Power Transfer, Tellegen's Theorems - problem solving using dependent sources also.

UNIT-VI

Network synthesis: Positive real function, Basic Synthesis procedure, LC Immittance functions, RC Impedance functions, RL impedance function or RC admittance functions, Foster and Cauer methods.

TEXT BOOKS:

1. Engineering Circuit Analysis – William H. Hayt, Jack E.Kemmerly, and S. Durbin, Tata McGraw-Hill Company,6th edition.
2. Electrical Circuit Analysis (Including Passive Network Synthesis) – C. L. Wadhwa, 2nd Edition, New Age International Publishers.

REFERENCE BOOKS:

1. Network Analysis – A. Sudhakar and Shyammohan S Palli, 1st Edition, Tata McGraw- Hill Publications.
2. Network Analysis – N.C.Jagan, C.LakshmiNarayana, 2ndedition , BS Publications.
3. Network Synthesis – Van Valkenburg, Prentice-Hall of India Private Ltd.
4. Introduction to circuit analysis and design – Tildon Glisson, Jr. Springer Publications

SEMESTER-II	L	T	P	C
	3	1	-	3
ENGINEERING PHYSICS				

UNIT – I

CRYSTALLOGRAPHY AND X-RAY DIFFRACTION

(6hours)

Introduction – Space lattice – Basis – Unit Cell – Lattice parameters – Crystal systems – Bravais lattices – Structures and packing fractions of SC, BCC and FCC-Directions and planes in crystals – Miller indices – Separation between successive (h k l) planes – Bragg's law- Bragg's Spectrometer.

UNIT – II

QUANTUM MECHANICS FOR ELECTRONIC TRANSPORT

QUANTUM MECHANICS AND ELECTRON THEORY OF METALS: Schrodinger Time Independent and Time Dependent wave equations – Particle in a box – Classical free electron theory – electrical conductivity – Mean free path – Relaxation time and drifty velocity – Quantum free electron theory – Fermi – Dirac distribution function (analytical) and its dependence on temperature – Fermi energy.

BAND THEORY OF SOLIDS: Bloch theorem (qualitative) – Kronig – Penney model – Origin of energy band formation in solids – Classification of materials into conductors, semi – conductors & insulators – Concepts of effective mass of electron and concept of hole.

UNIT – III

MAGNETIC RESPONSE OF MATERIALS & SUPERCONDUCTIVITY

MAGNETIC PROPERTIES : Magnetic permeability – Magnetization – Origin of magnetic moment – Classification of Magnetic materials – Dia, Para, Ferro, Anti-Ferro and Ferri-magnetism – Hysteresis curve by Weiss Domain Theory -Soft and Hard Magnetic materials

SUPERCONDUCTIVITY: General properties – Meissner effect – Type I and Type II superconductors –London's equations – Penetration depth – BCS Theory- Flux quantization –DC and AC Josephson effects-Applications of Superconductors .

UNIT – IV

COHERENT OPTICS – COMMUNICATIONS AND STRUCTURE OF MATERIALS

LASERS: Introduction – coherent sources – Characteristics of lasers – Spontaneous and Stimulated emission of radiation – Einstein's coefficients – three level and four level laser pumping schemes – Population inversion – Ruby laser – Helium-Neon laser- Applications of Laser.

FIBER OPTICS: Introduction-Principle of wave propagation in Optical Fiber-Acceptance angle and acceptance cone-Numerical aperture-Types of optical fibers - Application of optical fibers.

UNIT – V

SEMICONDUCTOR PHYSICS

Introduction – Intrinsic semiconductor and carrier concentration – Equation for conductivity – Extrinsic semiconductor and carrier concentration – Drift and diffusion – Einstein's equation – Hall Effect – direct & indirect band gap semiconductors.

UNIT – V

I: DIELECTRIC PROPERTIES& ACOUSTICS

DIELECTRIC PROPERTIES: Introduction - Dielectric constant - Electronic, ionic and orientation polarizations - Internal fields in solids - Clausius-Mossotti equation - Ferro and Piezo electricities.

ACOUSTICS: Sound absorption, absorption coefficient and its measurements, Reverberations time – Sabine's formula, Eyring's formula.

TEXT BOOKS

1. A Text Book of Engineering Physics by M. N. Avadhanulu & P. G. Kshirasagar (S. Chand publications)
2. Engineering Physicsby Mani Naidu S (Pearson Publications)

REFERENCE BOOKS

1. Introduction to solid state physics by Charles Kittle (Willey India Pvt.Ltd)
2. Applied Physics by T. Bhimasenkaram (BSP BH Publications)
3. Applied Physics by M. Arumugam (Anuradha Agencies)
4. Engineering Physics by Palanisamy (Scitech Publishers)
5. Engineering Physics by D.K.Bhattacharya (Oxford University press)
6. Engineering Physics by Sanjay D Jain and Girish G Sahasrabudhe (University Press)
7. Engineering Physics by B.K.Pandey & S. Chaturvedi (Cengage Learning)

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OOPS THROUGH C++				

UNIT – I

INTRODUCTION:

Differences between C and C++ , The Object Oriented Technology, Disadvantages of Conventional Programming, Advantages of OOP, Structure of a C++ Program, Header Files and Libraries.

INPUT and OUTPUT in C++:

Streams, Stream Classes, Pre-defined Streams and Stream Classes, Formatted and Unformatted Data, Unformatted Console I/O Operations, Member Functions of Input Stream Classes, Formatted Console I/O Operations, Bit Fields, Manipulators, User Defined Manipulators.

UNIT – II

Tokens in C++, Variable Declaration and Initialization, Data Types, Operators in C and C++, Scope Access Operators, Comma Operator, Revision of Decision Statements, Control Loop Statements

FUNCTIONS IN C++:

Structure of a Function, Passing Arguments, L Value and R Values, Return by reference, Returning more values by reference, Default arguments, Const Arguments, Inputting Default Arguments, Inline Functions, Function Overloading, Recursion

UNIT – III

CLASSES AND OBJECTS:

Classes in C++, Declaring Objects, Access Specifiers and their scope, Member functions, Outside member functions as inline, Data Hiding or Encapsulation, Classes, Objects and Memory, Static Member variables, Static Member Functions Static Object, Array of Objects, Objects as Function Arguments, Friend Functions, The Const Member Functions, The Volatile Member Functions, Recursive Member Functions, Local Classes, Empty , Static and Const Classes, Member Function and Non-Member Function, Overloading Member Functions, Nested Classes

UNIT – IV

CONSTRUCTORS AND DESTRUCTORS:

Characteristics of Constructors & Destructors, Applications of Constructors, Parameterized Constructors, Overloading Constructors, Constructor with Default Arguments, Copy Constructor, the Const Objects, Destructors, Qualifiers and Nested Classes

OPERATOR OVERLOADING AND TYPE CONVERSION:

Overloading Unary Operators, Constraint on Increment and decrement operators, Overloading binary operators, Overloading with friend functions, Overloading Assignment operator, type conversion, rules for overloading operators

UNIT – V

INHERITANCE:

Reusability, Access Specifiers and Simple Inheritance, Protected data with private inheritance, types of inheritances, virtual base class, Constructors, Destructors and Inheritance, Object as Class member, Abstract Classes, Qualifier Classes and Inheritance, Constructor in Derived Class, Pointer and Inheritance, Overloading member function, advantages and disadvantages of Inheritance

UNIT – VI

APPLICATIONS WITH FILES:

File Stream Classes, File Opening Modes, File Pointers and manipulators, Manipulators with Arguments, Sequential Access Files, Binary and ASCII Files, Random Access Files

EXCEPTION HANDLING:

Principles of Exception handling, the keywords: try catch, throw, exception handling mechanism, multiple catch statements, catching multiple exceptions

TEXT BOOKS:

1. Programming in C++, Ashok N Kamthane, Pearson 2nd Edition.
2. Object Oriented Programming through C++, E Balagurusamy, Mc Graw Hill Education.

REFERENCE BOOKS:

1. Object Oriented Programming C++, Joyce Farrell, Cengage.
2. Mastering C++, Venugopal, Rajkumar, Ravi Kumar TMH.
3. Object Oriented Programming with C++, 2nd Ed, Sourav Sahay OXFORD.

SEMESTER- II	L	T	P	C
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ENGINEERING DRAWING				

UNIT – I

INTRODUCTION: Engineering Drawing and Plane Curves, Use of Drawing Instruments and Conventions.

GEOMETRICAL CONSTRUCTIONS: Constructions of Polygons using General Method-

CONICS: Construction of Ellipse, Parabola and Hyperbola by Eccentricity Method.

CYCLOIDAL CURVES: Construction of Cycloid, Epi-Cycloid and Hypo-Cycloid.

UNIT – II

PROJECTIONS OF POINTS AND LINES: Introduction to Orthographic Projections - Projection of Points, **PROJECTION OF STRAIGHT LINES:** Parallel to both the Planes, Parallel to One Plane and Inclined to Other Plane, Inclined to Both the Planes.

UNIT – III

PROJECTIONS OF PLANES: Introduction to Perpendicular Planes, Perpendicular to both the Reference Planes, Perpendicular to One Plane and Parallel to Other Plane, Perpendicular to One Plane and Inclined to Other Plane, Inclined to Both the Reference Planes.

UNIT – IV

PROJECTIONS OF SOLIDS: Projections of Simple Solids like Prism, Cylinder, Pyramids and Cones. Projections of Solids with Axis Perpendicular to one Plane, Projections of Solids with Axis Parallel to Both the Planes.

UNIT – V

PROJECTIONS OF SOLIDS – AXIS INCLINED TO ONE PLANE: Projections of Solids with Axis inclined to one plane Parallel to other Plane, Axis inclined to the VP and Parallel to the HP, Axis Inclined to the HP and Parallel to the VP.

UNIT – VI

ISOMETRIC PROJECTIONS: Principles of Isometric Projections - Isometric Scale, Isometric Projections of Planes, Simple Solids, Conversion of Isometric to Orthographic Views and Vice Versa.

TEXT BOOKS:

1) Engineering Drawing by K.L. Narayana & P. Khannaiah., SCIETECH Publishers.
2) Engineering Drawing by M.B. Shah & B.C. Rana., Pearson's Publishers.

REFERENCE BOOKS:

1) Engineering Drawing by N.D. Bhatt, Charotar Publishers.
2) Engineering Drawing by K. Venugopal., NEW AGE Publications.

SEMESTER -II	L	T	P	C
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ENGLISH COMMUNICATION SKILLS LAB – II				

Suggested Lab Manuals:

OBJECTIVE: To impart to the learner the skills of grammar as well as communication through listening, speaking, reading, and writing including soft, that is life skills.

ADVANCED COMMUNICATION SKILLS

UNIT 6	Body Language
UNIT 7	Dialogues
UNIT 8	Interviews and Telephonic Interviews
UNIT 9	Group Discussions
UNIT 10	Presentation Skills
UNIT 11	Debates

Text Book: 'Strengthen your Communication Skills' Part-B by Maruthi Publications

Reference Books:

1. INFOTECH English (Maruthi Publications)
2. Personality Development and Soft Skills (Oxford University Press, New Delhi)

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ENGINEERING PHYSICS LAB				

List of Experiments

Student has to do Any Ten Experiments of the Following

1. Determination of the Rigidity Modulus of given material wire using Torsional Pendulum.
2. Determination of the Acceleration due to Gravity and Radius of Gyration using Compound Pendulum.
3. Determination the Frequency of vibration in Transverse and Longitudinal Modes using Melde's Apparatus.
4. Determination Frequency of A.C supply by using Sonometer
5. Determination of wavelength using Laser.
6. Determination of Numerical Aperture of an Optical Fiber.
7. Determination of the Planck's constant using Photo-Cell.
8. Study the variation of Magnetic Field along the axis of a solenoid coil using Stewart - Gee's Apparatus.
9. Determination of the Time Constant for a C-R Circuit.
10. Determination of the Band Gap of a Semiconductor using a p-n junction diode.
11. Study of Characteristic curves (I/V) of a Zener diode to determine its Breakdown voltage.
12. Determination of Thermoelectric coefficient of a Thermistor by using its Characteristic curve.

MANUAL:

1. Engineering Physics Lab Manual Prepared by Physics Faculty.

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	-	-	3	2
OOPS THROUGH C++ LAB				

Exercise 1

Write a CPP program that contains a function to exchange values of two arguments (swap) by using pointers and reference parameters.

Exercise 2

Write a CPP program to find the given string is palindrome or not. Declare private member function to find palindrome of the given string and access it using public member function.

Exercise 3

Write a CPP program to find transpose of 2D matrix and allocate memory dynamically to the matrix using dynamic memory allocation. Initialize and display contents of the matrix and de-allocate memory.

Exercise 4

Write a CPP program to add two polynomials of any degree using object as function arguments. Hint: create two objects each represent one polynomial equation.

Exercise 5

Write a CPP program to add corresponding elements of two 2D matrices using friend function. Create two classes each capable of storing one 2D matrix. Declare the matrix under private access specifier and access them outside the class.

Exercise 6

Write a program to find total and average marks of each student in class. Create a student class with student number, name, 6 subject marks as its members and initializes the details. Use friend class that access the details of student and calculates total, average marks and prints the result.

Exercise 7

Write a program to add two matrices of same copy. Create two objects of the class and each of which refers one 2Dmatrix. Use constructor to allocate memory dynamically and use copy constructor to allocate memory when one array object is used to initialize another.

Exercise 8

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

Exercise 9

Write a program for finding area of different geometric shapes (circle, Rectangle, cube). Use function overloading with type, order, sequence of arguments to find the area of shapes.

Exercise 10

Write a program which prompts the user to enter a string and returns the length of the longest sequence of identical consecutive characters within the string using pointers to data members and member function. For example, in the string "aaaAAAAAjjB", the longest sequence of identical consecutive characters is "AAAAA".

Exercise 11

Write a program to calculate gross and net pay of employee from basic salary. Create employee class which consists of employee name, emp_id, and basic salary as its data members. Use parameterized constructor in the derived class to initialize data members of the base class and calculate gross and net pay of the employee in the derived class.

Exercise 12

Write a program to calculate bonus of the employees. The class master derives the information from both admin and account classes which intern derives information from class person. Create base and all derived classes having same member functions called get data, display data and bonus. Create a base class pointer that capable of accessing data of any class and calculates bonus of the specified employee. (Hint: Use virtual functions)

Exercise 13

Write a program to add two matrices of mxn size using binary operator over loading.

Exercise 14

Write a program to find transpose of a given matrix of mxn size using unary operator overloading.

Exercise 15

Write a program to concatenate one string to another using binary operator overloading.

Exercise 16

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

a. To copy contents of one file into another file.
b. To replace a word with other word in a given file
c. To count the no of occurrences of a word in a given file

Exercise 17

Write a program to sort a given set of elements using function template.

Exercise 18

Write a program to search a key element in a given set of elements using class template.

Exercise 19

Write a program to find average marks of the subjects of a student. Throw multiple exceptions and define multiple catch statements to handle division by zero as well as array index out of bounds exceptions.

Exercise 20

Write a program to find factorial of a given number. Throw multiple exceptions and define multiple catch statements to handle negative number and out of memory exception. Negative number exception thrown if given number is negative value and out of memory exception is thrown if the given number is greater than 20.

SEMESTER-III	L	T	P	C
	3	1	-	3
BTEE3T01-ELECTRICAL CIRCUITS				

Objective

The student able to Understand:

a) The concept of balanced and unbalanced three phase circuits & its phase sequence
b) The Measurement of active and reactive power in three phase systems
c) The transient analysis of circuits for AC and DC excitations& study the performance of a network based on input and output excitation
d) The application of Fourier analysis and Transforms for analysis of electrical circuits

UNIT – I

Balanced Three phase circuits: Phase sequence –star and delta connection-relation between line and phase voltages and currents in balanced systems-analysis of balanced three phase circuits-measurement of active and reactive power in balanced three phase systems-problem solving

UNIT – II

Unbalanced Three phase circuits: Analysis of three phase unbalanced circuits: Loop method –Star –Delta transformation technique-Two wattmeter methods for measurement of three phase power-Problem solving

UNIT – III

Transient Analysis in DC circuits: Transient response of R-L, R-C, R-L-C circuits for DC excitations, solution using differential equations and Laplace transforms-problem solving

UNIT – IV

Transient Analysis in AC circuits: Transient response of R-L, R-C, R-L-C circuits for AC excitations, solution using differential equations and Laplace transforms-problem solving

UNIT – V

Two Port Networks: Two port network parameters –Z, Y, ABCD and hybrid parameters and their relations, cascaded networks-pole and zeros of network functions-problem solving

UNIT – VI

Fourier analysis and Transforms: Fourier theorem- Trigonometric form and exponential form of Fourier series, Conditions of symmetry- line spectra and phase angle spectra, Analysis of electrical circuits to non sinusoidal periodic waveforms-problem solving Fourier integrals and Fourier transforms – properties of Fourier transforms and application to electrical circuits

Outcomes

Students are able to:

a) Solve three phase circuits under balanced & unbalanced condition
b) Find out transient response of electrical circuits for AC and DC excitations
c) Estimate the different types of two port network parameters
d) Extract the different harmonics components from the response of electrical network

TEXT BOOKS:

1. Engineering circuit analysis by William Hayt and Jack E.Kemmerley, Mc Graw Hill Company, 6^{th} edition.
2. Network synthesis: Van Valkenburg; Prentice-Hall of India Private Ltd.

