ACADEMIC REGULATIONS (R-14)
COURSE STRUCTURE
AND
DETAILED SYLLABI
FOR

B. Tech Regular Four Year Degree Courses

(For the Batches Admitted From 2014-2015)

&

B. Tech (Lateral Entry Scheme)

(For the Batches Admitted From 2015-2016)

ELECTRICAL AND ELECTRONICS ENGINEERING

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

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SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

(**Affiliated to J.N.T. University Anantapur, Ananthapuramu).**

ACADEMIC REGULATIONS

B.Tech. Regular Four Year Degree Program

(For the batches admitted from the academic year 2014-15)

And

B.Tech. (Lateral Entry Scheme)

(For the batches admitted from the academic year 2015-16)

1. Applicability : All the rules specified herein, approved by the Academic Council, will be in force and applicable to students admitted from the academic year 2014-2015 onwards. Any reference to "College" in these rules and regulations stands for Sri Venkateswara College of Engineering and Technology (Autonomous).

2. Extent : All the rules and regulations, specified herein after shall be read as a whole for the purpose of interpretation and as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. As per the requirements of statutory bodies, Principal, Sri Venkateswara College of Engineering and Technology (A) shall be the Chairman of the Academic Council.

3. Admission :

3.1 Admission in to first year of Four Year B.Tech., Degree Program of study in Engineering :

3.1.1 Eligibility : A candidate seeking admission into the first year of four year B.Tech., Degree Program

Should have Passed either Intermediate Public

Examination conducted by the Board of Intermediate Education, Government of Andhra Pradesh with Mathematics, Physics and Chemistry as optional subjects (or any equivalent examination recognized by the Board of Intermediate Education and JNTU Anantapur) or Diploma in Engineering in the relevant branch conducted by the Board of Technical Education, Andhra Pradesh (or equivalent Diploma recognized by State Board of Technical Education, Government of Andhra Pradesh and JNTU Anantapur) for admission.

3.1.2 Admission Procedure : As per the existing stipulations of A.P State Council of Higher Education (APSCHE), Government of Andhra Pradesh, admissions are made into the first year of four year B.Tech., Degree Program as follows:

Seats under various categories are filled as per the norms prescribed by the Government of Andhra Pradesh.

3.2 Admission into the second year of four Year B.Tech., Degree Program in Engineering:

3.2.1 Eligibility : Candidates qualified in ECET (FDH) and / or admitted by the Convener, ECET (FDH).

In all such cases for admission, when needed, Permissions from the statutory bodies are to be obtained.

3.2.2 Admission Procedure : Lateral Entry seats are filled as per the norms prescribed by the Government of Andhra Pradesh from time to time.

4. Programs of study offered leading to the award of B.Tech degree

1. B.Tech (Civil Engineering)
2. B.Tech (Electrical & Electronics Engineering)
3. B.Tech (Mechanical Engineering)
4. B.Tech (Electronics & Communication Engineering)

5. B.Tech (Computer Science & Engineering)
6. B.Tech (Information Technology)
7. B.Tech (Automobile Engineering)

5. Academic Year : The College shall follow semester pattern from first year onwards. I, II semesters of First Year of four Year B.Tech., Program shall have a minimum of 14 instructional weeks. From second year onwards each semester shall have a minimum of 16 instructional weeks.

6. Course Structure : Each Program of study shall consist of:

- **General subjects comprise of the following courses: (5 to 10%)**
  i. English Language /Communication Skills / Mind Skills
  ii. Humanities and Social Sciences
  iii. Principles of Management

The above courses are common to all Branches.

- **Basic science subjects comprise of the following courses: (15 to 25%)**
  i. Mathematics
  ii. Physics
  iii. Chemistry

The above courses are common to all branches.

- **Basic Engineering subjects comprise some of the following courses, depending upon the branch: (15 to 25%)**
  i. Engineering Drawing
  ii. Engineering workshop
  iii. Engineering Mechanics
  iv. Basic Mechanical Engineering
  v. Basic Electrical & Electronics Engineering
  vi. Computer Programming

- **Core Subjects: (45 to 55%)**

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

- **Elective subjects: (10 to 15%)**

Electives will be offered to the students to diversify the spectrum of knowledge.

These electives can also be chosen based on the interest of the student to broaden his individual skill and knowledge in the specialized area.

Main Project: Main Project shall be carried out in the institution / industry during IV year II semester for a period of one semester. The project report shall be submitted to the department after successful completion.

7. Credit System : Credits are assigned based on the following norms.

Subject	**Semester Pattern**	
	Hours / Week	**Credits**
Theory	01	01
Practical	03/04	02/02
Drawing Practice	02	04
Project Work	--	**12**

i. As a norm, for the theory subjects, **one credit** for one contact period per week is assigned.

ii. As a norm, for practical courses **two credits** will be assigned for three contact periods per week.

iii. Tutorials do not carry any credits. However, each of the analytical and problem oriented courses will have one tutorial period per week.

iv. For Project work where formal contact hours are not specified, credits are assigned based on the complexity of the work to be carried out.

- The four year curriculum of any B.Tech, Program of study shall have a total of **176** credits.
- In the case of lateral entry students, B.Tech. program of study shall have a total of **132** credits.
- The exact requirements of credits for each subject will be as recommended by the concerned Board of Studies and approved by the Academic Council.

8. Examination System : All components in any Program of study will be Evaluated continuously through internal evaluation and an external evaluation component conducted as semester-end examination.

8.1 Distribution of Marks:

S. No	Examination	Marks%	Examination and Evaluation	Scheme of examination
1	Theory	70	Semester-end examination (external Paper setting and external evaluation)	This Examination question paper in theory subjects will be for a maximum of 70 marks. The question paper shall consists of two parts **Part A:** 5 short answer questions shall be given for a maximum 20 marks with one question from each unit. No choice will be given and all questions carry equal marks. **Part B**: 5 Descriptive/ problematic questions shall be given for a maximum of 50 marks with one question from each unit with internal choice i.e either or type. All questions carry equal marks.

		30	20	Mid– Examination of 120 Min. duration (Internal evaluation). The question paper shall be of descriptive type with 5 questions out of which 4 are to be answered and evaluated for 20 marks.	Two (02) mid-term exams, each for 20 marks are to be conducted. Better of the two shall be considered for awarding internal marks. **Mid-I:** After first spell of instructions(First 2 Units) **Mid-II:** After second spell of instructions (Last 3 Units.)
			10	Assignment (Internal evaluation)	Two assignments shall be given and each will be evaluated for 10 marks. Average of two Assignments shall be taken as internal marks for the assignments. **Assignment-I:** After first spell of instructions(First 2 Units) **Assignment-II:** After second spell of instructions (Last 3 Units.)
2	Laboratory	70	Semester-end Lab Examination (External evaluation)		70 marks are allotted for laboratory examination during semester-end.
		30	20	Continuous evaluation	Performance in laboratory experiments and Record are considered.
			10	Internal test	Practical Test at the end of the semester.
					➢ Marks scored in the continuous evaluation and internal test are considered

					for awarding internal marks.
3	Drawing	70	Semester-end drawing Examination (External evaluation)		70 marks are allotted for drawing examination during semester-end.
		30	20	Continuous evaluation	Performance in Drawing classes will be considered.
			10	Internal test	Two tests will be conducted. Better of the two will be taken.
					➢ Marks scored in the continuous evaluation and internal test are considered for awarding internal marks.
4	Project Work	200	140	External evaluation	Semester-end Project Viva-Voce Examination by a Committee as detailed under 8.2.
			60	Internal evaluation	Continuous evaluation by the Departmental Committee

Wherever the Question paper is different from the conventional pattern, the concerned pattern of question paper will be given at the end of the syllabus of that subject.

8.2 Project Work Evaluation : *The Semester-End Examination (Viva-voce) shall be conducted by a Committee consisting of External examiner (nominated by the Chief Controller of Examinations), HOD, & Supervisor. The evaluation of project work shall be conducted at the end of the IV year second semester. The Internal Evaluation shall be made by the Departmental Committee, on the basis of two project reviews of each student.*

8.3 Eligibility to appear for the Semester-End examination:

8.3.1 *A student shall be eligible to appear for Semester –End examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects in a semester.*

8.3.2 *Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted on medical grounds*

by the College Academic Committee. A stipulated fee shall be payable towards condonation of shortage of attendance to the College.

8.3.3 *Shortage of Attendance below 65% in aggregate shall in no case be condoned and the candidate will be detained.*

8.3.4 *Detained students are not eligible to take their end examination of that class and their registration shall stand cancelled.*

8.3.5 *A student detained due to shortage of attendance, will have to repeat that semester when offered next.*

8.4 Evaluation: Following procedure governs the evaluation.

8.4.1 *The marks for the internal evaluation components will be added to the external evaluation marks secured in the Semester –End examinations, to arrive at total marks for any subject in that semester.*

8.4.2 *Performance in all the subjects is tabulated program-wise and will be scrutinized by the Results Committee and subject-wise marks lists are finalized. Total marks obtained in each subject are converted into letter grades.*

Results Committee comprises of Principal, Controller of Examinations, one Senior Professor nominated by the Principal and the University Nominee.

8.4.3 *Student-wise tabulation is done and student-wise Grade Sheet is generated and issued to the students.*

8.5 Revaluation / Recounting:

Students shall be permitted for request for recounting/revaluation of the Semester-End examination answer scripts within a stipulated period after payment of prescribed fee. After recounting or revaluation, records are updated with changes if any and the student will be issued a revised grade sheet. If there are no changes, the same will be intimated to the students.

8.6 Supplementary Examination:

8.6.1 *In addition to the regular Semester- End examinations conducted, the College may also schedule and conduct supplementary examinations for all the subjects of other semesters when feasible for the benefit of students. Such of the candidates writing supplementary examinations may have to write more than one examination per day.*

9. Academic Requirements for Promotion/ completion of regular B.Tech Program of study:

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

9.1 For students admitted in B.Tech (Regular) Program:

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

ii. *A student shall be promoted from second year to third year only if he fulfills the academic requirement of securing 44 credits from:*

a) Two regular and two supplementary examinations of I-year I semester.
b) Two regular and one supplementary examinations of I-year II semester.
c) One regular and one supplementary examination of second year I semester.
d) One regular examination of II- year II Semester.

Irrespective of whether the candidates appear for Semester-End examination or not as per the normal course of study.

iii. *A student shall be promoted from third year to fourth year Program of study only if he fulfills the academic requirements of securing 66 credits from:*

a) *Three regular and three supplementary examinations of* I-year I semester.
b) *Three regular and two supplementary examinations of* I-year II Semester
c) *Two regular and two supplementary examination of second year I semester.*
d) *Two regular and one supplementary examinations second year II semester.*
e) *One regular and one supplementary examination of third year I semester.*
f) One Regular Examination of Third year II semester.

Irrespective of whether the candidate appears for the Semester-End examination or not as per the normal course of study and in case of getting detained for want of credits by sections 9.1(ii) and 9.1 (iii) above, the student may make up the credits through supplementary examinations before the date

of commencement of class work for III year I semester or IV year I semester as the case may be.

iv. *A student shall register for all the 176 credits and earn all the 176 credits. Marks obtained in all the 176 credits shall be considered for the award of the class based on CGPA.*

v. *A student who fails to earn 176 credits as indicated in the course structure within eight academic years from the year of his admission shall forfeit his seat in B. Tech., Program and his admission stands cancelled.*

9.2 For Lateral Entry Students (batches admitted from 2015-2016):

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

ii. *A student shall be promoted from third year to fourth year only if he fulfills the academic requirements of securing 44 credits from the following examinations.*

a) *Two regular and two supplementary examinations of II year I semester.*
b) *Two regular and one supplementary examination of II year II semester.*
c) *One regular and one supplementary examination of III year I semester.*
d) One Regular Examination of Third year II semester.

Irrespective of whether the candidate appear the Semester-End examination or not as per the normal Course of study and in case of getting detained for want of credits the student may make up the credits through supplementary exams of the above exams before the date of commencement of class work for IV year I semester.

i. *A student shall register for all 132 credits and earn all the 132 credits. Marks obtained in all 132 credits shall be considered for the award of the class based on CGPA.*

ii. *A student who fails to earn 132 credits as indicated in the Course structure within*

six academic years from the year of his admission shall forfeit his seat in B.Tech., Program and his admission stands cancelled.

9.3 ***Audit Courses:*** *Any student who wishes to pursue audit course can register for the same with the concerned teacher and attend to the classes regularly. No examination will be conducted, no grade will be given for the audit courses. However such of those students who have registered and got the requisite attendance of 75% in the audit course, it will be mentioned in their grade sheet.*

10. Transitory Regulations:

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

A regular student has to satisfy all the eligibility requirements within the maximum stipulated period of eight years, and a lateral entry student within six years, for the award of B.Tech Degree.

11. Grades, Grade Point Average and Cumulative Grade Point Average

11.1 ***Grade System:*** *After all the components and sub-components of any subject (including laboratory subjects) are evaluated, the final total marks obtained will be converted to letter grades on a* ***"10 point scale"*** *described below.*

% of marks obtained	*Grade*	*Grade Points(GP)*
90 to 100	*A+*	*10*
80 to 89	*A*	*9*
70 to 79	*B*	*8*
60 to 69	*C*	*7*
50 to 59	*D*	*6*
40 to 49	*E*	*5*
Less than 40 in sum of Internal &		

External (or) Less than 35 in External	*F*	*0*
Not Appeared	*N*	*0*

- ***Pass Marks:*** *A student is declared to have passed theory and/ or laboratory subject, if he secures minimum of 35% marks in external examination, and a minimum of 40% marks in the sum total of internal evaluation and external examination taken together. Otherwise he will be awarded fail grade – F in such subject irrespective of internal marks.*
- *F is considered as a fail grade indicating that the student has to pass the semester-end examination in that subject in future and obtain a grade other than F and N for clearing this subject.*

11.2 Grade Point Average (GPA):

Grade Point Average (GPA) will be calculated as given below on a "10 Point scale" as an Index of the student's performance at the end of each semester:

$$\boldsymbol{GPA = \frac{\sum(CXGP)}{\sum C}}$$

Where C denotes the credits assigned to the subjects undertaken in that semester and GP denotes the grade points earned by the student in the respective subjects.

11.3 Cumulative Grade Point Average (CGPA):

At the end of every semester, a Cumulative Grade Point Average (CGPA) on a 10 Point scale is computed considering all the subjects passed up to that point as an index of overall Performance up to that Point as given below:

$$\boldsymbol{CGPA = \frac{\sum(CXGP)}{\sum C}}$$

Where C denotes the credits assigned to subjects undertaken upto the end of the current year/semester and GP denotes the grade points earned by the student in the respective courses.

11.4 Grade Sheet: *A grade sheet (Marks Memorandum) will be issued to each student Indicating his performance in all subjects registered in that semester Indicating the GPA and CGPA. GPA and CGPA will be rounded off to the*

second place of decimal.

12. Consolidated Grade Sheet: *After successful completion of the entire Program of study, a Consolidated Grade Sheet containing performance of all academic years will be issued as a final record. Transcripts will also be issued, if required, after payment of requisite fee.*

13. Award of Degree **:** *The Degree will be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Ananthapuramu on the recommendation of the Principal of SVCET (Autonomous), Chittoor.*

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

- *Registered and successfully completed all the components prescribed in the program of study for which he is admitted.*
- *Successfully acquired the minimum required credits as specified in the curriculum corresponding to the branch of study within the stipulated time.*
- *Obtained CGPA greater than or equal to 5.0 (Minimum requirement for declaring as passed.)*

13.2 Award of Class **:** *Declaration of Class is based on CGPA.*

Cumulative Grade Point Average	***Class***
≥7.0	*First Class with Distinction*
≥6.0 and<7.0	*First Class*
>5.0 and <6.0	*Second Class*
5.0	*Pass Class*

14. **With – Holding of Results:** If the candidate has not paid dues to the university/ college or if any case of in-discipline is pending against him, the result of the candidate shall be withheld and he will not be allowed / promoted into the next higher semester. The issue of degree is liable to be withheld in such cases.

15. Additional academic regulations:

i. *A regular student has to complete all the eligibility requirements within the maximum stipulated period of eight years, and a lateral entry student within six years.*

ii. *A student can appear for any number of supplementary examinations till he clears all subjects within the stipulated period.*

iii. *A grade sheet (marks memorandum) will be issued to the student indicating his performance in all the courses of that semester along with the GPA and CGPA.*

iv. *Any canvassing / impressing the administration, examiners, faculty or staff in any form, the candidate is liable for punishment as per the mal practice rules appended here with.*

v. *When a student is absent for any examination (internal or external) he is treated as to have appeared and obtained zero marks in that component (course) and grading is done accordingly.*

vi. *When a component is cancelled as a penalty, he is awarded zero marks in that component.*

16. Amendments to regulations:

The Academic Council of Sri Venkateswara College of Engineering and Technology (Autonomous) reserves the right to revise, amend, or change the Regulations, Scheme of Examinations, and / or Syllabi or any other Policy relevant to the needs of the society or industrial requirements etc.., without prior notice.

17. General:

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

Note: Failure to read and understand the regulations is not an excuse.

SRI VENKATESWARA COLLEGE OF ENGINNERING & TECHNOLOGY

(AUTONOMOUS)

(AFFILIATED TO JNTUA, ANANTAPUR)

RULES FOR DISCIPLINARY ACTION FOR MALPRACTICE / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices / Improper conduct	Punishment
	If the candidate	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year.

		The Hall Ticket of the candidate is to be cancelled.
3.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that Semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that Semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the

		candidate is subject to the academic regulations in connection with forfeiture of seat.
6.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that Semester/year. The candidate is also debarred and forfeits of seat.
7.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the impostor is an outsider, he will be handed over to the police and a case is

		registered against him.
8.	Refuses to obey the orders of the Chief Superintendent / Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in-charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction or property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be

		handed over to police and, a police case will be registered against them.
10.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Examination committee for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.

PROGRAM OUTCOMES

1. An ability to apply the knowledge of Mathematics, Science and Engineering, fundamentals to solution of complex Engineering problems in Electrical Engineering.
2. An ability to identify and analyse a problem, and formulate complex engineering problems using principles of Mathematics, Basic and Engineering sciences.
3. An ability to design, implement, and evaluate a computer based system, process, component, or program to meet the desired needs for the appropriate consideration for the public health and safety, cultural, societal and environmental issues.
4. An ability to conduct experiments, to analyze and interpret data and synthesis of the information to provide valid conclusions.
5. An ability to create, select and apply modern engineering tools and techniques, resources for modeling of complex Electrical Engineering problems.
6. An ability to analyze the local and global impact of computing on individuals, organization, and society.
7. An understanding of the impact of advancements in the field of Electrical Engineering on the environment and its sustainability.
8. An understanding of professional, ethical, legal, safety and security, social issues and norms of the Electrical Engineering practices.
9. An ability to function effectively as individual, as a member or leader in diversified teams and multidisciplinary areas.
10. An ability to communicate effectively complex engineering activities with the engineering community and society.
11. An understanding of Electrical Engineering and management principles and apply these to one's own work, as a member or leader in a team, to manage projects.
12. An ability to engage in continuous professional development through lifelong learning.

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)
R.V.S. NAGAR, CHITTOOR-517127. A.
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
REVISED SCHEME OF INSTRUCTIONS FROM I B.Tech TO IV B.Tech (EEE) – R14

I B.Tech, I Semester

S. No	Course Code	Subject	Hours / Week			Credits	Maximum Marks		
			L	T	P		Internal	External	Total
1	14AHS02	Engineering Mathematics-I	3	1	-	3	30	70	100
2	14AHS04	Engineering Physics	3	1	-	3	30	70	100
3	14AHS05	Environmental Science	3	1	-	3	30	70	100
4	14AEE01	Electrical Circuits-I	3	1	-	3	30	70	100
5	14ACS02	Programming in C & Data Structures	3	2	-	4	30	70	100
6	14AHS09	Engineering Physics Lab	-	-	3	2	30	70	100
7	14AME03	Engineering Workshop	-	-	3	2	30	70	100
8	14ACS04	C & Data Structures Lab	-	-	3	2	30	70	100
		TOTAL	15	6	9	22	240	560	800

I B.Tech, II Semester

S. No	Course Code	Subject	Hours / Week			Credits	Maximum Marks		
			L	T	P		Internal	External	Total
1	14AHS01	Technical English –I	3	-	-	3	30	70	100
2	14AHS06	Engineering Mathematics –II	3	1	-	3	30	70	100
3	14AHS03	Engineering Chemistry	3	1	-	3	30	70	100
4	14AME01	Engineering Drawing	2	-	4	4	30	70	100
5	14AEC01	Electronic Devices & Circuits	3	1	-	3	30	70	100
6	14AHS07	Technical English Lab-I	-	-	3	2	30	70	100
7	14AHS08	Engineering Chemistry Lab	-	-	3	2	30	70	100
8	14AEC02	Electronic Devices & Circuits Lab	-	-	3	2	30	70	100
		TOTAL	14	3	13	22	240	560	800

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II B.Tech, I Semester

S. No	Course Code	Subject	Hours / Week			Credits	Maximum Marks		
			L	T	P		Internal	External	Total
1	14AHS11	Engineering Mathematics –III	3	1	-	3	30	70	100
2	14AHS12	Managerial Economics and Financial Analysis	3	1	-	3	30	70	100
3	14ACE11	Fluid Mechanics and Hydraulic Machinery	3	1	-	3	30	70	100
4	14AEC05	Switching Theory And Logic Design	3	1	-	3	30	70	100
5	14AEE04	Electrical Circuits – II	3	1	-	3	30	70	100
6	14AEE05	Electrical Machines –I	3	1	-	3	30	70	100
7	14AEE07	Electrical Circuits Lab	-	-	3	2	30	70	100
8	14AEE08	Electrical Machines-I Lab	-	-	3	2	30	70	100
		TOTAL	18	6	6	22	240	560	800

II B.Tech, II Semester

S. No	Course Code	Subject	Hours / Week			Credits	Maximum Marks		
			L	T	P		Internal	External	Total
1	14AEC15	Analog and Digital Electronic Circuits	3	1	-	3	30	70	100
2	14AEC06	Signals & Systems	3	1	-	3	30	70	100
3	14AEE10	Generation of Electrical Power	3	1	-	3	30	70	100
4	14AEE11	Electromagnetic Fields	3	1	-	3	30	70	100
5	14AEE12	Electrical Measurements and Instrumentation	3	1	-	3	30	70	100
6	14AEE13	Electrical Machines-II	3	1	-	3	30	70	100
7	14AEC16	Pulse and Digital Circuits Lab	-	-	3	2	30	70	100
8	14AEE16	Electrical Measurements and Instrumentation lab	-	-	3	2	30	70	100
		TOTAL	18	6	6	22	240	560	800
	14AHS15	Quantitative Aptitude and Reasoning – I (Audit Course)	3	-	-	-	-	-	-

III B.Tech, I Semester

S. No	Course Code	Subject	Hours / Week			Credits	Maximum Marks		
			L	T	P		Internal	External	Total
1	14AEE18	Transmission of Electrical Power	3	1	-	3	30	70	100
2	14AEE19	Power Electronics	3	1	-	3	30	70	100
3	14AEE20	Control Systems	3	1	-	3	30	70	100
4	14AEC20	Microprocessors & Microcontrollers	3	1	-	3	30	70	100
5	14AEE21	Electrical Machines –III	3	1	-	3	30	70	100
6	14AEE22	Switch Gear & Protection	3	1	-	3	30	70	100
7	14AEE23	Electrical Machines –II Lab	-	-	4	2	30	70	100
8	14AEE24	Control Systems Lab	-	-	4	2	30	70	100
9	14AEE25	Comprehensive online Examination	-	-	-	1	-	100	100
		TOTAL	18	6	8	23	240	660	900
	14AHS16	Quantitative Aptitude and Reasoning – II (Audit Course)	3	-	-	-	-	-	-

III B.Tech, II Semester

S. No	Course Code	Subject	Hours / Week			Credits	Maximum Marks		
			L	T	P		Internal	External	Total
1	14AHS13	Technical English –II	**3**	**1**	**-**	**3**	**30**	**70**	**100**
2	14AEE26	Power Semiconductor Drives	**3**	**1**	**-**	**3**	**30**	**70**	**100**
3	14AEE27	Power System Analysis	**3**	**1**	**-**	**3**	**30**	**70**	**100**
4	14AEE28	Electric Power Distribution	**3**	**1**	**-**	**3**	**30**	**70**	**100**
5	14AEC28	Digital Signal Processing	**3**	**1**	**-**	**3**	**30**	**70**	**100**
CHOICE BASED INTER DEPARTMENT COURSES									
6	14ACS12	Object oriented programming through java	**3**	**1**	**-**	**3**	**30**	**70**	**100**
	14AEC30	Basic Communication Systems							
	14AME58	Robotics							
7	14AHS14	Technical English Lab – II	**-**	**-**	**4**	**2**	**30**	**70**	**100**
8	14AEC32	Microprocessors & Microcontrollers Lab	**-**	**-**	**4**	**2**	**30**	**70**	**100**
9	14AEE29	Comprehensive online Examination	**-**	**-**	**-**	**1**	**-**	**100**	**100**
		TOTAL	**18**	**6**	**6**	**23**	**240**	**660**	**900**
	14AMB01	Management Science (Audit Course)	**3**	**-**	**-**	**-**	**-**	**-**	**-**

IV B.Tech, I Semester

S. No	Course Code	Subject	Hours / Week			Credits	Maximum Marks		
			L	T	P		Internal	External	Total
1	14AEE30	Renewable Energy Sources and Smart Grid Technology	**3**	**1**	**-**	**3**	**30**	**70**	**100**
2	14AEE31	Utilization of Electrical Energy	**3**	**1**	**-**	**3**	**30**	**70**	**100**
3	14AEE32	Advanced Control Systems	**3**	**1**	**-**	**3**	**30**	**70**	**100**
4	14ACS15	Data Base Management Systems	**3**	**1**	**-**	**3**	**30**	**70**	**100**
CHOICE BASED CREDIT COURSES (DEPARTMENT SPECIFIC)									
5	14AEE33	Power systems operation & control	**3**	**1**	**-**	**3**	**30**	**70**	**100**
	14AEE34	High Voltage Engineering							
	14AEE35	Design of Electrical Systems							

S. No	Course Code	Subject	Hours / Week			Credits	Maximum Marks		
			L	L	L		Internal	External	Total
CHOICE BASED CREDIT COURSES (DEPARTMENT SPECIFIC)									
6	14AEE36	HVDC Transmission	**3**	**1**	**-**	**3**	**30**	**70**	**100**
	14AEE37	Soft Computing Techniques							
	14AEE38	Energy Auditing and Demand Side Management							
7	14AEE39	Power Electronics & Drives Lab	**-**	**-**	**4**	**2**	**30**	**70**	**100**
8	14AEE40	Electrical systems and Simulation Lab	**-**	**-**	**4**	**2**	**30**	**70**	**100**
		Total	**18**	**6**	**8**	**22**	**240**	**560**	**800**
	14AMB02	Professional Ethics (Audit Course)	**3**	**-**	**-**	**-**	**-**	**-**	**-**

IV B.Tech, II Semester

S. No	Course Code	Subject	Hours / Week			Credits	Maximum Marks		
			L	T	P		Internal	External	Total
MOOC – I									
1		Subject-I				3	30	70	100
		Subject-II							
		Subject—III							
		Subject-IV							
MOOC – II									
2		Subject-I				3	30	70	100
		Subject-II							
		Subject—III							
		Subject-IV							
3	14AEE42	Comprehensive Viva - Voce	-	-	-	2	-	100	100
4	14AEE43	Project Work	-	-	-	12	60	140	200
		Total	**-**	**-**	**-**	**20**	**120**	**380**	**500**

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I B.Tech, I Semester

L	T	P	C
3	1	-	3

14AHS02 ENGINEERING MATHEMATICS – I
(Common to all branches)

Objectives:

1. *Model a wide range of engineering and practical problems as ordinary differential equations.*
2. *Apply fundamental mathematical principles as well as computational techniques to the problems of engineering and scientific practice.*
3. *Formulate the engineering problems in vectorial form.*

UNIT-I

DIFFERENTIAL EQUATION: Linear and Bernoulli's Equations – Non - homogenous Linear Differential equation of second and higher order with constant co-efficients, Newton's law of cooling L-R-C Circuits.

UNIT-II

FUNCTIONS OF SEVERAL VARIABLES: Maxima and Minima for functions of two variables – Lagrange's method of multipliers of 3 variables only.

CURVE TRACING: Cartesian and polar curves.

RADIUS OF CURVATURE: Cartesian and polar curves.

UNIT-III

APPLICATIONS OF INTEGRATION: Length of an arc and area using line integral.

MULTIPLE INTEGRALS: Double and Triple integrals-Change of variables-Change of Order of integration(Cartesian and polar forms), Surface area and volume of solid of revolution.