REFERENCE BOOKS:

1. Networks Analysis by A. Sudhakar, Shyammohan S.Pillai, The McGraw-Hill Companies
2. Introduction to circuit analysis and design by Tildon Glisson, Jr, Springer Publications
3. Circuits by A.Bruce Carlson , Cengage Learning Publications
4. Network Theory Analysis and Synthesis by Smarajit Ghosh, PHI publications
5. Networks and Systems by D. Roy Choudhury, New Age International publishers
6. Electric Circuits by David A. Bell, Oxford publications
7. Circuit Theory (Analysis and Synthesis) by A.chakrabarthi, Dhanpat Rai&co

SEMESTER-III	L	T	P	C
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BTEE3T02-ELECTROMAGNETIC FIELDS				

OBJECTIVE

a) To study the production of electric field and potentials due to different configurations of static charges.
b) To study the properties of conductors and dielectrics, calculate the capacitance of different configurations-various and understand the concept of conduction and convection current densities.
c) To study the magnetic fields produced by currents in different configurations, application of ampere's law and the Maxwell's second and third equations
d) To study the magnetic force and torque through Lorentz force equation in magnetic field environment like conductors and other current loops
e) To develop the concept of self and mutual inductances and the energy stored
f) To study time varying and Maxwell's equations in different forms and Maxwell's fourth equation for the induced Emf.

GENERAL: Rectangular, Cylindrical and Spherical Coordinate Systems.

UNIT – I

Electrostatics: Electrostatic Fields – Coulomb's Law – Electric Field Intensity (EFI) – EFI due to a line and a surface charge – Work done in moving a point charge in an electrostatic field – Electric Potential – Properties of potential function – Potential gradient – Guass's law – Application of Guass's Law – Maxwell's first law, div (D)=ρ_v. Laplace's and Poison's equations – Solution of Laplace's equation in one variable. Electric dipole – Dipole moment – potential and EFI due to an electric dipole – Torque on an Electric dipole in an electric field – Behavior of conductors in an electric field – Conductors and Insulators.

UNIT – II

Dielectric & Capacitance: Electric field inside a dielectric material – polarization – Dielectric – Conductor and Dielectric – Dielectric boundary conditions, Capacitance – Capacitance of parallel plate and spherical and co-axial capacitors with composite dielectrics – Energy stored and energy density in a static electric field – Current density – conduction and Convection current densities – Ohm's law in point form – Equation of continuity

UNIT – III

Magneto Statics: Static magnetic fields – Biot-Savart's law – Oesterd's experiment - Magnetic field intensity (MFI) – MFI due to a straight current carrying filament – MFI due to circular, square and solenoid current – Carrying wire – Relation between magnetic flux, magnetic flux density and MFI – Maxwell's second Equation, div(B)=0.

UNIT – IV

Ampere's circuital law and its applications: Ampere's circuital law and its applications viz. MFI due to an infinite sheet of current and a long current carrying filament – Point form of Ampere's circuital law – Maxwell's third equation, Curl (H)=Jc, Field due to a circular loop, rectangular loops.

UNIT – V

Force in Magnetic fields, self and mutual inductance: Magnetic force - Moving charges in a Magnetic field – Lorentz force equation – force on a current element in a magnetic field – Force on a straight and a long current carrying conductor in a magnetic field – Force between two straight long and parallel current carrying conductors – Magnetic dipole and dipole moment – a differential current loop as a magnetic dipole – Torque on a current loop placed in a magnetic field .Self and Mutual inductance – determination of self-inductance of a solenoid and toroid and mutual inductance between a straight long wire and a square loop wire in the same plane – energy stored and density in a magnetic field.

UNIT – VI

Time Varying Fields: Time varying fields – Faraday's laws of electromagnetic induction – Its integral and point forms – Maxwell's fourth equation, Curl (E)=-∂B/∂t – Statically and Dynamically induced EMFs – Simple problems -Modification of Maxwell's equations for time varying fields – Displacement current – Poynting Theorem and Poynting vector.

OUTCOMES

a) Ability to calculate electric field and potentials using Guass's law or solving Laplace's or Poisson's equations
b) Learn how to calculate capacitance, energy stored in dielectrics and get's the concept of conduction and convection currents
c) Ability to find magnetic field intensity due to current, the application of ampere's law and the Maxwell's second and third equations
d) Students can calculate the magnetic forces and torque produced by currents in magnetic field
e) Student will be able to calculate self and mutual inductances and the energy stored in the magnetic field.
f) Students will gain knowledge on time varying fields and get ability to calculate induced Emf Concepts of displacement current and Poynting vector and associated problems are solved.

TEXT BOOKS:

1. Engineering Electromagnetics by William H. Hayt & John. A. Buck Mc. Graw-Hill Companies, 7th Editon.2006.
2. Introduction to Electro Dynamics by D J Griffiths, Prentice-Hall of India Pvt.Ltd, 2nd edition

REFERENCE BOOKS:

1. Principles of Electro Magnetics" by Sadiku, Oxford Publications, 4th edition.
2. Introduction to Electro Dynamics by D J Griffiths, Prentice-Hall of India Pvt. Ltd., 2nd edition.
3. Electromagnetic Field Theory" by Yaduvir Singh, Pearson.

4. Fundamentals of Engineering Electromagnetics by Sunil Bhooshan, Oxford higher education.
5. Electro magnetism : Problems with solutions by Ashutosh Pramanik, PHI Publications.

SEMESTER-III	L	T	P	C
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BTEE3T03-ELECTRICAL MACHINES-I				

OBJECTIVES

i. Knowing about the principles of electromagnetic energy conversion and understand the construction of dc machine
ii. Understand the principle of operation and performance of dc generators
iii. Knowing the characteristics of dc generators& dc motors
iv. Understand the speed control and testing methods of dc motors
v. Knowing the basic ideas of design of dc machine

UNIT I

DC MACHINES: Constructional features of DC machine–Principle of operation of DC generator–EMF equation–Types of excitation– Principle of operation of DC motors-Back EMF–Torque equation–Types of DC motors –commutation–armature reaction–Applications of DC motor-problem solving

UNIT II

CHARACTERISTICS OF DC MACHINES: No load and load characteristics of DC Generators -Speed–Torque characteristics of DC motors, parallel operation of DC generators, Losses & Efficiency-problem solving

UNIT III

SPEED CONTROL OF D.C MOTORS: Speed control of Dc Motors: Armature voltage and field flux control methods-Ward Leonard system-Principle of 3 point and 4 point starters-protective devices-Application of DC motors.

UNIT IV

TESTING OF DC MACHINES: Losses and efficiency-condition for maximum efficiency-Testing of DC machines: Brake test, Swinburne's Test, Retardation test, Hopkinson's Test-problem solving

UNIT-V

TRANSFORMERS: Principle of operation–Constructional features of single phase and three phase transformers–EMF equation–Transformer on No load and Load–Phasor diagram - Equivalent circuit–Regulation-parallel operation of single phase -Auto transformers-Testing of transformer: Polarity test, load test, open and short circuit test, Sumpner's test- All day efficiency-Introduction to three phase transformers- tap changers-Scott connection-problem solving.

UNIT –VI

DESIGN OF ELECTRICAL MACHINES AN INTRODUCTION: DC machine output equation-Choice of specific electric and magnetic loadings-Separation of D and L for rotating machines-Transformer output equation- core, yoke and winding design-number of tubes.

OUTCOMES

At the end of course the students will be:

i. Able to explain the concepts of electromagnetic energy conversion
ii. Demonstrate the operation and construction of DC machines
iii. Compare the characteristics and performance of DC machine
iv. Design aspects of a DC machine and Transformers

TEXT BOOKS

1. Electric Machines, Nagarath.I.J. and Kothari.D.P., T.M.H. Publishing Co Ltd., New Delhi, 3th edition 2006.
2. Electric Machinery and Transformers, B. S. Guru And H. R. Hiziroglu, Oxford University Press, New York

REFERENCE BOOKS

1. Electrical Machines, S. K. Bhattacharya, Tata McGraw - Hill Education, New Delhi
2. Electric Machinery and Transformers, I. L. Kosow, Prentice Hall Of India, New Delhi
3. Electrical Machinery, Bimbhra.P.S., Khanna Publishers,
4. A Course in "Electrical Machine Design" A.K.Sawhney , Dhanpat Rai & Co(P) Ltd

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BTEC3T01-ELECTRONIC DEVICES AND CIRCUITS				

UNIT - I

CATHODE RAY OSCILLOSCOPE: Motion of a charged particle in electric and magnetic fields, simple problems involving electric and magnetic fields only, electrostatic and magneto static deflection sensitivities, constituents of cathode ray oscilloscope, cathode ray tube, the electron gun, focusing, deflection system, uses of cathode ray oscilloscope.

UNIT-II

JUNCTION DIODE CHARACTERSTICS: P and N Type semiconductors, open circuited PN Junction, forward bias and reverse bias, current components in PN diode, diode equation volt-ampere characteristics, diffusion capacitance and diode resistance(static and Dynamic).Energy Band of PN Diode.

SPECIAL DIODES: Avalanche and zener breakdown, zener diode characteristics, Tunnel diode characteristics with the help of band diagrams, varactor diode,

UNIT-III

RECTIFIERS AND FILTERS: Half wave rectifier, ripple factor, full wave rectifier(with and without transformer), Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L- section filter, Π- section filter, Multiple L- section and Multiple Π section filter, and comparison of various filter circuits in terms of ripple factors, Simple circuit of a regulator using zener diode.

UNIT-IV

BIPOLAR JUNCTION TRANSISTORS: Introduction, transistor construction, transistor operation, transistor current components,transistor as an amplifier, common base configuration, common emitter configuration, common collector configuration, limits of operation, transistor specifications.

FIELD EFFECT TRANSISTORS

Junction Field Effect Transistor (JFET) - Principle of operation, volt ampere characteristics, advantages of JFET over BJT. Introduction to MOSFETs - depletion and enhancement type MOSFETs, operation, specifications and volt-ampere characteristics.

SPECIAL SEMICONDUCTOR DEVICES: Principle of operation, Characteristics and applications of UJT, DIAC, TRIAC, Photo Diode, LED, LCD, SCR.

UNIT-V

TRANSISTOR BIASING AND THERMAL STABILIZATION

Transistor Biasing and Thermal Stabilization: Operating point, Basic Stability, Collector to Base Bias, Self Bias, Stabilization against variations in V_{BE},, and β for the self bias circuit, Stabilization factors, (S, S', S''), Bias Compensation,Thermistor and Sensitor compensation, Compensation against variation in V_{BE}, I_{co},, Thermal runaway and thermal stability.

FET BIASING: Biasing techniques: Fixed bias, Source self-bias, Voltage divider bias.

UNIT-VI

AMPLIFIERS

Small signal low frequency transistor amplifier circuits: h-parameter representation of a transistor, Analysis of single stage transistor amplifier using h-parameters: voltage gain, current gain, Input impedance and Output impedance. Comparison of transistor configurations in terms of AI, Ri , Av, Ro.

APPLICATIONS OF SEMICONDUCTOR DEVICES: Electronic voltage Regulator using DIAC and TRIAC, phase controlled voltage Regulators using SCR, UJT sweep Generator.

TEXT BOOKS:

1. Electronic Devices and Circuits – J.Millman, C.C.Halkias, and Satyabratha Jit Tata McGraw Hill, 2nd Ed., 2007.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, 9th Edition, 2006.

REFERENCES:

1.G. K. Mittal (1999), Electronic Devices and Circuits, 22 nd edition, Khanna Publications, New Delhi.

2.Electronic Devices and Circuits – S Salivahanan, N.Suresh Kumar and A Vallavaraj, McGraw Hill, 5th edition, 2010.

3. Electronic Devices and Circuits – T.F. Bogart Jr., J.S.Beasley and G.Rico, Pearson Education, 6th edition, 2004.

4.Electronic Devices and Circuits–Dr. K.Lal Kishore, B.S.Publications, 2nd Edition, 2005.

5.Electronic Devices and Circuits- Prof GS N Raju I K International Publishing House Pvt. Ltd 2006.

6.B.Visweswara Rao, K.Bhaskarram Murthy, K.Raja Rajeswari, P.Chalam Raju Pantulu, "Electronic Devices and Circuits", Pearson Publications, 2nd Edition, 2009.

7.Sanjeev Gupta, "Electronic Devices and Circuits", Dhanpat Rai Publications, Reprint, 2003.

8.K.Satyaprasad, "Electronic Devices And Circuits", VGS Publications, 2006.

SEMESTER-III	T	L	P	C
	3	1	-	3
BTBM3T02-PRINCIPLES OF ECONOMICS AND MANAGEMENT				

UNIT I

Introduction to Economics: Concept, Nature & Scope of Economics-Macro and Micro Economics- Demand Analysis: Demand Determinants- Law of Demand& its exceptions- Elasticity of Demand-Types –Demand Forecasting-Methods.

UNIT II

Market Structures: Types of Markets-Price output determination in Perfect Competition, Monopoly, Monopolistic Competition, Oligopoly **-** Pricing methods - Break – Even Analysis (simple problems).

UNIT III

Introduction to Management: Concept - Functions of Management - Scientific Management- Principles of Management- Leadership Styles - Functional areas of Management.

Human Resource Management: Definition, Significance and Functions - PM Vs HRM – Recruitment, Selection, Training and Development -Job Analysis - Role and position of HR department – Performance Appraisal.

UNIT IV

Marketing Management : Needs- Wants - Products - Market- Marketing- Production Concept, Product Concept, Sales Concept, Marketing Concept, Societal Marketing Concept-Organizing the Marketing Department - **Marketing Mix**: Product, Price, Place, Promotion (in brief) **Production Management:** Concept of production management**-** Types of Production processes- Plant Location & Layout, Statistical Quality Control.

UNIT V

Financial Management: Financial Statements – Contents of Trading Account, Profit and Loss Account – Balance Sheet (Theory only) - Analysis of Financial statements : Ratio
analysis (simple problems) - Concept of Finance - Objectives of Finance-Wealth Maximization Vs. Profit Maximization - Functions of Finance - Role of financial manager - Organization of finance function.

UNIT VI

Forms of Business Organizations- Sole Proprietorship, Partnership, Joint Stock Company - Private limited and Public limited Companies, Public enterprises and their types, Business Cycles. **Entrepreneurship**- Entrepreneur – Qualities of good entrepreneur - Entrepreneurial Functions, Entrepreneurial Development: Objectives, Training, Benefits - Phases of Installing a Project.

TEXT BOOKS:

1. P.G.Ramanujam, B.V.R.Naidu & PVR Sastry, **Management Science**, Himalaya Publishing House, Mumbai.
2. A.R.Aryasri, **Managerial Economics and Financial Analysis**, Tata Mc Graw- Hill, New Delhi.

REFERENCE BOOKS:

1. M.Y.Khan & P.K.Jain, Financial Management, TATA McGraw-Hill, New Delhi.
2. K. Aswathappa, Production Mangement, Himalaya Publishing House, Mumbai.
3. P.Subba Rao, Human Resource Management, Himalaya Publishing House, Mumbai.
4. Philip Kotler, Marketing Management, Pearson Prentice Hall, New Delhi.
5. Vasant Desai, Entreprenuership, Himalaya Publishing House, Mumbai.
6. Varshini &Maheswari, Managerial Economics, SChand & Co, New Delhi.

SEMESTER-III	T	L	P	C
	3	1	-	3
BTME3T01-FLUID MECHANICS AND HYDRAULIC MACHINERY				

UNIT I

FLUID STATICS: Dimensions and units: physical properties of fluids: Specific gravity, viscosity, surface tension, vapour 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, 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: Pitot tube, venturimeter, orifice meter and Flow nozzle.

UNIT IV

IMPACTS OF FREE JETS: 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, Force Exerted by a jet of water on a series of flat vanes and radial curved vanes.

UNIT V

HYDRAULIC TURBINES: Classification of turbines. Impulse and reaction turbines. Pelton wheel, Francis turbine and Kaplan turbine: working proportions, work done and efficiencies. Draft tube

theory: functions and efficiency.

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 VI

CENTRIFUGAL PUMPS: Classification, working, work done, manometric 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. Hydraulics and fluid mechanics including Hydraulic machines by P.N. MODI and S.M.SETH, Standard book house.
2. Fluid Mechanics and Hydraulic Machines by R.K.Bansal, Laxmi publications (P) Ltd.

REFERENCES:

1. Fluid Mechanics and Fluid Power Engineering by D.S. Kumar, Kotaria & Sons.
2. Fluid Mechanics and Machinery by D. Rama Durgaiah, New Age International.
3. Hydraulic Machines by Banga & Sharma, Khanna Publishers.

SEMESTER-III	L	T	P	C
	-	-	3	2
BTEE3L01- NETWORKS AND SIMULATION LAB				

OBJECTIVES

This laboratory course will give a thorough knowledge about the basics of circuit analysis.

i. Implement and verify circuit theorems
ii. Gain knowledge about resonance and circuit transients.

LIST OF EXPERIMENTS

1. Determination of Self, Mutual Inductances and coefficient coupling
2. Serial and Parallel Resonance
3. Verification of Superposition theorem
4. Verification of maximum power transfer theorem.
5. Experimental determination of Thevenin's and Norton's equivalent circuits and verification by direct test
6. Verification of compensation theorem
7. Verification of Reciprocity , Millimann's Theorems
8. Simulation of DC circuits
9. Mesh Analysis
10. Nodal Analysis

OUTCOMES

i. Acquire knowledge and skills about electric instruments, such as multimeter, oscilloscope
ii. Identify and learn properties about main electrical components, such as resistors, capacitors, inductors, voltage source.
iii. Verify in practice some important circuit Theorems and concepts, such as Thevenin, Superposition, impedance, phasors, sinusoidal signal characteristics, transients and steady state response

REFERENCES

1. Department Lab Manual
2. Sudhakar.A and Shyam Mohan.S.P, "C*ircuits and Networks Analysis and Synthesis"*, Fourth edition, Tata McGraw Hill Publishing Company Ltd., New Delhi,
3. Schaum's Outline of Electric Circuits, Sixth Edition, Mahmood Nahvi, PhD, Joseph A. Edminister, McGraw-Hill Education

SEMESTER-III	L	T	P	C
	-	-	3	2
BTME3L01- FLUID MECHANICS AND HYDRAULIC MACHINERY LAB				

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 Venturi meter.
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. Bernoulli's apparatus.

NOTE: Any 10 of the above 12 experiments are to be conducted.

SEMESTER-III	L	T	P	C
	-	-	2	1
BTBS3L01- SOFT SKILLS/ APTITUDE LAB-I				

				1
Reading	**:**	Reading Passage – 1	**Artificial Intelligence**	hour
				1
comprehension	**:**	Reading Passage – 2	**Atmosphere**	hour
				1
	:	Reading Passage – 3	**Modern Life**	hour
			Father of the Olympic	1
	:	Reading Passage –4	**Games**	hour
				1
Speaking Skills	**:**	Task-1	**Self Introduction**	hour
				1
	:	Task-2	**Presentation skills**	hour
				1
	:	Task-3	**Group Discussion**	hour
				1
	:	Task-4	**Review of a Cinema**	hour
				1
	:	Task-5	**Just A Minute**	hour
				1
	:	Task-6	**Role Play**	hour
				1
Writing Skills	**:**	Task-1	**Letter writing** - Formal	hour
				1
	:	Task-2	**Resume writing**	hour
				1
	:	Task-3	**Parallel writing**	hour
				1
	:	Task-4	**Story generating**	hour

			1
	: Task-5	**Text Building**	hour
			1
	: Task-6	**Diary writing**	hour
			1
Verbal Reasoning	: Task-1	**Detection of errors**	hour
			1
	: Task-2	**Sentence corrections**	hour
			1
	: Task-3	**Insertions of apt words from the given confusionable words**	hour
			1
	: Task-4	**Scrambled words**	hour
			1
	: Task-5	**Dialogue completion**	hour
			1
	: Task-6	**Analogies**	hour
			1
	: Task-7	**Root words**	hour
			1
	: Task-8	**Synonyms**	hour
			1
	: Task-9	**Antonyms**	hour
			1
	: Task-10	**Odd one out**	hour

Speed Mathematics: Think Without Ink(TWI) Approach - Speed Maths: Squaring of Numbers - Multiplication of Numbers -Finding Square Roots - Finding Cube Roots - Solving Simultaneous Equations Faster – Number System: HCF, LCM - Decimals - Percentages - Averages - Powers and Roots - Sudoku (level 1) -Series Completion (Numbers, Alphabets, Pictures) - Odd Man Out - Puzzles

Verbal Reasoning: Analogies - Alphabet Test - Theme Detection - Family Tree - Blood Relations (Identifying relationships among group of people) - Coding & Decoding - Situation Reaction Test – Statement & Conclusions

Reference Books:

1. Instructional Manual- Prepared by Faculty.
2. Aggarwal, R.S. "A Modern Approach to Verbal and Non-verbal Reasoning", Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.
3. Abhijit Guha, "Quantitative Aptitude", TMH, 3rd edition

SEMESTER-IV	L	T	P	C
	3	1	-	3
BTEE4T01-ELECTRICAL MACHINES-II				

OBJECTIVE

Student able to understand:

i. The Construction details of three phase IM and its characteristics at different loads and Speed control methods

ii. The concept of working principle of Synchronous machine ,Voltage regulation Calculation by using different methods

iii. The Concept of Design Specifications

UNIT I

SYNCHRONOUS GENERATORS: Construction features of alternators–winding factors-e.m.f equation- synchronous reactance-armature reaction—Predetermination of voltage regulation using E.M.F, M.M.F, Potier reactance and ASA methods–parallel operation– synchronizing power-Active and reactive power sharing—alternator on infinite bus bars-Salient pole synchronous machine –two reaction theory-slip test–operating characteristics-capability curves-problem solving.

UNIT II

SYNCHRONOUS MOTOR: Principle operation- methods of starting–torque and power developed equations–Effect of change in excitation and load on synchronous motor-V curves and inverted V curves–Hunting and suppression methods-synchronous condenser-problem solving.

UNIT III

THREE PHASE INDUCTION MACHINES: Construction details- production of rotating magnetic field- principle of operation- concept of slip and its effects—No load and blocked rotor tests-equivalent circuit- torque & power equations –torque -slip characteristics-losses and efficiency- load test- separation of loss-performance calculation

from circle diagram. Double cage rotor– cogging & crawling-Induction generator-problem solving.

UNIT IV

STARTING AND SPEED CONTROL OF INDUCTION MACHINES: Need for starting Types of starters-DOL, Rotor resistance starters- autotransformer and star/delta starters– Speed control techniques-voltage control–pole changing–frequency control–cascade connection-rotor resistance control–slip energy recovery scheme-Braking of three phase induction motor: plugging, dynamic braking and regenerative braking-problem solving.

UNIT V

SINGLE PHASE INDUCTION MOTOR: Constructional features and the problem of starting–Double revolving field theory–starting methods- split-phase-capacitor start and run-shaded pole- Equivalent circuit- Load test.

UNIT VI

DESIGN OF THREE PHASE MACHINES (Introduction): Output equations- main dimensions-choice of average flux density-length of air gap-design of rotor- Synchronous machine: choice of electrical and magnetic loading -short circuit ratio-armature design - design of rotor and damper winding-problem solving.

OUTCOMES

At the end of course the students will be able to:

i. Explain the Construction details of three phase IM and its characteristics at different loads and Speed control methods
ii. Analyze to develop equivalent circuit and evaluate performance of alternator
iii. Demonstrate the operation and construction of synchronous machines
iv. Ability to analyze load sharing of parallel operation of alternators
v. Ability to model and analyse electrical machines

TEXT BOOKS

3. Electric Machines, Nagarath.I.J. and Kothari.D.P., T.M.H. Publishing Co Ltd., New Delhi, 3th edition 2006.
4. Electric Machinery and Transformers, B. S. Guru And H. R. Hiziroglu, Oxford University Press, New York

REFERENCE BOOKS

5. Electrical Machines, S. K. Bhattacharya, Tata McGraw - Hill Education, New Delhi
6. Electric Machinery and Transformers, I. L. Kosow, Prentice Hall Of India, New Delhi
7. Electrical Machinery, Bimbhra.P.S., Khanna Publishers,
8. A Course in "Electrical Machine Design" A.K.Sawhney , Dhanpat Rai & Co(P) Ltd

SEMESTER-IV	L	T	P	C
	3	1	-	3
BTEE4T02-CONTROL SYSTEMS				

OBJECTIVE

The student able to

i. Learn the mathematical modeling of physical systems and to use block diagram algebra and signal flow graph to determine overall transfer function
ii. Know the stability of closed loop system by RH criterion and Root Locus method
iii. Present the frequency response approaches for the analysis of LTI System using bode plots,polar plots and nyquist stability
iv. Discus basic aspects of design and compensation of linear control systems using bode plot.
v. To formulate state models and analyze the systems.

UNIT I

Mathematical Modeling of Control Systems: Introduction, Open Loop and Closed Loop control systems and their differences, Classification of control systems, Feedback characteristics, Transfer function of linear systems. Differential equations of electrical networks, Translational and Rotational mechanical systems, Transfer function of DC Servo motor, Transfer function of AC Servo motor, Synchross transmitter and Receiver, Block diagram algebra and Problems, Signal flow graph – Reduction using Mason's gain formula with Problems

UNIT II

Time Response Analysis: Standard test signals, Time response of first order systems, Time response of second order systems, Time domain specifications, Steady state errors and error constants, Effects of proportional derivative and proportional integral systems, Problems

UNIT III

Stability and Root locus technique: The concept of stability, Location of poles on s-plane for stability, Routh's stability criterion and problems, Limitations of Routh's stability, The Root locus concept, Construction of root loci and simple problems.

UNIT IV

Frequency response analysis: Introduction, Frequency domain specifications, Bode diagrams and Procedure for magnitude and phase plot of Bode plot, Problems on Bode plot, Stability analysis from Polar plots and problems, Nyquist stability criterion and problems.

UNIT V

Compensation techniques: Lag and Lead compensators, Lag-Lead compensators, Design of compensators using Bode plots

UNIT VI

State space analysis of continuous systems:

Concepts of state, state variables and state model, State space representation of transfer function, Diagonalization – Solving the Time invariant state equations, State transition Matrix and its Properties, Concept of Controllability and Observability

OUTCOMES

1) Ability to derive the transfer function ofphysical systems and determination of transfer function using block diagram algebra and signal flow graph of
2) Ability to analyze absolute and relative stability of LTI Systems
3) Ability to design different compensators to improve system performances
4) Understanding the concepts of controllability and observability

TEXT BOOKS

1. Modern control Engineering, Kotsuhiko Ogata, Prentice Hall of India.
2. Automatic control systems, BenjamanC.Kuo, Prentice Hall of India, 2nd Edition.

REFERENCE BOOKS

1. Control Systems, ManikDhanesh N, Cengage publications.
2. Control Systems principles and design, M. Gopal, Tata McGraw Hill education Pvt Ltd., 4th Edition.
3. Control Systems Engineering, S.Palani, Tata McGraw Hill Publications.
4. Control Systems by A. NagoorKani, RBA Publications.

SEMESTER-IV	L	T	P	C
	3	1	-	3
BTEE4T03-POWER SYSTEM-I				

OBJECTIVE

i. To study the principle of operation and function of different components of conventional and non conventional power stations
ii. To study the concepts of DC & AC distribution systems along with voltage drop calculations.
iii. To study the constructional details of different components of substations
iv. To study the concepts of different types of tariff methods and economical aspects.

UNIT-1

Thermal power stations: Selection of site, general layout of a thermal power plant showing paths of coal, steam, water, air, ash and flue gasses, ash handling system, Brief description of components: Boilers, Super heaters, Economizers, electrostatic precipitators-Steam Turbines

: Impulse and reaction turbines, Condensers, steam and heat rate, feed water circuit, Cooling towers and Chimney.

UNIT-2

Nuclear power stations: Location of nuclear power plant, Working principle, nuclear fission, nuclear fuels, nuclear chain reaction, nuclear reactor Components: Moderators, Control rods, Reflectors and Coolants. Types of Nuclear reactors and brief description of PWR, BWR and FBR. Radiation: Radiation hazards and Shielding, nuclear waste disposal.

UNIT-3

Hydro electric plants: Choice of site hydrology, Classification of plants, typical layout and associated components, functions of different components of hydro plant.

UNIT -4

Gas turbine plants and combined cycle power plants: Layout, component of gas turbine plant, open cycle and closed cycle plants, combined cycle power plants, integrated gasifier based combined cycle systems

UNIT-5

Economic and Environmental aspects of power plants: Load curve, load duration and integrated load duration curves, discussion on economic aspects: connected load, maximum demand, demand factor, load factor, diversity factor, capacity factor, utilization and plant use factor-Numerical problems.

UNIT-6

Tariff methods: Costs of generation and their division in to fixed, semi fixed and running costs. Desirable characteristics of a tariff method, tariff methods: simple rate, flat rate block rate two part and three part, and power factor tariff methods-problem solving.

OUTCOMES

At the end of course the students will be able to:

i. Describe Generation of power by thermal, nuclear, gas, wind and solar power generation.
ii. Explain the distribution systems.
iii. Explain about substations.
iv. Illustrate the economic aspects of power generation and environmental issues
v. Know the different tariff methods

TEXT BOOKS

1. P.K.Nag, Power Plant Engineering, Tata McGraw-Hill Publishing Company Ltd., Third Edition, 2008
2. M.M. El-Wakil, Power Plant Technology, Tata McGraw-Hill Publishing Company Ltd., 2010

REFERENCE BOOKS:

1. A Text book on power system engineering by M L Soni, P V Gupta, U S Bhatnagar and A Chakrabarti, Dhanpat Rai &co. Pvt Ltd.
2. Generation, distribution and utilization of electric energy by C.L. Wadhwa New age international (P) Limited.
3. Elements of Electrical Power Station Design by M.V.Deshpande, PHI, New Delhi.

SEMESTER-IV	L	T	P	C
	3	1	-	3
BTEC4T05-PULSE & DIGITAL CIRCUITS				

UNIT I:

Linear wave shaping: High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square and ramp inputs. RC network as differentiator and integrator, double differentiation, 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, Transfer characteristics of clippers, Emitter coupled clipper, Comparators, applications of voltage comparators, clamping operation, clamping circuits using diode with different inputs, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage, Transfer characteristics of clampers.

UNIT III:

Switching Characteristics of Devices & *Sampling Gates:*

Switching Characteristics of Devices: Diode and Transistor as switches, Break down voltage consideration of transistor, saturation parameters of Transistor and their variation with temperature, Design of transistor switch, transistor-switching times.

Sampling gates; Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates, Reduction of pedestal in gate circuits, Four-diode sampling gates; Applications of sampling gates.

UNIT IV:

Multivibrators: Analysis & Design of Bistable Multivibrators: Fixed bias& self biased transistor binary, Commutating capacitors, Triggering in binary, Schmitt trigger circuit, Applications

UNIT V:

Multivibrators(Contd.): Analysis & design of Monostable Multivibrator: Collector-coupled and Emitter-coupled Monostable multivibrators, Triggering in monostable multi; Analysis & design of Astable multivibrator (Collector coupled and Emitter-coupled) using transistors.

UNIT VI

Time Base Generators

General features of a time base signal, methods of generating time base waveform, Miller and Bootstrap time base generators – basic principles, Transistor miller time base generator, Transistor Bootstrap time base generator, Current time base generators.

TEXT BOOKS:

1. Pulse Digital and Switching Waveforms-J.Millimana&H.Taub
2. Solid State Pulse Circuits-David A.Bell

REFERENCES:

1. Pulse and Digital Circuits –A.Anand Kumar.
2. Wave Generation and Shaping –L.Straus.
3. Pulse Digital Circuits and Computer Fundamentals-B.N.Yoganarasimhan.

SEMESTER-IV	L	R	P	C
	3	1	-	3
BTEC4T06-SWITCHING THEORY & LOGIC DESIGN				

UNIT I

Review of Number systems: Representation of numbers of different radix, conversion of numbers from one radix to another radix, r-1's complement and r's complement of unsigned numbers subtraction, problem solving. Signed binary numbers, different forms, problem solving for subtraction. 4-bit codes: BCD, EXCESS 3, alphanumeric codes, 9's complement, 2421, etc.,

UNIT II

Logic operation, error detection and correction codes: Basic logic operations NOT, OR, AND, Boolean theorems, Complement and dual of logical expressions, NAND and NOR Gates, EX-OR, EX-NOR Gates, standard SOP and POS, Minimisation of logic functions using theorems, Generation of self dual functions. Gray code, error detection and error correction codes, parity checking even parity, odd parity, Hamming code, multi leveled AND-NOR Realisations. Two level NAND-NAND and NOR-NOR realizations. Degenerative forms and multi level realizations.

UNIT III

Minimisation of switching functions: Minimisation of switching functions using K-Map up to 6-variables, Tabular minimization, minimal SOP and POS Realisation.
Problem solving using K-map such as code converters binary multiplier etc.,

UNIT IV

Combinational logic circuits: Design of Half adder, full adder, half subtractor, full subtractor, applications of full adders, 4-bit binary adder, 4-bit binary subtractor, adder-subtractor circuit, BCD adder circuit Excess3 adder circuit, look-a-head adder circuit. Design of decoder, Demultiplexer, higher order demultiplexing, encoder, multiplexer, higher order multiplexer, realization of Boolean functions using decoders and multiplexers, priority encoder, different code converter using full adders.

UNIT V

Sequential circuits I: Classification of sequential circuits (synchronous and asynchronous): basic flip-flops, truth tables and excitation tables (NAND -RS latch, NOR- RS latch, RS flip-flop. JK flip-flop, T flip-flop, D flip-flop with reset and clear terminals).Conversion of flip-flop to flip-flop. Design of ripple counters, design of synchronous counters, Johnson counters, ring counters. Design of registers, Buffer register, control buffer register, shift register, bi-directional shift register, universal shift register.

UNIT VI

Sequential circuits II: Finite state machine, capabilities and limitations, analysis of clocked sequential circuits, design procedures, reduction of state tables and state assignment. Realization of circuits using various flip-flops. Meelay to Moore conversion and vice-versa.

Text books:

1. Switching Theory and Logic Design by Hill and Peterson, Mc-Graw hill MH edition.
2. Switching Theory and Logic Design by A. Anand Kumar.
3. Digital Design by Mano, 2nd edition, PHI.

Reference books:

1. Modern Digital Electronics by R.P. Jain.
2. Switching Theory and Logic Design by –AP Godse, Technical publications.

SEMESTER-IV	L	T	P	C
	3	1	-	3
BTCS4T05-COMPUTER ORGANIZATION				

COURSE OBJECTIVES

i. To impart the basic knowledge of computer system including the analysis and design of components of the system.
ii. To understand the register transfer language, micro operations and design of basic components of the system.
iii. To outline the description of different parameters of a memory system, organization and mapping of various types of memories.

UNIT I

Basic Structure of Computers: Basics of computer, Von Neumann Architecture, Generation of Computer, Types of Compute, Functional unit, Basic Operational Concepts and Bus Structures.

UNIT II

Register Transfer Language and Micro Operations: Register Transfer language. Register Transfer Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.

Basic Computer Organization and Design: Instruction codes, Computer Registers, Computer Instructions, Timing and control, Instruction Cycle, Memory – Reference, Input – Output and Interrupt Instructions. Design of basic computer, Design of Accumulator logic.

UNIT III

Central Processing Unit: General Register Organization, STACK organization. Instruction formats. Addressing modes. DATA Transfer and manipulation, Program control, Reduced Instruction Set Computer.