UNIT-IV

LAPLACE TRANSFORMS: Laplace transforms of standard functions - First Shifting Theorem - Transforms of derivatives and integrals- Unit step Function – Second Shifting Theorem – Laplace transforms of Periodic functions – Inverse Laplace transforms - Convolution theorem.

UNIT-V

VECTOR CALCULUS: Gradient, Divergence, Curl and their properties (without identities).

VECTOR INTEGRATION: Line Integrals – Potential functions - Area, Surface and Volume integrals - Green's theorem- Stoke's theorem& Gauss Divergence theorems (without proof) – Problems on Green's, Stoke's and Gauss's Theorem

Text Books:

1. B.V.Ramana:*A Text book of Engineering Mathematics-I*, Tata Mc Grawhill
2. T.K.V.Iyengar, B.Krishna Gandhi and others:*A Text book of Engineering Mathematics –I*, S.Chand and company.
3. C.Sankaraiah: *A Text book of Engineering Mathematics*, VGS book links
4. E.Rukmangadachari and Keshava Reddy:, *A Text book of Engineering Mathematics-I*, Pearson Education

References:

1. Dr.B.S.Grewal:*Higher Engineering Mathematics*.
2. Thomson:*A Text book of Engineering Mathematics*, Book Collection
3. N.Bail, M.Goyal & C.Walking:*A Text book of Advanced Engineering Mathematics-A computer approach.*

Outcomes:

After completion of the course the student will be able to

1. *Comprehend the areas of application of differential equations.*
2. *Apply the principles of differential equations, functions of variables separable, integration, Laplace transforms and vector calculus to the engineering and scientific problems.*
3. *Obtain their solutions using various computational methods.*

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L	T	P	C
3	1	-	3

14AHS04 ENGINEERING PHYSICS
(Common to EEE, ECE, CSE & IT)

Objectives:

1. *To introduce basic physics concepts relevant to different branches of Engineering and Technology*
2. *To prepare graduates in understanding the basic principles of Modern Optics, Solid State Physics and their possible applications.*
3. *They shall also understand the role of the physics in the development of newer innovations and technologies.*

UNIT I

OPTICS: Interference- Interference in thin films by reflection – Newton Rings. Diffraction- Fraunhofer diffraction due to single slit-Diffraction Grating.

MODERN OPTICS: Introduction to lasers – Characteristics of lasers – Spontaneous and stimulated emission of radiation – Einstein's coefficients – population inversion –Ruby laser - He-Ne laser Applications of laser. Introduction to fiber optics – Principle of optical fiber – Acceptance angle and acceptance cone – Numerical aperture – Classification of Optical Fibers- Attenuation in optical fibers – Optical fiber communication system- Applications of optical fibers.

UNIT II

CRYSTAL STRUCTURES AND X-RAY DIFFRACTION: Introduction – Space lattice – Basis – Unit cell – Lattice parameter – Crystal systems – Bravais lattices – Structure and packing fractions of Simple cubic, body centered cubic, face centered cubic crystals-Directions and planes in crystals – Miller Indices – Separation between successive [h k l] planes – Bragg's law-X-Ray Diffraction by Powder method.

ULTRASONICS: Introduction – Production of ultrasonic's by piezoelectric method – Properties and detection of Ultrasonic waves – Applications in non-destructive testing.

UNIT III

PRINCIPLES OF QUANTUM MECHANICS: Wave and particles – de Broglie hypotheses – Matter waves – Schrödinger time independent wave equation – Physical significance of wave function – Particle in one dimensional box.

FREE ELECTRON THEORY: Classical free electron theory – Equation for electrical conductivity - Quantum free electron theory – Fermi-Dirac distribution – Kronig-Penny model (qualitative)

UNIT IV

DIELECTRIC PROPERTIES: Introduction – Dielectric constant – Electronic, Ionic and Oriental polarizations (qualitative) – Local Field- Clausius - Mossotti equation – Piezoelectricity - Ferroelctricty.

MAGNETIC PROPERTIES: Introduction – magnetic moment – Classification of magnetic materials – Hysteresis curve – Hard and Soft Magnetic Materials-Applications.

UNIT V

SEMICONDUCTORS: Introduction – Intrinsic and extrinsic Semiconductors–Fermi level-Equation of conductivity - Drift and diffusion – Einstein's equation – Hall Effect.

SUPERCONDUCTORS: General properties of superconductors – Meissner effect – Penetration depth – Type I and Type II superconductors – Flux quantization – Josephson effect – Application of superconductors.

NANOMATERIALS: Introduction– Basic principles of nanomaterials – Growth of nanomaterials: Sol-Gel method-Chemical vapor deposition–Properties of nanomaterials-Carbon Nano Tubes -Application of carbon nano tubes and nanomaterials.

Text Books:

1. Avadhanulu and Kshirasagar:*A Text book of Engineering Physics*, Revised Edition, S.Chand, New Delhi 2014
2. Gaur and Gupta:*Engineering Physics,* New Delhi, DhanpatRai Publishers, 2010
3. K. Thyagarajan: *Engineering Physics*,Delhi, Tata Mcgraw Hill Publishers, 2013.

Reference Books:

1. Pillai.S.O: *Solid State Physics*, 6thedition, New Delhi, New Age International, 2005.
2. Chattopadhyay, K.K, Banerjee,A.N: *Introduction to Nano Science and Technology*, New Delhi, PHI,2009 .
3. Resnick, Halliday and Walker: *Fundamentals of Physics*, 9th Edition, New Delhi, Wiley Publishers, 2010.

Outcomes:

1. *Graduates will able to apply the knowledge of Physics in the field of Communications, Electrodynamics, Solid State Physics and Optics.*
2. *The acquaintance of basic physics principles would help the engineers to develop or understand the working of different tools and devices*
3. *It equips the students with the fundamental knowledge of physics together with the problem solving skills and understanding.*

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I B.Tech, I Semester

L	T	P	C
3	1	-	3

14AHS05 ENVIRONMENTAL SCIENCE
(Common to EEE, ECE, CSE & IT)

Objectives:

1. *To study about conservation of natural resources, environmental monitoring & remediation, Industrial waste management and public health.*
2. *To develop analytical skills, critical thinking & demonstrate problem solving skills using scientific and engineering techniques.*
3. *To motivate the students to participate in environment protection and make man free from all sorts of environmental problems.*

UNIT-I

ENVIRONMENT AND NATURAL RESOURCE MANAGEMENT: Definition, Scope and Importance of Environmental Science, Need for Public Awareness, Components of Environment (Atmosphere, Hydrosphere, Lithosphere and Biosphere) Renewable and non-renewable Natural resources and associated problems: **Forest resources:** Use and over-exploitation, deforestation, case studies – 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. **Food resources**: Sources of food, impacts of overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. **Energy resources:** Renewable and Non-renewable energy resources

UNIT-II

ECOSYSTEMS: Concept of an ecosystem, Structure and function of an ecosystem (Producers, Consumers and decomposers) – Energy flow in the ecosystem – Food chains, food webs and ecological pyramids – Ecological Succession.

TYPES OF ECOSYSTEMS:

a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT-III

BIODIVERSITY AND ITS CONSERVATION: Introduction, Definition, Types of biodiversity (genetic, species and ecosystem diversity)- Bio-geographical classification of India, Values of biodiversity(Consumptive use, Productive use, Social use, Ethical use, Aesthetic and Option values)- India as a mega diversity nation-Hot spots of India-Threats to biodiversity(habitat loss, Poaching of wildlife, man-wildlife conflicts)-Endangered and endemic species of India-Conservation of biodiversity(In-situ and Ex-situ conservation of biodiversity).

UNIT-IV

ENVIRONMENTAL POLLUTION AND ACT'S: Definition, causes, effects and control measures of:
a. Air Pollution b. Water Pollution c. Soil Pollution d. Noise Pollution e. Thermal Pollution f. nuclear hazards.
Solid Waste Management: Causes, effects and control measures of urban and industrial wastes.
ACT'S: Environment Protection Act-Air (Prevention and Control of Pollution) Act-Water (Prevention and control of Pollution) Act-Wildlife Protection Act-Forest Conservation Act-
Disaster management: Floods, Earthquake, Cyclone and Landslides.

UNIT-V
SOCIAL ISSUES AND THE ENVIRONMENT: From unsustainable to sustainable development, Water conservation(rainwater harvesting, watershed management)-Resettlement and rehabilitation of people its problems and concerns, Environmental ethics, Global warming, Acid rain, Ozone layer depletion-Population growth, variation among nation, Population explosion-Family Welfare Programme -Environment and human health-Human Rights-Value Education-HIV/AIDS-Women and Child Welfare Programmes -Role of Information Technology in Environment and human health.
Field Work: Visit to local polluted site-Urban/Industrial.

Text Books:

1. Erach Bharucha: *Textbook of Environmental Studies for Undergraduate courses by from UGC.*
2. Dr.Raghavan Nambiar.K: *Text Book of Environmental Studies*,Sitech publications,2010.
3. Benny Joseph: *Environmental Studies* by Mc. Graw Hill Publications, 2010.

References:

1. Dr.Suresh, K.Dhameja: *Environmental Studies*, S.K. Kataria & Sons Publishers, 2012.
2. Sharma.J.P: *Comprehensive Environmental Studies*, Laxmi Publications, 2010.

Outcomes:
After completion of the course the student will be able to

1. *Develop critical thinking (or) observation skills and apply them in the analysis of a problem (or) question related to the environment.*
2. *Analyze and interpret the complex relationships between natural and human systems.*
3. *Analyze and interpret the fundamental physical, chemical and biological principles that govern natural process.*

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I B.Tech, I Semester EEE

L	T	P	C
3	1	-	3

14AEE01 ELECTRICAL CIRCUITS – I

Objectives:

1. *To understand the nature of different circuit elements, fundamental laws and network theorems, Electrical Circuit analysis which is the foundation for all subjects of the Electrical Engineering discipline.*
2. *To understand about phasor concepts of single phase circuits, and concept of self and mutual inductances, dot convention etc.*
3. *To know the application of locus diagrams in circuit analysis and Resonance in R-L-C circuits.*

UNIT I

INTRODUCTION TO ELECTRICAL CIRCUITS: Circuit Concept – R-L-C parameters – Voltage and Current sources – Independent and dependent sources - Source transformation – Voltage – Current relationship for passive elements – Kirchhoff's laws.

UNIT II

NETWORK REDUCTION TECHNIQUES & ANALYSIS: Series, parallel, series-parallel, star-to-delta or delta-to-star transformation - Node and Mesh analysis - concept of super node and super mesh for DC Circuits.

UNIT III

MAGNETIC CIRCUITS: Magnetic Circuits – Faraday's laws of electromagnetic induction – concept of self and mutual inductance – Dot convention – coefficient of coupling – composite magnetic circuit - Analysis of series and parallel magnetic circuits.

UNIT IV

SINGLE PHASE A.C CIRCUITS: R.M.S and Average values and form factor for different periodic wave forms, Steady state analysis of R, L and C (in series, parallel and series parallel combinations) with sinusoidal excitation – Concept of Reactance, Impedance, susceptance and Admittance – Phase and Phase difference – concept of power factor, Real and Reactive powers – J-notation, Complex and Polar forms of representation, Complex power.

UNIT V

LOCUS DIAGRAMS AND RESONANCE: Locus diagrams – series R-L, R-C, R-L-C and parallel combination with variation of various parameters – Resonance – series, parallel circuits, concept of band width and Q factor.

Text Books:

1. William Hayt and Jack E. Kimmerly: *Engineering circuit analysis*, Mc Graw Hill Company, 6thedition.
2. Alexander and sadiku: *Fundamentals of Electric circuits*, Mc-graw Hill

References:

1. S.Sudhakar, P.S.M.Satyanarayana: *'Electrical Circuits'*, TMH Publication.
2. Nahvi and Edminister: *Electric circuits*, Schaum's outline series, Tata Mc-graw Hill
3. wincent &Deltoro: *Principles of Electrical Engineering*-PHI, 2010.

Outcomes:

After completion of this course, the student will be able to:

1. *Apply circuit analysis techniques in study of other courses like electrical circuits, design of electrical machines and power systems analysis.*
2. *To apply the circuit concept in modelling of any physical system and performance for steady state analysis.*
3. *To study the system performance for steady state analysis.*

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	L	T	P	C
I B.Tech, I Semester	**3**	**2**	**-**	**4**

14ACS02 PROGRAMMING IN C AND DATA STRUCTURES
(Common to EEE & ECE)

Objectives:

1. *Enable the students to understand problem solving techniques.*
2. *Understand the syntax and semantics of C programming language and other features of the language.*
3. *Design and develop algorithms and flowcharts for solving a problem.*
4. *Be familiar with the importance of basic data structures, searching and sorting techniques.*

UNIT – I
INTRODUCTION TO COMPUTER PROBLEM SOLVING, ALGORITHM/ PSEUDO CODE, FLOWCHART AND C FUNDAMENTALS

Introduction to Computer problem solving: What is computer, Block diagram of Computer, Hardware Vs Software, Types of Programming Languages, The Problem Solving aspect, Top Down design, Implementation of algorithms.

Algorithm, Flowchart: Fundamental algorithms- Exchanging the values of two variables, Factorial computation, Sign function computation, Reversing the digits of an integer, Generating prime numbers.

C Fundamentals: Structure of a C program, A simple C program, C character set, Identifiers and keywords, Data types, Constants, Variables, Operators- Classification of operators, Expressions- Precedence and Associativity, Evaluation of expressions, Standard library functions, Statements - Input-Output statements (getchar, putchar, scanf, printf, gets and puts), Conditional statements (if, if-else, nested if, else-if ladder), Iterative Statements (for, while, do-while), Switch, Break, Continue, Goto statements with Simple C Programs , Compiling, Running and Debugging a C program.

UNIT – II
FUNCTIONS, ARRAYS, AND STRINGS

Functions: Defining a function, Accessing a function, Function prototypes, Passing arguments to a function, Parameter passing mechanisms - Call-by-value, Call-by-reference, Recursion, Storage classes (auto, static, register, extern), Macros.

Arrays: Declaration and Definition of an array, Processing an Array, Passing arrays to functions, Two-dimensional and Multi-dimensional arrays, Array techniques- Finding the k^{th} largest and Smallest element, Array order reversal, Removal of duplicates from an ordered array.

Strings: Defining and Initialization of Strings, NULL character, Reading and Writing a string , Processing the string , String handling functions, Character arithmetic.

UNIT – III
POINTERS, STRUCTURES AND UNIONS

Pointers: Fundamentals, Pointer declarations, Passing pointer to a function, Pointers and One-dimensional array, Dynamic memory allocation, Operations on pointers, Arrays of pointers, Passing functions to other functions, More about pointer declarations.

Structures and Unions: Declaration, Definition and Initialization of structures, Accessing structures, User-defined data type (typedef), Nested structures, Structures and pointers, Passing structures to functions, Unions, Enumerated Data type (enum), Bit-fields.

UNIT – IV

SEARCHING & SORTING, FILES

Searching & Sorting: Linear and Binary search methods, Bubble sort, Selection sort, Insertion sort, Quick sort.

Files: Significance of files, Opening and Closing a data file, Reading and Writing a data file, Processing a data file, Unformatted data files, Concept of binary files, File handling functions, Additional features – Command line parameters, Preprocessor directives.

UNIT – V

DATA STRUCTURES

Data Structures: Introduction to Data structures, Linear and Non-Linear data structures, Data abstraction, Stacks, Stacks using dynamic arrays, Queues, Circular queues using dynamic arrays, Evaluation of expressions using Stacks - Evaluating postfix expressions, Infix to Postfix conversion, Linked List - Singly linked list and chains, Representing chains in C, Doubly linked list and Circular linked list.

Text Books:

1. R.G. Dromey: *"How to Solve it by Computer",* Low Price Edition, Pearson Education India, 2008.
2. Behrouz A. Forouzan, Richard F. Gilberg: *"C Programming & Data Structures",* India Edition, Course Technology, 2010.

References:

1. D.A.Godse, A.P.Godse: "*C Programming and Data Structures*", First Edtion, Technical Publications, 2007.
2. Hanly: "*Programming in C and Data Structures (For Jntu)",* First Impression, Pearson Education India, 2009.
3. E Balagurusamy: *"C PROG & DATA STRUCTURES-JNTU",* Fourth Edition, Tata McGraw-Hill Education, 2009.
4. Yashavant P Kanetkar: *"Let Us C (Computer science series)",* 12th Edition, BPB Publications, 2010.

Outcomes:

After completion of this course, the student will be able to:

1. *Apply problem solving techniques in designing the solutions for a wide-range of problems.*
2. *Understand the basic concepts of pointers and structures.*
3. *Demonstrate the techniques for implementing applications using C programming.*
4. *Choose appropriate data structure and control statements depending on the problem to be solved.*

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I B.Tech, I Semester

L	T	P	C
-	-	3	2

14AHS09 ENGINEERING PHYSICS LAB
(Common to EEE, ECE, CSE & IT)

Objectives:

1. *To educate students about the basics of instrumentation, measurement, interpretation, and analysis.*
2. *To promote equipment/machinery handling skills and also to train the students with proper laboratory discipline.*
3. *To teach the behaviour of magnetic, semiconductor and optical materials/instruments and explain its properties and applications.*

ENGINEERING PHYSICSLAB:

A minimum of 10 experiments to be conducted during the academic year

1. Determine the wavelengths of given light source - Spectrometer.
2. Dispersive power of prism
3. Determine the wavelength of given laser source – Diffraction grating.
4. Determine the particle size by using laser source
5. Determine the thickness of thin wire by Interference.
6. Determine the radius of curvature of given plano convex lens by forming Newton Rings.
7. Magnetic field along the axis of a current carrying coil – Stewart and Gee's method.
8. Numerical Aperture of an optical fiber.
9. Bending losses in Optical Fiber.
10. Determine the wavelength of Laser source by using optical fiber.
11. Determination of Hall Coefficient and Carrier concentration in the given Semiconductor.
12. Determine the energy loss of ferromagnetic sample by plotting B-H curve
13. Energy gap of a given semiconductor.
14. Determine the Dielectric constant of Barium Titanate.

Outcomes:

After completion of this course, the student will be able to:

1. *Obtain and analyze scientific data from different physics laboratory instruments.*
2. *Develop their manipulative, observational and reporting skills.*
3. *Understand many modern devices and technologies based on optics, electrodynamics, semiconductors, lasers and optical fibers.*

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I B.Tech, I Semester

L	T	P	C
-	-	3	2

14AME03 ENGINEERING WORKSHOP
(Common to EEE, ECE, CSE & IT)

1.TRADES FOR EXERCISES:

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

2. TRADES FOR DEMONSTRATION:

a. Plumbing
b. Machine Shop
c. Metal Cutting

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

References:

1. P.Kannaiah, K.L.Narayana:*Work shop Manual*, SciTech Publishers.
2. Jeyapoovan, Saravana Pandian:*Engineering Practices Lab Manual*, 4/e Vikas
3. GHF Nayler:*Dictionary of Mechanical Engineering*, Jaico Publishing House.

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14ACS04 C AND DATA STRUCTURES LAB
(Common to EEE & ECE)

Objectives:

The main objective of conducting this lab is to enable the students to:

1. *Understand the various concepts of C language such as branching, loops, functions, input/output, arithmetic rules, arrays, pointers and files.*
2. *Apply the syntaxes of control and loop statements.*
3. *Solve problems of repetitive nature using loop structures.*
4. *Distinguish user-defined data types like structures and unions*

Week l

a) Sum of the individual digits means adding all the digits of a number. Ex: 123, sum of digits is 1+2+3=6.
Write a C program to find the sum of individual digits of a positive integer.

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

c) Prime number is a number which is exactly divisible by one and itself only Ex: 2, 3, 5, 7,…… Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
(Consider the operators +,-,*, /, % and use Switch Statement).

Week 2

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

b) In converting roman numeral to decimal number, we have to take the roman value as input. This value is converted into a it's equivalent decimal number. Ex: X=10. Write a C program to convert a Roman numeral to its decimal equivalent.

Week 3

a) Write C programs that use both recursive and non-recursive functions
   i) To find the factorial of a given integer. Factorial of a number is nothing but the multiplication of numbers from a given number to 1.
   ii) To find the GCD (greatest common divisor) of two given integers. GCD means Greatest Common Divisor. i.e. the highest number which divides the given number. Ex: GCD (12, 24) is 12.
   Formula: GCD= product of numbers / LCM of numbers

b) Towers of Hanoi problem means we have three towers Here source, intermediate and destination are the three towers. We have to transfer all the disks from source to destination towers. Here the restriction is not to place a big disk on smaller one. for this we use intermediate tower. Finally the arrangements in the destination tower must be as same as the disks in the source tower at first.
Write C programs that use recursive function to solve the Towers of Hanoi problem.

Week4

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

b) Write a C program that uses functions to perform the following using Arrays:
i) Addition of Two Matrices ii) Multiplication of Two Matrices

Week 5

a)Write a C program that uses functions to perform the following operations:
i) To insert a sub-string in to a given main string from a given position.
ii) To delete n Characters from a given position in a given string.

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

Week 6

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

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

Week 7

Write a C program that uses functions to perform the following operations:
i) Reading a complex number ii) Writing a complex number
iii) Addition of two complex numbers iv) Multiplication of two complex numbers
(Note: Represent complex number using a structure).

Week 8

Write C programs that use both recursive and non recursive functions to perform the Following searching operations for a Key value in a given list of integers:
i) Linear search ii) Binary search

Week 9

Write a C program that implements the following sorting methods to sort a given list of integers in ascending order
i) Bubble sort ii) Insertion Sort iii) Quick Sort

Week 10

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

b)Write a C program to reverse the first n characters in a file.
(Note: The file name and n are specified on the command line).

Week 11

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

b)Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).

Week 12

Write C programs that implement Stack (its operations) using Arrays.

Week 13

Write C programs that implement Queue (its operations) using Arrays.

Week 14

Write a C program that uses functions to perform the following operations on singly linked list: i) Creation ii) Insertion iii) Deletion iv) Traversal

Outcomes:

After performing this lab, the students should be able to:

1. *Confidently work on any C programming development environment.*
2. *Predict the behavior of variables using different types of storage classes.*
3. *Use file concept to read/write data in secondary storage area.*
4. *Develop programs in basic data structures such as linked lists, stacks and queues.*

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14AHS01 TECHNICAL ENGLISH-I
(Common to EEE, ECE, CSE & IT)

Objectives:

1. To improve the language proficiency of the students in English with an emphasis on LSRW Skills.
2. To strengthen the students to study academic subjects through theoretical and practical components of the syllabus.
3. To comprehend the growing demand for English in the modern world.
4. To enumerate the aims of teaching English in India.

UNIT-I
EMERGING TECHNOLOGIES: Solar Thermal Power-Cloud Computing

UNIT-II
ENVIRONMENTAL CONSCIOUSNESS: Climate Change- Green cover-Pollution

UNIT-III
ENERGY: Renewable and Non-Renewable sources-Alternative sources-Conservation-Nuclear Energy

UNIT-IV
ENGINEERING ETHICS: Challenger Disaster-Biotechnology-Genetic Engineering-Protection From Natural Calamities

UNIT-V
TRAVEL AND TOURSIM: Advantages and Disadvantages of Travel –Tourism - Atithi Devo Bhava-Tourism in India**.**

- **The teacher shall cover the following components which are given as exercises in the prescribed text book while teaching each of the five units listed above.**

REMEDIAL GRAMMAR:

1. Articles
2. Prepositions
3. Time & Tense
4. Sentence Construction-Strategies (avoiding Repetition and ambiguity)
5. Sentence Transformation (Degrees, Voice, Speech & synthesis)
6. Common Errors in English

VOCABULARY:

1. Roots-Prefixes-Suffixes(RPS Method)
2. Synonyms
3. Antonyms
4. Phrasal Verbs
5. Idioms
6. One-word substitutes

WRITING PRACTICE (COMPOSITION):

1. Paragraph-Writing(Descriptive, Narrative, Persuasive, Expository and Creative)
2. Summarizing
3. Note-Making and Note taking
4. Letter-Writing (Formal &Informal)
5. Report writing

Texts for classroom study:

(Prescribed Text book: Mindscapes-English for Technologies and Engineers, published by Orient Black Swan, 2012)

Reference Books:

1. M. Ashraf RizWi: *"Technical English Communication",* Tata Mc Graw Hill, Latest Edition.
2. V.R. Narayana Swamy: *"Strengthen Your Writing",* 1st edition, Orient longman, 2003.
3. Thomas Elliot Berry*:"The Most Common Mistakes in English Usuage",* 1st Edition, Tata McGraw Hill, 2004.
4. Margaret M Maison: "*Examine your English*", 1st edition, Orient Longman, 1999.
5. Andrea J Rutherford: *Basic communication skills for Technology*, Pearson Education, Asia.
6. MeenakshiRaman Sangeetha Sharma: *Technical communication*, Oxford
7. *Cambridge Internationalof Phrasal Verbs*, Cambridge.
8. Martin Hewings: *Essential English Grammar*, Cambridge
9. John Eastwood: *Oxford Practice Grammar*, Oxford.
10. Daniel Jones: *English Pronouncing Dictionary,* Oxford.

Question Paper Pattern:

From the prescribed text book without leaving any lessons:

1. Three mark questions **4 x 3 = 12M**
2. Ten Mark questions **2 x 10 = 20M**

Based on the Grammar exercises given in the prescribed Text Book.

3. Reading Comprehension – I **5M**
4. Synonyms & Antonyms **5M**
5. Prefixes & Suffixes **5M**
6. Tense Forms **4M**
7. Compound words **2M**
8. Prepositions & Articles **2M**
9. Idioms **2M**
10. Jumbled Sentences **5M**
11. Letter writing **8M**

Total **70M**

Outcomes:

1. *The students will learn the language by observing the rules of grammar, vocabulary and composition that are necessary.*
2. *Students are made to appreciate the intelligent and innovative use of rules in order to be able to generate creative output in tune with the demands of industry and the corporate world.*
3. *After the course, the students will improve their power of comprehension and the ability to express themselves through listening, reading, speaking and writing.*
4. The students will be able to distinguish between formal English and functional English.

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14AHS06 ENGINEERING MATHEMATICS – II
(Common to all branches)

Objectives:

1. *Conceptualize the basics and applications of matrices, interpolation, partial differential equations and transforms.*
2. *Model a wide range of engineering and practical problems into any of the above suitable forms.*
3. *Apply fundamental mathematical principles as well as computational techniques to the problems of engineering and scientific practice.*

UNIT-I

MATRICES: Rank of a matrix-Echelon form, Normal form -solution of linear system of homogeneous and non-homogeneous equations -Gauss elimination method.

Eigen values and Eigen vectors -Cayley-Hamilton theorem - Linear Transformations - Orthogonal transformations -Diagonalization of a matrix. Quadratic forms- Reduction of Quadratic form to Canonical form and their nature.

UNIT-II

SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS: Introduction - The Bisection method - The method of false position - Newton - Raphson method.

Curve Fitting: Fitting a straight line - Second degree curve- Exponential curve - Power curve by method of least squares.

Interpolation: Forward Differences - backward differences-Newton's forward and backward differences formulae for interpolation - Lagrange's interpolation formula - Inverse interpolation.

UNIT-III

Numerical differentiation-First and second order derivatives- Numerical integration-Trapezoidal rule - Simpson's 1/3 rule - Numerical solutions of ordinary differential equations by Taylor's series-Picard's method of successive Approximations - Euler's Method – Runge-Kutta Methods – Predictor - corrector method - Milne's method

UNIT-IV

FOURIER SERIES: Fourier series- Even and odd functions-Fourier series in an arbitrary interval - - Half-range Fourier sine and cosine expansions. Fourier integral theorem (statement) -Fourier sine and cosine integrals. Fourier Transforms - Fourier sine and cosine Transforms.

UNIT-V

PARTIAL DIFFERENTIAL EQUATIONS: Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions - Method of separation of variables - solution of one dimensional wave equation, heat equation and two – dimensional Laplace's equation.

Z-TRANSFORMS: Inverse Z-transforms – Properties - Damping rule- Shifting rule - Initial and final value theorems. Convolution theorem - Solution of difference equations by Z-transforms.

Text Books:

1. Iyengar T.K.V., Krishna Gandhi.B and others: *Mathematical Methods*, New Delhi, S.Chand & company,2012.
2. Sankar rao G.,Kesav Reddy.E: *Mathematical Methods*, International publishing house,Pvt.ltd
3. Sastry.S.S:*Introduction to Numerical analysis*, New Delhi, Prentice Hall of India,2003
4. Dr..Grewal.B.S: *Higher Engineering Mathematics*, New Delhi, Khanna Publishers,2004

References:

1. Erwin Kreyszig: *Advanced Engineering Mathematics*, John Wiley & Sons.
2. Jain.M.K, IyengarT.K.V,.Jain.R.K: *Numerical Methods for Scientific and Engineering Computation,* Newage International publishers.
3. Pal: *Mathematical Methods*, Oxford University Press, 2009.
4. Ranganatham.S, Prasad.M.S.S.N.,Ramesh Babu.V: *Numerical Analysis*, S.Chand & company
5. Sankaraiah.C: *Mathematical Methods*, Vijayawada, V.G.S Book links,2007.

Outcomes:

After completion of the course the student will be able to

1. *Comprehend the areas of application of matrices, interpolation, partial differential equations and transforms.*
2. *Apply the principles of matrices, curve fitting, partial differential equations, transforms etc. to the engineering and scientific problems.*
3. *Obtain their solutions using various computational methods.*

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I B.Tech, II Semester

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14AHS03 ENGINEERING CHEMISTRY
(Common to EEE, ECE, CSE & IT)

Objectives:

1. To study the effect of hard water and its treatment for various purposes, corrosion and control of metallic materials.
2. To study the engineering materials such as high polymers namely plastics, rubbers and their preparation, properties and applications along with lubricants, refractories & cement with its applications.
3. To study the calorific value of fuels, combustion of fuels, working of batteries, recharging of batteries, application of different fuel cells.

UNIT – I

WATER TECHNOLOGY: Hardness of Water and its unit of expression – Estimation of hardness in water by EDTA titration method – Numerical problems – Effect of different water impurities (Hardness, Dissolved Oxygen and Chlorides) on boiler troubles – Water softening methods – zeolite process – Ion Exchange process – Demineralization of Brakish Water – Electrodialysis and Reverse Osmosis.

UNIT – II

CHEMISTRY OF CORROSION: Dry and Wet corrosion – causes of corrosion – mechanism of corrosion – Galvanic series – Galvanic and Concentration cell corrosion – Factors influencing the corrosion – Control of corrosion – Cathodic protection – Sacrificial anodic and Impressed current cathodic protection – Electro Plating and Electroless plating (Copper and Nickel).

UNIT – III

MATERIALS CHEMISTRY:

Organic (High Polymers & Lubricants)

Plastics: Thermosetting and thermoplastics – Engineering applications and properties of PE, PTFE, PVC, Nylon and Bakelite.

Rubbers: Processing of Natural Rubbers – Vulcanization – Compounding of Rubber – Synthetic Rubber – Buna S, Buna N, Silicone rubber properties and applications.

Lubricants: Definition– Function of Lubricants – Classification of Lubricants – Properties of Lubricants (Viscosity Index – Flash and Fire point – Cloud and Pour point – Aniline point – Neutralization number – Mechanical strength).

Inorganic (Refractories & Cement)

Refractories: Definition – Classification – Important properties of refractories (Refractoriness, RUL, Thermal stability, Porosity, Dimensional stability and Mechanical strength).

Cement: Definition– Composition – Classification of cements – Setting and Hardening of cement.

UNIT – IV

FUELS AND COMBUSTION:

Fuels: Classification of Solid, Liquid and Gaseous fuels – Calorific value – HCV, LCV. Measurement of calorific value using Bomb calorimeter and Junkers gas calorimeter – Numerical problems – Fuel rating system – Octane and Cetane numbers and their influence on I.C. Engines.

Combustion: Combustion products and calculation of air requirement (numerical problems) – Flue gas analysis by Orsat's apparatus.

UNIT – V

ELECTROCHEMICAL CELLS: Electrochemical Cells – Standard electrode potential – Working principles and applications of different batteries – Dry cell, Lithium-ion cell, Lead-acid cell and Nickel-cadmium cell. Recharging of Batteries – Battery rating (A-h rating) – Working principles and applications of hydrogen-oxygen and methanol-oxygen fuel cells – Principle of solar cells.

Text Books:

1. Prof. K.N.Jayaveera, Dr.G.V.Subba Reddy and Dr.C. Ramachandraiah: *Chemistry for Engineers,* McGraw Hill Higher Education Hyd., 3rd edition, 2009.
2. S.S. Dara and S.S. Umare: *A text book of Engineering Chemistry,*S. Chand & Co. Ltd., 12th edition, 2010.
3. Jain & Jain: *A text book of Engineering Chemistry,* Dhanpat Rai Publishing Company, 15th edition, New Delhi, 2008.

References:

1. Dr. K. B. Chandrasekhar, Dr. U.N. Dash, Dr. Sujatha Mishra: *Engineering Chemistry,* ScitechPublications (India) Pvt. Limted, Hyderabad, 2009.
2. C.V. Agarwal, C. Parameswara Murthy and Andra Naidu: *Chemistry of Engineering Materials,* BS Publications, Hyderabad, 9th edition, 2006.

Outcomes:

After completion of the course students will be able to understand

1. *The impact of hard water and its removal, formation of corrosion, effect of corrosion and designing of corrosion resistance articles.*
2. *Selection of suitable engineering materials for specific applications.*
3. *selection of suitable fuels, calculation of air requirements for combustion of fuel, applications of different batteries and fuel cells.*

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14AME01 ENGINEERING DRAWING
(Common to CSE, ECE, EEE & IT Branches)
(First Angle Projection)

Objectives:

1. *To understand the importance of Engineering Drawing and get enhanced imagination capacity.*
2. *To understand the Use of Engineering Drawing instruments and improve free hand Lettering.*
3. *To understand the principles of orthographic projections and Preparation of pictorial drawings.*

INTRODUCTION: Drawing Instruments and their uses, BIS conventions, Lettering, Dimensioning and free hand practicing. Geometrical constructions – construction of polygons – drawing tangents – dividing a line into number of equal divisions.

UNIT-I

Principles of projection – both first and third angle – Projections of points – Projections of straight lines- lines inclined to both the principal planes, determination of true length and true inclinations.

UNIT-II

Projections of planes – inclined to both the principal planes.
Projection of regular solids – prisms, Pyramids, cylinders, tetrahedron and cones – axis inclined to one plane.

UNIT-III

Sections of solids such as prisms, pyramids, cylinders, tetrahedron and cones (solids in simple position) – True shape of the section.

UNIT-IV

Principles of isometric projection – isometric scale – isometric projection of planes and solids – conversion of orthographic views into isometric views and vice- versa.

UNIT-V

Development of surfaces of simple solids such as prisms, pyramids, cylinders, tetrahedron, cones and part solids.

Text Books:

1. Narayana K L and Kannaiah P: *Engineering Drawing,* Scitech Publications, Chennai 2012.
2. Bhatt N D and Panchal.V.M: *Engineering Drawing,* Revised Edition, Charotar Publications, 2010.

References:

1. Johle: *Engineering Drawing,* Tata McGraw-Hill, 2008.
2. Shah and Rana: *Engineering Drawing,* 2/e, Pearson Education, 2005.

FINAL EXAMINATION QUESTION PAPER PATTERN
(External Evaluation & Paper setting)
Paper Setting:

1. Two questions to be set from each unit in either or choice (All Questions carries equal marks)
2. Student has to answer all questions.

Outcomes:

After completion of this course, the student will be able to:

1. *Prepare pictorial drawings as per the standards.*
2. *Communicate his/her ideas effectively by using orthographic projections.*
3. *Prepare the development of surfaces of engineering objects.*

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14AEC01 ELECTRONIC DEVICES AND CIRCUITS
(Common to ECE & EEE)

Objectives:

1. *To understand operation of various Electronic devices such as Diodes, BJT, JFET and MOSFET.*
2. *To understand various applications of diode and special purpose electronic devices.*
3. *To understand the design of various biasing and amplifier circuits of BJT and JFET.*

UNIT-I

PN JUNCTION DIODE AND ITS APPLICATIONS:PN Junction Characteristics, biasing- band diagrams and current flow, Diode current equations under forward bias and reverse bias conditions, Junction breakdown in diodes and breakdown voltages, effect of temperature on diode characteristics, Junction capacitance under forward bias and reverse bias, V-I characteristics and Specifications of Zener Diode, simple Zener voltage regulator and its limitation - Half wave, Full wave and Bridge rectifiers - their operation, performance characteristics, various filters and their importance and analysis of C-filter.

UNIT-II

BIPOLAR JUNCTION TRANSISTOR: Construction, Principle of Operation, V-I characteristics, Current components and current flow in BJT, Modes of transistor operation, Early effect, BJT input and output characteristics in CB, CE CC configuration, Various BJT biasing techniques, Thermal runway and Thermal Stabilization, Stability factors, Bias stabilization and Compensation techniques.

UNIT-III

SMALL SIGNAL TRANSISTORS EQUIVALENT CIRCUITS: Small signal low frequency h-parameter model of BJT, Determination of h-Parameters from Transistor Characteristics, Measurement of h-Parameters, Analysis of CE, CB and CC configurations using exact h-parameters, Comparison of CB, CE and CC amplifier configurations.

UNIT-IV

JUNCTION FIELD EFFECT TRANSISTORS (JFET): JFET Construction, Operation & Current flow, Pinch-off voltage, V-I characteristics of JFET, Various biasing circuits for JFET, Low frequency small signal model of JFET, Analysis of CS amplifier.
MOSFETs: MOSFET Construction, Operation & Current flow, V-I characteristics of MOSFET in Enhancement and Depletion modes.

UNIT-V

SPECIAL PURPOSE ELECTRONIC DEVICES: Principle of Operation, and Characteristics of Tunnel Diode, Varactor Diode, Schottky BarrierDiode, Silicon Control Rectifier (SCR), Uni-Junction Transistor (UJT), Semiconductor photo devices - LDR, LED, Photo diodes & Photo transistors.

Text Books:

1. J. Millman & Christos C. Halkias: *Integrated Electronics,* TMGH Edition, 2008.
2. R.L. Boylestad and Louis Nashelsky: *Electronic Devices and Circuits,* Pearson/PrenticeHall, 10th Edition, 2009.
3. David A.Bell: *Electronic Devices and Circuits*, 5th edition, Oxford University Press, 2008.

References:

1. T.F. Bogart Jr., J.S.Beasley and G.Rico: *Electronic Devices and Circuits,* Pearson Education, 6th edition, 2008.
2. J.Millman, C.C.Halkias, and Satyabratha Jit, Millman's: *Electronic Devices and Circuits,* Tata McGraw Hill, 2nd Edition, 2008.

Outcomes:

After completion of this course, the student will be able to:

1. *Get working knowledge of various Semiconductor Devices like Diode, BJT, JFET, MOSFET, SCR & UJT.*
2. *Design and analyze the DC bias circuitry of BJT and FET*
3. *Design and analyze basic transistor amplifier circuits using BJT and FET.*

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14AHS07 TECHNICAL ENGLISH LAB – I
(Common to EEE, ECE, CSE & IT)

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

Objectives:

1. To train students to use language effectively in everyday conversations and to participate in group discussions to help them face interviews, and sharpen public speaking skills.
2. To expose the students to a varied blend of self-instructional, learner-friendly modes of language learning.
3. To enable them to learn better pronunciation following the principles of stress, intonation and rhythm.
4. To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required ability to face computer-based competitive exams such as GRE, TOEFL, GMAT etc.

SYLLABUS:

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

UNIT-I Organs of speech, speech mechanism, vowels, consonants, diphthongs, syllable division, word stress, intonation, phonetic transcription with support of speech solutions, dictionary practice with AHD & CALD software.

UNIT-II Speaking of past, present & Future, Role play-Graded exercise with support of exercises from English Mastery, TOEFL Mastery & CALD Software.

UNIT-III **FUNCTIONAL ENGLISH-I**

Situational conversation-Grader exercises with support of Rosetta Stone Software

UNIT-IV **FUNCTIONAL ENGLISH-II**

Situational conversation-Grader exercises with support of Rosetta Stone Software

- Greeting/Self-introduction
- Expressing the cause of something
- Describe a current situation
- Speaking traditions/customs/public issues
- Making plans for vacation
- Expressing of emotions
- Shopping –bargaining price and making purchases
- Making an appointment
- Naming foods and describing tastes
- Reporting other person's messages
- Requesting
- Asking for directions and describing
- Making suggestions, agreements and refusals

UNIT-V **GROUP DISCUSSIONS:**

Do's and Don'ts of a G.D, Speaking on Knowledge based, controversial or abstract topics.

References:

1. *English Language lab manual* prepared by the Department of English
2. T. Balasubramaniyam: *A Text Book of English Phonetics for Indian students,* Macmillan Ltd., 2000.
3. Sasikumar.V and P.V. Dhamija: *Spoken English: A Self-Learning Guide to Conversation Practice,* 34th Reprint. Tata MC Graw Hill. New Delhi,1993.
4. *English Pronouncing Dictionary*, Daniel Jones Current Edition with CD.
5. R.K. Bansal and J.B. Harrison: *Spoken English*, Orient Longman 2006 Edn.
6. *Speaking English Effectively*, Krishna Mohan & NP Singh (Macmillan)
7. J. Sethi, Kamlesh Sadan and & D.V. Jindal: *A Practical course in English Pronunciation, (with two Audio cassettes),* Prentice- Hall of India Pvt. Ltd., New Delhi.
8. *English Dictionary for Advanced Learners, (with CD)* international edn. Macmillan 2009.
9. E. Suresh Kumar, P. Sreehari: *A Handbook for English Language Laboratories,* Foundation Books, 2009.
10. *Delta's Key to the Next Generation TOEFL Test,* 6 audio CDs, New Age International Publishers, 2007.

Outcomes:

1. *The students will be able to recognize English sounds- Monophthongs, diphthongs and consonant sounds.*
2. *The students will appreciate and use correct pronunciation in English.*
3. *The pupils will distinguish between Received Pronunciation and Indian variety.*
4. *The lab course will make the students use English with correct stress and intonation patterns because English is a rhythmic language.*

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14AHS08 ENGINEERING CHEMISTRY LAB
(Common to EEE, ECE, CSE & IT)

Objectives:

To make the student understand the

1. *Process of estimation of metal ions like Iron, Copper and Calcium by titrometry; Evaluation of impurities like dissolved oxygen, oxidizable substances in water,*
2. *Process of determination of acidity and alkalinity of water sample, determination of lubricant properties like viscosity Index, Flash and Fire points,*
3. *Construction of simple phase diagram, determination of acid strength by conductometry and potentiometry.*

Any **TEN** of the following experiments

1. Estimation of Hardness of water by EDTA method.
2. Estimation of Dissolved Oxygen in Water.
3. Estimation of Chlorides in Water sample.
4. Determination of Chemical Oxygen Demand.
5. Determination of Acidity of Water sample.
6. Determination of Alkalinity of Water sample.
7. Estimation of Copper by EDTA method.
8. Estimation of Ferrous Ion by Potassium Dichromate method.
9. Determination of Flash and Fire point by using Pensky Marten's apparatus.
10. Determination of viscosity of oils through Redwood viscometer No.1.
11. Determination of viscosity of oils through Redwood viscometer No.2.
12. Determination of Eutectic temperature of Binary system (Urea-Benzoic acid).
13. Acid- Base titration by Conductometric method.
14. Redox titrations by Potentiometry.
15. Titration of Strong acid vs Strong base by Potentiometry.

Text Books:

1. Dr K. N. Jayaveera and K.B. Chandra Sekhar: *Chemistry Pre-lab manual,* S.M. Enterprizes Ltd., 2007.
2. *Vogel's Textbook of Quantitative Inorganic Analysis*, ELBS Edition, 1994.

Equipment Required:

1. Glassware: Burettes, Pipettes, Standard Flasks, Beakers, Measuring jars, BOD bottles and Reagent bottles.
2. Analytical balance,
3. Reflux Condensers,
4. Pensky Marten's apparatus,
5. Redwood viscometer,
6. Bomb calorimeter,
7. Conductometer, Potentiometer.

Outcomes:

After completion of practical's student will be able to

1. *Use volumetric analysis for the estimation of metal ions, hardness of water, dissolve oxygen in water, chlorides in water, oxygen demand for water, alkalinity and acidity of water,*
2. *The importance of viscosity index, flash point and fire point of lubricants,*
3. *Evaluation of eutectic temperature of binary system, the use of conduct meter and potentiometer.*

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14AEC02 ELECTRONIC DEVICES AND CIRCUITS LAB
(Common to ECE & EEE)

Electronic Workshop Practice:

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Coils, Gang Condensers, Relays, Bread Boards.
2. Identification, Specifications and Testing of active devices, Diodes, BJTs, JFETs, LEDs, LCDs, SCR, UJT.
3. Soldering Practice- Simple circuits using active and passive components.
4. Study and operation of Ammeters, Voltmeters, Transformers, Analog and Digital Multimeter, Function Generator, Regulated Power Supply and CRO.

List of Experiments
(For Laboratory Examination-Minimum of Twelve Experiments)

1. Study of CRO Operation and its Applications.
2. P-N Junction Diode Characteristics
   - Part A: Germanium Diode (Forward bias& Reverse bias)
   - Part B: Silicon Diode (Forward bias only)
3. Zener Diode Characteristics
   - Part A: V-I Characteristics
   - Part B: Zener Diode act as a Voltage Regulator
4. Rectifiers (without and with c-filter)
   - Part A: Half-wave Rectifier
   - Part B: Full-wave Rectifier
5. BJT Characteristics (CE Configuration)
   - Part A: Input Characteristics
   - Part B: Output Characteristics
6. BJT Characteristics (CB Configuration)
   - Part A: Input Characteristics
   - Part B: Output Characteristics
7. FET Characteristics (CS Configuration)
   - Part A: Drain (Output) Characteristics
   - Part B: Transfer Characteristics
8. SCR Characteristics.
9. UJT Characteristics.
10. LDR Characteristics.
11. LED Characteristics.
12. Transistor Biasing.
13. Frequency response of Common Emitter amplifier.
14. Frequency response of Common Collector amplifier.

15. Frequency response of Common Source amplifier.

Equipment required for Laboratory:

1. Regulated Power Supplies.
2. Analog/Digital Storage Oscilloscopes.
3. Analog/Digital Function Generators.
4. Digital Multimeter.
5. Decade Résistance Boxes/Rheostats.
6. Decade Capacitance Boxes.
7. Ammeters (Analog or Digital).
8. Voltmeters (Analog or Digital).
9. Active & Passive Electronic Components.
10. Bread Boards.
11. Connecting Wires.
12. CRO Probes etc.

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14AHS11 ENGINEERING MATHEMATICS-III
(Common to EEE and ECE)

Objectives:

1. *To introduce the special functions like β , γ functions*
2. *To understand the concepts of complex numbers and residual theorems.*
3. *To comprehend the different series and different theorems in respect of residues and conformal mapping functions.*
4. *To apply the above concepts to engineering applications*

UNIT-I

SPECIAL FUNCTIONS: Gamma and Beta Functions - their properties - Evaluation of Improper Integrals - Bessel and Legendre's functions – properties, Recurrence relations- Bessel's integrals. Legendre's Polynomials-Properties- Rodrigue's formula -Recurrence relation - Orthogonality.

UNIT-II

FUNCTIONS OF COMPLEX VARIABLE: Continuity-Differentiability-Analyticity- properties-Cauchy Riemann equations in Cartesian and polar coordinates-Harmonic conjugate harmonic functions-Milne Thompson method. Elementary Functions & their properties - e^z , sinz ,Cosz, logz and Coshz.

UNIT-III

COMPLEX INTEGRATION: Line integral - Cauchy's integral theorem - Cauchy's integral formula – General integral formula .

Power Series - Expansion in Taylor's series Maclaurin's series and Laurent's series

UNIT-IV

RESIDUES AND IMPROPER INTEGRALS:

Singular point - isolated singular point- pole of order m - Essential singularity. Residues - Residue theorem - Evaluation of integrals of the type

(a) improper real integrals $\int f(x)\,dx$ in $[-\infty,\infty]$

(b) $\int f(\cos\theta , \sin\theta)\, d\theta$ in $[c,c+2\Pi]$

(c) $\int e^{imx} f(x)\,dx$ in $[-\infty,\infty]$

UNIT-V

ARGUMENT PRINCIPLE AND CONFORMAL MAPPING:

Argument Principle – Rouche's theorem – Determination of number of zeros of complex polynomials - maximum Modulus principle - Fundamental theorem of algebra, Liouville's theorem. Conformal Mapping – Properties of conformal mapping- Translation-rotation - magnification and inversion –Special Transformations $e^{z,}$ lnz ,z^2,sinz,cosz,sinhz,coshz - Bilinear transformation - Determination of bilinear transformation mapping three given points.

Text Books:

1. Iyengar T.K.V, Krishna Gandhi .B and others:*A Text Book of Engineering mathematics*, Vol-III ,New Delhi, S.Chand & company.
2. Rukmangadachari. E., Kesava Reddy.E:*A Text Book of Engineering Mathematics –III*, Pearson Education

References:

1. Ramana .B.V:*A Text Book of Engineering Mathematics,* New Delhi, Tata Mc Graw Hill.2007.
2. Grewal B.S:*Higher Engineering Mathematics*, New Delhi, Khanna publication, 2004.
3. Ruel V Churchill and James Ward Brown, Complex Variables.Mc GraW-Hill Higher Education; 9 Edition 2013.
4. Erwin Kreysizing, Advanced Engineering Mathematics,10th Edition, John Willey & sons,2013.

Outcomes:

After completion of this course, the student will be able to:

1. *Understand simple closed contours and distinguish between the interior domain and the exterior domain which are separated by the simple closed contour.*
2. *Learn and apply properties of contour integrals in Engineering.*
3. *Apply the Cauchy's integral formula for engineering applications.*
4. *Understand and apply the Lowville's theorem, the mean-value property of a function and the maximum modulus principle in Engineering Sciences*

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14AHS12 MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Common to EEE, ECE, CSE & IT)

Objectives:

1. *Comprehend the fundamental concepts and theoretical principles of the Economics*
2. *The course equips the students to develop an economic way of thinking in dealing with practical business problems and challenges*
3. *Identify the basic economic events most common in business operations*
4. *Also enable the students by providing the basic knowledge of book keeping, accounting and make analysis of financial statements of a business organization.*

UNIT – I

INTRODUCTION TO MANAGERIAL ECONOMICS: Managerial Economics: Definition, Nature and Scope – Demand analysis: Law of demand, Demand determinants, Elasticity of Demand: Definition, Types, Measurement and Significance – Demand forecasting methods (Survey methods, Statistical methods, Expert opinion method, Test marketing, Controlled experiments, Judgmental approach)

UNIT – II

THEORY OF PRODUCTION AND COST ANALYSIS: Production function – Cobb Douglas Production function – Laws of Returns – Internal and External economies of scale.

COST ANALYSIS: Cost concepts, Fixed vs. Variable costs, Explicit vs. Implicit Costs, Out of Pocket costs Vs Imputed costs, Opportunity Cost and Sunk costs.

BREAK EVEN ANALYSIS: Concept of Break Even Point (BEP) – Break Even Chart – Assumptions underlying and Practical significance of BEP (Simple Problems).

UNIT – III

INTRODUCTION TO MARKETS AND BUSINESS ORGANIZATIONS: Market structures – Types of Competition – Features of perfect competition, Monopoly, Monopolistic competition – Price-Output Determination under perfect competition and Monopoly – Types of Business organization – Features, Merits and demerits of Sole proprietorship, Partnership and Joint stock companies – Types of companies – Public enterprises –Types and Features – Changing business environment in post – Liberalization scenario.

UNIT – IV

CAPITAL AND CAPITAL BUDGETING: Capital and its Significance – Types of capital – Estimation of fixed and working capital requirements – Methods and sources of raising capital – Capital Budgeting Methods**:** Payback Method, Accounting Rate of Return (ARR), and Net Present Value (NPV) Method (Simple Problems).

UNIT –V

FINANCIAL ACCOUNTING AND FINANCIAL ANALYSIS THROUGH RATIOS: Double entry book keeping – Journal – Ledger – Trial Balance –Trading Account and balance sheet with simple adjustments.

Ratio analysis: Computation of Liquidity Ratios (Current and Quick Ratio), Activity Ratios (Inventory Turnover Ratio and Debtor Turnover Ratio), Capital Structure Ratios (Debt-Equity Ratio and Interest Coverage Ratio) and Profitability Ratios (Gross Profit Ratio, Net Profit Ratio, Operating Ratio, P/E Ratio and EPS).

Text Books:

1. Aryasri A. R: *Managerial Economics and Financial Analysis,* 4/E, TMH, 2009.
2. Varshney R.L. and K.L. Maheswari: *Managerial Economics,* Sultan Chand & Sons, 19/E, 2009.
3. Siddiqui S.A. and Siddiqui A.S*: Managerial Economics and Financial Analysis,* New Age international, 2009.

References:

1. Gupta R.L: *Financial Accounting,* Volume I, Sultan Chand & Sons, New Delhi, 2001
2. James C. Van Horne: *Financial Management policy,* 12/E, PHI, 2001.
3. Joel Dean: *Managerial Economics,* PHI, 2001.

Outcomes:

After the completion of the course student will be able to

1. *Gain knowledge on managerial economics*
2. *Develop an understanding of economic principles and to enhance skills in high-level problem solving and critical thinking*
3. *Evaluate the economic environment and the impact of governmental economic policies on consumers and financial institutions.*
4. *Know the application of financial accounting in the field of Engineering.*

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14ACE11 FLUID MECHANICS AND HYDRAULIC MACHINERY

Objectives:

1. *The aim of this course is to introduce and explain basic fundamentals of Fluid Mechanics, which is used in various applications of Engineering.*
2. *To understand fluid properties, hydrostatic law, flow measurement and its applications in Industries and to obtain the loss of flow in a flow system.*
3. *To understand the dimensional analysis and boundary layer concepts.*
4. *To understand the working principles of hydraulic machinery.*

UNIT I

FLUID PROPERTIES: Dimensions and units - Definition of a fluid – Physical properties of fluids Density – Specific weight – Specific volume – Specific gravity – Compressibility – Vapour pressure – Surface tension and capillarity –Viscosity.

FLUID STATICS: Pascal's law – Pressure variation in a static fluid – Atmospheric, gauge and absolute pressures – Measurement of pressure – Piezometer – U–tube and inverted U–tube manometers – Bourdon's pressure gauge – Hydrostatic forces on plane and curved surfaces– Buoyancy-Buoyant Force and Centre of Buoyancy- Metacentre and Metacentric Height- Stability of Submerged and Floating Bodies- Determination of Metacentric Height.

UNIT II

Types of flow, velocity field, one and two-dimensional flow analysis, circulation and vorticity, stream function and velocity potential function, potential flow, standard flow patterns, combination of flow patterns, flow net.

Continuity equation, Euler's equation of motion, Bernoulli's equation and applications (Venturimeter and orifice meter). Impulse momentum equation and applications (pipe bend).

UNIT III

Equations of motion for laminar flow of a Newtonian fluid – Viscous flow – Navier – Stoke's equations, simple exact solutions for Hydrodynamic lubrication.

PIPE FLOW: Reynold's experiment – Reynold's - Minor losses in pipe flow - Darcy–Weisbach equation – Variation of friction Factor – Moody's chart – Pipes in series – Pipes in parallel.

UNIT IV

Dimensional Analysis as a tool in design of experiments, identification of non dimensional numbers and their significance, dimensional analysis methods.

Boundary Layer Theory – Formation, growth and separation of boundary layer – Integral momentum principles to compute drag and lift forces- Mathematical models for boundary layer flows.

UNIT V

HYDRAULIC TURBINES: Elements of hydroelectric power plants- Heads and efficiencies of turbines – Classification of turbines –Pelton wheel-Modern Francis turbine – Kaplan turbine. Main components and working principle - Expressions for work done and efficiency – Working proportions and design of each.

CENTRIFUGAL PUMPS: Classification and types of pumps – Components and working of a centrifugal pump – Work done by the impeller– Heads and efficiencies – Net positive suction

head(NPSH)- Priming – Priming devices – Minimum starting speed – Multistage pumps – Pumps in series and parallel – Submersible pumps – Limiting suction head – Cavitation – Expression for specific speed.

Text Books:

1. Dr.P.N. Modi & Dr.S.M. Seth, *Hydraulics and Fluid Mechanics including Hydraulic Machines*, New Delhi, Standard Book House, Delhi.
2. R.K.Bansal, *A text book of Fluid Mechanics and Hydraulic machinery*, 9th edition, Laxmi Publications (P) Ltd, 2010.

References:

1. Jagadish Lal, *Hydraulic Machines*, 9th edition, Metropolitan Book Company Pvt. Ltd, 2003.
2. Nachleba, *Hydraulic Turbines*, New Delhi, 1st edition, Tata Mc Graw Hill Publishing Co. Ltd, 2012.
3. Bernard Massey, *Mechanics of Fluids*, 5th edition, Taylor & Francis, 2012.