Micro Programmed Control: Control Memory, Address sequencing, micro program example, design of control unit.

UNIT IV

Computer Arithmetic: Addition and Subtraction, multiplication algorithms, Division Algorithms. Floating point arithmetic operations. Decimal Arithmetic unit, Decimal arithmetic operations.

UNIT V

Input- Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupts, Direct memory Access.

The Memory System: Memory Hierarchy, Main Memory, Auxiliary memory, Associative Memory, Cache Memory and Virtual Memory.

UNIT VI

Parallel Processing and Vector Processing: Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

Text Books

1. Computer System Organization, M.Moris Mano, 3rd Edition, Pearson / PHI
2. Computer Organization, Carl Hamacher, Zvonks Vranesic, SafeaZaky, 5th Edition, McGraw Hill.
3. Computer Organization, a quantitative approach, John L.Hennessy and David A.Patterson, Fourth Edition Elsevier

Reference Books

1. Computer Organization and Architecture - William Stallings Sixth Edition, Pearson / PHI
2. Structured Computer Organization - Andrew s. Tanenbaum, 4th Edition, PHI/ Pearson.
3. Fundamentals of Computer Organization and Design, - Sivaraama Dandamudi, Springer Int. Edition.

COURSE OUTCOMES:

i. Graduates will have fundamental knowledge about structure of computers.

ii. Graduates will be able to choose appropriate addressing modes and instructions for writing programs.

iii. Graduates will understand the need for using Peripheral devices for efficient operation of system.

iv. Graduates will gain basic ability to analyze Micro operations such as Arithmetic microoperations, Shift micro operations and Logic micro operations.

SEMESTER-IV	L	T	P	C
	-	-	3	2
BTEE4L01-ELECTRICAL MACHINES-I LAB				

OBJECTIVE

To give students a fair knowledge of testing different types of DC machines and Transformers

a) To rig up circuits for testing a given machine
b) To obtain the performance characteristics of machines

LIST OF EXPERIMENTS

1. Load test on DC motors
2. Speed Control of DC Motor: Field control, Armature control
3. Load test on DC generators.
4. Load test on single phase transformer.
5. Open circuit & Short circuit test on single phase transformer
6. Open circuit characteristics of DC generator (Self and Separately Excited)
7. Swinburne's test and separation of losses in DC Machine.
8. Hopkinson's test
9. Sumpner's test on 1 phase transformers
10. 3-phase transformer connections
11. 3-phase to 2–phase conversion
12. Demo type experiment based on student activity (Compulsory by each group)

OUTCOMES

a) Demonstrate knowledge of D.C. motor and generator operation.
b) Demonstrate knowledge of transformer theory.

REFERENCES

1. Department Laboratory Manual.

SEMESTER-IV	L	T	P	C
	-	-	3	2
BTEC4L03-ELECTRONIC DEVICES AND CIRCUITS LAB				

ELECTRONIC WORKSHOP PRACTICE (in 6 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.
2. Identification, Specifications and Testing of Active Devices, Diodes, BJTs, Lowpower JFETs, MOSFETs, Power Transistors, LEDs, LCDs, Optoelectronic Devices, SCR, UJT, DIACs, TRIACs, Linear and Digital ICs.
3. Soldering practice – Simple Circuits using active and passive components.
4. Single layer and Multi layer PCBs (Identification and Utility).
5. Study and operation of
   Multimeters (Analog and Digital)
   Function Generator
   Regulated Power Supplies
6. Study and Operation of CRO.

PART B: (For Laboratory Examination – Minimum of 10 experiments)

1. Frequency measurment using Lissajous Figures
2. PN Junction diode characteristics
   A. Forward bias
   B. Reverse bias.(cut in voltage & Resistance calculations)
3. Zener diode characteristics and Zener as a regulator
4. Transistor CB characteristics (Input and Output) & h Parameter calculations
5. Transistor CE characteristics (Input and Output) & h Parameter calculations
6. Rectifier without filters (Full wave & half wave)
7. Rectifier with filters (Full wave & half wave)
8. FET characteristics
9. SCR Charecteristics
10. UJT Characteristics
11. CE Amplifier.
12. CC Amplifier (Emitter Follower)

SEMESTER-IV	L	T	P	C
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BTBS4L01-SOFT SKILLS/APTITUDE LAB-II				

Reading Comprehension	:	Reading Passage – 1	**The first and only Indian-American to reach space**			1 hour
	:	Reading Passage – 2	**The Moral Basis of Vegetarianism**			1 hour
	:	Reading Passage – 3	**Health programme of the Chinese Government**			1 hour
	:	Reading Passage – 4	**Remedy to ease inflation**			1 hour
Speaking Skills	:	Task-1	**Self Introduction**			1 hour
	:	Task-2	**Presentation skills**			1 hour
	:	Task-3	**Group Discussion**			1 hour
	:	Task-4	**Review of a Cinema**			1 hour
	:	Task-5	**Just A Minute**			1 hour
	:	Task-6	**Role Play**			1 hour
Writing Skills	:	Task-1	**Letter writing** - Formal			1 hour
	:	Task-2	**Resume writing**			1 hour
	:	Task-3	**Paragraph writing**			1 hour

	:	Task-4	**Story generating with picture**				1 hour
			sequence				
	:	Task-5	**Text Building with topic**				1 hour
			sentence				
	:	Task-6	**Essay writing**				1 hour
Verbal Reasoning	:	Task-1	**Detection of errors**				1 hour
	:	Task-2	**Sentence corrections**				1 hour
	:	Task-3	**Sentence completion with**			**apt**	1 hour
			word s	**from**	**the**	**given**	
			Confusionable words				
	:	Task-4	**Scrambled words**				1 hour
	:	Task-5	**Dialogue completion**				1 hour
	:	Task-6	**Analogies**				1 hour
	:	Task-7	**Root words**				1 hour
	:	Task-8	**Synonyms**				1 hour
	:	Task-9	**Antonyms**				1 hour
	:	Task-10	**Odd one out**				1 hour

Quantitative Aptitude- Part-I: Problem on Ages - Percentages - Profit and Loss - Simple & Compound Interest - Averages - Ratio, Proportion

Quantitative Aptitude – Part 2: Speed, Time & Work and Distance - Pipes and Cisterns - Mixtures and Allegations - Races -Problem on Trains - Boats and Streams **Practice:** Puzzles, Sudoku, Series Completion, Problem on Numbers

Reference Books:

1. Instructional Manual- Prepared by Faculty.
2. Aggarwal, R.S. "A Modern Approach to Verbal and Non-verbal Reasoning", Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.
3. Abhijit Guha, "Quantitative Aptitude", TMH, 3rd edition

SEMESTER-V	L	T	P	C
	3	1	0	3
BTEE5T01- POWER SYSTEM-II				

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 & GMD, symmetrical and asymmetrical conductor configuration with and without transposition, Numerical Problems. Calculation of capacitance for 2 wire and 3 wire systems, effect of ground on capacitance, capacitance calculations for symmetrical and asymmetrical single and three phase, single and double circuit lines, Numerical Problems.

UNIT-II

Performance of Short and Medium Length Transmission Lines: Classification of Transmission Lines - Short, medium, long line and their model representations -Nominal-T, Nominal-Pie and A, B, C, D Constants for symmetrical & Asymmetrical Networks, Numerical Problems. Mathematical Solutions to estimate regulation and efficiency of all types of lines - Numerical Problems.

UNIT-III

Performance of Long Transmission Lines: Long Transmission Line-Rigorous Solution, evaluation of A,B,C,D Constants, Interpretation of the Long Line Equations, Incident, Reflected and Refracted Waves -Surge Impedance and SIL of Long Lines, Wave Length and Velocity of Propagation of Waves - Representation of Long Lines - Equivalent-T and Equivalent Pie network models (numerical problems).

UNIT-IV

Various Factors Governing the Performance of Transmission line: Skin and Proximity effects - Description and effect on Resistance of Solid Conductors –Ferranti effect - Charging Current - Effect on Regulation of the Transmission Line, Shunt Compensation. Corona - Description of the phenomenon, factors affecting corona, critical voltages and power loss, Radio Interference.

UNIT-V

Sag and Tension Calculations: Sag and Tension calculations with equal and unequal heights of towers, effect of Wind and Ice on weight of Conductor, numerical Problems - Stringing chart and sag template and its applications.

UNIT-VI

Insulators & Underground Cables: Types of Insulators, voltage distribution in insulator string, improvement of string efficiency, testing of insulators, capacitance grading and static shielding.- Types of Cables, Construction, and Types of insulating materials, Calculation of insulation resistance, stress in insulation and power factor of cable, capacitance of single and 3-Core belted Cables, Grading of Cables-Capacitance grading and Intersheath grading

TEXT BOOKS:

1. Power system Analysis-by John J Grainger William D Stevenson, TMC Companies, 4th edition
2. Electrical power systems - by C.L.Wadhwa, New Age International (P) Limited, Publishers, 1998.

REFERENCE BOOKS:

1. Power System Analysis and Design by B.R.Gupta, Wheeler Publishing.
2. Power System Analysis by Hadi Saadat – TMH Edition..
3. Modern Power System Analysis by I.J.Nagaraj and D.P.Kothari, Tata McGraw Hill, 2nd Edition
4. A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta, U.S.Bhatnagar, A.Chakrabarthy, Dhanpat Rai & Co Pvt. Ltd.

SEMESTER-V	L	T	P	C
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BTEE5T02- POWER ELECTRONICS				

Learning Objectives:

i. To study the characteristics of various power semiconductor derive and analyze the operation of diode bridge rectifier.
ii. To design firing circuits for SCR. Analyze the operation of AC voltage controller and half–wave phase controlled rectifiers.
iii. To understand the operation of single phase full–wave converters and analyze harmonics in the input current.
iv. To study the operation of three phase full–wave converters and dual converter.
v. To analyze the operation of high frequency dc–dc converters.
vi. To understand the working of inverters and application of PWM techniques for voltage control and harmonic mitigation.

UNIT–I:

Power Semi Conductor Devices: Thyristors–Silicon controlled rectifiers (SCR's) –Characteristics of power MOSFET and power IGBT– Basic theory of operation of SCR–Static characteristics– Turn on and turn off methods–Dynamic characteristics of SCR– Snubber circuit design–Numerical problems–Diode bridge rectifier with R–load and capacitive filter–Output voltage and input current waveforms.

UNIT–II:

Phase Controlled Converters – Single Phase: Firing circuits for SCR– Line commutation principle– Single phase AC voltage controller with R and RL load–Half wave converters with R, RL and RLE loads– Derivation of average load voltage and current–Effect of freewheeling diode for RL load.

UNIT–III:

Single phase AC-DC Bridge Converters & Harmonic analysis: Operation of semi and fully controlled converters with R, RL and RLE loads–Derivation of average voltage and current – Effect of source Inductance- Harmonic analysis for input current waveform in a system with a large load inductance –Calculation of input power factor.

UNIT–IV:

Three Phase AC–DC Bridge Converters: Full converter with R and RL loads–Semi converter (Half Controlled) with R and RL loads– Derivation of load voltage–Line commutated Inverter operation–Dual converters with non–circulating and circulating currents.

UNIT – V:

DC–DC Converters: High frequency DC–DC converters**:** Buck Converter operation– Time ratio control and current limit control strategies–Voltage and current waveforms–Derivation of output voltage–Boost converter operation–Voltage and current waveforms–Derivation of output voltage – Buck-Boost converter operation –Voltage and current waveforms.

UNIT – VI:

DC–AC Inverters and PWM Technique: Single phase inverters–unipolar and bipolar switching– Three phase Inverters (120^0 and 180^0 modes of operation) –PWM techniques– Sine triangular PWM technique– amplitude and frequency modulation Indices –Harmonic analysis.

Learning Outcomes:

Student should be able to

i. Explain the characteristics of various power semiconductor derive and analyze the operation of diode bridge rectifier.
ii. Design firing circuits for SCR. Analyze the operation of AC voltage controller and half–wave phase controlled rectifiers.
iii. Explain the operation of single phase full–wave converters and analyze harmonics in the input current.
iv. Explain the operation of three phase full–wave converters and dual converter.
v. Analyze the operation of high frequency dc–dc converters.
vi. Explain the working of inverters and application of PWM techniques for voltage control and harmonic mitigation.

TEXT BOOKS:

1. Power Electronics: Circuits, Devices and Applications – by M. H. Rashid, Prentice Hall of India, 2nd edition, 1998
2. Power Electronics: converters, applications & design –by Nedmohan, Tore M. Undeland, Robbins by Wiley India Pvt. Ltd.
3. Power Converter Circuits -by William Shepherd, Li zhang, CRC Taylor & Francis Group.

REFERENCE BOOKS:

1. Elements of Power Electronics–Philip T.Krein.oxford.
2. Power Electronics – by P.S.Bhimbra, Khanna Publishers.
3. Thyristorised Power Controllers – by G. K. Dubey, S. R. Doradla, A. Joshi and R. M. K.Sinha, New Age International (P) Limited Publishers, 1996.
4. Power Electronics handbook by Muhammad H. Rashid, Elsevier.

SEMESTER-V	L	T	P	C
	3	1	0	3
BTEE5T03- ELECTRICAL AND ELECTRONICS				

UNIT–I

Measuring Instruments: Classification – Deflecting, control and damping torques – Ammeters and Voltmeters – PMMC, moving iron type, dynamometer and electrostatic instruments – Expression for the deflecting torque and control torque – Errors and compensations– Extension of range using shunts and series resistance – CT and PT**:** Ratio and phase angle errors – Design considerations.

UNIT – II

Measurements of Parameters: Method of measuring low, medium and high resistance – Sensitivity of Wheat stone's bridge – Carey Foster's bridge– Kelvin's double bridge for measuring low resistance– Loss of charge method for measurement of high resistance – Megger– Measurement of earth resistance – Measurement of inductance – Quality Factor – Maxwell's bridge–Hay's bridge – Anderson's bridge–Measurement of capacitance and loss angle – Desautybridge – Schering Bridge– Wagner's earthing device–Wien's bridge.

UNIT –III

Measurement of Power: Single phase and three phase dynamometer wattmeter – LPF and UPF – Expression for deflecting and control torques – Extension of range of wattmeter using instrument transformers – Measurement of active and reactive powers in balanced and unbalanced systems – Type of P.F. Meters

UNIT –IV

Measurement of Energy: Single phase and three phase dynamometer and moving iron type Single phase induction type energy meter – Driving and braking torques – errors and compensations – Testing by phantom loading using

R.S.S. meter– Three phase energy meter – Tri vector meter – Maximum demand meters– Electrical resonance type frequency meter and Weston type synchroscope

UNIT – V

Magnetic Measurements: Ballistic galvanometer – Equation of motion – Flux meter – Constructional details–Determination of B–H Loop methods of reversals six point method – AC testing – Iron loss of bar samples– Core loss measurements by bridges and potentiometers.

UNIT VI

Voltage Sensors: Overview- - Electronic Voltmeters- Analog Voltmeters- DC Analog Voltmeters. Rectifier-Based AC Analog Voltmeters- True RMS Analog Voltmeters Capacitive Sensors- Inductive Sensors- Electro-Optical Sensor- Piezoelectric Electroacoustic Sensors- Electrostrictive Sensors

Current Sensors: Principles- Charge Integration- Shunts- Calorimetric Method- Sensing the Energy of the Magnetic Field- Measuring the Lorentz Force on the Conductor- Hall Elements- Magnetooptical Sensors- Magnetostrictive Sensors

Text Books:

1. Electrical Measurements and measuring Instruments – by E.W. Golding and F.C.Widdis, fifth Edition, Wheeler Publishing.
2. Modern Electronic Instrumentation and Measurement Techniques – A.D. Helfrick and W.D. Cooper, PHI, 5th Edition, 2002.
3. Electrical and Electronic Measurements and instrumentation by R.K.Rajput, S.Chand

Reference Books:

1. Electrical & Electronic Measurement & Instruments by A.K.Sawhney Dhanpat Rai & Co. Publications.
2. Electrical and Electronic Measurements –by G.K.Banerjee, PHI Learning Private Ltd., New Delhi–2012.
3. Hand Book of sensors and Actuators Vol.7, Measuring Current, Voltage and Power, Seties editor S.Middelhoek, Elsevier
4. Measurement Instrumentation and Sensors, John_G_Webster, CRC Press LLC

SEMESTER-V	L	T	P	C
	3	1	0	3
BTEE5T04- HIGH VOLTAGE ENGINEERING				

OBJECTIVES:

The course should enable the student to understand

- The various types of over voltages in power system and protection methods.
- Generation of over voltages in laboratories
- Measurement of over voltages.
- Nature of Breakdown mechanism in solid, liquid and gaseous dielectrics.
- Testing of power apparatus and insulation coordination.

UNIT I

OVER VOLTAGES IN ELECTRICAL POWER SYSTEMS: Causes of over voltages and its effects on power system – Lightning, switching surges and temporary overvoltages, Corona and its effects –Reflection and Refraction of Travelling waves- Protection against overvoltages.

UNIT II

BREAKDOWN ON GASEOUS & LIQUID DIELECTRIC: Gaseous breakdown in uniform and non-uniform fields – Corona discharges – Vacuum breakdown – Conduction and breakdown in pure and commercial liquids, Maintenance of oil Quality

UNIT III

BREAKDOWN ON SOLID DIELECTRIC & APPLICATION OF INSULATING MATERIALS:

Intrinsic breakdown, electromechanical breakdown, thermal breakdown, breakdown of solid dielectrics in practice, Breakdown in composite dielectrics, solid dielectrics used in practice. Applications of insulating materials in transformers, rotating machines, circuit breakers, cable power capacitors and bushings.

UNIT IV

GENERATION OF HIGH VOLTAGES AND HIGH CURRENTS: Generation of High DC, AC, impulse voltages and currents - Triggering and control of impulse generators.

UNIT V

MEASUREMENT OF HIGH VOLTAGES AND HIGH CURRENTS: High Resistance with series ammeter – Dividers, Resistance, Capacitance and Mixed dividers - Peak Voltmeter, Generating Voltmeters - Capacitance Voltage Transformers, Electrostatic Voltmeters – Sphere Gaps - High current shunts- Digital techniques in high voltage measurement.

UNIT VI

HIGH VOLTAGE TESTING & INSULATION COORDINATION: High voltage testing of electrical power apparatus as per International and Indian standards – Power frequency, impulse voltage and DC testing of Insulators, circuit breakers, bushing, isolators and transformers- Insulation Coordination.

OUTCOMES:

- Ability to understand and analyze power system operation, stability, control and protection.

TEXT BOOKS:

1. S.Naidu and V. Kamaraju, 'High Voltage Engineering', Tata McGraw Hill, Fifth Edition, 2013.
2. E. Kuffel and W.S. Zaengl, J.Kuffel, 'High voltage Engineering fundamentals', Newnes Second Edition Elsevier , New Delhi, 2005.
3. Subir Ray,' An Introduction to High Voltage Engineering' PHI Learning Private Limited, New Delhi, Second Edition, 2013.

REFERENCES:

1. L.L. Alston, 'High Voltage Technology', Oxford University Press, First Indian Edition, 2011.
2. C.L. Wadhwa, 'High voltage Engineering', New Age International Publishers, Third Edition, 2010.
3. High Voltage Engineering and Technology by Ryan, IET Publishers.

SEMESTER-V	L	T	P	C
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BTEC5T06- LINEAR AND DIGITAL IC APPLICATIONS				

UNIT I

INTEGRATED CIRCUITS: Integrated circuits-Types, Classification, Package Types and temperature ranges, Power supplies, Differential Amplifier- DC and AC analysis of Dual input balanced output Configuration, Properties of other differential amplifier configuration (Dual Input Unbalanced Output, Single Ended Input – Balanced/ Unbalanced Output), DC Coupling and Cascade Differential Amplifier Stages, Level translator.

UNIT II

OPERATIONAL AMPLIFIER: Characteristics of OP-Amps, Op-amp Block Diagram, ideal and practical Op-amp specifications, DC and AC characteristics, 741 op-amp & its features, FET input. Op-Amps, Op-Amp parameters & Measurement, Input & Out put Off set voltages &currents, slew rates, CMRR, PSRR, drift, Frequency Compensation technique.

UNIT III

APPLICATIONS OF OP-AMPS: Inverting and Non-inverting amplifier, Integrator and differentiator, Difference amplifier, Instrumentation amplifier, AC amplifier, V to I, I to V converters, Buffers, Comparators, Multivibrators.

UNIT IV

TIMERS & D to A & A to D CONVERTERS: Introduction to 555 timer, functional diagram, Monostable and Astable operations and applications, Schmitt Trigger- Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC.

UNIT V

COMBINATIONAL LOGIC DESIGN: Introduction, Design and Analysis procedures, Decoders, encoders, multiplexers and demultiplexers, Code Converters, comparators, adders & sub tractors, Ripple Adder, Binary Parallel Adder, Binary Adder-Subtractor**,** Combinational multipliers with relevant Digital ICs.

UNIT VI

SEQUENTIAL LOGIC DESIGN: Introduction-Latches, and flip-flops, Flip-Flop Conversions, Counters, Design of Counters using Digital ICs, Counter applications, Synchronous design methodology, Shift Registers, Modes of Operation of Shift Registers, Ring Counter, Johnson Counter Design considerations of the above sequential logic circuits with relevant Digital ICs.

TEXT BOOKS:

1. Linear Integrated Circuits – D. Roy Chowdhury, New Age International (p) Ltd, 2nd Edition, 2003.
2. Op-Amps & Linear ICs - Ramakanth A. Gayakwad, PHI,1987.

REFERENCES:

1. Design with Operational Amplifiers & Analog Integrated Circuits - Sergio Franco, McGraw Hill, 1988.
2. Digital Logic and Computer Design By Mano, Pearson Education.
3. Micro Electronics – Millman, McGraw Hill,1988
4. Digital IC Applications By Atul P.Godse and Deepali A.Godse, Technical Publications, Pune, 2005.

SEMESTER-V	L	T	P	C
	-	-	3	2
BTEE5L01- ELECTRICAL MACHINES-II LAB				

OBJECTIVE

To give students a fair knowledge of testing different types of Synchronous machines and IM

- To rig up circuits for testing a given machine
- To obtain the performance characteristics of machines

LIST OF EXPERIMENTS

1. Calculation of Voltage regulation of alternators (EMF & MMF)
2. Regulation of three–phase alternator by Potier triangle method.
3. Determination of X_d and X_q
4. Determination of positive, Negative and Zero sequence reactance of Synchronous machines
5. Synchronization and parallel operation of alternators
6. Determination of V and Inverted V curves
7. Circle diagram of induction motor
8. Load test on 3-phase induction motor
9. Load test on 1-phase induction motor
10. Equivalent Circuit of a single phase induction motor
11. Rotor Rheostat speed control of slip ring induction motor
12. Demo type experiment based on student activity (Compulsory by each group).

OUTCOME

- Demonstrate knowledge of and apply the theory of induction motors and synchronous machines
- Describe the requirements and characteristics of selected motors and generators for a given application.

REFERENCES

1. Department Laboratory Manual.
2. Laboratory manual in Electro Machines by curriculum Development cell IIT, Delhi, Wiley Eastern Ltd,1990

SEMESTER-V	L	T	P	C
	-	-	3	2
BTEE5L02- CONTROL SYSTEM & SIMULATION LAB				

Learning Objectives:

- To impart hands on experience to understand the performance of basic control system components such as D.C. servo motors, A.C. Servo motors.
- To understand time and frequency responses of control system with and without controllers and compensators.

LIST OF THE EXPERIMENTS

1. Time response of Second order System
2. Characteristics of Synchros
3. Effect of feedback on DC Servo motor.
4. Effect of P, PD ,PI ,PID controller on a second order system
5. Design and implementation of Lag and lead compensator
6. DC position control system
7. Transfer function of DC motor
8. Temperature controller using PID
9. Characteristics of AC servo motor
10. Digital simulation of P, PI, PD, PID controllers using MATLAB software.
11. Stability analysis of a second order system using MATLAB software
12. State Space model for classical transfer function using MATLAB verification

Learning Outcomes

- Able to analyze the performance and working of D.C. servo motors, A.C. Servo motors and synchronous motors.
- Able to design P,PI,PD and PID controllers
- Able to design lag, lead and lag–lead compensators
- Able to control the temperature using PID controller
- Able to determine the transfer function of D.C.motor
- Able to control the position of D.C servo motor performance

SEMESTER-V	L	T	P	C
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BTEE5L03- ELECTRICAL AND ELECTRONICS MEASUREMENTS LAB				

PART-A: Electrical Measurements

1. Measurement of resistance
2. Measurement of inductance & capacitance
3. Calibration of single phase energy meter
4. Calibration of three phase energy motor
5. Measurement of power factor
6. Study of displacement and pressure transducers.
7. Calibration of dynamometer power factor meter
8. Calibration of LPF wattmeter – by direct loading.
9. Measurement of earth resistance
10. Crompton D.C. Potentiometer – Calibration of PMMC ammeter and PMMC voltmeter
11. Measurement of % ratio error and phase angle of given C.T. by comparison.
12. Measurement of 3 phases reactive power with single-phase wattmeter.
13. Measurement of parameters of a choke coil using 3 voltmeter and 3 ammeter methods.

PART-B: Electronics Measurements

SEMESTER-VI	L	T	P	C
	3	1	0	3
BTEE6T01- POWER SYSTEM ANALYSIS				

Learning Objectives:

- To study the development of impedance diagram (p.u) and formation of Ybus
- To study the Gauss Seidel, Newton raphson, decoupled and fast decoupled load flow methods.
- To study the concept of the Zbusbuilding algorithm.
- To study short circuit calculation for symmetrical faults
- To study the effect of unsymmetrical faults.
- To study the rotor angle stability analysis of power systems.

UNIT –I

Per-Unit Representation: Per Unit Quantities–Single line diagram– Impedance diagram of a power system – Graph theory definition – Formation of element node incidence and bus incidence matrices – Primitive network representation – Formation of Y– bus matrix by singular transformation and direct inspection methods.

UNIT –II

Power Flow Studies: Necessity of power flow studies – Derivation of static power flow equations – Gauss-Seidel Method (limited to 3-buses), Algorithm-Newton Raphson Method in Rectangular and polar coordinates form – Derivation of Jacobian matrix, power flow solution using NR method (3bus), Decoupled and fast Decoupled method (3 bus), Algorithms.

UNIT – III

Z-Bus formulation: 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) -Sparsity Matrix.

UNIT – IV

Symmetrical Fault Analysis: 3-Phase short circuit currents and reactances of synchronous machine, short circuit MVA calculations, symmetrical fault calculations using Z-bus.

UNIT –V

Symmetrical Components & Faults: Synthesis of unsymmetrical phasor from their symmetrical components, operators, symmetrical components of unsymmetrical phasor, phase – shift of symmetrical components in Y-Δ, power in terms of symmetrical components, sequence networks – positive, negative and zero sequence networks. Various types of unsymmetrical faults LG, LL, LLG on unloaded alternator, unsymmetrical faults on power system

UNIT –VI

Power System 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. Derivation of Swing Equation. Determination of Transient Stability by Equal Area Criterion, Application of Equal Area Criterion, methods to improve steady state and transient stability.

OUTCOMES:

- Able to draw an impedance diagram for a power system network.
- Able to form a Ybus matrix for a power system network with or without mutual couplings.
- Able to find out the load flow solution of a power system network using different types of load flow methods.
- Able to formulate the Zbus for a power system network.
- Able to find out the fault currents for all types faults with a view to provide data for the design of protective devices.
- Able to find out the sequence components of currents for any unbalanced power system network.
- Able to analyze the steady state, transient and dynamic stability concepts of a power system.

TEXT BOOKS:

1. Power System Analysis by Grainger and Stevenson, Tata McGraw Hill.
2. Modern Power system Analysis – by I.J.Nagrath &D.P.Kothari: Tata Mc Graw–Hill Publishing Company, 2nd edition.
3. Power System Analysis and Design by J.Duncan Glover, M.S.Sarma, T.J. Overbye – CengageLearning publications.

REFERENCE BOOKS:

1. Power System Analysis – by A.R.Bergen, Prentice Hall, Inc.
2. Power System Analysis by HadiSaadat – TMH Edition.
3. Power System Analysis by B.R.Gupta, Wheeler Publications.
4. Electrical Power Systems by P.S.R.Murthy, B.S.Publications

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SEMESTER-VI	L	T	P	C
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BTEE6T02- POWER SEMICONDUCTOR DRIVES				

Learning Objectives:

- To analyze the operation of single and three phase converter fed DC drives and four quadrant operation of dc motors using dual converters.
- To discuss the converter control of dc motors in various quadrants.
- To understand the concept of speed control of induction motor by using AC voltage controllers and voltage source inverters.
- To learn the principles of static rotor resistance control and various slip power recovery schemes.
- To understand the speed control mechanism of synchronous motors

UNIT–I

Single phase converter fed DC Drives: 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

Three phase converter fed DC Drives: Revision of speed control techniques – Separately excited and series motors controlled by full converters – Output voltage and current waveforms – Speed-torque expressions – Speed-torque characteristics – Numerical problems – Four quadrant operation using dual converters.

UNIT–III

Chopper fed DC Drives (Type C & Type D): Single quadrant – Two quadrant and four quadrant chopper fed separately excited and series excited motors – Continuous current operation– Output voltage and current waveforms – Speed–torque expressions – Speed–torque characteristics –Four quadrant operations – Closed loop operation (Block diagrams only).

UNIT–IV

Induction motor control – Stator side: Variable voltage characteristics–Control of Induction Motor by AC Voltage Controllers – Waveforms –Speed torque characteristics– Variable Voltage Variable Frequency control of induction motor by voltage source inverter – PWM control – Closed loop operation of induction motor drives (Block Diagram Only).

UNIT–V

Control of Induction motor – Rotor side: Static rotor resistance control – Slip power recovery schemes – Static Scherbius drive – Static Kramer drive – Performance and speed torque characteristics – Advantages –Applications.

UNIT–VI

Control of Synchronous Motors: Separate control &self control of synchronous motors – Operation of self controlled synchronous motors by VSI– Closed Loop control operation of synchronous motor drives (Block Diagram Only) –Variable frequency control–Pulse width modulation.

Learning Outcomes:

Student should be able to

- Analyze the operation of single and three phase converter fed DC drives and four quadrant operation of dc motors using dual converters.
- Explain the converter control of dc motors in various quadrants.
- Explain the concept of speed control of induction motor by using
- AC voltage controllers and voltage source inverters.
- Explain the principles of static rotor resistance control and various slip power recovery schemes.
- Explain the speed control mechanism of synchronous motors

Text Books:

1. Fundamentals of Electric Drives – by G K Dubey Narosa Publications
2. Power Semiconductor Drives, by S.B. Dewan, G.R.Slemon, A.Straughen, Wiley-India Edition.

Reference Books:

1. Electric Motors and Drives Fundamentals, Types and Apllications, by Austin Hughes and Bill Drury, Newnes.
2. Thyristor Control of Electric drives – Vedam Subramanyam Tata McGraw Hill Publications.
3. Power Electronic Circuits, Devices and applications by M.H. Rashid, PHI.
4. Power Electronics handbook by Muhammad H.Rashid, Elsevier

SEMESTER-VI	L	T	P	C
	3	1	0	3
BTEE6T03- UTILIZATION OF ELECTRICAL ENERGY				

Learning objectives:

- To understand the operating principles and characteristics of traction motors with respect to speed, temperature, loading conditions.
- To acquaint with the different types of heating and welding techniques.
- To study the basic principles of illumination and its measurement.
- To understand different types of lightning system including design.
- To understand the basic principle of electric traction including speed–time curves of different traction services.
- To understand the method of calculation of various traction system for braking, acceleration and other
- To understand about UPS system

UNIT – I

Selection of Motors: Choice of motor, type of electric drives, starting and running characteristics, speed control, temperature rise, applications of electric drives, types of industrial loads, continuous, intermittent and variable loads, load equalization.

UNIT – II

Electric Heating & Electric Welding: Advantages and methods of electric heating, resistance heating induction heating and dielectric heating. - Electric welding: Resistance and arc welding, electric welding equipment, comparison between A.C. and D.C. Welding.

UNIT – III

Illumination fundamentals & Various Methods: Introduction, terms used in illumination, laws of illumination, polar curves, integrating sphere, lux meter, sources of light.- Discharge lamps, MV and SV lamps – comparison between tungsten filament lamps and fluorescent tubes, Basic principles of light control, Types and design of lighting and flood lighting, LED lighting.

UNIT – IV

Electric Traction – I: System of electric traction and track electrification– Review of existing electric traction systems in India– Special features of traction motor– Mechanics of train movement– Speed–time curves for different services – Trapezoidal and quadrilateral speed time curves.

UNIT – V

Electric Traction – II: 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 and coefficient of adhesion– Principles of energy efficient motors.

UNIT – VI

UPS Systems: Introduction- Types and principles of UPS -types of batteries- Design and selection of UPS- Testing of UPS and its protection- Installation Procedure to maintain UPS.

Learning Outcomes:

- Able to identify a suitable motor for electric drives and industrial applications
- Able to identify most appropriate heating or welding techniques for suitable applications.
- Able to understand various level of illuminosity produced by different illuminating sources.
- Able to estimate the illumination levels produced by various sources and recommend the most efficient illuminating sources and should be able to design different lighting systems by taking inputs and constraints in view.
- Able to determine the speed/time characteristics of different types of traction motors.
- Able to estimate energy consumption levels at various modes of operation.
- Able to demonstrate UPS system

TEXT BOOK:

1. Utilization of Electric Energy – by E. Openshaw Taylor, Orient Longman.
2. Art & Science of Utilization of electrical Energy – by Partab, Dhanpat Rai & Sons.

REFERENCE BOOKS:

1. Utilization of Electrical Power including Electric drives and Electric traction – by N.V.Suryanarayana, New Age International (P) Limited, Publishers, 1996.
2. Generation, Distribution and Utilization of electrical Energy – by C.L. Wadhwa, New Age International (P) Limited, Publishers,1997.
3. Technical manual on uninterruptible power supply system by headquarters, department of the army available at: http://webbooks.net/freestuff/ups.pdf

SEMESTER-VI	L	T	P	C
	3	1	0	3
BTEE6TE1- ENERGY AUDIT CONSERVATION AND MANAGEMENT				

Learning Objectives:

- To understand energy efficiency, scope, conservation and technologies.
- To design energy efficient lighting systems.
- To estimate/calculate power factor of systems and propose suitable compensation techniques.
- To understand energy conservation in HVAC systems.
- To calculate life cycle costing analysis and return on investment on energy efficient technologies.

UNIT-I

Basic Principles of Energy Audit: Energy audit- definitions, concept, types of audit, energy index, cost index, pie charts, Sankey diagrams, load profiles, Energy conservation schemes, and energy saving potential.

UNIT-II

Energy Management: Principles of energy management, organizing energy management program, initiating, planning, controlling, promoting, monitoring, reporting, Energy manager, Qualities and functions, language, Questionnaire - check list for top management.