Outcomes:

After completion of this course the student will be able to:

1. *Apply how to find frictional losses in a pipe when there is a flow between two places.*
2. *Able to know types of flow and its measurements and applications.*
3. *Able to identify the suitable pump required for different purposes.*
4. *Able to Classify the turbines and design criteria based on water availability*

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14AEC05 SWITCHING THEORY AND LOGIC DESIGN
(Common to ECE and EEE)

Objectives:

1. *To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.*
2. *To introduce basic postulates of Boolean algebra and show the correlation between Boolean expressions.*
3. *To outline the formal procedures for the analysis and design of combinational circuits and sequential circuits.*
4. *To illustrate the concept of synchronous and asynchronous sequential circuits.*

UNIT I

NUMBER SYSTEM & BOOLEAN ALGEBRA: Digital systems, Binary Numbers, Number base conversions, Complements of numbers, Signed Binary numbers, Binary codes. Boolean algebra - Basic definition, Basic theorems and properties, Boolean Functions, Canonical & Standard forms, other logic operations & Digital logic gates.

UNIT II

GATE LEVEL MINIMIZATION: The map method, four variable K-map, five variable K-map, POS & SOP Simplification, Don't care conditions, NAND & NOR Implementation, Other two-level Implementations, Exclusive-OR Function, Tabular Method-Simplification of Boolean function using tabulation Method.

UNIT III

ANALYSIS AND SYNTHESIS OF COMBINATIONAL CIRCUITS: Combinational circuits, Analysis & Design procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude comparator, Decoder, Encoders, Multiplexers, De-multiplexers, Code Converters.

UNIT IV

ANALYSIS AND SYNTHESIS OF SEQUNTIAL CIRCUITS: Sequential Circuits, Latches, Flips-Flops, Analysis of Clocked sequential circuits, State Reduction & Assignment, Design procedure, Registers & Counters – Registers, Shift Registers, Ripple Counters, Synchronous counters, other counters.

UNIT V

ASYNCHRONOUS SEQUENTIAL LOGIC & PROGRAMMABLE MEMORIES: Introduction, Analysis Procedure, Circuits with Latches, Design Procedure, Reduction of State and flow tables, Race-free State Assignment, Hazards. Random Access Memory, Memory Decoding, Error detection and correction, ROM, PLA, PAL.

Text Books:

1. M.Morris Mano & Michel D. Ciletti, *"Digital Design",* Pearson, 5th Edition.
2. Zvi Kohavi and Nirah K.Jha, "*Switching theory and Finite Automata Theory*", Cambridge, 3rd Edition

Reference Books:

1. Subratha Goshal, *"Digital Electronics",* Cambridge.
2. Comer, "*Digital & State Machine Design*", Third Indian edition, OXFORD.

Outcomes:

After completion of the course, the student will be able to:

1. *Design and Analyze combinational and sequential circuits for various practical problems using basic gates and flip flops.*
2. *Implement LSI and MSI circuits using programmable logic devices (PLDs).*
3. *Demonstrate knowledge of hazards and race conditions generated within asynchronous circuits.*
4. *Implement synchronous state machines using flip-flops.*

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14AEE04 ELECTRICAL CIRCUITS-II

Objectives:

1. *To understand the phasor concepts of three phase circuits.*
2. *To understand the nature of different network theorems.*
3. *To study the transient behavior and steady state analysis of circuits.*
4. *To study the network topology and analysis of two-port networks.*

UNIT I

THREE PHASE CIRCUITS: Phase sequence – Star and delta connection – Relation between line and phase voltages and currents in balanced systems – Analysis of balanced and Unbalanced 3 phase circuits – Measurement of real and reactive power-Problems.

UNIT II

NETWORK THEOREMS (WITHOUT PROOFS): Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer, Millman's, Tellegen's, and Compensation theorems for D.C. and a.c. excitations**-**Problems**.**

UNIT III

TRANSIENT ANALYSIS: Transient response of R-L, R-C, R-L-C circuits (Series combinations only) for D.C. and sinusoidal excitations – Initial conditions - Solution using differential equation approach and Laplace transform methods. Response of RL, RC and RLC Series circuits for step function using Laplace Transform method-Problems..

UNIT IV

NETWORK TOPOLOGY: Basic Definitions – planar and nonplanar networks - Graph – Tree, Basic cutest and Basic Tie set – incidence matrices for planar networks – Loop and Nodal methods of analysis of Networks with independent voltage and current sources - Duality & Dual networks-Problems..

UNIT V

TWO PORT NETWORK PARAMETERS: Concept of Two port network - Two port network parameters: Impedance (Z), Admittance (Y), Transmission (ABCD) and hybrid parameters (h) and their relationship – Conditions for symmetry and Reciprocity (AD-BC=1)

Text Books:

1. William Hayt and Jack E. Kimmerly: *Engineering circuit analysis*, Mc Graw Hill Company, 6thedition.
2. A.Sudhakar, Shyam Mohan, S.Paki: *Network Theory,* Tata MC Graw Hill Company.
3. Alexander and sadiku: *Fundamentals of Electric circuits*, Mc-graw Hill

References:

1. Vanvalkenburg*: 'Network Analysis',* PHI.
2. S.Sudhakar, P.S.M.Satyanarayana: *'Electrical Circuits',* TMH Publication.
3. Nahvi and Edminister: *Electric circuits,* Schaum's outline series, Tata Mc-graw Hill

Outcomes:

After completion of this course, the student will be able to:

1. *To apply circuit analysis techniques in the study of electrical machine design.*
2. *To apply the circuit concepts in modeling of any physical system.*
3. *To study the system performance for transient analysis.*
4. *To apply the circuit analysis techniques in the study of power system analysis.*

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14AEE05 ELECTRICAL MACHINES-I

Objectives:

1. *To study the principles of energy conversion, Armature reaction and commutation, constructional details, principle of operation, Armature windings in DC machines.*
2. *To know the types of DC generators, Methods of excitation, characteristics and applications of DC generators.*
3. *To understand the load characteristics, load sharing and parallel operation of DC shunt and series generators.*
4. *To know the necessity of 3 point & 4 point of starters and their principle of operation, characteristics, speed control, testing and applications of DC Motors.*

UNIT I

D.C MACHINES: Principles of energy conversion - Forces and Torque in magnetic field systems – Constructional features - Principle of operation - Armature windings - Lap and wave windings - Simplex and Multiplex windings - Laminated Armature - E.M.F Equation - Armature reaction - Cross-magnetizing and de-magnetizing AT/pole - Commutation - Methods of improving commutation - Reactance voltage - Problems.

UNIT II

D.C GENERATORS: Types of Generators – Methods of Excitation - Separately excited and self-excited generator – Characteristics of Generators – Open Circuit Characteristics – Determination of Critical field resistance and critical speed - causes for failure of self excitation and remedial measures.

UNIT III

LOAD CHARACTERISTICS OF D.C GENERATORS: Load characteristics of shunt, series and compound generators - Parallel operation of D.C shunt generators - load sharing - Parallel Operation of dc Series generator - use of equalizer bar and cross connection of field winding - load sharing.

UNIT IV

D.C MOTORS: Operation of 3-point and 4-point starters - Principle of operation of DC Motor - Back E.M.F - Torque equation - characteristics and applications of shunt, series and compound motors - Speed control of D.C. Motors - Armature voltage and field flux control methods - Ward-Leonard system.

UNIT V

TESTING OF D.C. MACHINES: Testing of D.C machines Losses - Constant & Variable losses - Calculation of efficiency - Condition for maximum efficiency - Methods of testing - Direct, Indirect and Regenerative testing - brake test - Swinburne's test - Hopkinson test - Field's test - Retardation test - separation of stray losses into mechanical and magnetic losses.

Text Books:

1. Bimbra.P.S: *Electrical Machines,* Khanna Publishers.
2. Kamakshaiah.S: *Electromechanics-I*, Overseas publishers Pvt Ltd.
3. J.B.Gupta: *Theory and Performance of Electrical Machine,* S.K.Kataria & Sons Publishers.

References:

1. Clayton & Hancock: *Performance and Design of D.C. Machines*, BPB Publishers
2. Nagrath.I.J & Kothari.D.P: *Electric Machines*, Tata Mc Graw-Hill Publishers

Outcomes:

After completion of this course the student will be able to:

1. *Understand the basic principles of energy conversion, construction details, armature reaction and commutation of DC Machines.*
2. *Understand the operating principles and design aspects* of DC *machines.*
3. *Acquire knowledge about operating characteristics of DC generators, speed control of DC motors and their application in industry and domestic appliances.*
4. *Impart knowledge about testing and efficiency of DC machine.*

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14AEE07 ELECTRICAL CIRCUITS LAB

Objectives:

1. *To understand the nature of different network theorems.*
2. *To study the network and analysis of two-port networks.*
3. *To study the self, mutual inductance and coefficient of coupling.*
4. *To understand about phasor concepts of Locus diagrams and Resonance in R-L-C circuits.*

PART-A:

The following experiments are required to be conducted as compulsory experiments:

1. Verification of Superposition & Reciprocity theorems
2. Experimental determination of Thevenin's & Norton`s equivalent circuits and verification by direct test.
3. Verification of Maximum power transfer theorem in DC and AC Circuits with Resistive and Reactive Loads
4. Verification of Compensation & Millmann's theorem
5. Determination of self, Mutual inductance & Coefficient of coupling of pair of inductive coils.
6. Series & Parallel Resonance in RLC Network. Determination of Timing and Resonant frequency, Bandwidth and Q Factor of circuit
7. Current Locus diagram in RL and RC series circuit with variable R and C

PART-B:

Any three of the following experiments are required to be conducted:

8. Determination of Z & Y Parameters in Two Port Networks, Analytical Verification
9. Time response of First order RC/RL series Network for periodic non sinusoidal inputs. Determination of Time constant and steady state error
10. Measurement of active power in three phase circuit with star and delta connected balanced loads
11. Measurement of power in three phase by two wattmeter method for unbalanced star connected load
12. Determination of Transmission (ABCD) and Hybrid Parameters (h) in two port network, Analytical Verification

Outcomes:

After completion of this course the student will be able to:

1. *Understand the concept of two port networks and analysis of Z, Y and ABCD parameters.*
2. *Acquire the knowledge about the phenomenon of resonance in RLC circuits.*
3. *Understand the locus diagrams of RL and RC series circuits.*
4. *Determine the self, mutual inductance and co-efficient of coupling for pair of coils.*

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14AEE08 ELECTRICAL MACHINES –I LAB

Objectives:

1. *To understand the magnetic characteristics of DC machines and obtain experimentally*
2. *To acquire knowledge about Internal and External characteristics of DC generator*
3. *To test the different types of DC machines and determine their efficiency from different test results*
4. *To know the methods of speed control ,separating losses and efficiency of DC motor*

PART-A:

The following experiments are required to be conducted as compulsory experiments:

1. Magnetization characteristics (O.C.C) of dc shunt generator-Determination of critical field resistance and critical speed.
2. Load test on dc shunt generator- External characteristics of generator
3. Load test on dc compound generator –Determination of performance curves.
4. Swinburne's tests on dc shunt motor – Predetermination of efficiency as generator and motor.
5. Load test on dc shunt motor - Determination of performance curves.
6. Speed control of dc shunt motor - Armature voltage control.
   - Field control
7. Hopkinson's test

PART-B:

Any Three of the following experiments are required to be conducted:

8. Separation of losses on dc shunt motor
9. Field's test on dc series motor-Determination of efficiency
10. Retardation test on dc shunt motor- Determination of losses.
11. Load test on dc compound motor.
12. Load test on dc series generator.

Outcomes:

After completion of this course the student will be able to:

1. *Acquire knowledge about performance characteristics of DC machines.*
2. *Predetermine the losses and efficiency of DC machines.*
3. *Understand the speed control of DC shunt machine*
4. *Acquire knowledge about testing of DC machines.*

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14AEC15 ANALOG AND DIGITAL ELECTRONIC CIRCUITS

Objectives:

1. *To introduce the basic building blocks of linear integrated circuits and various applications of Op-Amp.*
2. *To learn the theory and applications related to Analog Filters, Timers and PLL.*
3. *To design and analyze various RC Circuits & Multivibrator Circuits.*
4. *To design various combinational logic circuits and sequential logic circuits.*

UNIT-I

LINEAR WAVESHAPING-CLIPPERS & CLAMPERS: High Pass,Low Pass RC circuits and their response for Sinusoidal, Step, Pulse, Square and Ramp inputs. Diodes Clippers, Transistor Clipper, 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, Practical Clamping circuits, Effect of Diode characteristics on clamping voltage and Transfer characteristics of clampers.

UNIT –II

SWITCHING CHARACTERSTICS OF DEVICES & MULTIVIBRATORS: Transistor as a Switch, Breakdown Voltage considerations of transistor, Saturation parameters of Transistors and their variations with temperature, Design of Transistor Switch, Transistor Switching Times. Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using transistors.

UNIT –III

LINEAR & NON-LINEAR APPLICATIONS OF OP-AMPS: Integrated Circuits, Types, Classification, Package Types and Temperature Ranges, Power Supplies for Op-Amp, Block Diagram of Op-Amp, Ideal and Practical Op-Amp Specifications, Characteristics of OP Amps,DC and AC Characteristics, 741 Op-Amp & its features, FET Input Op-Amps, Op-Amp parameters & Measurements .Inverting and Non Inverting Amplifiers, Difference Amplifier, Instrumentation Amplifier, Integrator and Differentiator and Buffers .Non-Linear function generation: Comparators, Multivibrators, Triangular and Square Wave Generators.

UNIT –IV

TIMERS: Introduction to 555 Timer, Functional diagram, Astable and Monostable Operation and its Applications.

BIPOLAR LOGIC & CMOS LOGIC: Introduction to Logic Families, Bipolar Transistor Logic TTL families, Emitter Coupled Logic, Comparison of various Logic Families, Familiarity with standard 74XX and CMOS 40XX Series ICs and Specifications, CMOS Logic, CMOS Steady State Electrical Behavior, CMOS Dynamic Electrical Behavior and CMOS Logic Families.

UNIT – V

COMBINATIONAL & SEQUENTIAL LOGIC DESIGN: Decoders, Encoders, Three state devices, Multiplexers and Demultiplexers, Code converters, EX-OR gates and Parity Circuits, Comparators, Adders and Subtractors. Latches and Flip-Flops, PLDs, Counters, Shift Register

Text Books:

1. Anand Kumar: *Pulse & Digital circuits*, PHI publication.
2. D.Roy Chowdhury: *Linear Integrated Circuits*, 2nd Edition, New Age International (p) Ltd, 2003.
3. John F.Wakerly: *Digital Design principles & Practices*, 3rd Edition, PHI/Pearson Education Asia, 2005.

References:

1. Millman.J Halkias.C: *Integrated Electronics*, Tata Mc-graw Hill Edition, 2008.
2. A.Gayakwad Ramakanth: *Op-Amps & Linear ICs*, 4th Edition, PHI, 2009.
3. H.Roth.Jr: *Digital System Design using VHDL*, 1st Edition, Charles Cengage Publications

Outcomes:

After completion of this course, the student will be able to:

1. *Design Wave Shaping Circuits.*
2. *Design and Analyze Multivibrator Circuits for different applications.*
3. *Acquire basic concepts in the design of electronic circuits using linear integrated circuits and their applications in the processing of analog signals.*
4. *Design Various combinational logic circuits and sequential logic circuits.*

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14AEC06 SIGNALS & SYSTEMS
(Common to EEE & ECE)

Objectives:

1. *To introduce theory to qualify and quantify signals and systems.*
2. *To do analysis of signals & systems using time domain & frequency domain methods.*
3. *To understand the concept of ROC in Laplace and Z-transforms.*
4. *To know various transform techniques in the analysis of signals and systems.*

UNIT I

SIGNAL ANALYSIS : Analogy between vectors and signals, Orthogonal signal space, Signal approximation using orthogonal functions, Mean square error, Closed or complete set of orthogonal functions, Orthogonality in complex functions, Exponential and sinusoidal signals, Concepts of Impulse function, Unit step function, Signum function.

FOURIER SERIES REPRESENTATION OF PERIODIC SIGNALS: Representation of Fourier series, Continuous time periodic signals, properties of Fourier series, Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Complex Fourier spectrum

UNIT II

FOURIER TRANSFORMS: Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Fourier transform of periodic signals, properties of Fourier transforms, Fourier transforms involving impulse function and Signum function.

LAPLACE TRANSFORMS: Review of Laplace transforms(L.T), Partial fraction expansion, Inverse Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of L.T's, Relation between L.T's and F.T. of a signal .

UNIT III

SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS: Linear system, impulse response, Response of a linear system, Linear Time Invariant (LTI) system, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, system bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Poly-Wiener criterion for physical realization, relationship between bandwidth and rise time.

UNIT IV

CONVOLUTION AND CORRELATION OF SIGNALS: Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Convolution property of Fourier transforms. Cross correlation and auto correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between auto correlation function and energy/power spectral density function, Relation between convolution and correlation, Detection of periodic signals in the presence of noise by correlation, Extraction of signal from noise by filtering.

UNIT V

SAMPLING: Sampling theorem – Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling – Aliasing.

Z–TRANSFORMS: Concept of Z- Transform of a discrete sequence. Region of convergence (ROC), properties of Z-transforms, Inverse Z-transform-Long Division method, partial fraction method, convolution method.

Text Books:

1. B.P. Lathi, *Signals, Systems & Communications*, BS Publications, 2009.
2. A.V. Oppenheim, A.S. Willsky and S.H. Nawab, *Signals and Systems*, PHI, 2nd Edition.
3. Simon Haykin and Van Veen, *Signals & Systems*, Wiley, 2nd Edition.

References:

1. Ramakrishna Rao, *Signals and Systems*, 2008, TMH.
2. B.P.Lathi, *Linear Systems and Signals*, 2nd Edition, Oxford University Press, 2008.
3. Anand kumar , *Signals and Systems*, PHI

Outcomes:

1. *For integral-differential equations, the students will have the knowledge to make use of Laplace transforms.*
2. *For continuous time signals the students will make use of Fourier transform and Fourier series.*
3. *For discrete time signals the students will make use of Z transforms.*
4. *The concept of convolution is useful for analysis in the areas of linear systems and communication* theory.

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II B.Tech –II Semester EEE	**L**	**T**	**P**	**C**
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14AEE10 GENERATION OF ELECTRICAL POWER

Objectives:

1. *To meet the large amount of electric power demanded by the industries and domestic appliances.*
2. *To study in detail the concept of Thermal power generation.*
3. *To gain knowledge on the components of Hydel power plants and their working principles.*
4. *To acquire explicit knowledge on Nuclear energy concepts, Nuclear power generating plants and renewable power generation concepts.*

UNIT I

THERMAL POWER STATIONS: Line diagram of the Thermal Power Station (TPS) showing paths of coal, stream, water, ash and flue gasses - Brief description of TPS components - Economizers - Boiler Super heaters - Turbines, Condensers, Chimney and cooling towers.

UNIT II

HYDRO POWER STATIONS: Selection of site – classification – Layout - Description of main components-Dams-Turbines-spillways-surge tank-penstock.

UNIT III

NUCLEAR POWER STATIONS: Nuclear Fission and Chain reaction - Nuclear fuels principle of operation of Nuclear reactor - Reactor Components – Moderators - Control rods, Reflectors and Coolants - Radiation Hazard - Shielding and safety precautions - Types of Nuclear reactors and brief description of Pressurized Water Reactor (PWR), Boiling Water Reactor (BWR) and Fast Breeder Reactor (FBR).

UNIT IV

BASICS OF RENEWABLE ENERGY GENERATION: Role and potentials of renewable energy sources –electrical power generation using- solar energy-windmill-bio mass and Bio gas energy-Geothermal energy-ocean Energy-tidal energy. Economic aspects of renewable energy generation.

UNIT V

ECONOMIC ASPECTS OF POWER GENERATION: Load curve - Load duration and integrated load duration curves - load, demand, diversity capacity, utilization and plant use factors - Numerical problems - Costs of Generation and their division into Fixed, Semi-fixed and Running Costs-numerical problems

TARIFF METHODS: Desirable Characteristics of a Tariff Method - Tariff methods: Flat Rate, Block-Rate, two-part, three-part, and power factor tariff methods - numerical problems

Text Books:

1. Soni.M.L, Gupta.P.V, Bhatnagar.U.S and Chakraborti.A: *A Text Book on Power Systems Engineering*, Dhanpat Rai & Co.Pvt.Ltd., 1999.
2. Mehta.V.K and Rohit Mehta: *Principles of power systems*, S.Chand & Company Ltd, New Delhi 2004.
3. Rajput.R.K: *Power systems Engineering*, Laxmi Publishers.

References:

1. S.K.Dubey and DR.S.K.Bhargava: *Non conventional energy Resources*, DhanpatRai& Co.(P) LTD.,2008.
2. Singh.S.N: *Electrical power Generation Transmission and Distribution*, PHI, 2003.
3. Rai.G.D: *Non Conventional energy sources*, Khanna Publishers.

Outcomes:

After completion of this course the student will be able to:

1. *Gain knowledge of construction and operation of Thermal and hydro power stations.*
2. *Acquire the Knowledge about Nuclear power generating plants and its associated components.*
3. *Know the significance of Solar, wind, Geo thermal, Ocean energy, Bio energy method of electric power generation.*
4. *Understand the economic aspects of power generation and tariff methods*

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14AEE11 ELECTROMAGNETIC FIELDS

Objectives:

1. *To introduce the concepts and electrostatic fields and their applications.*
2. *To impart knowledge about the concept of dielectrics and capacitances.*
3. *To impart knowledge about all electromagnetic field laws which are used in electro-statics and in magneto statics*
4. *To understand concept of time varying fields and its significance.*

UNIT I

ELECTROSTATICS: Electrostatic Fields - Coulomb's Law - Electric Field Intensity(EFI) due to Line, Surface and Volume charges- Work Done in Moving a Point Charge in Electrostatic Field-Electric Potential due to point charges, line, surface and Volume Charges - Properties of Potential Functions-Potential Gradient - Gauss's Law-Application of Gauss's Law-Maxwell's First Law, Laplace's Equation and Poisson's Equations - Solution of Laplace's Equation in one Variable.

UNIT II

CONDUCTORS, DIELECTRICS AND CAPACITANCE: Electric Dipole - Dipole Moment - Potential and EFI due to Electric Dipole - Torque on an Electric Dipole in an Electric Field - Behavior of Conductors in an Electric Field-Conductors and Insulators - Electric Field Inside a Dielectric Material – Polarization – Dielectric Conductors and Dielectric Boundary Conditions – Capacitance-Capacitance of Parallel Plate and Spherical Capacitors. 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 Law – Magnetic Field Intensity(MFI) due to a Straight Current Carrying Filament, Circular and Square Filament – Solenoid Current Carrying Wire – Relation Between Magnetic Flux ,Magnetic Flux Density and MFI – Maxwell's Second Equation. Ampere's Circuital Law and Its Applications Viz., MFI Due to an Infinite Sheet of Current and a Long Current Carrying Filament – Maxwell's Third Equation. Magnetic Dipole and Dipole moment – A Differential Current Loop as a Magnetic Dipole – Torque on a Current Loop Placed in a Magnetic Field. Scalar Magnetic Potential and Vector Magnetic Potential and its Properties - Scalar Laplace equations, Vector Poisson's Equations.

UNIT IV

MAGNETIC FORCE AND INDUCTANCE: Magnetic Force – Lorentz Force Equation – Force on Current Element in a Magnetic Field - Force on a Straight and Long Current Carrying Conductor - Force Between two Straight and Parallel Current Carrying Conductor - Self and Mutual Inductances – 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 – Neumann's Formulae – Energy Stored and energy density in a Magnetic Field.

UNIT V

TIME VARYING FIELDS: Time Varying Fields – Faraday's Law of Electromagnetic Induction – It's Integral and Point Forms – Maxwell's Fourth Equation. Statically and Dynamically Induced E.M.F's – Displacement Current density - Modified Maxwell's Equations for Time Varying Fields – Poynting Theorem – Poynting Vector and its Significance.

Text Books:

1. William.H.Hayt: *Engineering Electromagnetics*, Mc.Graw – Hill, 2010.
2. Sadiku: *Electromagnetic Fields*, Oxford University Press, 5th Edition, 2010.

References:

1. Gangadhar: *Field Theory*, Khanna Publications, 2003.
2. Joseph Edminister: *Electromagnetics*, Tata Mc Graw Hill, 2006.

Outcomes:

After completion of this course the student will be able to:

1. *Apply basic circuit techniques in electromagnetic static fields in power transmission lines.*
2. *Design all electrical parameters which are related to magnetic potential and time variant fields.*
3. *Apply basic laws of magneto static fields in electrical machines.*
4. *Describe and analyze the force and inductance of magnetic fields and time varying fields in transmission lines.*

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14AEE12 ELECTRICAL MEASUREMENTS AND INSTRUMENTATION

Objectives:

1. *To introduce the basic principles of all electrical and Electronic Measuring instruments*
2. *To develop the knowledge about instrument transformer, power factor meter, energy meters.*
3. *To know about potentiometers and magnetic measurement and their applications.*
4. *To study operation of AC and DC bridges used for measurement of Resistance, Inductances, Capacitances and principles of transducers and their applications.*

UNIT I

MEASURING INSTRUMENTS: Classification – deflecting, controlling and damping systems – Ammeters and Voltmeters – PMMC, Dynamometer, moving iron type instruments – Expression for the deflecting torque and control torque – Errors and compensation - Extension of range using shunt and series resistance.

UNIT II

INSTRUMENT TRANSFORMERS AND P.F METER AND MEASUREMENT OF POWER / ENERGY: Current Transformers and Potential Transformers – Ratio and phase angle errors – Design considerations - Types of Power Factor Meters – Dynamometer and moving iron type – 1-Φ and 3-Φ meters, Rotating field and alternating field types.

Single and three phase dynamometer wattmeter - LPF and UPF - Double element and three element Dynamometer wattmeter - Expression for Deflecting and control torques - Single and three phase Induction type Energy Meter –Errors and compensation .

UNIT III

POTENTIOMETERS and MAGNETIC MEASUREMENTS: Principle and operation of D.C. Crompton's potentiometer – standardization – Measurement of unknown resistance, current, voltage and power - A.C. Potentiometers: Polar and coordinate types - Standardization – Ballistic galvanometer – Equation of motion – Flux meter – Constructional details - Comparison with Ballistic Galvanometer - Determination of B-H Curve - Method of reversals – step by step method - A.C. testing.

UNIT IV

D.C & A.C BRIDGES: Measurement of low, medium and high resistances – Kelvin's double bridge - Wheatstone's bridge, Sensitivity – Loss of charge method - measurement of inductance - Maxwell's bridge, Anderson's bridge - Measurement of capacitance - Desauty bridge – Schering Bridge – Measurement of frequency – Wien's Bridge.

UNIT V

TRANSDUCERS and MEASUREMENT OF NON-ELECTRICAL QUANTITIES: Classification of transducers - Advantages -Characteristics and choice of transducers - Principle operation of resistor, inductor, LVDT and capacitor transducers - LVDT Applications - Strain gauge – Principle of operation - gauge factor – Thermistors – Thermocouples – Synchros, Piezo electric transducers – photovoltaic – photo conductive cells, photo diodes – Hall effect – Current and voltage sensors. Measurement of strain - Gauge Sensitivity - Displacement,

Velocity, Angular Velocity, Acceleration, Force, Torque, Temperature, Pressure, Vacuum, Flow, Liquid level

Text Books:

1. Bakshi.U.A, Bakshi.A.V, Bakshi.K.A: *Electrical Measurements,* Technical Publications
2. Sawhney.A.K: *Electrical & Electronic Measurement & Instruments*, Dhanpat Rai & Co. Publications.
3. Murthy.D.V.S: *Transducers and Instrumentation,* Prentice – Hall of India

References:

1. Golding.E.W and Widdis.F.C: *Electrical Measurements and Instrumentation*, 5th Edition, Reem Publications.
2. Morris.A.S: *Principles of Measurement and Instrumentation*, Pearson/Prentice – Hall of India

Outcomes:

After completion of this course the student will be able to:

1. *Understand the working all the electrical measuring instruments with their errors and compensation techniques.*
2. *Acquire knowledge about CT & PT with phase angle errors and various types of power factor meters, wattmeter's, and energy meters and its applications.*
3. *Acquire knowledge about potentiometers, flux meters, ballistic galvanometers and applications.*
4. *Know measurement of Resistance, Inductance and Capacitance using AC and DC bridges and types of transducer used for measurement of non electrical quantities.*

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II B.Tech –II Semester EEE

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14AEE13 ELECTRICAL MACHINES –II

Objectives:

1. *To know the construction details, principle of operation, prediction of performance of single phase transformers.*
2. *To acquire the knowledge about different types of testing of single phase transformers.*
3. *To study the three phase connection details of three Phase transformer and principle of operation Auto transformers.*
4. *To understand the construction details, principle of operation, methods of speed control, starting methods and performance of three phase induction motor.*

UNIT I

SINGLE PHASE TRANSFORMERS: Types - constructional details - EMF equation - operation on no-load and on-load - Phasor diagrams - Equivalent circuit - losses and efficiency – Regulation - All day efficiency - Effect of variations of frequency & supply voltage on iron losses.