UNIT-III

Power Factor & Energy Instruments: Power factor – methods of improvement, location of capacitors, Pf with non linear loads, effect of harmonics on p.f., motor controllers, Energy Instruments- watt-hour meter, data loggers, thermocouples, pyrometers, tong testers, Power analyzer.

UNIT-IV

Space Heating and Ventilation: Ventilation, Air-Conditioning (HVAC) and Water Heating: Introduction-Heating of buildings-Transfer of Heat-Space heating methods-Ventilation and air-conditioning-Insulation-Cooling load-Electric water heating systems-Energy conservation methods.

UNIT-V

Economic Aspects and Analysis: Economics Analysis-Depreciation Methods, time value of money, rate of return, present worth method, replacement analysis, life cycle costing analysis - Energy efficient motors (basic concepts),

UNIT-VI

Computation of Economic Aspects: Calculation of simple payback method, net present worth method- Power factor correction, lighting - Applications of life cycle costing analysis, return on investment

LEARNING OUTCOMES:

Student will be able to

- Explain energy efficiency, conservation and various technologies.
- Design energy efficient lighting systems.
- Calculate power factor of systems and propose suitable compensation techniques.
- Explain energy conservation in HVAC systems.
- Calculate life cycle costing analysis and return on investment on energy efficient technologies.

TEXT BOOKS:

1. Energy management by W.R. Murphy & G. Mckay Butter worth, Elsevier publications. 2012
2. Energy efficient electric motors by John .C. Andreas, Marcel Dekker Inc Ltd–2nd edition, 1995

REFERENCE BOOKS:

1. Electric Energy Utilization and Conservation by S C Tripathy, Tata McGraw hill publishing company Ltd. New Delhi.
2. Energy management by Paul o' Callaghan, Mc–Graw Hill Book company–1st edition, 1998.
3. Energy management hand book by W.C.Turner, John wiley and sons.
4. Energy management and conservation, K V Sharma and P Venkataseshaiah-I K International Publishing House pvt.ltd, 2011.
5. http://www.energymanagertraining.com/download/Gazette_of_India PartIISecI-37_25-08-2010.pdf

SEMESTER-VI	L	T	P	C
	3	1	0	3
BTEE6TE2- INSTRUMENTATION ENGINEERING				

Learning Objectives:

- To study various types of signals and their representation.
- To study various types of transducers: Electrical, Mechanical, Electromechanical, Optical etc.
- To study and measure the various types of Non–electrical quantities.
- To study various types of digital voltmeters
- To study the working principles of various types of oscilloscopes and their applications.
- To study various types of signal analyzers

UNIT-I

Characteristics of Signals and their representation: Measuring Systems, Performance Characteristics, - Static characteristics, Dynamic Characteristics; Errors in Measurement – Gross Errors, Systematic Errors, Statistical Analysis of Random Errors. Signal and their representation: Standard Test, periodic, aperiodic, modulated signal, sampled data, pulse modulation and pulse code modulation

UNIT-II

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, photo diodes.

UNIT-III

Digital Voltmeters: Digital voltmeters- Successive approximation, ramp, dual-Slope integration continuous balance type-Micro processor based ramp type DVM digital frequency meter-digital phase angle meter

UNIT-IV

Oscilloscope: Cathode ray oscilloscope-time base generator-horizontal and vertical amplifiers-Measurement of phase and frequency-lissajous patterns-Sampling oscilloscope-analog and digital type data logger, transient recorder

UNIT-V

Signal Analyzers: Wave Analyzers- 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

Measurement of Non-Electrical Quantities: Measurement of strain, Gauge Sensitivity, Displacement, Velocity, Angular Velocity, Acceleration, Force, Torque, Measurement of Temperature, Pressure, Vacuum, Flow, Liquid level.

TEXT BOOKS:

1. Transducers and Instrumentation by D.V.S Murthy, Prentice Hall of India
2. A course in Electrical and Electronic Measurements and Instrumentation, A.K. Sawhney, Dhanpatrai & Co.

REFERENCE BOOKS:

1. Measurements Systems, Applications and Design – by D O Doeblin
2. Principles of Measurement and Instrumentation – by A.S Morris, Pearson /Prentice Hall of India
3. Electronic Instrumentation-by H.S.Kalsi Tata MCGraw-Hill Edition, 1995.
4. Modern Electronic Instrumentation and Measurement techniques – by A.D Helfrick and W.D.Cooper, Pearson/Prentice Hall of India.

Learning Outcomes:

- Able to represent various types of signals.
- Acquire proper knowledge to use various types of Transducers.
- Able to monitor and measure various parameters such as strain, velocity, temperature, pressure etc.
- Acquire proper knowledge and working principle of various types of digital voltmeters.
- Able to measure various parameter like phase and frequency of a signal with the help of CRO.
- Acquire proper knowledge and able to handle various types of signal analyzers.

SEMESTER-VI	L	T	P	C
	3	1	0	3
BTEE6TE3- NON-CONVENTIONAL SOURCES OF ENERGY				

Learning Objectives

- To study the solar radiation data, extraterrestrial radiation, radiation on earth's surface.
- To study solar thermal collections.
- To study solar photo voltaic systems.
- To study maximum power point techniques in solar pv and wind.
- To study wind energy conversion systems, Betz coefficient , tip speed ratio.
- To study basic principle and working of hydro, tidal, biomass, fuel cell and geothermal systems.

UNIT–I:

Fundamentals of Energy Systems: Energy conservation principle – Energy scenario (world and India) – Solar radiation**:** Outside earth's atmosphere – Earth surface – Analysis of solar radiation data – Geometry – Radiation on tilted surfaces – Numerical problems.

UNIT–II:

Solar Thermal Systems: Liquid flat plate collections**:** Performance analysis – Transmissivity – Absorptivity – Product collector efficiency factor – Collector heat removal factor – Numerical problems – Introduction to solar air heaters- Concentrating collectors and solar pond.

UNIT–III:

Solar Photovoltaic Systems: Balance of systems – IV characteristics – System design**:** Storage sizing, PV system sizing, Maximum power point techniques**:** Perturb and observe (P&O) technique – Hill climbing technique.

UNIT–IV:

Wind Energy: Wind patterns – Types of turbines – Kinetic energy of wind – Betz coefficient – Tip–speed ratio – efficiency – Power output of wind turbine – Selection of generator(synchronous, induction) – Maximum power point tracking.

UNIT–V:

Hydro and Tidal power systems: Basic working principle – Classification of hydro systems**:** large, small, micro – Measurement of head and flow – Energy equation – Types of turbines – Numerical problems. Tidal power – Basics – Kinetic energy equation – Numerical problems – Wave power – Basics – Kinetic energy equation.

UNIT–VI:

Biomass, fuel cells and geothermal systems: Biomass Energy**:** Fuel classification – Pyrolysis – Direct combustion of heat – Different digesters and sizing. Fuel cell**:** classification – Efficiency – VI characteristics. Geothermal**:** classification – Dry rock and acquifer – Energy analysis

Learning Outcomes:

Student should be able to

- Analyze solar radiation data, extraterrestrial radiation, radiation on earth's surface.
- Design solar thermal collections.
- Design solar photo voltaic systems.
- Develop maximum power point techniques in solar PV and wind.
- Explain wind energy conversion systems, Betz coefficient , tip speed ratio.
- Explain basic principle and working of hydro, tidal, biomass, fuel cell and geothermal systems

Text Books:

1. Solar Energy: Principles of Thermal Collection and Storage, S. P. Sukhatme and J. K. Nayak, TMH, New Delhi, 3rd Edition.
2. Renewable Energy Resources, John Twidell and Tony Weir, Taylor and Francis
3. Energy Science: Principles, Technologies and Impacts, John Andrews and Nick Jelly, Oxford.

Reference Books:

1. Handbook of renewable technology Ahmed and Zobaa, Ramesh C Bansal,World scientific, Singapore.
2. Renewable Energy Technologies /Ramesh & Kumar /Narosa.
3. Renewable energy technologies – A practical guide for beginners – Chetong Singh Solanki, PHI.

SEMESTER-VI	L	T	P	C
	3	1	0	3
BTEC6T05- MICROPROCESSOR & MICRO CONTROLLER				

UNIT-I

Introduction to Microprocessor Architecture: Introduction and evolution of Microprocessors, Architecture of 8086, Register Organization of 8086, Memory organization of 8086, General bus operation of 8086, Instruction set, Addressing modes, Minimum and Maximum mode operations of 8086, 8086 Control signal interfacing, read and write cycle timing diagrams.

UNIT-II

Algorithms for Assembly Language Programming: Assembly Directives, Macro's, Algorithms for Implementation of FOR Loop, WHILE, REPEAT and IF-THEN-ELSE Features.

UNIT-III

I/O Interface: 8255 PPI- Architecture of 8255, Modes of operation, Interfacing I/O devices to 8086 using 8255, Interfacing A to D converters, Interfacing D to A converters, Stepper motor interfacing.

UNIT-IV

Interfacing with Advanced Devices: Static memory interfacing with 8086, DMA controller (8257)-Architecture, interfacing 8257 DMA controller; Programmable Interrupt Controller (8259)-Command words and operating modes of 8259, Interfacing of 8259; Keyboard/display controller (8279)-Architecture, modes of operation, command words of 8279, Interfacing of 8279.

UNIT-V

Introduction to 8051 Micro Controller: Overview of 8051 Micro Controller, Architecture, Register set, I/O ports and Memory Organization, Interrupts, Timers and Counters, Serial Communication.

UNIT-VI

Assembly Language Programming of 8051: Addressing modes and Instruction set of 8051, Assembly language programming of 8051, Development systems and tools, Applications of Micro Controllers, Interfacing 8051 to LED's, Push button, Relay's and Latch Connections, Keyboard Interfacing, Interfacing Seven Segment Display, ADC and DAC Interfacing.

TEXT BOOKS:

1. Advanced Microprocessors And Peripherals by A .K .RAY , K.M BHURCHANDI,TMH Publishers, 2006.
2. Kenneth J Ayala, "The 8051 Micro Controller Architecture, Programming and Applications", Thomson Publishers, 2nd Edition.
3. Microprocessors and Interfacing, Douglas V Hall, Mc-Graw Hill, 2nd Edition.

REERENCE BOOKS:

1. R.S. Kaler, " A Text book of Microprocessors and Micro Controllers", I.K. International Publishing House Pvt. Ltd.
2. Ajay V. Deshmukh, "Microcontrollers – Theory and Applications", Tata McGraw-Hill Companies –2005.
3. Ajit Pal, "Microcontrollers – Principles and Applications", PHI Learning Pvt Ltd, 2011.

SEMESTER-VI	L	T	P	C
	-	-	3	2
BTEE6L01- POWER ELECTRONICS AND SIMULATION LAB				

Learning objectives:

- To study the characteristics of various power electronic devices and analyze firing circuits and commutation circuits of SCR.
- To analyze the performance of single–phase and three–phase full–wave bridge converters, single–phase dual converter with both resistive and inductive loads.
- To understand the operation of AC voltage controller and cycloconverter with resistive and inductive loads.
- To understand the working of Buck converter, Boost converter, single–phase bridge inverter and PWM inverter.

LIST OF EXPERIMENTS

1. Study of Characteristics of SCR, MOSFET & IGBT
2. Gate firing circuits for SCR's
3. Single -Phase Half controlled converter with R and RL load
4. Single -Phase fully controlled bridge converter with R and RL loads
5. Single -Phase AC Voltage Controller with R and RL Loads
6. Single -Phase Cyclo–converter with R and RL loads
7. Single -Phase Bridge Inverter with R and RL Loads
8. Single -Phase dual converter with RL loads
9. Three -Phase half controlled bridge converter with RL load.
10. Three- Phase full converter with RL–load.
11. DC–DC buck converter.
12. DC–DC boost converter.
13. Single -phase PWM inverter.
14. Single -phase diode bridge rectifier with R load and capacitance filter.
15. Forced commutation circuits (Class A, Class B, Class C, Class D and Class E)
16. PSPICE simulation of single-phase full converter using RLE loads and single-phase AC voltage controller using RLE loads.
17. PSPICE simulation of resonant pulse commutation circuit and Buck chopper.
18. PSPICE simulation of single phase Inverter with PWM control.

Learning outcomes:

- Able to study the characteristics of various power electronic devices and analyze firing circuits and commutation circuits of SCR.
- Able to analyze the performance of single–phase and three–phase full–wave bridge converters, single–phase dual converter with both resistive and inductive loads.
- Able to understand the operation of AC voltage controller and cyclo converter with resistive and inductive loads.
- Able to understand the working of Buck converter, Boost converter, single–phase bridge inverter and PWM inverter.

SEMESTER-VI	L	T	P	C
	-	-	3	2
BTEC6L02- MICROPROCESSORS AND MICROCONTROLLERS LAB				

Any **8** of the following experiments are to be conducted:

I. Microprocessor 8086:

Introduction to MASM/TASM.

1. Arithmetic operation – Multi byte addition and subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation, ASCII – arithmetic operation.
2. Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
3. By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Inserting, Deleting, Length of the string, String comparison.
4. Modular Program: Procedure, Near and Far implementation, Recursion.
5. Dos/BIOS programming: Reading keyboard (Buffered with and without echo) – Display characters, Strings.
6. Interfacing 8255-PPI
7. Programs using special instructions like swap, bit/byte, set/reset etc.
8. Programs based on short, page, absolute addressing.
9. Interfacing 8259 – Interrupt Controller.
10. Interfacing 8279 – Keyboard Display.

Any 2 of the following experiments are to be conducted:

Microcontroller 8051

11. Reading and Writing on a parallel port.
12. Timer in different modes.
13. Serial communication implementation.
14. Understanding three memory areas of 00 – FF (Programs using above areas).

Using external interrupts.

SEMESTER-VI	L	T	P	C
	-	-	3	2
BTEE6L02- INDUSTIAL AUTOMATION PRACTICE (PLC and SCADA)				

LIST OF EXPERIMENTS:

1. To study Ladder logic programming of a industrial PLC like SEIMENS /FATEK /MICROLOGIX
2. To write programme for control of Drinks machine
3. To write a Programme for Car Parking.
4. To study step sequence in a PLC
5. To write a programme & interface simulated hardware unit of Tank level control.
6. To write a programme & interface & control a traffic light using PLC.
7. To write a programme & interface & control a simulated elevator control using PLC
8. To write a programme & interface & control a conveyer belt using PLC
9. To write a programme & interface & control speed of a DC motor using PLC
10. To write a programme & interface & temperature control system using analog outputs of a PLC.

SEMESTER-VII	L	T	P	C
	3	1	0	3
BTEE7T01- POWER SYSTEM OPERATION AND CONTROL				

Learning Objectives:

- To understand optimal dispatch of generation with and without losses.
- To study the optimal scheduling of hydro thermal systems.
- To study the optimal unit commitment problem.
- To study the load frequency control for single area system
- To study the PID controllers for single area system and two area system.
- To understand the reactive power control and compensation of transmission lines.

UNIT–I

Economic Operation of Power Systems: Optimal operation of Generators in Thermal Power Stations, - heat rate Curve – Cost Curve – Incremental fuel and Production costs, input-output characteristics, Optimum generation allocation with line losses neglected, Optimum generation allocation including the effect of transmission line losses – Loss Coefficients, General transmission line loss formula.

UNIT–II

Hydrothermal Scheduling: Optimal scheduling of Hydrothermal System: Hydroelectric power plant models, scheduling problems- Short term hydrothermal scheduling problem.

UNIT–III

Unit Commitment: Optimal unit commitment problem – Need for unit commitment – constraints in unit commitment – cost function formulation – solution methods – dynamic programming.

UNIT–IV

Single Area Load Frequency Control: Modelling of steam turbine, generator, mathematical modelling of speed governing system – Transfer function, modelling of Hydro turbine. Necessity of keeping frequency constant. Definitions of Control area – Single area control – Block diagram representation of an isolated power system – Steady state analysis – Dynamic response – Uncontrolled case.

UNIT–V

LFC Controllers & Two-Area Load Frequency Control: Load Frequency controller: Proportional plus Integral control of single area and its block diagram representation, steady state response – Load Frequency Control and Economic dispatch control. Load frequency control of two area system – uncontrolled case and controlled case, tie-line bias control,

UNIT–VI

Reactive Power 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, Uncompensated and compensated transmission lines: shunt and Series Compensation, introduction to flexible alternating current transmission system (FACTS).

Learning Outcomes:

- Able to compute optimal scheduling of Generators.
- Able to understand hydrothermal scheduling.
- Understand the unit commitment problem.
- Able to understand importance of the frequency.
- Understand importance of PID controllers in single area and two area systems.
- Will understand reactive power control and line power compensation.

TEXT BOOKS

1. Power System stability & control, Prabha Kundur,TMH
2. Modern Power System Analysis – by I.J.Nagrath & D.P.Kothari Tata Mc Graw – Hill Publishing Company Ltd, 2nd edition.

REFERENCE BOOKS:

1. Power System Analysis and Design by J.Duncan Glover and M.S.Sarma., THOMPSON,
2. 3rd Edition.
3. Electric Energy systems Theory – by O.I.Elgerd, Tata Mc Graw-hill Publishing Company
4. Ltd., Second edition.
5. Power System Analysis by Grainger and Stevenson, Tata McGraw Hill.
6. Power System Analysis by Hadi Saadat – TMH Edition.
7. Electrical power systems - by C.L.Wadhwa, New Age International (P) Limited, Publishers, 1998.

SEMESTER-VII	L	T	P	C
	3	1	0	3
BTEE7T02- ELECTRICAL DISTRIBUTION SYSTEMS				

Learning Objectives

- To study general concepts of distribution system.
- To study and design the substations and distribution systems.
- To study the determination of voltage drop and power loss.
- To study the distribution system protection and its coordination.
- To study the effect of compensation on p.f improvement.
- To study the effect of voltage control on distribution system.

UNIT- I

Distribution systems: Classification of Distribution systems, design features of Distribution systems, radial Distribution ,ring main Distribution ,voltage drop calculations: DC Distributors for following cases :radial DC distributor fed at one end and at both ends (equal and unequal voltages),ring main distributor, stepped distributor and AC Distribution , Comparison of AC and DC Distribution system.

UNIT – II:

Substations: Location of substations**:** Rating of distribution substation – Service area within primary feeders – Benefits derived through optimal location of substations.

Distribution Feeders: Design Considerations of distribution feeders**:** Radial and loop types of primary feeders – Voltage levels – Feeder loading – Basic 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.

UNIT – IV:

Protection: Objectives of distribution system protection – Types of common faults and procedure for fault calculations – Protective devices**:** Principle of operation of fuses – Circuit reclosures – Line sectionalizes and circuit breakers.

Coordination: Coordination of protective devices**:** General coordination procedure – Residual current circuit breaker RCCB (Wikipedia).

UNIT – V:

Compensation for Power Factor Improvement: Capacitive compensation for power–factor control – Different types of power capacitors – shunt and series capacitors – Effect of shunt capacitors (Fixed and switched) – Power factor correction – Capacitor allocation – Economic justification – Procedure to determine the best capacitor location.

UNIT – VI:

Voltage Control: Voltage Control**:** Equipment for voltage control – Effect of series capacitors – Effect of AVB/AVR –Line drop compensation.

LEARNING OUTCOMES:

- Able to understand the various concepts of distribution system.
- Able to design the substation and feeders.
- Able to determine the voltage drop and power loss
- Able to understand the protection and its coordination.
- Able to understand the effect of compensation on p.f improvement.
- Able to understand the effect of voltage, current distribution system performance.

TEXT BOOK:

1. "Electric Power Distribution system, Engineering" – by TuranGonen, McGraw–hill Book Company.

REFERENCE BOOKS:

1. Electrical Distribution Systems by Dale R.Patrick and Stephen W.Fardo, CRC press
2. Electric Power Distribution – by A.S. Pabla, Tata McGraw–hill Publishing company, 4th edition, 1997.
3. Electrical Power Distribution Systems by V.Kamaraju, Right Publishers.

SEMESTER-VII	L	T	P	C
	3	1	0	3
BTEE7T03- RENEWABLE ENERGY SYSTEMS				

UNIT I

Introduction to RES: Definition, Concepts of NCES, Limitations of RES, Criteria for assessing the potential of NCES, Classification of NCES, Solar, Wind, Geothermal, Biomass, Ocean energy sources, Comparison of these energy sources

UNIT II

Solar Energy: Solar radiation its measurements and prediction - solar thermal flat plate collectors concentrating collectors – applications - heating, cooling, desalination, power generation, drying, cooking etc - principle of photovoltaic conversion of solar energy, types of solar cells and fabrication. Photovoltaic Applications: battery charger, domestic lighting, street lighting, and water pumping, power generation schemes.

UNIT III

Wind Energy: Atmospheric circulations – classification – factors influencing wind - wind shear – turbulence - wind speed monitoring - Betz limit - Aerodynamics of wind turbine rotor- site selection - wind resource assessment - wind energy conversion devices - classification, characteristics, applications, Hybrid systems - safety and environmental aspects.

UNIT IV

Bio-Energy: Biomass resources and their classification - chemical constituents and physicochemical characteristics of biomass - Biomass conversion processes - Thermo chemical conversion: direct combustion, gasification, pyrolysis and liquefaction - biochemical conversion: anaerobic digestion, alcohol production from biomass - chemical conversion process: hydrolysis, hydrogenation, Biogas - generation - types of biogas Plants- applications.

UNIT V

Hydrogen And Fuel Cells: Thermodynamics and electrochemical principles - basic design, types, and applications - production methods – Biophotolysis Hydrogen generation from algae biological pathways - Storage gaseous, cryogenic and metal hydride and transportation. Fuel cell – principle of working- various types -construction and applications.

UNIT VI

Other sources of Energy: Ocean energy resources - principles of ocean thermal energy conversion systems -ocean thermal power plants - principles of ocean wave energy conversion and tidal energy conversion – hydropower – site selection, construction, environmental issues geothermal energy - types of geothermal energy sites, site selection, and geothermal power plants.

TEXT BOOK:

1. Sukhatme, S.P., Solar Energy, Tata McGraw Hill, 1984
2. Twidell, J.W. and Weir, A., Renewable Energy Sources, EFN Spon Ltd., 1986.

REFERENCES:

1. Kreith, F and Kreider, J. F., Principles of Solar Engineering, McGraw-Hill, 1978.
2. Godfrey Boyle, Renewable Energy, Power for a Sustainable Future, Oxford University Press, U.K, 1996.

SEMESTER-VII	L	T	P	C
	3	1	0	3
BTEC7T05- DIGITAL SIGNAL PROCESSING				

UNIT I

INTRODUCTION: Classification of systems: Continuous, discrete, linear, causal, stable, dynamic, recursive, time variance; classification of signals: continuous and discrete, energy and power; mathematical representation of signals; spectral density; sampling techniques, quantization, quantization error, Nyquist rate, aliasing effect. Digital signal representation.

UNIT II

DISCRETE TIME SYSTEM ANALYSIS: Z-transform and its properties, inverse z-transforms; difference equation – Solution by z-transform, application to discrete systems - Stability analysis, frequency response – Convolution – Fourier transform of discrete sequence – Discrete Fourier series.

UNIT III

DISCRETE FOURIER TRANSFORM & COMPUTATION : DFT properties, magnitude and phase representation - Computation of DFT using FFT algorithm –DIT & DIF - FFT using radix 2 – Butterfly structure.

UNIT IV

IIR DIGITAL FILTERS: Analog filter approximations – Butter worth and Chebyshev, Design of IIR Digital filters from analog filters, Design Examples: Analog-Digital transformations.

UNIT V

FIR DIGITAL FILTERS: Characteristics of FIR Digital Filters, frequency response. Design of FIR Digital Filters using Window Techniques, Frequency Sampling technique, Comparison of IIR & FIR filters.

UNIT VI

DIGITAL SIGNAL PROCESSORS: Introduction – Architecture – Features – Addressing Formats – Functional modes - Introduction to Commercial Processors.

TEXT BOOKS

1. J.G. Proakis and D.G. Manolakis, 'Digital Signal Processing Principles, Algorithmsand Applications', Pearson Education, New Delhi, 2003 / PHI.
2. S.K. Mitra, 'Digital Signal Processing – A Computer Based Approach', Tata McGraw Hill, New Delhi, 2001.

SEMESTER-VII	L	T	P	C
	3	1	0	3
BTEE7TE1- SPECIAL ELECTRICAL MACHINES				

Learning Objective:

- To explain theory of operation and control of switched reluctance motor.
- To explain the performance and control of stepper motors, and their applications.
- To describe the operation and characteristics of permanent magnet dc motor.
- To distinguish between brush dc motor and brush less dc motor**.**
- To explain the theory of travelling magnetic field and applications of linear motors.
- To impart knowledge on the Construction, principle of operation and performance of permanent magnet synchronous motors

UNIT I

Switched Reluctance Motor: Principle of operation – Design of stator and rotor pole arc – Power converter for switched reluctance motor – Control of switched reluctance motor.

UNIT II:

Stepper Motors: Construction – Principle of operation – Theory of torque production – Hybrid stepping motor – Variable reluctance stepping motor – Open loop and closed loop control.

UNIT III:

Permanent Magnet DC Motors: Construction – Principle of working – Torque equation and equivalent circuits – Performance characteristics – Moving coil motors.

UNIT IV:

Permanent Magnet Brushless DC Motor: Construction – Principle of operation – Theory of brushless DC motor as variable speed synchronous motor – Sensor less and sensor based control of BLDC motors.

UNIT V:

Linear motors: Linear induction motor: Construction– principle of operation– applications. Linear synchronous motor: Construction – principle of operation– applications.

UNIT VI

Permanent Magnet Synchronous Motors (PMSM) : Principle of operation – Ideal PMSM – EMF and Torque equations – Armature MMF – Synchronous Reactance – Sine wave motor with practical windings - Phasor diagram – Torque/speed characteristics - Power controllers - Converter Volt-ampere requirements– Applications

Learning Outcomes:

The student should be able to

- Explain theory of operation and control of switched reluctance motor.
- Explain the performance and control of stepper motors, and their applications.
- Describe the operation and characteristics of permanent magnet dc motor.
- Distinguish between brush dc motor and brush less dc motor**.**
- Explain the theory of travelling magnetic field and applications of linear motors.
- Understand the significance of permanent magnet synchronous motors

TEXT BOOKS:

1. Special electrical Machines, K.Venkata Ratnam, University press, 2009, New Delhi.
2. Brushless Permanent magnet and reluctance motor drives, Clarenden press, T.J.E. Miller, 1989, Oxford.
3. Special electrical machines, E.G. Janardhanan, PHI learning private limited, 2014.

REFERENCE BOOKS:

1. R.Krishnan, 'Switched Reluctance Motor Drives – Modeling, Simulation, Analysis, Design and Application', CRC Press, New York, 2001.
2. P.P. Aearnley, 'Stepping Motors – A Guide to Motor Theory and Practice', Peter Perengrinus London, 1982.
3. T. Kenjo and S. Nagamori, 'Permanent Magnet and Brushless DC Motors', Clarendon Press, London, 1988.
4. E.G. Janardanan, 'Special electrical machines', PHI learning Private Limited, Delhi, 2014.

SEMESTER-VII	L	T	P	C
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BTEC7TE6- NANO SCIENCE & TECHNOLOGY				

UNIT I

INTRODUCTION: Science and Technology- Implications for Physics, Chemistry, Biology and Engineering- Classifications of nanostructured materials- nano particles- quantum dots, nanowires- ultra-thinfilms- multilayered materials. Length Scales involved and effect on properties: Mechanical, Electronic, Optical, Magnetic and Thermal properties, Introduction to properties and motivation for study (qualitative only).

UNIT II

GENERAL METHODS OF PREPARATION: Bottom-up Synthesis-Top-down Approach: Co-Precipitation, Ultrasonication, Mechanical Milling, Colloidal routes, Self-assembly, Vapour phase deposition, MOCVD, Sputtering, Evaporation, Molecular Beam Epitaxy, Atomic Layer Epitaxy, MOMBE.

UNIT III

NANOMATERIALS: Nanoforms of Carbon - Buckminster fullerene- graphene and carbon nanotube, Single wall carbon Nano tubes (SWCNT) and Multi wall carbon nanotubes (MWCNT)- methods of synthesis(arc-growth, laser ablation, CVD routes, Plasma CVD), structure-property Relationships applications- Nanometal oxides-ZnO, TiO2,MgO, ZrO2, NiO, nano alumina,CaO, AgTiO2, Ferrites, Nanoclays- fictionalization and applications-Quantum wires,Quantum dots- preparation, properties and applications.

UNIT IV

CHARACTERIZATION TECHNIQUES: X-ray diffraction technique, Scanning Electron Microscopy - environmental techniques, Transmission Electron Microscopy including high-resolution imaging, Surface Analysis techniques- AFM, SPM, STM, SNOM, ESCA, SIMS-Nanoindentation.

UNIT V

APPLICATIONS: NanoInfoTech: Information storage- nanocomputer, molecular switch, super chip, nanocrystal, Nanobiotechlogy: nanoprobes in medical diagnostics and biotechnology, Nano medicines,Targetted drug delivery, Bioimaging - Micro Electro Mechanical Systems (MEMS), Nano Electro Mechanical Systems (NEMS)- Nanosensors, nano crystalline silver for bacterial inhibition, Nanoparticles for sunbarrier products - In Photostat, printing, solar cell, battery.

UNIT VI

PREPARATION ENVIRONMENTS: Clean rooms: specifications and design, air and water purity, requirements for particular processes, Vibration free environments: Services and facilities required. Working practices, sample cleaning, chemical purification, chemical and biological contamination, Safety issues, flammable and toxic hazards, biohazards.

TEXT BOOKS:

1. A.S. Edelstein and R.C. Cammearata, eds., "Nanomaterials: Synthesis, Properties and Applications", Institute of Physics Publishing, Bristol and Philadelphia, 1996.
2. N John Dinardo, "Nanoscale Charecterisation of surfaces & Interfaces", 2nd edition, Weinheim Cambridge,Wiley-VCH, 2000.

REFERENCES:

1. G Timp, "Nanotechnology", AIP press/Springer, 1999.
2. Akhlesh Lakhtakia,"The Hand Book of Nano Technology, Nanometer
3. Structure, Theory, Modeling and Simulations". Prentice-Hall of India (P) Ltd, New Delhi, 2007

SEMESTER-VII	L	T	P	C
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BTCS7TE8- OPENSOURCES SOFTWARE				

UNIT-I

INTRODUCTION: Introduction to Open sources – Need of Open Sources – Advantages of Open Sources– Application of Open Sources. Open source operating systems: LINUX: Introduction – General Overview – Kernel Mode and user mode

UNIT-II

LINUX: Process – Advanced Concepts – Scheduling – Personalities – Cloning – Signals – Development with Linux.

UNIT-III

OPEN SOURCE DATABASE: MySQL: Introduction – Setting up account – Starting, terminating and writing your own SQL programs – Record selection Technology – Working with strings – Date and Time– Sorting Query Results – Generating Summary – Working with metadata – Usings equences – MySQL and Web.

UNIT-IV

OPEN SOURCE PROGRAMMING LANGUAGES: PHP: Introduction – Programming in web environment – variables – constants – data types – operators – Statements – Functions – Arrays – OOP – String Manipulation and regular expression – File handling and data storage

UNIT-V

PHP and SQL database –PHP and LDAP – PHP Connectivity – Sending and receiving E-mails – Debugging and error handling – Security – Templates, PYTHON **:** Syntax and Style – Python Objects – Numbers – Sequences – Strings – Lists and Tuples – Dictionaries – Conditionals and Loops

UNIT-VI

Files – Input and Output – Errors and Exceptions – Functions – Modules – Classes and OOP – Execution Environment, PERL **:** Perl backgrounder – Perl overview – Perl parsing rules – Variables and Data – Statements and Control structures – Subroutines, Packages, and Modules- Working with Files –Data Manipulation.

TEXT BOOKS:

1. Remy Card, Eric Dumas and Frank Mevel, "The Linux Kernel Book", Wiley Publications, 2003
2. Steve Suchring, "MySQL Bible", John Wiley, 2002

REFERENCE BOOKS:

1. Rasmus Lerdorf and Levin Tatroe, "Programming PHP", O'Reilly, 2002
2. Wesley J. Chun, "Core Phython Programming", Prentice Hall, 2001
3. Martin C. Brown, "Perl: The Complete Reference", 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
4. Steven Holzner, "PHP: The Complete Reference", 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
5. Vikram Vaswani, "MYSQL: The Complete Reference", 2nd Edition, Tata McGraw -Hill Publishing Company Limited, Indian Reprint 2009.

SEMESTER-VII	L	T	P	C
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BTEE7L01- POWER SYSTEM SIMULATION LAB

OBJECTIVES

This course should enable the student to:

a. Understand the usage of standard packages necessary for analysis and simulation of power system required for it planning, operation and control.

LIST OF THE EXPERIMENTS

1. Computation of Parameters and Modelling of Transmission Lines
2. Formation of Bus Admittance and Impedance Matrices and Solution of Networks.
3. Load Flow Analysis - I : Solution of Load Flow And Related Problems Using
4. Gauss-Seidel Method
5. Load Flow Analysis - II: Solution of Load Flow and Related Problems Using Newton-Raphson and Fast-Decoupled Methods
6. Fault Analysis
7. Transient and Small Signal Stability Analysis: Single-Machine Infinite Bus System
8. Transient Stability Analysis of Multimachine Power Systems
9. Electromagnetic Transients in Power Systems
10. Load – Frequency Dynamics of Single- Area and Two-Area Power Systems
11. Economic Dispatch in Power Systems

OUTCOMES

A student who satisfactory complete the course should be able to

a) Develop simple programs for the following basic requirements:
   i. Formation of bus admittance and impedance matrices and network solution
   ii. Power flow solution of small systems
   iii. Unit commitment and economic dispatch

b) Acquire experience in the usage of standard package for the following analysis/ simulation/ control functions.
   i. Steady-state analysis of large system
   ii. Quasi steady state analysis for balanced and unbalanced faults
   iii. Transient stability simulation of multimachine power system
   iv. Simulation of LFC dynamics and control of power system

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BTEE7L02- RENEWABLE ENERGY SYSTEMS LAB				

1. Measurement of Solar Radiation
2. Efficiency of a Flat Plate Solar Collector
3. Operation and Efficiency of a Gasifier-Engine
4. I-V Characteristics and Efficiency of a Solar PVcell

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BTEE8T01- SWITCH GEAR AND PROTECTION				

UNIT–I

Circuit Breakers: Miniature Circuit Breaker(MCB)– Elementary principles of arc interruption– Restrike Voltage and Recovery voltages– Restrike phenomenon– Average and Max. RRRV– Current chopping and Resistance switching– Introduction to oil circuit breakers– Description and operation of Air Blast– Vacuum and SF6 circuit breakers– CB ratings and specifications– Auto reclosing.

UNIT–II

Electromagnetic Protection: Principle of operation and construction of attracted armature– Balanced beam– induction disc and induction cup relays– Relays classification– Instantaneous– DMT and IDMT types– Applications of relays**:** Over current/under voltage relays– Directional relays– Differential relays and percentage differential relays– Universal torque equation– Distance relays**:** Impedance– Reactance– Mho and offset mho relays– Characteristics of distance relays and comparison.