UNIT II

TESTING OF SINGLE PHASE TRANSFORMERS: OC and SC tests – Determination of Equivalent circuit parameters - Predetermination of efficiency and regulation - Separation of losses - Sumpner's test - Parallel operation with equal and unequal voltage ratios.

UNIT III

THREE PHASE TRANSFORMERS: Three phase connections - Y/Y, Y/Δ, Δ/Y, Δ/Δ and open Δ - Third harmonics in phase voltages - Three winding transformers - Tertiary windings - Scott connection - Auto transformers - Principle of operation - Equivalent circuit - comparison with two winding transformers.

UNIT IV

THREE PHASE INDUCTION MOTORS: Production of a rotating magnetic field - Construction details of squirrel cage and wound rotor Induction motors - principle of operation - Rotor EMF and rotor frequency - Rotor Reactance - Rotor Current - Power factor at standstill and running condition - Equivalent circuit - Phasor diagram - Torque equation - Torque slip characteristics - Rotor power input - Rotor copper loss and mechanical power developed - Expressions for maximum torque and starting torque - Crawling and Cogging - Double cage and deep bar rotors.

UNIT V

TESTING AND SPEED CONTROL OF INDUCTION MOTORS: No load and Blocked rotor tests - Construction of Circle diagram - Predetermination of performance characteristics - Methods of starting - Calculation of starting current and torque - Methods of speed control - Change of frequency - Pole changing - Injection of an EMF into rotor circuit (qualitative treatment only) - Cascade connection - Induction Generator - Principle of operation.

Text Books:

1. Bhimbra.P.S: *Electrical machinery*, 7th Edition, Khanna Publishers, 2004.
2. Nagarath.I.J, Kothari.D.R: *Electrical Machines*, 7th Edition, tata Mc Graw Hill, 2005.
3. Kamakashaiah.S: *Electro mechanics-II (transformers and induction motors),* Hitech publishers.

References:

1. Say.M.G: *Performance and Design of AC Machines*, BPB Publishers
2. Fitzgerald.A.E, Kingsley.C and Umans.S: *Electric machinery*, 5th edition, Mc Graw Hill Companies.

Outcomes:

After completion of this course the student will be able to:

1. *Understand the concept of single phase and three phase transformers and their applications.*
2. *Know about the utilization of transformers in distribution, transmission of power.*
3. *Know the characteristics of three phase induction motor and its applications.*
4. *Acquire knowledge on testing and speed control of Induction Motors.*

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II B.Tech –II Semester EEE

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14AEC16 PULSE AND DIGITAL CIRCUITS LAB

Objectives:

1. *To generate Different types of non-sinusoidal signals.*
2. *To generate and processing of non-sinusoidal signals.*
3. *To learn about Limiting and storage circuits and their applications.*
4. *To learn about Different synchronization techniques, basics of different sampling gates and their uses.*
5. *To obtain Basics of digital logic families.*

Minimum Twelve experiments to be conducted:

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers.
3. Non Linear wave shaping – Clamper's.
4. Transistor as a switch.
5. Study of Logic Gates & Some applications.
6. Half adder & Full adder.
7. Sampling Gates.
8. Astable Multivibrator.
9. Monostable Multivibrator.
10. Bistable Multivibrator.
11. Schmitt Trigger.
12. UJT Relaxation Oscillator.
13. Bootstrap sweep circuit.
14. Constant Current Sweep Generator using BJT.

Equipment required for Laboratories:

1. RPS - 0 – 30 V
2. CRO - 0 – 20 M Hz.
3. Function Generators - 0 – 1 M Hz
4. Components
5. Multi Meters

Outcomes:

After completion of this course the student will be able to:

1. *Student understands the various design and analysis to generate various types of signals.*
2. *Student can design various digital circuits based on the application and specifications.*

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L	T	P	C
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14AEE16 ELECTRICAL MEASUREMENTS AND INSTRUMENTATION LAB

Objectives:

1. *To understand the different types of measuring instruments, calibration of LPF Wattmeter and Energy meter.*
2. *To test the various DC and AC Bridges for measurement of DC and AC bridges.*
3. *To acquire knowledge about dielectric strength of transformer oil and air*
4. *To emphasize the measurement of three phase power, intensity and illumination*

PART-A:
The following experiments are required to be conducted as compulsory experiments:

1. D.C. Potentiometer – Calibration of PMMC ammeter and PMMC voltmeter.
2. Measurement of % ratio error and phase angle error of given C.T by comparison.
3. Resistance strain gauge and LVDT- Calibration and measurement of Resistance & Capacitance.
4. Calibration of LPF wattmeter – by Phantom testing.
5. Kelvin's double Bridge & Wheat stone's bridge - Measurement of low & medium resistance.
6. Schering Bridge & Anderson bridge-Measurement of capacitance & inductance.
7. Measurement of 3 phase power using Two watt meter method (Balanced).

PART-B:
Any three of the following experiments are required to be conducted:

8. Characteristics of Thermistor, Thermo couple and Piezo Electric Transducers
9. Calibration of dynamometer power factor meter.
10. Polar curve using LUX meter- Measurement of intensity of illumination.
11. Measurement of dielectric strength of air and oil using H.T. testing Kit.
12. Measurement of 3 phase reactive power with single-phase wattmeter.

Outcomes:

After completion of this course the student will be able to:

1. *Know the use of DC bridges for measurement of low and medium resistances .*
2. *Understand the operation of DC potentiometer for measurement of DC parameters*
3. *Acquire knowledge of calibration of PMMC ammeter and voltmeter.*
4. *Know Calibration and Measurement of LPF wattmeter, resistance and capacitance using strain gauge and LVDT*

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II B.Tech –II Semester EEE	**L**	**T**	**P**	**C**
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14AHS15 QUANTITATIVE APTITUDE AND REASONING – I
(Common to all Branches)

Objectives:

The main objective of this course are

1. *To learn the concept of coding and decoding of letters and numbers.*
2. *To interpretation data using the graphs.*
3. *To understand the basic concepts of probability.*
4. *To comprehend the relation between time and distance in real life problems.*

Syllabus for Quantitative Aptitude

Competency 1:

2. Numbers

Classification of numbers-Divisibility rules-Finding the units digit-Finding remainders in divisions involving higher powers-LCM and HCF Models.

2. Decimal Fractions

2. Simplification

2. Square Roots & Cube Roots

2. Average

Definition of Average- Rules of Average-Problems on Average-Problems on Weighted Average-Finding Average using Assumed mean method.

2. Problems on Numbers

2. Problems on Ages

2. Surds & Indices

2. Percentage

Introduction –Converting a percentage into decimals-Converting a Decimal into a Percentage-Percentage equivalent of fractions-Problems on Percentages.

2. Profit and Loss & True Discount

Problems on profit and loss percentage-Relation between cost price and selling price-Discount and Marked Price-Two different articles sold at same cost price-Two different articles sold at same selling price-Gain%/Loss% on selling.

2. Ratio and Proportion

Definition of Ration-Properties of Ratios-comparison of Ratios-Problem on Ratios-Compound Ratio-Problems of Proportion, Mean Proportional and continued Proportion.

Competency 2:

2.1 Partnership

Introduction-Relation between capitals, Period of investments and Shares

a. Chain Rule

b. Time & Work

Problems on unitary method-Relation between Men,Days,Hours and work-Problems on Man-Day-Hours method-Problems on alternate days-Problems on Pipes and Cisterns.

c. Time and Distance

Relation between speed, distance and time-Converting Kmph into m/s and vice cersa-Problems on average speed-Problems on relative speed-Problems on trains-Problems on boats and streams-Problems on circular tracks-Problems on races.

d. Mixtures and Allegations

Problems on mixtures-Allegations rule-Problems on Allegation

e. Simple Interest

Definitions-Problems on interest and amount-Problems when rate of interest and time period are numerically equal.

f. Compound Interest

Definition and formula for amount in compound interest-Difference between simple interest and compound interest for 2 years on the same principle and time period.

g. Logarithms

<u>Syllabus for Reasoning</u>

Competency 3:

a. Cubes

Basics of a cube-Formulae for finding volume and surface area of a cube-Finding the minimum number of cuts when the number of identical pieces are given-Finding the maximum number of pieces when cuts are given –Problems on painted cubes of same and different colors-Problems on cuboids-Problems on painted cuboids-Problems on diagonal cuts

b. Venn diagrams

Representing the given data in the form of a Venn diagram-Problems on Venn diagrams with two sets-Problems on Venn diagrams with three sets-Problems on Venn diagrams with four sets

c. Binary Logic

Definition of a truth –teller –Definition of a liar-Definition of an alternator-Solving problems using method of assumptions-Solvinh analytical puzzles using binary logic.

Competency 4:

1.1 Number and letter series

Difference series-Product series-Square series-Cubes Series-Alternate Series-Combination Series-Miscellaneous Series-Place values of letters.

1.2 Number and Letter Analogies

Definition of Analogy-Problems on number analogy-Problems on letter analogy –Problems on verbal analogy.

Odd man out

Problems on number Odd man out-Problems on letter Odd man out-Problems on verbal Odd man out.

Competency 5:

a. Coding and Decoding

Coding using same set of letters-Coding using different set of letters-Coding into a number –Problems on R-model.

b. Direction sense

Solving problems by drawing the paths-Finding the net distance travelled-Finding the direction-Problems on clocks-Problems on shadows-Problems on damaged compass –Problems on direction sense using symbols and notations

c. Critical Reasoning

Problems on assumption-Problems on conclusion-Problems on inferences-Problems on strengthening and weakening of arguments-Problems on principle – problems on paradox

d. Lateral reasoning puzzle

Problems on common balance –Problems on digital balance –Problems on coins-Problems on lockers-Problems on heights-Digit puzzles using basic arthimetic operations.

Text Books:

1.GL Barrons , Tata MC Graw-Hills, 'Thorpe's Verbal reasonong',LSAT Materials.2015.

2.R S Agarwal, 'A modern approach to logical reasoning', S chand company Ltd 2002.

Reference Books:

1.Abhjit Guha 'Quantitative Aptitude' Tata MC Graw Hills, 4th Edition, 2011.

2.R S Agarwal, 'Quantitative Aptitude' S chand company Ltd 2008.

3.G.L BARRONS 'Quantitative Aptitude', Tata MC Graw Hills,2014.

Outcomes:

After completion of the course the student will be able to

1. *Strengthen their ability to meet the challenges in solving Time and distance problems.*
2. *Apply Data interpretation to solve the problems on Line, Bar, Pie graphs.*
3. *Develop the thinking ability and apply Venn diagram and binary logic.*
4. *Apply the number series and letter analogies in problems on verbal analogy.*

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14AEE18 TRANSMISSION OF ELECTRICAL POWER L T C

III B.TECH –I SEMESTER EEE 3 1 3

- **OBJECTIVES:**
  1. *To acquire knowledge on Transmission line parameters and their calculation for various configurations of transmission lines.*
  2. *To gain adequate knowledge on performance specifications of Transmission lines such as regulation and efficiency for various models of lines.*
  3. *To study the power system transients and Corona.*
  4. *To study Overhead line insulators and mechanical aspects of Transmission lines such as Sag and Tension effects.*
  5. *To study the constructional features of underground cables and their performance.*

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 single phase and symmetrical three phase lines- Numerical Problems.

UNIT-II

PERFORMANCE OF TRANSMISSION LINES: Classification of Transmission Lines - Short, medium and long transmission lines and their model - representations - Nominal-T, Nominal-$\prod$ and A, B, C, D Constants - Mathematical Solutions to estimate regulation and efficiency of all types of lines - Numerical Problems-Long Transmission Line - Rigorous Solution - evaluation of A,B,C,D Constants - Interpretation of the Long Line Equations – Representation of Long lines–surge Impedance and surge Impedance loading - Ferranti effect .

UNIT- III

POWER SYSTEM TRANSIENTS: Types of System Transients - Travelling or Propagation of Surges - Attenuation, Distortion, Reflection and Refraction Coefficients - Termination of lines with different types of conditions - Open Circuited Line, Short Circuited Line, T-Junction, Lumped Reactive Junctions (Numerical Problems).

CORONA: Corona - Description of the phenomenon - factors affecting corona - critical voltages and power loss - Radio Interference.

UNIT- IV

OVERHEAD LINE INSULATORS: Types of Insulators - String efficiency - Methods for improvement - voltage distribution - calculation of string efficiency - Capacitance grading and Static Shielding-numerical problems.

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- V

UNDERGROUND CABLES: Types of Cables – Construction - Types of Insulating materials - Calculations of Insulation resistance and stress in insulation - Numerical Problems - Capacitance of single core and three Core belted cables - Numerical Problems - Grading of Cables - Capacitance grading - Numerical Problems - Description of Inter-sheath grading.

- ## OUTCOMES:

After completion of the course the student will be able to:

1. *Determine the transmission line parameters for various configurations.*
2. *Analyze the performance of different types of transmission lines.*
3. *Analyze different types of transients occurring in transmission lines and also corona effect.*
4. *To Calculate string efficiency of overhead line insulators and improve the same*
5. *Calculate the sag and tension in electric towers and select suitable cable*

- **TEXT BOOKS:**

1.Soni M.L, Gupta P.V, Bhatnagar U.S, Chakrabarthy.A: A Text Book on Power System Engineering, Dhanpat Rai & Co Pvt. Ltd.

2.Wadhwa C.L: Electrical power systems, New Age International (P) Limited, Publishers, 1998.

- **REFERENCE BOOKS:**

1. Rajput R. K: *Power System Engineering*, Laxmi Publications, 1st Edition.
2. Gupta B.R: *Power System Analysis and Design*, 6th Revised Edition, S. Chand & Co, 2010.
3. Nagarath I.J and Kothari D.P: *Modern Power System Analysis*, 2nd Edition, Tata McGraw Hill.

- **MAPPING OF COs with POs:**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	✓		✓				✓					✓
CO2	✓			✓	✓			✓				✓
CO3	✓		✓		✓							✓
CO4	✓		✓			✓	✓					✓
CO5	✓		✓		✓		✓					✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEE19 POWER ELECTRONICS L T C

III B.TECH –I SEMESTER EEE 3 1 3

- **OBJECTIVES:**
  1. *To understand the basic theory of power semiconductor switches such as power BJT, SCR, MOSFET, IGBT and their triggering and commutation mechanisms.*
  2. *To understand the operation of single phase and three phase controlled rectifiers with R, RL, RLE loads and effect of source inductance and freewheeling diode on converter performance.*
  3. *To know about control strategies of Choppers and their performance with R, RL loads and switched mode regulators*
  4. *To impart knowledge on AC voltage controllers and line commutated converters*
  5. *To understand the operation of inverters and cyclo-converters with R, RL and RLE Loads and their applications.*

UNIT- I

POWER SEMICONDUCTOR DEVICES: Thyristors – Silicon Controlled Rectifiers (SCR's) – Power MOSFET – Power IGBT and their characteristics - Basic theory of operation of SCR - Ratings – Static & Dynamic characteristics of SCR – Turn on and turn off methods -Two transistor analogy – SCR Firing Circuits – R, RC and UJT firing circuits – Series and parallel connections of SCR's – Snubber circuit– Commutation Methods - Line Commutation and Forced Commutation circuits–Numerical problems.

UNIT- II

SINGLE PHASE HALF & FULLY CONTROLLED CONVERTERS: Phase control technique – Single phase Line commutated converters – Midpoint and Bridge connections – Half controlled converters with R, RL and RLC loads – Derivation of average load, voltage and current –Effect of freewheeling diode –Fully controlled converters - Midpoint and Bridge

connections with R, RL loads - Derivation of average load voltage and current – Line commutated inverters –Effect of Freewheeling Diode - Effect of source inductance – Derivation of load voltage and current equations – Numerical problems.

UNIT- III

DC CHOPPERS: Principle and operation of step up and step down chopper circuit- control strategies Time ratio control and Current limit– Types of Chopper Circuits -Derivation of load voltage and currents with R, RL and RLE loads - AC Chopper - Load voltage Expression – Switch mode regulator – Buck and Boost regulators

UNIT- IV

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

AC VOLTAGE CONTROLLERS: AC voltage controllers – Single phase two SCR's in anti parallel with R and RL loads – Modes of operation of Triac – Triac with R and RL loads – Derivation of RMS load voltage, Current and Power Factor wave forms – Firing circuits - Numerical problems.

UNIT- V

CYCLOCONVERTERS: Single phase Midpoint cycloconverters with Resistive and Inductive Load (Principle of operation only) – Bridge configuration of single phase cycloconverter (Principle of operation only) – Waveforms.

INVERTERS: Single phase bridge Inverter – Single phase Half Bridge and Full Bridge configuration - Three phase Half Bridge and Full Bridge configuration - Voltage control techniques for inverters - Pulse Width Modulation Techniques –Numerical problems

- **OUTCOMES:**

After completion of this course the student will be able to:

1. *Design firing, commutation and protection circuits for power semiconductor devices.*
2. *Apply the three phase controlled rectifiers and dual converters to motor control*
3. *Apply the choppers for speed control of DC drives and Switch mode regulators*
4. *Apply AC voltage controllers and line commutated converters for variable speed AC drives*
5. *Design inverters and cyclo converters which are used in variable speed AC drives.*

- **TEXT BOOKS:**

1. Dr.Bimbhra.P.S: *Power Electronics*, Kanna publishers,2010
2. Singh.M.D & Kanchandhani.K.B: *Power Electronics*, Tata Mc Graw – Hill Publishing Company, 1998.

- **REFERENCE BOOKS:**

1. Rashid.M.H: *Power Electronics Circuits, Devices and Applications*, 2nd edition, Prentice Hall of India, 1998.
2. Dubey.G.K, Doradla.S.R, Joshi.A and Sinha.R.M.K: *Thyristorised Power Controllers*, New Age International (P) Limited Publishers, 1996.
3. Sen.P.C: *Power Electronics*, Tata Mc Graw-Hill Publishing.

- **MAPPING OF COS WITH POS:**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	✓	✓	✓				✓			✓		✓
CO2		✓	✓				✓			✓	✓	✓
CO3		✓	✓				✓			✓	✓	✓
CO4		✓	✓	✓			✓			✓	✓	✓
CO5			✓	✓			✓			✓		✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEE20 CONTROL SYSTEMS **L T C**

III B.TECH –I SEMESTER (COMMON TO EEE & ECE) **3 1 3**

- **OBJECTIVES:**
  1. *To understand the concept of open loop and closed loop control systems and their applications, mathematical models of electrical and mechanical systems.*
  2. *To acquire the knowledge about time response of first order and second order systems and steady state errors.*
  3. *To study the different techniques of stability analysis and their limitations.*
  4. *To acquire the knowledge about frequency response analysis and determine the performance parameters.*
  5. *To understand the design of compensating techniques to improve the steady state error and concept of the state space analysis for continuous system*

UNIT- I

INTRODUCTION: Concepts of Control Systems - Open Loop and closed loop control systems and their differences - Examples of control systems - Classification of control systems - Feed-back Characteristics - Effects of feedback - Mathematical models – Differential equations - Impulse Response and transfer functions - Translational and Rotational mechanical systems - Transfer Function of DC Servo motor - AC Servo motor - Block diagram algebra – Signal flow graph - Reduction using Mason's gain formula.

UNIT -II

TIME RESPONSE ANALYSIS: Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control system - Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional - Integral and derivative controls.

UNIT- III

STABILITY ANALYSIS: Concept of stability – Routh's stability criterion – Qualitative stability and conditional stability – Limitations of Routh's stability analysis - Root locus concept - Construction of root loci-effects of adding poles and zeros to G(s)H(s) on the root loci.

UNIT- IV

FREQUENCY RESPONSE ANALYSIS: Frequency domain specifications - Bode diagrams - Determination of Frequency domain specifications and transfer function from the Bode Diagram - Polar Plot-Phase margin and Gain margin - Stability Analysis from Bode Plots-Nyquist stability criterion.

UNIT -V

CLASSICAL CONTROL DESIGN TECHNIQUES: Compensation techniques – Lag, Lead, Lead-Lag Controllers design in frequency domain - P, PD, PI, PID Controllers.

STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS: Concepts of state - State variables and State Model - Derivation of state models from Block Diagrams – Diagonalization - Solving the Time invariant state Equations - State Transition Matrix and it's properties.

- ## OUTCOMES:

After completion of this course the student will be able to:

1. *Understand the concept of open loop and closed loop systems, applications, transfer functions for linear, time invariant electrical and mechanical systems.*
2. *Apply the time domain analysis to find system desire performance.*
3. *Understand the concept of stability and apply stability techniques for analyzing the system response*
4. *Analyze the system stability using Bode Plots and Nyquist stability criterian*
5. *Design P,PI,PD &PID controllers which are used in Motor controls and also state model of the systems*

- **Text Books:**

1. *Norman S. Nise: Control Systems Engineering, 5th edition, Wiley India*
2. Kuo.B.C, Farid Golnaraghi: *Automatic Control Systems*, 8th edition,2003 John wiley and sons.
3. Nagrath.I.J and Gopal.M: *Control Systems Engineering*, 5th edition, New Age International (P) Limited Publishers, 2007.

- **REFERENCE BOOKS:**

1. Katsuhiko Ogata*: Modern Control Engineering, 5th edition, Prentice Hall of India Pvt. Ltd., 2010*
2. Anand Kumar.A*: Control Systems*, Prentice Hall of India Pvt. Ltd.,
3. Joseph Distetano Schaum's outline of feedback and control systems 2nd edition,

- **MAPPING OF COs with POs:**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	✓	✓	✓									✓
CO2	✓	✓	✓									✓
CO3	✓	✓	✓									✓
CO4	✓	✓	✓		✓			✓				✓
CO5	✓	✓	✓					✓		✓		✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEC20 MICROPROCESSORS AND MICROCONTROLLERS

III B.TECH –I SEMESTER (COMMON TO EEE & ECE)

L	T	C
3	1	3

- **OBJECTIVES:**

The course will provide the student:

1. *To familiarize the architecture of 8086 processor.*
2. *To become skilled in 8086 assembly language programming.*
3. *To understand and design microprocessor based systems for various applications.*
4. *To learn about various programmable peripheral devices and their interfacing.*
5. *To provide the knowledge of 8051 microcontroller concepts, architecture and programming.*

UNIT- I

8086 MICROPROCESSOR: Evolution of microprocessors, memory segmentation,8086 Architecture, register organization, Flag Register, Pin Diagram of 8086- Minimum and Maximum mode 8086 systems, Timing Diagrams for Memory Read(MR),Memory Write (MW),IO Read (IOR) and IO Write(IOW) bus cycles.

UNIT- II

INSTRUCTION SET AND ASSEMBLY LANGUAGE PROGRAMMING OF 8086: Addressing Modes-Instruction Set, Assembler Directives-Macros and procedures, assembly language programs for addition ,subtraction, multiplication, division, GCD and LCM of two numbers, Evaluation of arithmetic expressions, largest and smallest numbers in an array, sorting an array, searching for a number in an array, programs using lookup tables.

UNIT- III

INTERFACING MEMORY & IO AND APPLICATIONS OF 8086 ICROPROCESSOR:

Interfacing memory (static RAM and ROM), programmable input-output port PIO 8255-modes of operation and interfacing with 8086. ADC interfacing, DAC interfacing, waveform generation-Square wave, rectangular wave, ramp wave, triangular wave, staircase wave, traffic light controller, stepper motor control, temperature measurement and control.

UNIT- IV

INTERFACING DEVICES: Interrupt structure of 8086,interrupt vector table, programmable interrupt controller 8259 architecture and interface, DMA data transfer-DMA controller 8257, Asynchronous and synchronous serial data transfer schemes- 8251 USART architecture and interfacing, programmable interval timer 8254-architecture and operating modes.

UNIT V

INTRODUCTION TO 8051 MICROCONTROLLER: Architecture, Registers, I/O Ports and Memory Organization, Addressing Modes, Instruction Set, simple assembly language programs using 8051, interrupt structure of 8051-initialization of interrupt, interrupt priorities , timer and counter modes of 8051, serial communication modes of 8051.

- **OUTCOMES:**

After the completion of the course the students will be able

1. *To Study and understand the architecture and programming of any other microprocessor or microcontroller.*
2. *To write 8086 assembly language programs.*
3. *To do any type of VLSI and Embedded Systems for Industrial and Real Time applications.*
4. *To use the microprocessor for serial data transfer.*
5. *To use the built in devices of 8051 microcontroller in any application.*

- **Text Books:**

1. A.K.Ray and K.M.Bhurchandi, “Advanced Microprocessors and Peripherals”, 2nd

Edition, TMH Publications.

2. Ajay V. Deshmukh, "Microcontrollers, Theory and applications", Tata McGraw-Hill Companies – 2005.

- **REFERENCE BOOKS:**

1. Douglas V.Hall, "Microprocessors and Interfacing", 2nd Revised Edition, TMH Publications.
2. Liu & Gibson, "Microcomputer Systems: The 8086/8088 Family: Architecture, Programming and Design", 2nd ed., PHI
3. Kenneth j.Ayala, Thomson, "The 8051 Microcontrollers", Asia Pvt.Ltd

- **MAPPING OF COs with POs:**

COURSES OUTCOMES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO-1	✓		✓	✓								
CO-2			✓									
CO-3					✓							
CO-4	✓		✓		✓							
CO-5			✓									

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEE21 ELECTRICAL MACHINES-III

III B.TECH –I SEMESTER EEE

L	T	C
3	1	3

- **OBJECTIVES:**

1. *To study the construction, working principle and performance of salient pole and non-salient pole types of synchronous generators.*
2. *To Understand the concepts of various types of voltage regulation methods of synchronous generators.*
3. *To acquire knowledge about parallel operation of synchronous generators and load sharing*
4. *To know the principle of operation of synchronous motor, its characteristics, determination of V and inverted V curves and starting methods*
5. *To know the principle of single phase Induction motor and their applications and also study of special machines*

UNIT- I

SYNCHRONOUS GENERATOR: Constructional features of round rotor and salient pole machines – Armature windings – Integral slot and fractional slot windings - Distributed and concentrated windings – Distribution, pitch and winding factors – E.M.F Equation – Characteristics - OCC & SC Test - Harmonics in generated E.M.F – Suppression of Harmonics – Armature reaction - Leakage reactance – Synchronous reactance and Impedance – Experimental Determination - Phasor diagram – Load characteristics .

UNIT- II

REGULATION OF SYNCHRONOUS GENERATOR: Synchronous impedance method - M.M.F method - Z.P.F method and A.S.A methods – Salient-pole alternators – Two reaction

analysis – Experimental Determination of X_d and X_q (Slip test) - Phasor diagrams – Regulation of Salient pole alternators.

UNIT- III

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

UNIT- IV

SYNCHRONOUS MOTORS: Principle Of Operation - Phasor diagram – Characteristics of Synchronous Motors - Variation of current and power factor with excitation – V and Inverted V Curves - Power developed – Synchronous Condenser - Power Circles - Excitation and power circles – Hunting and its suppression – Methods of starting – Synchronous Induction motor.

UNIT- V

SINGLE PHASE MOTORS: Single phase Induction motor – Constructional features - Double revolving field theory – Elementary idea of cross-field theory – Split-phase motors – Shaded pole motor.

SPECIAL MOTORS: Principle & performance of A.C. Series motor-Universal motor – Principle of Permanent Magnet Synchronous Motor (PMSM) – Brushless DC Motor (BLDC) – Switch Reluctance Motor (SRM) - stepper motor.

- ## OUTCOMES:

After completion of this course the student will be able to:

1. *Know the concept of synchronous machine and its power plant applications.*
2. *Test voltage regulation of synchronous generator using different methods*
3. *Understand the concept of synchronization of alternators with bus bars & load sharing in power generating stations.*

4. *Select the type of single phase induction motor based on the applications in industry and domestic appliances.*
5. *Know the concept of permanent magnet synchronous motor, Brushless DC motor and switched reluctance motor for industrial applications.*

- **Text Books:**

1. *Nagrath.I.J & Kothari.D.P: Electric Machines, 4th Edition, Tata Mc Graw-Hill Publishers, 2010.*
2. *Bimbra.P.S: Electrical Machines, Khanna Publishers.*

- **REFERENCES:**

1. *Say.M.G: The Performance and Design of A.C Machines, ELBS and Pitman & Sons*
2. *Langsdorf: Theory of Alternating Current Machinery, 2nd edition, Tata Mc Graw-Hill.*
3. *Fitzgerald.A.E, Kingsley.C and Umans.S: Electric Machinery, 5th edition Mc Graw-Hill Companies, 1990.*

- **MAPPING OF COs with POs:**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	✓	✓	✓			✓					✓	✓
CO2	✓	✓		✓	✓						✓	✓
CO3	✓	✓										✓
CO4	✓						✓	✓	✓			✓
CO5			✓	✓	✓		✓					✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEE22 SWITCH GEAR & PROTECTION

III B.TECH –I SEMESTER EEE

L	T	C
3	1	3

- **OBJECTIVES:**
  1. *To know the principles of various types of circuit breakers and their description.*
  2. *To know the basic requirements of different types of relays and their characteristics.*
  3. *To know about the various protection schemes available for protection of generators and transformers.*
  4. *To identify the schemes suitable for feeders and transmission protection.*
  5. *To know over voltage protection, insulation co-ordination and BIL.*

UNIT- I

CIRCUIT BREAKERS: Elementary principles of arc interruption - Restriking Voltage and Recovery voltage - Restriking Phenomenon - Average and Maximum RRRV - Numerical Problems - Current Chopping and Resistance Switching, Description and Operation of Minimum Oil Circuit breakers - Air Blast Circuit Breakers - Vacuum and SF_6 circuit breakers. Introduction to Gas insulated Substation.