UNIT–III

Generator Protection: Protection of generators against stator faults– Rotor faults and abnormal conditions– restricted earth fault and inter turn fault protection– Numerical examples.

Transformer Protection: Protection of transformers**:** Percentage differential protection– Design of CT's ratio– Buchholz relay protection–Numerical examples.

UNIT–IV:

Feeder and Bus bar Protection: Protection of lines**:** Over current– Carrier current and three zone distance relay using impedance relays–Translay relay–Protection of bus bars– Differential protection.

UNIT–V:

Static and Digital Relays: Static relays**:** Static relay components– Static over current relay– Static distance relay– Micro processor based digital relays.

UNIT–VI:

Protection against over voltage and grounding: Generation of over voltages in power systems– Protection against lightning over voltages– Valve type and zinc–Oxide lighting arresters– Insulation coordination– BIL– impulse ratio– Standard impulse test wave– volt~time characteristics– Grounded and ungrounded neutral systems–Effects of ungrounded neutral on system performance– Methods of neutral grounding**:** Solid–resistance–Reactance–Arcing grounds and grounding Practices.

TEXT BOOKS:

1. Protection and SwitchGear by BhaveshBhalja, R.P. Maheshwari, NileshG. Chothani, Oxford University Press, 2013
2. Power system protection- Static Relays with microprocessor applications. by T.S. Madhava Rao, TMH
3. Electrical Power System Protection by C. CHRISTOPOULOS and A. Wright, Springer publications

REFERENCE BOOKS:

1. Power System Protection and Switchgear by Badari Ram, D.N Viswakarma, TMH Publications.
2. Fundamentals of Power System Protection by Paithankar and S.R. Bhide, PHI, 2003.
3. Art & Science of Protective Relaying – by C R Mason, Wiley Eastern Ltd.

SEMESTER-VIII	L	T	P	C
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BTEE8TE1- FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS				

UNIT–I:

Introduction to FACTS: Power flow in an AC System – Loading capability limits – Dynamic stability considerations – Importance of controllable parameters – Basic types of FACTS controllers – Benefits from FACTS controllers – Requirements and characteristics of high power devices – Voltage and current rating – Losses and speed of switching – Parameter trade–off devices.

UNIT–II:

Voltage source and Current source converters: Concept of voltage source converter(VSC) – Single phase bridge converter – Square–wave voltage harmonics for a single–phase bridge converter – Three–phase full wave bridge converter– Three–phase current source converter – Comparison of current source converter with voltage source converter.

UNIT–III:

Shunt Compensators–1: Objectives of shunt compensation – Mid–point voltage regulation for line segmentation – End of line voltage support to prevent voltage instability – Improvement of transient stability – Power oscillation damping.

Methods of controllable VAR generation: Variable impedance type static VAR generators – Thyristor Controlled Reactor (TCR) and Thyristor Switched Reactor (TSR).

UNIT–IV:

Shunt Compensators–2: Thyristor Switched Capacitor (TSC)– Thyristor Switched Capacitor – Thyristor Switched Reactor (TSC–TCR). Static VAR compensator (SVC) and Static Compensator (STATCOM)**:** The regulation and slope transfer function and dynamic performance – Transient stability enhancement and power oscillation damping– Operating point control and summary of compensation control.

UNIT V:

Series Compensators: Static series compensators**:** Concept of series capacitive compensation – Improvement of transient stability – Power oscillation damping – Functional requirements. GTO thyristor controlled Series Capacitor (GSC) – Thyristor Switched Series Capacitor (TSSC) and Thyristor Controlled Series Capacitor (TCSC).

UNIT–VI:

Combined Controllers: Schematic and basic operating principles of unified power flow controller (UPFC) and Interline power flow controller(IPFC) – Application of these controllers on transmission lines.

TEXT BOOKS:

1. "Understanding FACTS" N.G.Hingorani and L.Guygi, IEEE Press.Indian Edition is available:—Standard Publications, 2001.
2. "Flexible ac transmission system (FACTS)" Edited by Yong Hue Song and Allan T Johns, Institution of Electrical Engineers, London.
3. Thyristor-based FACTS Controllers for Electrical Transmission Systems, by R.Mohan Mathur and Rajiv K.Varma, Wiley.

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BTEC8TE3- EMBEDDED SYSTEMS				

UNIT I

INTRODUCTION: Characteristics of Embedding Computing Applications-Concept of Real time Systems,-Challenges in Embedded System Design- Design Process-Requirements, Specifications, Architecture Design- Designing of Components and System Integration.

UNIT II

EMBEDDED SYSTEM ARCHITECTURE: Instruction Set Architecture-CISC architecture [8051] and RISC instruction set architecture [ARM processors], DSP Processors, Harvard Architecture-PIC. Coprocessors and Hardware Accelerators, Processor Performance Enhancement-Pipelining, Super-scalar Execution, CPU Power Consumption, Memory System Architecture-, Caches, Virtual Memory, Memory management unit and address Translation.

UNIT III

DESIGNING EMBEDDED COMPUTING PLATFORM: Designing with Processors-System Architecture, Hardware Design, and Implementation-Development Environment, Debugging Techniques, Manufacturing and Testing. Design Using CPU Bus: Bus Protocols, Bus Organization, I/O Device Interfacing, Interfacing Protocols-GPIB, FIREWIRE, USB, Watchdog Timers.

UNIT IV

OPERATING SYSTEMS: Kernel Features: Real-time Kernels, Polled Loops System, Co-routines, Interrupt driven System, Multi-rate System, Processes and Threads, Context Switching, Cooperative Multi-tasking, Pre-emptive Multi-tasking.

UNIT V

OPERATING SYSTEMS- SCHEDULING & OPTIMIZATION: Scheduling-Rate-Monotonic Scheduling, Earliest-Deadline First Scheduling, Task Assignment, Fault-Tolerant Scheduling. Inter-process Communication-Real-time Memory Management: Stack Management, Dynamic Allocation-Evaluating and Optimizing Operating System Performance-Response.

UNIT VI

EMBEDDED CONTROL APPLICATIONS: Open-loop and Closed Loop Control Systems-Application Examples-Washing Machine, Automotive Systems, Auto-focusing digital camera, Air-conditioner, Elevator Control System, ATM System.

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BTCS8TE7- DBMS				

UNIT – I

Data base System Applications, data base System VS file System – View of Data – Data Abstraction –Instances and Schemas – data Models – the ER Model – Relational Model – Other Models – Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data base System Structure – Storage Manager – the Query Processor – History of Data base Systems, Data base design and ER diagrams – Beyond ER Design Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model – Conceptual Design for Large enterprises.

UNIT – II

Relational Model: Introduction to the Relational Model – Integrity Constraint Over relations Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views –Destroying /altering Tables and Views, Relational Algebra and Calculus: Relational Algebra – Selection and projection set operations – renaming– Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple relational Calculus –Domain relational calculus – Expressive Power of Algebra and calculus.

UNIT – III

Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOTR – Impact on SQL Constructs– Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL 0 Triggers and ActiveData bases.

UNIT – IV

Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design –Multi valued Dependencies – forth Normal Form.

UNIT – V

Overview of Transaction Management: ACID Properties – Transactions and Schedules – Concurrent Execution of transaction – Lock Based Concurrency Control – Performance Locking – Transaction Support in SQL – Introduction to Crash recovery, Concurrency Control: Serializability, and recoverability – Introduction to Lock Management – Lock Conversions – Dealing with Dead Locks – Specialized Locking Techniques – Concurrency without Locking, Crash recovery: Introduction to ARIES – the Log – Other Recovery related Structures – the Write-Ahead Log Protocol – Check pointing – re3covering from a System Crash – Media recovery – Other approaches and Interaction with Concurrency control.

UNIT – VI

Overview of Storage and Indexing: Data on External Storage – File Organization and Indexing – Cluster

Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – Indexes and Performance Tuning, toring data Disks and Files- The Memory Hierarchy – Redundant Arrays of Independent – Disks – Disk Space Management – Buffer Manager – Files of records – Page Formats – record formats Tree Structured Indexing: Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+Trees: A Dynamic Index Structure Hash Based Indexing: Static Hashing – Extendable hashing – Linear Hashing – Exendble vs. Liner hashing.

TEXT BOOKS:

1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition
2. Data base System Concepts, Silberschatz, Korth, Mc.Graw hill, IV edition.

REFERENCES:

1. Introduction to Database Systems, C.J.Date Pearson Education
2. Data base Systems design, Implementation, and Management, Rob & Coronel 5th Edition.Thomson
3. Data base Management System, Elmasri Navrate Pearson Education
4. Data base Management System Mathew Leon, Leon Vikas.
5. Data base Systems, Connoley Pearson education

SEMESTER-VIII	L	T	P	C
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BTEE8TE2- ELECTRICAL POWER QUALITY				

UNIT–I

Introduction: Overview of power quality – Concern about the power quality – General classes of power quality and voltage quality problems – Transients – Long– duration voltage variations – Short–duration voltage variations – Voltage unbalance – Waveform distortion – Voltage fluctuation – Power frequency variations.

UNIT–II:

Voltage imperfections in power systems: Power quality terms – Voltage sags – Voltage swells and interruptions – Sources of voltage sag, swell and interruptions – Nonlinear loads – IEEE and IEC standards. Source of transient over voltages – Principles of over voltage protection – Devices for over voltage protection – Utility capacitor switching transients.

UNIT–III

Voltage Regulation and power factor improvement: Principles of regulating the voltage – Device for voltage regulation – Utility voltage regulator application – Capacitor for voltage regulation – End–user capacitor application – Regulating utility voltage with distributed resources – Flicker – Power factor penalty – Static VAR compensations for power factor improvement.

UNIT– IV

Harmonic distortion and solutions: Voltage distortion vs. Current distortion – Harmonics vs. Transients – Harmonic indices – Sources of harmonics – Effect of harmonic distortion – Impact of capacitors, transformers, motors and meters – Point of common coupling – Passive and active filtering – Numerical problems.

UNIT–V

Distributed Generation and Power Quality: Resurgence of distributed generation – DG technologies – Interface to the utility system – Power quality issues and operating conflicts – DG on low voltage distribution networks.

UNIT–VI

Monitoring and Instrumentation: Power quality monitoring and considerations – Historical perspective of PQ measuring instruments – PQ measurement equipment – Assessment of PQ measuring data – Application of intelligent systems – PQ monitoring standards.

TEXTBOOKS:

1. Electrical Power Systems Quality, Dugan R C, McGranaghan M F, Santoso S, and Beaty H W, Second Edition, McGraw–Hill, 2012, 3rd edition.
2. Electric power quality problems –M.H.J. Bollen IEEE series-Wiley india publications, 2011.
3. Power Quality Primer, Kennedy B W, First Edition, McGraw–Hill, 2000.

REFERENCE BOOKS:

1. Understanding Power Quality Problems: Voltage Sags and Interruptions, Bollen M HJ, First Edition, IEEE Press; 2000.
2. Power System Harmonics, Arrillaga J and Watson N R, Second Edition, John Wiley & Sons, 2003.
3. Electric Power Quality control Techniques, W. E. Kazibwe and M. H. Sendaula, Van Nostrad einhold, New York.
4. Power Quality c.shankaran, CRC Press, 2001
5. Harmonics and Power Systems –Franciso C.DE LA Rosa–CRC Press (Taylor & Francis).
6. Power Quality in Power systems and Electrical Machines–EwaldF. fuchs, Mohammad A.S. Masoum–Elsevier.

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BTEC8TE2- VLSI DESIGN				

UNIT –I

Introduction: Introduction to IC technology – The IC era – MOS and related VLSI technology – Basic MOS transistors – Enhancement and depletion modes of transistor action – IC production process – MOS and CMOS fabrication process – BiCMOS technology – Comparison b/w CMOS and bipolar technologies.

UNIT – II

Basic electrical properties of MOS and BiCMOS circuits: Ids–Vds relationships – Aspects of MOS transistor threshold voltage – MOS Trans–conductance and output conductance – MOS Transistor – Figure of merit – The pMOS transistor – The nMOS inverter – Determination of pull–up to pull–down ratio for nMOS inverter driven by another nMOS inverter for an nMOS inverter driven through one or more pass Transistors – Alternative forms of pull up – The CMOS Inverter MOS transistor Circuit model – Bi–CMOS Inverters.

UNIT – III

MOS and BiCOMS circuit design processes: MOS layers – Stick diagrams – Design rules and layout – General observation on the design rules, 2µm double metal, double poly – CMOS/BiCMOS rules, 1.2µm Double metal, Double poly CMOS rules – Layout diagrams of NAND and NOR gates and CMOS inverter – Symbolic Diagrams – Translation to Mask Form.

UNIT – IV

Basic circuit concepts: Sheet resistance – Sheet resistance concept applied to MOS transistor and inverters – Area capacitance of layers – Standard unit of capacitance – Some area capacitance calculations – The delay unit – Inverter delays – Driving large capacitive loads – Propagations Delays – Wiring Capacitance – Fan–in and Fan–out characteristics – Choice of layers – Transistor switches – Realization of gates using nMOS, pMOS and CMOS technologies.

UNIT – V

Scaling of MOS circuit: Scaling models and scaling factors – Scaling factors for device parameters – Limitations of scaling – Limits due to sub threshold currents – Limits on logic level and supply voltage due to noise – Limits due to current density – Some architectural Issues – Introduction to switch logic and gate logic..

UNIT – VI

Digital design using HDL: Digital system design process – VLSI Circuit Design Process – Hardware simulation – Hardware Synthesis – History of VHDL – VHDL requirements – Levels of abstraction – Elements of VHDL – Packages – Libraries and bindings – Objects and classes – Variable assignments – Sequential statements – Usage of subprograms – Comparison of VHDL and verilog HDL.

VHDL MODELLING: Simulation – Logic Synthesis – Inside a logic synthesizer – Constraints – Technology libraries – VHDL and logic synthesis – Functional gate – Level verification – Place and route – Post layout timing simulation – Static timing – Major net list formats for design representation – VHDL synthesis – Programming approach.

Text Books:

1. Essentials of VLSI Circuits and Systems–Kamran Eshraghian, Douglas and A.Pucknell and Sholeh Eshraghian, Prentice–Hall of India Private Limited, 2005 Edition.
2. VLSI Design–K. Lal Kishor and V.S.V.Prabhakar, I.K. International Publishing House Private Limited, 2009 First Edition.
3. VLSI Design–A.Shanthi and A.Kavitha, New Age International Private Limited, 2006 First Edition.

REFERENCES BOOKS:

1. VLSI Design By Debaprasad Das, Oxford University Press, 2010.
2. VLSI Design By A.Albert Raj & T. Latha, PHI Learning Private Limited, 2010.

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BTCS8TE8- OOPS THROUGH JAVA				

UNIT I

Introduction to OOP: Introduction, Need of Object Oriented Programming, Principles of Object Oriented Languages, Procedural languages Vs OOP, Applications of OOP, History of JAVA, Java Virtual Machine, Java Features, Program structures, Installation of JDK1.6

UNIT II

Programming Constructs: Variables, Primitive Datatypes, Identifiers- Naming Coventions, Keywords, Literals, Operators-Binary, Unary and ternary, Expressions, Precedence rules and Associativity, Primitive TypeConversion and Casting, Flow of control- Branching, Conditional, loops.

Classes and Objects- classes, Objects, Creating Objects, Methods, constructors-Constructor overloading, cleaning up unused objects-Garbage collector, Class variable and Methods-Static keyword, this keyword, Arrays, Command line arguments.

UNIT III

Inheritance: Types of Inheritance, Deriving classes using extends keyword, Method overloading, super keyword, final keyword, Abstract class.

Interfaces, Packages and Enumeration: Interface-Extending interface, Interface Vs Abstract classes, Packages-Creating packages, using Packages, Access protection, java. lang package.

Exceptions & Assertions - Introduction, Exception handling techniquestry-catch, throw, throws, finally block, user defined exception, Exception Encapsulation and Enrichment, Assertions.

UNIT IV

MultiThreading: java.lang.Thread, The main Thread, Creation of new threads, Thread priority, Multithreading- Using isAlive () and join (), Syncronization, suspending and Resuming threads, Communication between Threads

Input/Output: reading and writing data, java.io package

UNIT V

Applets- Applet class, Applet structure, An Example Applet Program, Applet Life Cycle, paint (), update () and repaint ()

Event Handling -Introduction, Event Delegation Model, java.awt.event Description, Sources of Events, Event Listeners, Adapter classes, Inner classes.

UNIT VI

Abstract Window Toolkit: Why AWT?, java.awt package, Components and Containers, Button, Label, Checkbox, Radio buttons, List boxes, Choice boxes, Text field and Text area, container classes, Layouts, Menu, Scroll bar

Swing: Introduction, JFrame, JApplet, JPanel, Components in swings, Layout Managers, JList and JScroll Pane, Split Pane, JTabbedPane, Dialog Box Pluggable Look and Feel.

TEXT BOOKS:

1. The Complete Refernce Java, 8ed, Herbert Schildt, TMH
2. Programming in JAVA, Sachin Malhotra, Saurabh choudhary, Oxford.
3. JAVA for Beginners, 4e, Joyce Farrell, Ankit R. Bhavsar, Cengage Learning.
4. Object oriented programming with JAVA, Essentials and Applications, Raj Kumar Bhuyya, Selvi, Chu TMH.
5. Introduction to Java rogramming, 7th ed, Y Daniel Liang, Pearson.

REFERENCE BOOKS:

1. JAVA Programming, K. Rajkumar. Pearson.
2. Core JAVA, Black Book, Nageswara Rao, Wiley, Dream Tech
3. Core JAVA for Beginners, Rashmi Kanta Das, Vikas.
4. Object Oriented Programming through JAVA , P Radha Krishna, University Press.