UNIT- II

RELAYS: Basic Requirements of Relays – Primary and Backup protection - Construction details – Attracted armature, balanced beam, Induction type and Differential type relays – Universal Torque equation – Characteristics of over current - Directional and Distance relays. Static Relays – Advantages and Disadvantages – Definite time, Inverse and IDMT static relays – Comparators – Amplitude and Phase comparators - Microprocessor based relays – Block Diagram for Over current and Distance relays and their flow charts only.

UNIT- III

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

UNIT -IV

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

UNIT -V:

PROTECTION AGAINST OVER VOLTAGES: Generation of Over Voltages in Power Systems - Protection against Lightning Over Voltages – Types of Lightning Arresters - Insulation Coordination – BIL.

- ## OUTCOMES:

After completion of this course the student will be able to:

1. *Understand power system protection and circuit breakers.*
2. *Select the type of relay for protection in transmission line*
3. *Understand the transformer and generator protection against faults*
4. *know the protection of feeders and transmission lines.*
5. *Obtain the concept of insulation co-ordination and BIL.*

- ## TEXT BOOKS:

1. *Badari Ram, Viswakarma.D.N: Power System Protection and Switchgear, TMH Publications.*
2. *A. Chakrabarti,M.L.Soni,P.V.Gupta,U.S.Bhatnagar: A Text Book on Power system Engineering, Dhanpat Rai & Co.*

- **REFERENCE BOOKS:**

1. *Wadhwa.C.L: Electrical Power Systems, 3rd edition, New Age international (P) Limited.*
2. *Bhuvanesh Oza: Power System protection and switch gear, TMH 2010.*
3. *Paithankar.Y.G: Transmission network protection, Taylor and Francis,2009*

- **MAPPING OF COs with POs:**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	✓	✓	✓		✓							✓
CO2	✓	✓	✓							✓		✓
CO3	✓	✓		✓	✓					✓		✓
CO4	✓	✓		✓	✓					✓		✓
CO5	✓	✓		✓	✓							✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEE23 ELECTRICAL MACHINES-II LAB

III B.TECH –I SEMESTER EEE

L	T	P	C
-	-	4	2

- **OBJECTIVES:**
  1. *To acquire knowledge about no load test on single phase transformer and three phase induction motor*
  2. *To understand sumpner's test on single phase transformers.*
  3. *To study the Blocked rotor and No-Load test on 3ϕ Induction motor to determine the performance curves*
  4. *To study the EMF, MMF, ZPF and ASA methods of regulation of alternators*
  5. *To study the V and inverted V curves of synchronous motor by conducting No load and Load test.*

PART-A:

The following experiments are required to be conducted as compulsory experiments:

1. OC and SC test on Single phase Transformer- Determination of equivalent circuit parameters and predetermination of efficiency and regulation.
2. Sumpner's Test on a pair of single phase transformers- Determination of efficiency.
3. Conversion of three-phase to two single phase supply using Scott connection of transformer.
4. No-load and Blocked Rotor tests on a three phase induction motor-Predetermination of performance curves by drawing circle diagram.
5. Load Test on Three-phase Induction Motor-Determination of performance curves.
6. OCC and SC tests on three phase alternator- predetermination of regulation and efficiency by EMF, MMF and Potier triangle methods.

7. No load and load tests on a three phase synchronous motor-Determination of V-Curves and Λ -curves.

PART-B:

Any three of the following experiments are required to be conducted:

8. Determination of X_d and Xq on a salient pole synchronous machine.
9. Parallel operation of two single phase transformers.
10. No load and blocked rotor tests on single phase Induction Motor-Determination of equivalent circuit parameters.
11. Separation of core losses of a single phase transformer.
12. Heat run test on single phase transformer.

- **Outcomes:**

After completion of this course the student will be able to:

1. *Determine the performance characteristics of single phase transformer and 3 phase Induction motor.*
2. *Determine the equivalent circuit of single phase transformers and predetermine the losses, efficiency and regulation of a transformer.*
3. *To determine the efficiency of 3-phase Induction motor at various loads.*
4. *Predetermine the regulation and efficiency of three phase alternator at different loads*
5. *Understand the concept on conversion of three phase to two single phase supply using scott connected transformers.*

- **MAPPING OF COs with POs:**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	✓	✓		✓	✓	✓		✓			✓	✓
CO2	✓	✓		✓		✓		✓				
CO3	✓	✓			✓	✓					✓	✓
CO4	✓	✓				✓					✓	
CO5	✓	✓				✓						

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEE24 CONTROL SYSTEMS LAB

III B.TECH –I SEMESTER EEE

L	T	P	C
-	-	4	2

- **OBJECTIVES:**
  1. *To acquire knowledge about time response of second order systems using controllers*
  2. *To determine transfer function of DC machine*
  3. *To study the magnitude and phase plots using compensation techniques*
  4. *To study the PLC controller and its applications in electrical system*
  5. *To obtain the characteristics of servomotors, synchros & magnetic amplifiers*

PART-A:

The following experiments are required to be conducted as compulsory experiments:

1. Time response of Second order system using P,PI & PID controller.
2. Transfer function of DC Motor using Armature voltage control and field control.
3. Characteristics of Synchros
4. Characteristics of AC servo motor
5. Effect of feedback on DC servo motor
6. Lag ,Lead & Lead- Lag compensation – Magnitude and phase plots
7. Simulation of Transfer function using OP-AMP.

PART-B:

Any three of the following experiments are required to be conducted:

8. Characteristics of magnetic amplifiers
9. Temperature controller using PID
10. Programmable logic controller-study and verification of truth tables of logic gates simple Boolean expressions and application of speed control of the motor

11. Transfer function of DC generator
12. Effect of P,PI,PID controllers on a second order systems

- **OUTCOMES:**

After completion of this course the student will be able to:

1. *Know the performance of second order systems using P, PI, PID controllers.*
2. *Design Lag, Lead, Lag-Lead compensation circuits.*
3. *Understand the performance of synchros, AC servo motor and DC servo motor.*
4. *Know the performance of D.C motor using Transfer function*
5. *Understand the application of PLC controllers in Electrical System*

- **MAPPING OF COs with POs:**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	✓	✓		✓			✓	✓				✓
CO2	✓	✓		✓		✓		✓				✓
CO3	✓	✓		✓			✓	✓				✓
CO4	✓	✓					✓	✓				✓
CO5	✓	✓										✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEE25 COMPREHENSIVE ONLINE EXAMINATION

III B.TECH –I SEMESTER EEE

L	T	P	C
-	-	-	1

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AHS16 QUANTITATIVE APTITUDE AND REASONING -II

III B.TECH –I SEMESTER (COMMON TO ALL BRANCHES)

L	T	P	C
3	-	-	-

OBJECTIVES:

The main objectives of this course are

1. *To evaluate various real life situations by resorting to analysis of key issues and factors.*
2. *To understand various languages structures.*
3. *To demonstrate different principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.*
4. *To explore the possibilities of utilization of concepts of reasoning.*
5. *To interpret the given data graphically*.

SYLLABUS FOR QUANTITATIVE APTITUDE

Competency 1:

1. **Area**
    - Formulas for Areas
    - Problems on Areas

2. **Volumes & Surface Areas**
    - Problems on Volumes
    - Problems on Surface Areas

3. **Races & Games of Skill**

4. **Calendars**

- Definition of a Leap Year
- Finding the number of Odd days
- Framing the year code for centuries
- Finding the day of any random calendar date

5. **Clocks**

- Finding the angle when the time is given
- Finding the time when the angle is known
- Relation between Angle, Minutes and Hours
- Exceptional cases in clocks

6. **Stocks & Shares**

7. **Permutation and Combinations**

- Definition of permutation
- Problems on Permutations
- Definition of Combinations
- Problems on Combinations

Competency 2:

8. **Probability**

- Definition of Probability
- Problems on coins
- Problems on dice
- Problems on Deck of cards
- Problems on Years

9. True Discount

10. Banker's Discount

11. Heights & Distances

12. Odd man out & Series

- Problems on number Odd man out
- Problems on letter Odd man out
- Problems on verbal Odd man out

13. Data Interpretation

- Problems on tabular form
- Problems on Line Graphs
- Problems on Bar Graphs
- Problems on Pie Charts

Syllabus for Reasoning

Competency 3:

Deductions

- Finding the conclusions using Venn diagram method
- Finding the conclusions using syllogism method

Connectives

- Definition of a simple statement
- Definition of compound statement
- Finding the Implications for compound statements
- Finding the Negations for compound statements

Competency 4:

Analytical Reasoning puzzles

- Problems on Linear arrangement
- Problems on Circular arrangement
- Problems on Double line-up
- Problems on Selections
- Problems on Comparisons

Competency 5:

Blood relations

- Defining the various relations among the members of a family
- Solving Blood Relation puzzles
- Solving the problems on Blood Relations using symbols and notations

- **Outcomes:**

After completion of the course the student will be able to

1. *Strengthen their ability to meet the challenges in solving real life problems.*
2. *The student will preserve maturity of the mind in solving linguistic problems.*
3. *Develop the thinking ability and apply Quadratic equations.*
4. *Apply the Analytical Reasoning puzzles to solve linear and circular arrangements*
5. *Analyze the blood relation puzzles in a family tree.*

- **Text Books:**

1. GL Barrons,Tata Mc Graw Hills, *'Thorpe's Verbal reasoning'*, LSAT Materials.

2. R S Agarwal, '*A Modern approach to Logical reasoning'* , S chand Company Ltd 2002.

- **REFERENCE BOOKS:**

1. Abhjit Guha *'Quantitative Aptitude'* Tata Mc Graw Hills, 4th Edition, 2011.
2. R S Agarwal, '*Quantitative Aptitude'* S. Chand Company Ltd 2008.
3. G.L BARRONS '*Quantitative Aptitude'*.Tata Mc Graw Hills.

- **MAPPING OF COs with POs:**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	✓	✓		✓		✓			✓	✓	✓	✓
CO2		✓	✓			✓	✓	✓	✓		✓	✓
CO3	✓	✓	✓		✓		✓	✓		✓		✓
CO4	✓	✓		✓	✓						✓	✓
CO5	✓		✓	✓		✓						✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AHS13 TECHNICAL ENGLISH-II

III B.TECH –II SEMESTER (COMMON TO EEE, ECE,CSE & IT)

L	T	C
3	1	3

- **PREAMBLE:**

English is an international language as well as a living and vibrant one. People have found that knowledge of English is a passport for better career and for communication with the entire world. As it is a language of opportunities in this global age, English is bound to expand its domain of use everywhere. The syllabus has been designed to enhance communication skills of the students of Engineering and Technology. The prescribed book serves the purpose of preparing them for everyday communication and to face global competitions in future. The prescribed text focuses on LSRW skills and vocabulary development. The teachers should encourage the students to use the target language. The classes should be interactive and student-centered. They should been courage to participate in the classroom activities keenly.

- **OBJECTIVES:**

1. *To enable the students to communicate in English for academic and social purpose.*
2. *To make the students to master LSRW skills to meet the challenges in the society.*
3. *To strengthen the students to have good command of English Language and thereby to have good command of subject.*
4. *To develop the skills in students for societal service and the love for work.*
5. *To make the students to be humane.*

UNIT –I

CHAPTER ENTITLED 'HUMOUR' FROM" USING ENGLISH"

Listening-Techniques-Importance of phonetics

L-Meet & Greet and Leave taking, Introducing One self and Others(Forma land Informal situations)

R- Reading Strategies-Skimming and Scanning

W-Writing strategies-sentence structures

G-Parts of Speech–Noun-number, pronoun-personal pronoun, verb-analysis

V-Affixes-prefix and suffix, root words, derivatives

UNIT–II

CHAPTER ENTITLED 'INSPIRATION' FROM"USING ENGLISH"

L-Listening to details

S- Apologizing, Interrupting, Requesting and Making polite conversations

R- Note making strategies

W-Paragraph-types-topic sentences, unity, coherence, length, linking devices

G-Auxiliary verbs and question tags

V-synonyms-antonyms, homonyms, homophones, homographs, words often confused

UNIT–III

CHAPTER ENTITLED'SUSTAINABLE DEVELOPMENT' FROM" USING ENGLISH"

L-Listening to themes and note taking

S-Giving instructions and Directions, making suggestions, Accepting ideas, fixing time and Advising

R- Readingfordetails-1

W-Resume and cover letter

G-Tenses–Present tense, Past tense and Future tense

V-Word formation and One-Word Substitutes

UNIT–IV

CHAPTER ENTITLED'RELATIONSHIPS' FROM" USING ENGLISH"

L-Listening to news

S- Narrating stories, Expressing ideas and opinions and telephone skills

R- Reading for specific details and Information

W-Technical Report writing-strategies, form at s-types-technical reportwriting

G-Voice and Subject–Verb Agreement

V- Idioms and prepositional Phrases

UNIT–V

CHAPTER ENTITLED'SCIENCE AND HUMANISM' FROM" USING ENGLISH"

L-Listening to speeches

S- Making Presentations and Group Discussions

R- Reading for Information

W-E-mail drafting

G-Conditional clauses and conjunctions

V-Collocations and Technical Vocabulary and using words appropriately

REMEDIAL GRAMMAR:

1. Adjectives and Adverbs.
2. Use of Articles.
3. Review of prepositions and conjunctions.
4. Transformation of sentences
    (a) Active and Positive Voice.
    (b) Synthesis and analysis.
    (C) Direct and indirect speech.
5. Common errors in English.

VOCABULARY:

1. Synonyms and antonyms.
2. One word substitutions.
3. Phrasal verbs and idioms.
4. Commonly confused words
5. Verbal ability.

WRITING PRACTICE (COMPOSITION):

1. Essay writing
2. Report writing
3. Resume writing
4. Creative writing
5. Letter writing

- **OUTCOMES:**

1 *The students will enrich their communication skills both in academic and social arena.*

2 *The students will master LSRW skills.*

3 *The students will become proficient in English language and make use of it to be good in his subject.*

4 *The students will cultivate skills for societal service and inculcate passion for work.*

5 *The students will understand the human values of life and work.*

- **TEXT BOOKS:**

1. " Using English; A Course book for Undergraduate Learners**"** published by Orient Black Swan, 2013.

2.A Course in Communication Skills-Kiranmai Dutt& co.FoundationBooks,2012.

- **REFERENCE BOOKS:**

1. Raymond Murphy's English Grammar with CD, Murphy, Cambridge University Press,2012.

2. English Conversation Practice–Grant Taylor, Tata Mc-GrawHill,2009.

3. Communication SKILLS, Sanjay Kumar & Pushpa latha Oxford Universityy Press,2012.

- **MAPPING OF COs with POs:**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	✓	✓	✓				✓	✓	✓	✓	✓	✓
CO2	✓	✓	✓				✓	✓	✓	✓	✓	✓
CO3	✓	✓	✓				✓	✓	✓	✓	✓	✓
CO4	✓	✓	✓				✓	✓	✓	✓	✓	✓
CO5	✓	✓	✓				✓	✓	✓	✓	✓	✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEE26 POWER SEMICONDUCTOR DRIVES **L T C**

III B.TECH –II SEMESTER EEE **3 1 3**

- **OBJECTIVES:**
  1. *To understand the concept of single phase and three phase DC Motor converters and control methods.*
  2. *To acquire the knowledge about closed loop operation of single quadrant, two quadrant and four quadrant chopper drives.*
  3. *To understand the concept of control of Induction motor on stator side using AC voltage controllers and cycloconverters*
  4. *To Know the concept of control of Induction motor from rotor side using different methods*
  5. *To acquire the knowledge about of control of synchronous motor using Inverters and cycloconverters.*

UNIT- I

CONTROL OF DC MOTORS BY SINGLE PHASE & THREE PHASE CONVERTERS: Introduction to Thyristor controlled Drives - Single Phase semi and Fully controlled converters connected to DC separately excited and DC series motors – continuous current operation – output voltage and current waveforms – Speed and Torque expressions – Speed-Torque Characteristics - Problems on Converter fed DC motor- Three phase semi and fully controlled converters connected to DC separately excited and DC series motors – output voltage and current waveforms – Speed and Torque expressions – Speed-Torque characteristics - Four quadrant operation of DC motors by dual converters – Problems.

UNIT- II

CHOPPER CONTROLLED DC DRIVES: Introduction to Four quadrant operation – Motoring operations, Electric Braking, Plugging, Dynamic and Regenerative Braking

operations– Closed loop operation of DC motor (Block Diagram Only)- Single quadrant, Two quadrant and four quadrant chopper fed DC separately excited and series excited motors – Continues current operation – Output voltage and current wave forms – Speed torque expressions – speed torque characteristics – Problems on Chopper fed D.C Motors – Closed Loop operation (Block Diagram Only)

UNIT- III

CONTROL OF INDUCTION MOTOR THROUGH STATOR VOLTAGE & FREQUENCY: Variable voltage characteristics - Control of Induction Motor by AC Voltage Controllers – Waveforms – speed torque characteristics- Variable frequency characteristics - Variable frequency control of induction motor by Voltage source and current source inverter and Cyclo converters - PWM control – Comparison of VSI and CSI operations –

UNIT- IV

CONTROL OF INDUCTION MOTOR FROM ROTOR SIDE: Speed torque characteristics – Numerical Problems on induction motor drives – Closed loop operation of induction motor drives (Block Diagram Only)Static rotor resistance control – Slip power recovery – Static Scherbius drive – Static Kramer Drive, performance and speed torque characteristics – Advantages - Applications – Numerical problems

UNIT- V

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

- ## OUTCOMES:

After completion of this course the student will be able to:

1. *Apply single phase and three phase converters for Speed control of Dc motors.*
2. *Analyze choppers fed DC Drives.*

3. *Acquire the knowledge about closed loop speed control of induction motors on stator side*
4. *Acquire the knowledge about closed loop speed control of induction motors on rotor side.*
5. *Know Closed loop operation of synchronous motor fed by Inverters & cycloconverter*

- **TEXT BOOKS:**

1. Dubey.G .K: *Fundamentals of Electric Drives*, Narosa Publications.
2. Rashid.M.H: *Power Electronics - Circuits, Devices and applications*, Pearson Publications.

- **REFERENCE BOOKS:**

1. Singh. M.D and Khanchandani.K.B: *Power Electronics*, Tata McGraw-Hill Publishing company, 1998
2. Bose.B.K: *Modern Power Electronics and AC Drives*, PHI Publishers.
3. Pillai.S.K: *Analysis of Thyristor Power – conditioned motors*, 1st Edition, Universities press.

- **MAPPING OF COs with POs:**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	✓	✓	✓		✓							✓
CO2	✓	✓	✓							✓		✓
CO3	✓	✓		✓	✓					✓		✓
CO4	✓	✓		✓								✓
CO5	✓	✓		✓								✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEE27 POWER SYSTEM ANALYSIS	**L**	**T**	**C**
III B.TECH –II SEMESTER EEE	**3**	**1**	**3**

14AEE27 POWER SYSTEM ANALYSIS

Objectives:

1. *To study the graph theory, incidence matrices, formation of bus impedance and bus admittance matrices*
2. *To Understand Per unit representation and symmetrical component theory for analyzing different types symmetrical and unsymmetrical faults*
3. *To study the Gauss siedel, Newton Raphson, Decoupled and Fast Decoupled methods for load flow studies and their comparison.*
4. *To Understand the concept of power system stability, Swing equation, Equal area criterion, and methods to improve stability.*

UNIT I POWER SYSTEM NETWORK MATRICES: Representation of power systems elements – graph theory –Incidence matrices - formation of Y_{bus} matrix - direct and singular transformation methods - formation of Z_{bus} matrix - partial network - addition of a branch and link - modification of the impedance matrix for changes in the network - Numerical problems

UNIT II SYMMETRICAL FAULT ANALYSIS: Representation of power systems components - per unit system representation - per unit equivalent reactance network - symmetrical faults analysis - short circuit current and MVA calculation - LLL, LLLG on an unloaded generators - sequence network of synchronous machine - sequence impendence of transformer – Numerical problems

UNIT III UNSYMMETRICAL FAULT ANALYSIS: Symmetrical components of unsymmetrical phasors - phase shift of symmetrical components in star - delta transformer banks - power in terms of symmetrical components - sequence impedance and sequence networks- unsymmetrical faults (LG,LL and LLG) on an unloaded generator - Numerical problems

UNIT IV LOAD FLOW ANALYSIS: Formation of load flow problem - Gauss –siedel method - Newton Raphson method - decoupled and fast decoupled method - comparison of load flow methods -Numerical problems

UNIT V STABILITY ANALYSIS: Elementary concepts of Steady State, Dynamic and Transient Stabilities - Power Angle Curve – Transfer Reactance – Development of Swing Equation – Inertia constant – Steady state stability Transient stability: General considerations and Assumptions – Reduction of Two machine system to one machine system – Equal Area Criterion – Applications of Equal Area Criterion – Critical Clearing Angle - Point by Point solution of Swing equation – Methods of improving steady state and transient stabilities.

Outcomes:

After completion of this course the student will be able to:

1. *Formulate the network matrices for modeling of power systems*
2. *Analyze the load flow solutions by different computational methods.*
3. *Analyze the symmetrical and unsymmetrical faults in power systems.*
4. *Improve the stability of power systems using different techniques.*

Text Books:

1. Stagg El – Abiad & Stags: *Computer Methods in Power Systems*, Mc Graw-hill.
2. Nagrath.I.J & Kothari.D.P: *Modern Power system Analysis*, 3rd edition, TataMcGraw-Hill Publishing Company.
3. William D steveson -: Elements of power system analysis, 4th edition , McGraw-Hill international edition

References:

1. L.P. Singh: *Advanced methods in power system analysis and dynamics*, Wiley Eastern.
2. Hadi Saadat: *Power system Analysis*, TMH, 2002.
3. Grainger and Stevenson: *Power System Analysis*, Tata McGraw Hill.

MAPPING OF COs with POs:

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	✓			✓	✓	✓	✓					✓
CO2	✓	✓	✓		✓	✓						✓
CO3	✓				✓	✓						✓
CO4	✓	✓				✓	✓		✓			✓
CO5	✓	✓		✓	✓			✓				✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEE28 ELECTRIC POWER DISTRIBUTION

III B.TECH –II SEMESTER EEE

L	T	C
3	1	3

Objectives:

1. *To introduce the overall distribution system planning, types of tariffs and load forecasting.*
2. *To study the substation distribution and bus schemes.*
3. *To study the basics of substation protection and automation.*
4. *To study the coordination of protective devices and voltage control.*
5. *To study the importance of compensation for power factor improvement.*

UNIT - I

GENERAL ASPECTS OF DISTRIBUTION SYSTEM: Distribution system- Classification of Distribution Systems-A.C Distribution –D.C Distribution -Types of D.C Distributors-D.C Distribution calculations –A.C Distribution calculations

UNIT - II

DISTRIBUTION SYSTEM PLANNING: Planning and forecasting techniques - load characteristics - Definitions – Load forecasting - Load management – Tariffs - Types of Distribution Transformers - Single phase and Three phase transformers - Y/Δ and Δ/Y connections - Dry type and Self protected type transformers - Regulation and Efficiency.

UNIT - III

SUB STATION DISTRIBUTION AND PROTECTION: Substation location and rating - Primary systems and installation - Bus schemes Sub transmission lines. Voltage drop and power loss calculations - Capacitors in distribution systems - Distribution system protection - - Grounding.

UNIT - IV

COORDINATION AND VOLTAGE CONTROL: Coordination of protective Devices – General Coordination Procedure – Voltage Control – Equipment for voltage control – Effect of Series Capacitors – Effect of AVB/AVR – Line drop compensation.

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.

Outcomes:

After completion of this course the student will be able to:

1. *Understand the general aspects of D.C and A.C distribution system.*
2. *Identify the location of substation and its rating and also understand the protection of substation*
3. *Calculate Voltage drop and power loss in distribution system and apply the protective devices for substation protection*
4. *Able to design the equipments for voltage control in substation.*
5. *Select the suitable capacitor for power factor improvement and determine optimum location of capacitor.*

Text Books:

1. Turan Gonen: *Electrical Power Distribution System Engineering,* 2nd Edition, CRC Press Publications, 2007.
2. S.Sivanagraju and V.Shankar: *Electrical Power Distribution and Automation,* Dhanapti ray and Co, 2010.
3. *V.K.Mehta: Principles of Power Systems, 2nd Edition, S Chand Publications, 2005.*

References:

1. Pabla A.S: *Electric Power Distribution Systems,* 4th Edition, Tata Mc Graw Hill Publishers, 2006.
2. Sunil S Rao: *Transmission and Distribution,* Khana Publishers, 2011.

- **MAPPING OF COs with POs:**

COURSES	*PROGRAM OUTCOMES*											
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
CO1	✓	✓						✓	✓		✓	✓
CO2	✓		✓	✓				✓			✓	✓
CO3	✓		✓		✓			✓				✓
CO4	✓		✓	✓								✓
CO5	✓		✓								✓	✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEC28 DIGITAL SIGNAL PROCESSING **L T C**

III B.TECH –II SEMESTER (COMMON TO ECE & EEE) **3 1 3**

- **OBJECTIVES:**

The course will provide the student:

1. *To have an overview of discrete time signals and systems.*
2. *To familiarize with DFT and FFT computations.*
3. *To design various types of IIR and FIR filters.*
4. *To realize digital filters using different structures.*
5. *To know about multi rate signal processing*

UNIT-I

Discrete Time Signals And Systems: Discrete time signals -sequences, Elementary discrete time signals, Basic operations on sequences, classification of discrete time signals, classification of discrete time systems-static and dynamic, causal and non causal, linear and nonlinear, shift invariant and shift variant, stable and unstable, FIR and IIR systems. Impulse response and linear convolution, condition for BIBO stability, Difference equation of a discrete time LTI system. System function H(Z). Stability analysis using system function. Response of a digital system using Z- transforms- Natural response, Forced response and total response. Frequency spectrum of discrete time systems.

UNIT-II

Discrete Fourier Transform And Fast Fourier Transform: Discrete Fourier Transforms (DFT)- DFT and IDFT, Properties of DFT, Direct Computation of DFT and IDFT, circular convolution, Linear convolution using circular convolution, overlap-add and overlap – save methods for long sequences.

Fast Fourier transforms (FFT) - Radix2 decimation in time and decimation in frequency FFT algorithms, computation of IDFT through FFT.

UNIT-III

Realization Of Digital Filters: IIR Filter structures: Direct form-I realization, Direct form-II realization, Transposed forms, Cascade form structure, Parallel form structure, Lattice structure for first and second order IIR systems, Ladder structure.

FIR Filter structures: Direct form, Transposed form and Cascade form structures, Minimum multiplier structure for linear phase FIR filters, Lattice structure for first order and second order FIR systems.

UNIT-IV

Design of IIR Filters: Analog filter approximations - Butterworth and Chebyshev, Analog to analog transformation to transform low pass to high pass, bandpass and bandstop filters, Design of IIR filters from analog filters: Backward difference method, Impulse invariant technique and Bilinear transformation, Illustrative Problems.

UNIT-V

Design of FIR Filters & Introduction To Multirate Signal Processing: Design of FIR digital Filters - Fourier series method, Windowing method - Rectangular window, Bartlett window, Hamming window, Hanning window, Blackman window, Illustrative Problems. Introduction to Multirate Digital Signal Processing: Decimation and Interpolation, Sampling rate conversion by a rational factor.

- **OUTCOMES:**

After completion of this course the student will be able to:

1. *Analyze and process signals in the discrete time domain.*
2. *Design digital filters to suit specific requirements for specified applications.*
3. *Find frequency spectrum of discrete time systems.*
4. *Check the stability of a digital filter.*

5. *Outline the concepts of decimation and interpolation.*

- **TEXT BOOKS:**

1. John G. Proakis & Dimitris G. Manolakis, Digital signal processing, Principles, Algorithms and Applications, Pearson Education/PHI, 4th edition, 2007.
2. Sanjit K. Mitra, Digital Signal Processing, A computer base approach, Tata McGraw Hill, 3rd edition, 2009.

- **REFERENCE BOOKS:**

1. A.V. Oppenheim and R.W. Schaffer, Discrete Time Signal Processing, Pearson Education, 2012.
2. Andreas Antoniou, Digital Signal Processing, TATA McGraw Hill, 2006.
3. M. H. Hayes, Digital Signal Processing, Schaum's Outlines, TATA Mc-Graw Hill, 2007.

- **MAPPING OF COs with POs:**

COURSES OUTCOMES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO-1	✓	✓		✓								✓
CO-2			✓									
CO-3				✓								
CO-4			✓									
CO-5					✓							✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14ACS12 OBJECT ORIENTED PROGRAMMING THROUGH JAVA	**L**	**T**	**C**
	3	**1**	**3**

III B.TECH –II SEMESTER EEE

Objectives:

The objectives of this course are as follows:

1. To provide students an in-depth theoretical base of the object oriented programming using JAVA.

2. To introduce the students to the programming statements of Java to manage execution flow control.

3. To provide knowledge about the benefits of object oriented programming over Procedure oriented programming.

4. To inculcate knowledge to students to use various concepts like Inheritance, file access techniques, polymorphism and memory management techniques.

UNIT I

OBJECT ORIENTED CONCEPTS: OOP principles-Encapsulation, Inheritance and Polymorphism, Class fundamentals, declaring objects, introducing methods, usage of static with data and methods.

JAVA BASICS: History of Java, Java buzzwords, JVM architecture, data types, variables, scope and life time of variables, arrays, operators, control statements, type conversion and casting, simple java program, constructors, string and String Buffer handling functions.

UNIT II

INHERITANCE AND POLYMORPHISM: Basic concepts, types of inheritance, member access rules, usage of this and super key word, method overloading, method overriding, abstract classes, dynamic method dispatch, usage of final keyword, Garbage Collection.

PACKAGES AND INTERFACES: Defining package, access protection, importing packages, defining and implementing interface, and variables in interface and extending interfaces.

UNIT III

EXCEPTION HANDLING: Exception handling fundamentals, exception types, uncaught exceptions, usage of try, catch, throw, throws and finally keywords, built-in exceptions, creating own exception sub classes.

MULTI THREADING: Concepts of thread, thread life cycle, creating threads using thread class and runnable interface, synchronization, thread priorities, inter thread communication.

UNIT IV

AWT CONTROLS: The AWT class hierarchy, user interface components- labels, button, text components, check box, check box groups, choices, list box, panels - scroll pane, menu, scrollbars. Working with frame windows, color, font.

EVENT HANDLING: Events, event sources, event listeners, relationship between event sources and listeners, delegation event model, handling mouse and keyboard events, adapter classes.

UNIT V

SWINGS: Introduction to swings, hierarchy of swing components. Containers, top level containers- JFrame, JWindow, JDialog- JPanel, swing components - JButton, JToggleButton, JCheckBox,JRadioButton, JLabel, JTextField, JTextArea, JList, JComboBox, JTable, JTree, JTabbedPanes, JScrollPane.

APPLETS: Life cycle of an applet, inheritance hierarchy for applets, differences between applets and applications, developing applets, simple applet display methods, passing parameters to applets.

Outcomes:

Successful completion of this course, students should be able to:

1. Understand the concept and underlying principles of Object-Oriented Programming.

2. Understand how object-oriented concepts are incorporated into the Java programming language

3. Develop problem-solving and programming skills using OOP concept.

4. Develop the ability to solve real-world problems through software development in high-level programming language like Java

TEXT BOOK:

Herbert schildt, "*The complete reference JAVA"*, 7th edition, Tata Mcgraw Hill, New Delhi, 2010.

REFERENCE BOOKS:

1. T. Budd, "*An Introduction to Object Oriented Programming"*, 3rd edition, Pearson Education, India, 2009.

2. J. Nino, F. A. Hosch, *An Introduction to programming and OO design using Java*, John Wiley & sons, New Jersey,2002.

3. Y. Daniel Liang, *Introduction to Java programming*, 7th edition, Pearson education, India, 2010.

- **MAPPING OF COs with POs:**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	✓											✓
CO2		✓										✓
CO3	✓											✓
CO4					✓							✓
CO5		✓										✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEC30 BASIC COMMUNICATION SYSTEMS **L T C**

III B.TECH –II SEMESTER EEE **3 1 3**

- **OBJECTIVES:**

The course will provide the student:

1. *To introduce different amplitude modulation and demodulation methods.*
2. *To introduce different frequency modulation and demodulation methods.*
3. *To introduce different analog pulse modulation and demodulation methods and multiplexing.*
4. *To introduce digitization techniques for analog messages and various digital modulation schemes.*
5. *To introduce satellite and optical fiber communications*

UNIT-I

AMPLITUDE MODULATION: Need of modulation – Mathematical representation of AM (AM, DSB SC AM, SSB SC AM, VSB AM) – frequency spectrum- band width – power relation – generation of AM – square law modulator – balanced modulator- generation of SSB-SC AM – Detection of AM - square law detector – Envelope detector – Synchronous detector.

UNIT-II

FREQUENCY MODULATION: Angle modulation – mathematical representation of FM, PM – frequency spectrum – bandwidth- generation of FM –varactor diode modulator, Armstrong modulator - FM detection – foster seeley discriminator – ratio detector.

UNIT-III

ANALOG PULSE MODULATION: Sampling – Sampling of low pass signals, Pulse Amplitude Modulation- Generation and Detection, Pulse Time Modulation Schemes: PWM and

PPM Generation and Detection, Multiplexing – TDM – FDM- Quadrature multiplexing – comparison.

UNIT-IV

DIGITAL MODULATION: Advantages & Disadvantages of digital communication, Elements of digital communication systems, Generation and Reconstruction- Pulse Code Modulation, Delta Modulation.

DIGITAL MODULATION TECHNIQUES: Introduction, Amplitude Shift Keying, Frequency Shift Keying, Phase Shift Keying.

UNIT-V

SATELLITE AND OPTICAL FIBER COMMUNICATIONS: Orbital satellites, Geostationary satellites, Look angles, Satellite system link models, Satellite system link equations; Advantages & Disadvantages of optical fiber communication, Optical fiber communication system block diagram, Light propagation through an optical fiber, Losses in optical fiber cables, Operation of light emitting diodes and PIN diodes.

- ## OUTCOMES:

On completion of the course the student will be able to:

1. *Analyze the different amplitude modulation and demodulation methods.*
2. *Analyze the different frequency modulation and demodulation methods.*
3. *Analyze the different analog pulse modulation and demodulation methods and multiplexing.*
4. *Analyze the digitization techniques for analog messages and various digital modulation schemes.*
5. *Understand the basics of satellite and optical fiber communications.*

- **TEXT BOOKS:**

1. Wayne Tomasi, "Electronic Communication Systems", Pearson Education, 3rd Edition, 2001.
2. A. Bruce Carlson & Paul B. Crilly, "Communication Systems – An Introduction to Signals & Noise in Electrical Communication", McGraw-Hill International Edition, 5th Edition, 2010.

- **REFERENCE BOOKS:**

1. R.P.Singh & Saphre, "Communication Systems", Tata McGraw Hill Publication, 2009.
2. Dennis Roddy and John Coolen, "Electronic communication", Prentice Hall, 1995.
3. Simon Haykins, "Communication Systems", John Wiely, 1990.

- **MAPPING OF COs with POs:**

COURSES OUTCOMES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO-1		✓										
CO-2		✓										
CO-3			✓			✓						
CO-4			✓			✓	✓					
CO-5		✓	✓		✓							

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AME58 ROBOTICS **L T C**

III B.TECH –II SEMESTER (COMMON TO EEE, CSE & AE) **3 1 3**

- **OBJECTIVES:**

To make the students learn*:*

1. *The basic concepts of robots.*
2. *The various robot drives and power transmission systems.*
3. *The fundamentals of robot sensors and its vision system.*
4. *The concept of arm kinematics and Programming Languages.*
5. *The applications of robot in various fields.*

UNIT- I

INTRODUCTION TO ROBOTICS: Automation versus Robotic technology, Laws of robot, Progressive advancements in Robots, Robot Anatomy, Classification of robots - coordinate method, control method; Specification of robots. End Effectors: Classification of End effectors – Tools as end effectors, Mechanical-adhesive-vacuum-magnetic-grippers.

UNIT- II

ROBOT ACTUATORS AND MOTION CONVERSION SYSTEMS: Robot Actuators-hydraulic, pneumatic and electric, its comparison, Motion Conversion: Rotary-to-Rotary motion conversion - Gears, Harmonic Drives, Belt-and- pulley systems, Rotary-to-Linear motion conversion- Lead screws, Rack and Pinion systems, cams.

UNIT- III

ROBOTIC SENSORS: Meaning of sensing, selection of sensor for a robot, types of sensors - Position sensors, range sensors, velocity sensors, touch sensors, force and torque sensors. **ROBOT VISION-** Block diagram of vision system, lighting techniques and devices, analog to

digital conversion, Image storage, Image processing and Analysis, Object recognition, Feature extraction.

UNIT- IV

ROBOT ARM KINEMATICS: Homogeneous transformations, Basics of forward kinematics, Inverse kinematics.

ROBOT PROGRAMMING: Requirements of good programming language, Types of Robot programming, Robot programming languages and features- AL, AML, RPL, and VAL.

UNIT- V

ROBOTIC APPLICATIONS: Present applications-Material Transfer, Material handling, loading and unloading, processing, welding, spray painting, Assembly and Inspection; Future applications.

- ## OUTCOMES:

After completion of the course, the student will be able to:

1. *Gain the fundamental knowledge of robotics.*
2. *Select the proper actuators for the robot based on the application.*
3. *Select the proper sensors and vision systems for typical robot.*
4. *Apply the robot kinematics and program for specified activities of a typical robot.*
5. *Introduce appropriate robots to improve productivity and reduce fatigue load of human labour.*

- ## TEXT BOOKS:

1. Richard D. Klafter, Robotics Engineering, Bangalore, New Delhi, Prentice Hall, Eastern Economy Edition, 1989.
2. R.K. Mittal & I.J. Nagrath, Robotics and Control, New Delhi, 3rd Edition, Tata McGraw Hill, 2007.

- ## REFERENCE BOOKS:

1. Ganesh S. Hegde, Industrial Robotics, Lakshmi Publications (P), LTD
2. M.P. Groover, Industrial Robotics, New Delhi, Tata McGraw Hill, 2008.

- **MAPPING OF COs with POs:**

COURSES	PROGRAM OUTCOMES											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	✓	✓										
CO2		✓	✓		✓							
CO3		✓	✓		✓							
CO4				✓	✓	✓						
CO5		✓	✓			✓	✓					✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AHS14 TECHNICAL ENGLISH LAB-II

III B.TECH –II SEMESTER (COMMON TO EEE, ECE, CSE & IT)

L	T	P	C
-	-	4	2

OBJECTIVES:

1. *To inculcate the confidence of using correct pronunciation (recollecting the sounds of Monophthongs, diphthongs, consonants and identifying the rules of accent/stress and intonation).*
2. *To enable the students to improve the proficiency in English (based on the previous learning) at all levels.*
3. *To train the students to use English effectively in participating group discussions, interviews & in public speaking.*
4. *To enhance the confidence in problem solving while facing the career.*
5. *To train the students to face job interviews with confidence.*

1. **Listening comprehension:** Listening to passage – Understanding the passage – answering the questions – personal and professional situations.

2. **Resume writing:** Structure – format style – defining career objective – projecting the strengths – preparing covering letter.

3. Speaking Activities:

Just A Minute (JAM) – importance – rules – etiquette – body language.

Debates – importance – rules - beginning – taking a stand – supporting & defending.

Describing objects/people/situations: how to describe – physical properties – material-functions – features - complexion - Attire - situation – place – time – theme.

4. Interview: Preparing for interview – physically and mentally – answering strategy – face-to-face interview – panel interview - tele interview – video conferencing.

5. Oral & PowerPoint Presentation: Importance – developing and organizing the presentations – verbal and visual support - using body language – how to make it effective.

MINIMUM REQUIREMENT FOR EL CS LAB:

1) Computer aided language lab for 70 students, 70 systems – one master console software for self-study.

2) T.V, digital stereo – audio – visual system.

3) Computer laboratory with LAN Connectivity of minimum 70 multimedia systems with the following configuration.

a) Intel Pentium® D 3.00GHZ

b) RAM-1GB minimum

c) Hard disk – 160GB

d) Headphones of durable quality.

Prescribed Software – Globarena

Suggested Software:

- K-Van Advanced Communication Skills
- TOEFL&GRE (KAPLAN,AARCO&BARRONS,USA, Cracking GRE by CLIFFS)
- *DELTA' s key to the Next Generation TOEFL Test: Advanced Skill Practice.*
- Lingua TOEFLCBT Insider, by Dream tech
- Cambridge Advanced Learners' English Dictionary with CD.
- Oxford AdvancedLearner'sCompass,8thEdition
- SanjayKumar&PushpLata.2011. Communication Skills, OUP

- **OUTCOMES:**

1. *The students will use English fluently in communication by following LSRW.*
2. *The students will develop the art of oral presentation to develop leadership qualities.*
3. *The students will assimilate the importance of English in the modern world to compete with the career in the challenging world.*
4. *The students will strengthen the required skills to be employable.*
5. *The students will face the interviews confidently and improve the chances of getting a job.*

- **REFERENCE BOOKS:**

1 *Meenakshi Raman – Technical Communication,2/e, Oxford University Press, New Delhi.*

2 *Krishna Mohan &Meera Benerji* Developing Communication Skills *by (Macmillan)*

3 *English Skills for Technical Students*, WBSCTE with British Council, OL

4 *TOEFL & GRE* (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)

5 Robert J Dixson, *Everyday Dialogues in English* by Prentice – Hall of India Ltd.

6 Koneru, *Professional Communication* by McGraw Hill.

- **MAPPING OF COs with POs**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	✓	✓	✓				✓	✓	✓	✓	✓	✓
CO2	✓	✓	✓				✓	✓	✓	✓	✓	✓
CO3	✓	✓	✓				✓	✓	✓	✓	✓	✓
CO4	✓	✓	✓				✓	✓	✓	✓	✓	✓
CO5	✓	✓	✓				✓	✓	✓	✓	✓	✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEC32 MICROPROCESSORS & MICROCONTROLLERS LAB

III B.TECH –II SEMESTER (COMMON TO ECE AND EEE)

L	T	P	C
-	-	4	2

OBJECTIVES:

The course will provide the student:

1. *To become skilled in 8086 Assembly Language Programming.*
2. *To understand different applications of 8086 Microprocessor.*
3. *To use microprocessor for any type of waveform generation including pattern generation.*
4. *To learn 8051 Microcontroller Assembly Language Programming.*
5. *To learn about built – in timer of 8051 Microcontroller.*

Note: Minimum Twelve Experiments to be conducted

(Any **Nine** from **Part A** and **Three** from **Part B**)

PART A

8086 MICROPROCESSOR PROGRAMS USING MASM/8086 Kit:

1. ALPs (8086) for addition and subtraction.
2. (a) ALPs (8086) for multiplication and Division.
   (b) ALPs (8086) to determine GCD and LCM of two 16-bit numbers.
3. ALPs(8086) to evaluate arithmetic expressions.
4. ALPs (8086) for sorting and searching.
5. Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
6. String operations – Move block, Reverse string, String comparison, Length of string.

INTERFACING:

7. ALPs (8086) for square wave and rectangular wave generation using 8255 in I/O mode and BSR mode.
8. ALPs (8086) for ADC and DAC interfacing boards and drawing output Vs input characteristics.
9. ALPs (8086) for generating ramp wave, triangular wave, and stair case wave forms using DAC.
10. ALP (8086) for pattern generation using dual DAC interfacing board.
11. ALP (8086) for traffic light controller.
12. ALP (8086) for stepper motor control.
13. ALP (8086) for temperature measurement.

PART B

MICROCONTROLLERS:

1. ALP (8051) to determine the largest and smallest of N bytes.
2. (a) ALP (8051) to multiply a 16-bit number by an 8-bit number.
   (b) ALP (8051) to find square root of an 8-bit number.
3. (a) ALP (8051) to determine LCM of two 8- bit numbers.
   (b)ALP (8051) to determine GCD of two 8- bit numbers.
4. Timer/Counters (8051) in different modes.

- **OUTCOMES:**

At the end of the course student will be

1. *Able to write 8086 Assembly Language Programs.*
2. *Able to use 8086 Microprocessor for any application.*
3. *Able to generate any type of waveforms.*
4. *Able to write 8051 Assembly Language Programs.*
5. *Able to use built – in timer of 8051 Microcontroller.*

- **MAPPING OF COs with POs**

COURSES OUTCOMES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO-1			✓		✓							
CO-2	✓		✓	✓								
CO-3	✓		✓		✓							✓
CO-4				✓								
CO-5			✓									

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEE29 COMPREHENSIVE ONLINE EXAMINATION

III B.TECH –II SEMESTER EEE

L	T	P	C
-	-	-	1

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AMB01 MANAGEMENT SCIENCE

III B.TECH –II SEMESTER (COMMON TO EEE, ECE, CSE & IT)

L	T	P	C
3	-	-	-

OBJECTIVES:

1. *To learn the principles of management*
2. *To apply concepts in administering technology driven industrial units.*
3. *To gain an understanding of management functional areas like Production, HR, Marketing etc*
4. *To develop knowledge using OR techniques for project management*
5. *To analyse the importance of production in the organisation*

UNIT- I

INTRODUCTION TO MANAGEMENT: Nature, importance and Functions of Management, Approaches to Management - Taylor's Scientific Management - Henry Fayol's Principles of Management, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Leadership Styles – Introduction to Organization –Types of Mechanistic and organic structures.

UNIT- II

OPERATIONS MANAGEMENT: Principles and Types of Plant Layout - Methods of production (Job, batch and Mass Production), Work Study - Basic procedure involved in Method Study and Work Measurement-Statistical Quality Control: $\bar{x}$ chart, R chart, c chart, p chart, (simple Problems), Acceptance Sampling, TQM Concept - Deming's principles, Six sigma, Bench marking.

UNIT- III

MATERIALS MANAGEMENT: Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records, MRP, JIT.

MARKETING: Functions of Marketing, Marketing Mix, Product Life Cycle, Channels of Distribution.

UNIT- IV

HUMAN RESOURCES MANAGEMENT (HRM): Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Wage and Salary Administration, Job Evaluation and Merit Rating, Performance Appraisal.

UNIT- V

PROJECT MANAGEMENT (PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing. (Simple Problems)

- ## OUTCOMES:

After completion of this course students will be able to:

1. *Apply various areas of functional management for the prospects of business organization*
2. *Apply management principles for decision making*
3. *Handle intricacies of projects efficiently*
4. *use tools and techniques to become an effective manager*
5. *Apply production tools and techniques in every area of business*

- ## TEXT BOOKS:

1. Aryasri: *Management Science,* TMH, 2004.
2. Stoner, Freeman, Gilbert:*Management Science*, 6th Edition, Pearson Education, New Delhi, 2004.

- **REFERENCE BOOKS:**

1. Kotler Philip & Keller Kevin Lane:*Marketing Management,* 12/e, PHI, 2005.
2. Koontz & Weihrich:*Essentials of Management,* 6/e, TMH, 2005.
3. Subba Rao.P:*Personnel and Human Resource Management*, Himalaya Publishing House, 2000.

- **MAPPING OF COs with POs**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1											√	
CO2									√			√
CO3										√	√	
CO4											√	√
CO5									√		√	

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEE30 RENEWABLE ENERGY SOURCES AND SMART GRID TECHNOLOGY

L	T	C
3	1	3

IV B.TECH –I SEMESTER EEE

- **OBJECTIVES:**
  1. *To understand the Principles of solar radiation and Energy Collection.*
  2. *To acquire the knowledge about direct energy conversion ,solar energy storage and applications*
  3. *To understand the principles of wind and Bio-conversion, methods of biogas digesters and applications.*
  4. *To study the architecture of smart grid and its design features*
  5. *To know the smart grid techniques and concept of micro grid*

UNIT- I

SOLAR RADIATION AND ENERGY COLLECTION: Solar Radiation- The solar energy option, Environmental aspects, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on tilted surface, instruments for measuring solar radiation - sun shine Recorder, solar radiation data. Solar Energy Collectors- Flat plate and concentrating collectors, classification of concentrating collectors.

UNIT- II

SOLAR ENERGY STORAGE AND DIRECT ENERGY CONVERSION: Different methods, Sensible, latent heat and solar ponds, Solar Energy Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion, Direct Energy Conversion- Need for DEC, principles of DEC, Carnot cycle, limitations.

UNIT- III

WIND ENERGY & BIO-MASS: Sources and potentials, power in the wind, horizontal and vertical axis windmills, performance characteristics, Betz coefficient. Generating systems: Constant speed –constant frequency system, Variable speed with constant frequency systems.

BIO-MASS: Principles of Bio-Conversion, Anaerobic/aerobic digestion, Factors affecting generation of biogas, Types of Bio-gas digesters, combustion characteristics of bio-gas

UNIT- IV

SMART GRID TECHNOLOGY: Introduction to Smart Grid – Smart Grid Functions – Advantages – Indian Smart Grid – Key Challenges for Smart Grid – Smart Grid Architecture – Components and Architecture of Smart Grid Design.

UNIT -V

SMART GRID TECHNIQUES: Transmission, Distribution and Automation – Computational Intelligence Techniques – Distribution, Generation Technologies – Renewable Energy Technologies – Concept of Micro grids – Control of Smart Grid System – Case Study.

- **OUTCOMES:**

After completion of this course the student will be able to:

1. *Design solar and wind energy system*
2. *Acquire Knowledge of solar energy storage and direct energy conversion system*
3. *Design Wind and Bio energy systems*
4. *Use Smart grid technology with non-conventional energy sources*
5. *Acquire Knowledge of Micro grid and Smart grid systems.*

- **Text Books:**

1. Rai.G.D: Non-Conventional Energy Sources, Khanna Publishers
2. Twidell & Wier: Renewable Energy Resources, CRC Press(Taylor & Francis)

- **REFERENCE BOOKS:**

1. Mittal.K, Wheeler: Non-Conventional Energy Systems
2. Kothari.D.P, Singhal.K.C: Renewable energy sources and emerging technologies
3. Gil Masters: Renewable and Efficient Electric Power system,Wilay-IEEE Press,2004

- **MAPPING OF COs with POs:**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	✓	✓		✓		✓					✓	✓
CO2	✓	✓	✓							✓		✓
CO3	✓		✓	✓		✓					✓	✓
CO4		✓				✓				✓		✓
CO5	✓									✓	✓	✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEE31 UTILIZATION OF ELECTRICAL ENERGY

IV B.TECH –I SEMESTER EEE

L	T	C
3	1	3

- **OBJECTIVES:**
  1. *To study the laws of illumination and different types of lamps.*
  2. *To study the different types of Electric heating , electric welding and Electrolytic Process.*
  3. *To study the operation of electric drives and their applications.*
  4. *To study the Electric traction system and Electric Braking.*
  5. *To study the speed-time curves, calculation of tractive Efforts etc related to Electric traction.*

UNIT- I

ILLUMINATION: Definition – Laws of illumination – Polar curves – Calculation of Mean Horizontal Candle power(MHCP) and Mean Spherical Candle Power(MSCP)

LAMPS: Incandescent lamp, Sodium Vapour lamp, LED lamp luminars Fluorescent lamp. Requirement of good lighting scheme – Types, Design and Calculation of illumination - Street lighting and Factory lighting – comparison between Sodium Vapour lamp, LED lamp - Numerical Problems.

UNIT- II

ELECTRIC HEATING & WELDING : Advantages - Methods of Electric heating – Resistance, Arc, Induction and Dielectric heating. Types of welding – Resistance, Electric arc, gas welding - Ultrasonic, Welding electrodes of various metals, Defects in welding.

ELECTROLYTIC PROCESS: Electrolysis - Faradays laws, Application of Electrolysis, Power supply for Electrolysis Lead acid batteries.

UNIT-III

ELECTRIC DRIVES: Types of DC and AC Motors and their Characteristics – Applications - Electric Braking - Speed Control of DC and AC Motors – Temperature rise and Load Equalization – Selection of Motors.

UNIT- IV

ELECTRIC TRACTION–I: Introduction – Systems of Electric Traction - Comparison between AC and DC Traction – Special features of Traction Motors - Methods of Electric Braking – Plugging, Rheostatic and Regenerative types -Mechanics of train movement.

UNIT- V

ELECTRIC TRACTION – II: Speed-time curves of different services – trapezoidal and quadrilateral, speed-time curves – Numerical Problems. Calculations of tractive effort, Power, specific energy consumption - effect of varying acceleration and braking retardation - Adhesive weight and coefficient of adhesion – Problems.

- **OUTCOMES:**

  After completion of this course the student will be able to:

  1. *Apply the laws of illumination and lamps in industrial lightning.*
  2. *Apply the principles of electric heating, electric welding and electrolytic process.*
  3. *Select the electric drive suitable for specific application in industry.*
  4. *Understand the concepts of electric traction in mechanics of train movement*
  5. *Apply the methods of electric braking in Electric Traction.*

- **Text Books:**

1. Partab: *Art & Science of Utilization of electrical Energy*, Dhanpat Rai & Co.
2. J.B.Gupta: *Utilization of Electric Power and Electric traction,* S.K.Kataria & sons

- **REFERENCE BOOKS:**

1. Openshaw Taylor.E and Rao. V.V.L: *Utilization of Electric Energy,* Universities Press.

2. Suryanarayana.N.V: *Utilization of Electrical Power including Electric drives and Electric traction*, New Age International (P) Limited, Publishers, 1996.
3. Uppal.S.L: *Power systems*

- **MAPPING OF COs with POs:**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	✓		✓	✓								✓
CO2	✓		✓		✓							✓
CO3	✓				✓							✓
CO4	✓		✓									✓
CO5	✓		✓	✓	✓							✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEE32 ADVANCED CONTROL SYSTEMS

IV B.TECH –I SEMESTER EEE

L	T	C
3	1	3

- **OBJECTIVES:**
  1. *To study the state space analysis which includes canonical forms, solution of state equations, feedback control systems and tests for controllability & observability.*
  2. *To understand the concepts of Non-Linear system and study the analysis of non linear control systems.*
  3. *To study different types of stability for linear and non linear systems.*
  4. *To acquire the knowledge about control variable inequality constraints and minimum principles for minimization of function.*
  5. *To formulate optimal control problems and study different optimal control problems.*

UNIT- I

STATE SPACE ANALYSIS: State Space Representation - Solution of State Equation - State Transition Matrix - Canonical Forms – Controllable Canonical Form - Observable Canonical Form - Jordan Canonical Form - Controllability and Observability -Tests for controllability and observability for continuous time systems – Time varying case - Jordan canonical form - Effect of state feedback on controllability and observability - Design of State Feedback Control through Pole placement - Full order observer and reduced order observer.

UNIT -II

ANALYSIS OF NON-LINEAR SYSTEMS: Introduction to nonlinear systems - Types of nonlinearities - Describing functions - Describing function analysis of nonlinear control systems - Introduction to phase-plane analysis - Method of Isoclines for Constructing Trajectories - singular points - phase-plane analysis of nonlinear control systems.

UNIT- III

STABILITY ANALYSIS: Stability in the sense of Lyapunov - Lyapunov's stability and Lypanov's instability theorems - Direct method of Lypanov for the Linear and Nonlinear continuous time autonomous systems.

UNIT- IV

CALCULUS OF VARIATIONS: Minimization of functionals of single function - Constrained minimization - Minimum principle - Control variable inequality constraints - Control and state variable inequality constraints - Euler Lagrangine Equation.

UNIT -V

OPTIMAL CONTROL: Formulation of optimal control problem - Minimum time, Minimum energy, minimum fuel problems - State regulator problem - Output regulator problem - Tracking problem, Continuous - Time Linear Regulators.

- ## OUTCOMES:

After completion of this course the student will be able to:

1. *Design state feedback controller using pole placement to meet transient response specifications.*
2. *Understand the types of nonlinearities and analysis non linear control systems.*
3. *Apply lyapunov stability for analysis of linear and nonlinear systems.*
4. *Minimize functions using calculus of variations and optimal control using minimum principle.*
5. *Formulate optimal control problems and define minimum time, minimum energy and minimum fuel problems.*

- ## TEXT BOOKS:

1. Gopal.M: *Modern Control System Theory*, 2nd edition, New Age International (P) Ltd, 1996
2. Nagoor Kani: *Advanced Control Systems.*

- **REFERENCE BOOKS:**

1. Ogata.K: *Modern Control Engineering*, 5th edition, Prentice Hall of India, 1998
2. Nagarath.I.J and Gopal.M: *Control Systems Engineering*, New Age International (P) Ltd.
3. Stainslaw H. Zak: *Systems and Control*, Oxford Press, 2003.

- **MAPPING OF COs with POs:**

COURSES	PROGRAM OUTCOMES											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	✓	✓			✓			✓			✓	✓
CO2	✓	✓	✓									✓
CO3	✓	✓										✓
CO4		✓	✓								✓	✓
CO5	✓	✓			✓			✓			✓	✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14ACS15 DATABASE MANAGEMENT SYSTEMS

IV B.TECH –I SEMESTER EEE

L	T	C
3	1	3

- **OBJECTIVES:**

The objective of this course is to make students to:

1. *Understand the importance of DBMS and explain how DBMS is better than traditional File Processing Systems and analyze the basic structure of Database and recognize the different views of the database.*
2. *Draw and Investigate Data Flow and Entity Relationship Diagrams. & analyze and use Relational Data Model, while comparing with other data models.*
3. *Formulate data retrieval queries in SQL and the Relational Algebra and Calculus.& Describe the semantics of a SQL query in set-theoretic terms.*
4. *Understand terms like Deadlocks, Transaction Processing and Concurrency Control.*
5. *Understand the database storage structures and access the techniques like indexing and hashing.*

UNIT- I

INTRODUCTION: History of database systems- Database system applications - Database system vs file systems - Purpose of Database System – Describing and storing data in a DBMS- Structure of a DBMS.

ENTITY-RELATIONSHIP MODEL (E-R MODEL): E-R Diagrams-Features of ER Model-conceptual Database design with the ER model-conceptual design for large enterprises.

UNIT- II

RELATIONAL MODEL: Introduction to relational model - Integrity constraints -Querying relational data-Logical Database design- Introduction to views- Destroying/Altering Tables and views-Relational Algebra - Relational Calculus.

SQL: The form of a basic SQL query-Union, Intersect and Except operators-Nested queries-Aggregate operators-Null values-Complex integrity constraints in SQL-Triggers and active databases-Designing active databases- Embedded SQL-Triggers – Cursors- Procedures-Functions in PL/SQL.

UNIT- III

SCHEMA REFINEMENT AND NORMAL FORMS: Introduction to schema refinement-Functional Dependencies – reasoning about FDs-Normal Forms: 1NF,2NF,3NF,Boyce-Codd Normal Form-Properties of decompositions-Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form.

UNIT- IV

TRANSACTIONS: Transaction Concepts – Transaction state- Implementation of Atomicity and Durability-concurrent executions– Implementation of Isolation- Serializability- Recoverability.

CONCURRENCY: Concurrency control: Lock based protocols- Time stamp based protocols-Validation based protocols-Multiple granularity-Deadlock handling.

UNIT- V

STORAGE AND FILE STRUCTURE: Overview of Physical Storage Media- Magnetic Disks-RAID-Tertiary storage-Storage Access -File Organization –Organization of Records in Files.

INDEXING AND HASHING: Ordered Indices- B+ Tree Index Files- B- Tree Index Files-Multiple Key Access- Static Hashing- Dynamic Hashing- Comparison of Ordered Indexing and Hashing- Bitmap Indices.

- ## OUTCOMES:

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

1. *Understand functional components of the DBMS.*
2. *Acquire Capability of maintenance of huge amounts of data along with reducing of redundancy in data.*
3. *Design data base schema, Develop E-R Model, Evaluate and optimize queries.*

4. *Understand transaction processing, concurrency control and recovery techniques.*
5. *Compare the basic database storage structures and access techniques: file and page organizations, indexing methods including B-tree, and hashing.*

- **TEXT BOOKS:**

1. Ragurama Krishnan, Johannes Gehrke , "*Data base Management Systems"* TATAMcGraw-Hill 3rd Edition,2007.
2. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, *"Database System Concepts"*, Fifth Edition, Tata McGraw Hill, 2006.

- **REFERENCE BOOKS:**

1. Peter Rob,Carlos Coronel, *Database Systems Design Implementationand Management*, 7th edition, 2009.
2. S.K.Singh, "*Database Systems Concepts, Design and Applications*", First edition,Pearson Education, 2006.
3. RamezElmasri, Shamkant B. Navathe, "*Fundamentals of DatabaseSystems*", Fourth Edition, Pearson / Addisionwesley, 2007.

- **MAPPING OF COs with POs:**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1		✓										✓
CO2	✓											✓
CO3			✓									✓
CO4			✓									✓
CO5		✓										✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEE33 POWER SYSTEM OPERATION AND CONTROL

IV B.TECH –I SEMESTER EEE

L	T	C
3	1	3

- **OBJECTIVES:**
  1. *To understand an overview of economic operation of power system and control.*
  2. *To study the optimal scheduling of hydro thermal system.*
  3. *To understand the modeling of turbine and governor systems.*
  4. *To study the load frequency control, economic dispatch and tie-line bias control.*
  5. *To understand the concepts related to reactive power control and compensation techniques in transmission systems.*

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 and Long term Hydrothermal scheduling problem.

UNIT- III

MODELING OF TURBINE AND GOVERNOR: Modeling of Turbine - First order Turbine model, Block Diagram representation of Steam Turbines and Approximate Linear Models - Modeling of Governor- Mathematical Modeling of Speed Governing System – Derivation of small signal transfer function – Block Diagram.

UNIT- IV

LOAD FREQUENCY CONTROL: 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. 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- V

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.

- ## OUTCOMES:

After completion of this course the student will be able to:

1. *Know basic economic operation of power system including the effect of line losses.*
2. *Prepare optimal scheduling of thermal and hydro power systems.*
3. *Model the turbine and speed governing system for computation analysis.*
4. *Apply the control techniques to determine of power system dynamics and steady state response of the system*
5. *Apply suitable compensation techniques for reactive power control in transmission line.*

- ## TEXT BOOKS:

1. Chakravarthi.A and Halder.S: *Power System Operation and Control*, 3rd Edition, PHI.
2. Nagrath.I.J & Kothari.D.P: *Modern Power System Analysis*, 2nd edition, Tata M Graw – Hill Publishing Company Ltd.

- **REFERENCE BOOKS:**

1. Duncan Glover.J and Sarma.M.S: *Power System Analysis and Design*, 3rd Edition.
2. Nasar.S.A: *Electric Power Systems*, Revised 1st Edition, Schaum's Outline Series TMH.
3. Elgerd.O.I: *Electric Energy Systems*, Mc Graw-hill Edition.

- **MAPPING OF COs with POs:**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	✓	✓	✓	✓				✓			✓	✓
CO2	✓	✓	✓					✓			✓	✓
CO3	✓	✓						✓				✓
CO4	✓	✓	✓	✓	✓			✓				✓
CO5	✓	✓						✓				✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEE34 HIGH VOLTAGE ENGINEERING

IV B.TECH –I SEMESTER EEE

L	T	C
3	1	3

- **OBJECTIVES:**
  1. *To know about the need of generation of high voltages in the laboratory and the industrial applications of high voltage.*
  2. *To apply the breakdown phenomena in gases, liquid and solid dielectrics.*
  3. *To study the generation of high AC, DC and Impulse voltages.*
  4. *To learn the measurement of high AC, DC and Impulse voltages.*
  5. *To study the discharge measurements ,methods of discharge detection and high voltage testing methods of power system components.*

UNIT- I

INTRODUCTION: Introduction to HV technology, need for generating high voltages in laboratory, Industrial applications of high voltage, Electrostatic precipitation, separation.

UNIT- II

BREAKDOWN IN GASES, LIQUIDS AND SOLID DIELECTRICS: Gases as insulating media, collision process, Ionization process, Townsend's criteria of breakdown in gases, Paschen's law. Liquid as Insulator, breakdown in pure and commercial liquids. Breakdown of solid dielectrics, Breakdown in composite dielectrics- Intrinsic breakdown, electromechanical breakdown, thermal breakdown, Partial discharge.

UNIT- III

GENERATION OF HIGH AC, DC AND IMPULSE VOLTAGES: Generation of High AC voltages- cascade connection of Transformers- Resonant Transformers - Tesla coil - Generation of High DC voltages Cockcroft - Walton voltage doubler - Calculation of high voltage regulation, ripple and voltage drop.

Generation of Impulse voltage- Introduction to standard lightning and switching impulse voltages – single and Multi stage impulse generator Circuits- Triggering methods of impulse generator circuits- Generation of high impulse current.

UNIT- IV

MEASUREMENT OF HIGH AC, DC AND IMPULSE VOLTAGES: Measurement of High AC voltages-Electrostatic voltmeter- Chubb and Fortescue method - Measurement of High DC voltages- Generating voltmeter- Series resistance micro ammeter - Standard sphere gap measurements of HVAC, HVDC and impulse voltages - Measurement of Impulse voltages- Potential dividers-resistance dividers, capacitance dividers and mixed RC potential dividers - Measurement of high impulse currents - Rogowsky coil.

UNIT- V

HIGH VOLTAGE TESTING TECHNIQUES: Dielectric loss and loss angle measurements using Schering Bridge – Partial discharge measurements – Factors affecting the discharge detection – Methods of Discharge detection – Straight and balanced methods. HV Testing of isolators, circuit breakers, cables, insulators and transformers.

- ## OUTCOMES:

After completion of this course the student will be able to:

1. *Understand the need for generation of High Voltages.*
2. *Understand break down phenomenon in gases, liquids and dielectrics.*
3. *Acquire the knowledge about the generation of high AC, DC and impulse voltages and applications*
4. *Acquire the knowledge about the measurement of high AC, DC and impulse voltages.*
5. *Measure dielectric loss and loss angles in capacitor and test insulators, circuit breakers ,cables etc.,*

- **TEXT BOOKS:**

1. Naidu.M.S and Kamaraju.V: *High Voltage Engineering*, 4th Edition, TMH Publications
2. C.L.Wadhwa: *High Voltage Engineering*, New Age Internationals (P) Limited, 1997.

- **REFERENCE BOOKS:**

1. Begamudre.R.D: *High Voltage Engineering Problems & Solutions*, First Edition, New Age International Publishers, 2010.
2. Kuffel.E, Zaengl.W.S, Kuffel.J: *High Voltage Engineering: Fundamentals*, 2nd Edition, Elsevier Publications.
3. L.L.Alston " High Voltage Technology", Oxford University Press, New Delhi , First Indian Edition

- **MAPPING OF COs with POs:**

COURSES	***PROGRAM OUTCOMES***											
	1	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***12***
CO1	✓	✓										✓
CO2	✓	✓										✓
CO3	✓	✓	✓									✓
CO4	✓	✓	✓									✓
CO5	✓	✓		✓								✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEE35 DESIGN OF ELECTRICAL SYSTEMS

IV B.TECH –I SEMESTER EEE

L	T	C
3	1	3

- **OBJECTIVES:**
  1. *To understand the design aspects of electrical lightning, ventilation, servicing, electric wiring in building.*
  2. *To acquire knowledge in design of industrial installations.*
  3. *To acquire knowledge in improvement of power factor, using compensation techniques and optimal location of capacitor.*
  4. *To study the earthing phenomenon, types of earthing, their characteristics and measurement of earth resistance.*
  5. *To understand power quality issues, resonance problems and energy economics in system design.*

UNIT- I

DESIGN ASPECTS AND INSTALLATIONS OF ELECTRICAL SYSTEMS: Role of Statutes in Electrical System Design - Classification of Building Services - Design Aspects of Lighting - Design Aspects of Ventilation - Design Aspects of Climate Control - Design Aspects of Vertical Transportation - Design Aspects of Minor Building Services. Classification - Estimation of Load Requirements - Selection of Type of Wiring - Special Features Applicable for High -Rise Apartment Buildings - Pre-commissioning Tests.

UNIT-II

INDUSTRIAL INSTALLATIONS: Classification of Industrial Installation - General Characteristics - Selection of Distribution Architecture - Selection of Transformers and Sub Stations. Short Circuit Studies - Fault Current Calculations - Earthing Design - Selection of Switch Gears - Electrical Protection, Protection of Circuit Elements, Persons & Life stack,

Equipment, Electrical Isolation, Switch Gear Control, Switching Devices, Uses, Selective Co-ordination, Circuit Breakers and their Selection.

UNIT- III

POWER FACTOR IMPROVEMENT: Nature of Reactive Energy - Power Factor, How to Improve Power Factor - Economics of Power Factor Improvement - Location of Capacitors - Installation Precautions - Optimal Compensation - PF Correction of Induction Motors - Protection and Control, Voltage Transients, Switching Considerations.

UNIT- VI

POWER SYSTEM EARTHING: Introduction – Earthing - Types of System Earthing - Reasons for Grounding/ Earthing - TN System, TT System, IT System, Protective Measures and Protective Devices in IT System - Main Characteristics of Earthing Systems - Selection Criteria for Earthing - Design Considerations of Earthing - Measurement of Earth Resistance - Earth Leakage Protection - Neutral Earthing for Generators and Transformers.

UNIT-V

POWER QUALITY ISSUES, RESONANCE PROBLEMS AND ENERGY ECONOMICS IN SYSTEMS DESIGN: Power Quality Issues - Harmonics, Sources of Harmonics - Disturbances Caused by Harmonics - Methods to reduce the Impact of Harmonics - Design the Detuned Capacitor Bank - IEEE Standard 519-1992 and Limits. Introduction - Time Value of Money - Single Payment Compound Amount Model (SPCA) - Uniform Series Compound Amount Model (USCA) - Uniform Series Present Worth Model (USPW) - Depreciation, Tax Considerations - After Tax Analysis.

- ## OUTCOMES:

After completion of this course the student will be able to:

1. *Design electric lightning, electric wiring, ventilation and load requirement in building/Apartment building.*
2. *Analyze short circuit study, fault current, earthing etc in industrial installations.*

3. *Improve the power factor using compensation techniques and find optimum location of capacitor.*
4. *Select suitable earthing systems and design earthing systems in domestic and industrial installation.*
5. *Identify power quality issues and estimate taxes and depreciation.*

- **TEXT BOOKS:**

1. Giridharan.M.K: *Electrical Systems Design*, I. K. International Publishing House Pvt. Ltd.
2. Er. V. K. Jain and Er.Amitabh Bajaj: *Design of Electrical Installations*, University Science Press.

- **REFERENCE BOOKS:**

1. Turangonen: *Electrical Distribution System*

- **MAPPING OF COs with POs:**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
CO2	✓		✓	✓	✓	✓				✓	✓	✓
CO3	✓	✓		✓	✓	✓	✓			✓		
CO4	✓		✓	✓	✓	✓	✓	✓		✓		
CO5			✓	✓	✓	✓	✓			✓	✓	

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEE36 HVDC TRANSMISSION

IV B.TECH –I SEMESTER EEE

L	T	C
3	1	3

- **OBJECTIVES:**

1. *To understand the concept and planning of HVDC power transmission system.*
2. *To study the analysis of HVDC Converters and their characteristics.*
3. *To study the principle of DC link control, effect of source inductance and reactive power control in the steady state on the systems.*
4. *To study the power flow analysis in AC/DC system converter faults and protection against over voltage and current.*
5. *To study the generation, characteristics and adverse effect of harmonics and design of AC filters.*

UNIT- I

INTRODUCTION TO HVDC TRANSMISSION: Economics & Terminal equipment of HVDC transmission systems - Types of HVDC Links – Apparatus required for HVDC Systems – Comparison of AC & DC Transmission - Application of DC Transmission System – Planning & Modern trends in DC Transmission.

UNIT- II

ANALYSIS OF HVDC CONVERTERS: Choice of Converter configuration – Analysis of Graetz – characteristics of 6 Pulse & 12 Pulse converters – Cases of two 3 phase converters in star – star mode operation and their performance.

UNIT- III

CONVERTER AND HVDC SYSTEM CONTROL AND REACTIVE POWER CONTROL: Principle of DC Link Control – Converters Control Characteristics – Firing angle

control – Current and extinction angle control – Effect of source inductance on the system - Starting and stopping of DC link - Power Control - Reactive Power Requirements in steady state - Sources of reactive power

UNIT- IV

POWER FLOW ANALYSIS IN AC/DC SYSTEMS, CONVERTER FAULT & PROTECTION: Modeling of DC Links - DC Network - DC Converter - Controller Equations - Solution of DC load flow – P.U System for DC quantities - solution of AC-DC Power flow - Simultaneous method - Sequential method - Converter faults – Protection against over current and over voltage in converter station – surge arresters – smoothing reactors – DC breakers

UNIT- V

HARMONICS AND FILTERS: Generation of Harmonics – Characteristics harmonics, calculation of AC Harmonics, Non- Characteristics harmonics, adverse effects of harmonics – Calculation of voltage & Current harmonics – Effect of Pulse number on harmonics.
Types of AC filters - Design of Single tuned filters – Double and High pass filters.

- ## OUTCOMES:

After completion of this course the student will be able to:

1. *Plan HVDC transmission system, comparison of AC and DC transmission of power flow.*
2. *Design HVDC transmission systems.*
3. *Analyze HVDC systems and reactive power control.*
4. *Analyze power flow in AC/DC systems and protection against over current and over voltage.*
5. *Estimate harmonics, calculation of harmonics, types of filters and their designs.*

- ## TEXT BOOKS:

1. Padiyar.K.R: *HVDC Power Transmission Systems: Technology and system Interactions,* New Age International (P) Limited, and Publishers.
2. Sunil S.Rao: *EHVAC and HVDC Transmission Engineering and Practice*.

- **REFERENCE BOOKS:**

1. Arrillaga.J: *HVDC Transmission*.
2. Kimbark.E.W: *Direct Current Transmission*, John Wiley & Sons.
3. Collin Adamson & Hingorani N.G " HVDC Power Transmission " Garraway Ltd , London 1960.

- **MAPPING OF COs with POs:**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	✓	✓	✓	✓	✓			✓	✓			✓
CO2	✓	✓	✓									✓
CO3	✓	✓										✓
CO4	✓	✓	✓						✓			✓
CO5	✓	✓	✓									✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEE37 SOFT COMPUTING TECHNIQUES

IV B.TECH –I SEMESTER EEE

L	T	C
3	1	3

- **OBJECTIVES:**
  1. *To understand the basic concepts of Artificial Neural networks and study the model including applications of ANN.*
  2. *Study the learning strategies of Artificial Neural networks and their training algorithms.*
  3. *To acquire knowledge about associate memory and training algorithms of various associate memory networks.*
  4. *To understand fuzzy logic control and its applications to motor control.*
  5. *To know the basics of genetic algorithm and its application in power system.*

UNIT- I

ARTIFICIAL NEURAL NETWORKS: Introduction - Biological Neuron - Artificial Neuron - Basic concepts of Neural Networks - Basic Models of ANN Connections - McCulloch-Pitts Model - Characteristics of ANN - Applications of ANN - Artificial Neuron Model - Operations of Artificial Neuron - Types of Neuron Activation Function - ANN Architectures - Classification Taxonomy of ANN – Connectivity, Neural Dynamics (Activation and Synaptic),

UNIT-II

SUPERVISED LEARNING NETWORKS: Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules - Types of Application Perceptron Network - Perceptron Learning Rule – Architecture - Perceptron Training Algorithm - ADALINE, MADALINE - Back Propagation Network - BP Learning Rule, Input Layer Computation, Hidden Layer Computation, Output Layer Computation - Radial Basis Function.

UNIT- III

ASSOCIATIVE MEMORY NETWORK: Training Algorithms for Pattern Association - Auto Associative Memory Network - Hetero Associative Memory Network – Bidirectional Associate Memory - Hopfield Networks.

UNIT- IV

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

FUZZY LOGIC SYSTEM COMPONENTS: Fuzzification - Membership value assignment - Development of rule base and decision making system - Defuzzification to crisp sets - Defuzzification methods.

UNIT -V

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

APPLICATIONS TO ELECTRICAL SYSTEMS: ANN based Short term Load Forecasting - Load flow Studies - Fuzzy logic based Unit Commitment and Genetic Algorithm based Economic Dispatch.

- ## OUTCOMES:

After completion of this course the student will be able to:

1. *Understand the principles of artificial Neural Networks, fuzzy logic systems and genetic algorithms and their applications.*
2. *Apply learning strategies.*
3. *Understand training algorithms for associative memory network.*
4. *Apply fuzzy logic in motor speed control.*
5. *Apply genetic algorithm in optimum location of real time control applications.*

- **TEXT BOOKS:**

1. Sivanandam.S.N and Deepa.S.N: *Principles of – Soft Computing*, Wiley India.
2. Rajasekharan and Pai: *Neural Networks, Fuzzy logic, Genetic algorithms: synthesisand Applications*, PHI Publications.

- **REFERENCE BOOKS:**

1. James A Freeman and Davis Skapura: *Neural Networks*, Pearson Education, 2002.
2. Assad Abu-Jasser: *Solving the unit commitment problem using Fuzzy Logic*, International Journal of Computer and Electrical Engineering, Vol. 3, No.6, December 2011.
3. Pradeepta Kumar Sarangi, Nanhay Singh, R.K.Chauhan and Raghuraj Singh: *Short term load forecasting using Artificial Neural Network: A comparison with Genetic Algorithm Implementation*, ARPN Journal of Engineering and Applied Sciences, Vol. 4, No. 9, November 2009.

- **MAPPING OF COs with POs:**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	✓	✓	✓		✓							✓
CO2	✓	✓	✓		✓							✓
CO3	✓	✓	✓		✓							✓
CO4	✓	✓	✓		✓							✓
CO5	✓	✓	✓		✓							✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEE38 ENERGY AUDITING AND DEMAND SIDE MANAGEMENT

IV B.TECH –I SEMESTER EEE

L	T	C
3	1	3

- **OBJECTIVES:**
  1. *To acquire the knowledge about energy auditing and energy conservation.*
  2. *To study the analysis of energy efficient motors for conservation of energy and reduce losses of the motor.*
  3. *Design good lighting system and acquire knowledge of energy instruments.*
  4. *To acquire the knowledge about energy economic analysis such as payback analysis, Depreciation methods etc.*
  5. *To understand the different techniques of demand side management.*

UNIT- I

INTRODUCTION OF ENERGY AUDITING: Introduction-Energy situation in world and India, energy consumption, conservation, Codes, standards and Legislation. - Energy audit-Definitions, concept, types of audit, energy index, cost index, pie charts, Sankey diagrams, load profiles, Energy conservation schemes. Measurements in energy audits, presentation of energy audit results.

UNIT- II

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

UNIT- III

LIGHTING AND ENERGY INSTRUMENTS: Good lighting system design and practice, lighting control ,lighting energy audit - Energy Instruments- wattmeter, data loggers, thermocouples, pyrometers, lux meters, tong testers ,application of Programmable Logic Control(PLC).

UNIT- IV

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

UNIT- V

DEMAND SIDE MANAGEMENT: Introduction to DSM, concept of DSM, Benefits of DSM, different techniques of DSM – Time of day pricing, Multi-utility power exchange model, time of day models for planning, Load priority technique, peak clipping, peak shifting, valley filling, strategic conservation, energy efficient equipment, Management and Organization of Energy Conservation awareness Programs.

- ## OUTCOMES:

After completion of this course the student will be able to:

1. *Increase energy efficiency and reduce energy related cost.*
2. *Develop energy efficient motors for energy saving and satisfying the load demand using different techniques like load priority technique, peak clipping, valley filling etc.*
3. *Design efficient lighting system towards conservation of energy.*
4. *Develop cash flow models and calculation of depreciation and taxes*
5. *Organize Energy Conservation awareness Programs*

- ## TEXT BOOKS:

1. Arry C. White, Philip S. Schmidt, David R. Brown: *Industrial Energy Management Systems,* Hemisphere Publishing Corporation, New York.

2. Albert Thumann, Englewood Cliffs: *Fundamentals of Energy Engineering*, Prentice Hall Inc, New Jersey.

- **REFERENCE BOOKS:**

1. Paul o' Callaghan: *Energy management*, 1st edition, Mc-graw Hill Book company, 1998
2. Sen.D.P, Padiyar.K.R, Indrane Sen, Pai.M.A: *Recent Advances in Control and Management of Energy Systems*, Interline Publisher, Bangalore, 1993.
3. Ashok V. Desai: *Energy Demand – Analysis*, Management and Conservation, Wiley Eastern, 2005.

- **MAPPING OF COs with POs:**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1						✓	✓	✓			✓	✓
CO2	✓	✓	✓		✓		✓	✓			✓	✓
CO3	✓	✓		✓	✓		✓	✓				✓
CO4	✓	✓			✓							✓
CO5					✓							✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEE39 POWER ELECTRONICS & DRIVES LAB

IV B.TECH –I SEMESTER EEE

L	T	P	C
-	-	4	2

- **OBJECTIVES:**
  1. *To determine the characteristics of power semi conductor devices.*
  2. *To understand the different types of firing and commutation circuits for silicon control rectifiers.*
  3. *To know the operation of single phase and three phase converter with R and RL Loads.*
  4. *To obtain the speed control of DC and AC machines using control rectifier.*
  5. *To understand the operation of DC choppers, inverter, cycloconverter and buck boost regulators.*

PART-A:

The following experiments are required to be conducted as compulsory experiments:

1. Characteristics of SCR, MOSFET & IGBT.
2. Gate firing circuits for SCR's- R, RC and UJT firing circuits.
3. Forced Commutation circuits (Class A, Class B, Class C, and Class D)
4. Single Phase Half wave & controlled rectifier with R & RL load.
5. Single Phase fully controlled bridge converter with R and RL loads.
6. Single Phase AC Voltage Controller with R and RL Loads.
7. Single Phase Cycloconverter with R and RL loads.

PART-B:

Any three of the following experiments are required to be conducted:

8. Three phase half and full controlled bridge converter with R & RL loads
9. Closed loop speed control of DC shunt motor using single phase control rectifier
10. Speed control of inverter fed single phase induction motor

11. Buck & Boost converter with R and RL loads.
12. Speed control of single phase Cycloconverter fed induction motor

- **OUTCOMES:**

After completion of this course the student will be able to:

1. *Design firing circuits and Commutation circuits for SCR.*
2. *Understand the operation of different types of controlled rectifiers.*
3. *Understand the working of AC Voltage controllers used for speed control of induction motor.*
4. *To analyze the speed control of cycloconverter fed induction motor.*
5. *Design chopper circuits for DC Drive.*

- **MAPPING OF COS WITH POS:**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	✓	✓	✓		✓							✓
CO2	✓	✓	✓		✓							✓
CO3	✓		✓									✓
CO4	✓			✓								✓
CO5	✓		✓									✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AEE40 ELECTRICAL SYSTEMS AND SIMULATION LAB

IV B.TECH –I SEMESTER EEE

L	T	P	C
-	-	4	2

- **OBJECTIVES:**

1. *To acquire knowledge about different types of software like PSPICE, PSIM and MATLAB*
2. *To design electrical circuits, power system control, control system and speed control of electrical machines using PSPICE and MATLAB*
3. *To analysis of electrical parameters using MATLAB editor and mdl file*
4. *To understand the operation of single phase and three phase converter and controller*
5. *To emphasize single and two area control and analysis of three phase circuits in transmission line .*

PART-A:

The following experiments are required to be conducted as compulsory experiments:

1. PSPICE simulation of DC circuits (Thevenin's equivalent, Transfer function).
2. PSPICE simulation of transient and parameter analysis of RLC circuits to an input i) Pulse ii) Step and iii) sinusoidal signals
3. Stability analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant system using MATLAB
4. Time domain analysis of second order system-Determination of time domain specifications and steady state error using MATLAB.
5. PSPICE simulation of single phase full converter using RLE loads and single phase AC voltage controller using RLE loads
6. Simulation of Dynamical systems (Single area and Two area power systems) using SIMULINK
7. Simulation of speed control of separately excited dc motor using MATLAB Simulink.

PART-B:

Any three of the following experiments are required to be conducted:

8. Simulation of single phase two level PWM inverter.
9. PSPICE Simulation of switch mode regulators
10. Analysis of 3-phase circuit representing the generator transmission line and load. Plotting three phase currents & Neutral current using PSPICE
11. Simulation of Tellegan's & Compensation theorems.
12. Simulation of RL & RC series circuits.

- ## OUTCOMES:

After completion of this course the student will be able to:

1. *Acquire knowledge about simulation of electrical circuits*
2. *Simulate DC and AC machines using PSPICE and MATLAB*
3. *Simulate different types of converter and controller*
4. *Analysis of time domain, frequency domain and steady state error of second order equations*
5. *Learn single and two area control and speed control of AC and DC machines.*

- ## TEXT BOOKS:

1. N. Yadaiah and G. Tulasi ram das: *Simulation tools for Electrical Engineers*, pearson Education

- ## REFERENCE BOOKS:

1. M.H. Rashid: *PSPICE for circuits and Electronics using PSPICE*, PHI publications
2. *MATLAB and its tool boxes user's manual and math works*, USA

- **MAPPING OF COS WITH POS:**

COURSES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	✓		✓		✓			✓				✓
CO2	✓		✓		✓			✓				✓
CO3	✓		✓		✓			✓				✓
CO4	✓	✓		✓								✓
CO5	✓											✓

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), CHITTOOR

14AMB02 PROFESSIONAL ETHICS

IV B.TECH –I SEMESTER EEE

L	T	C
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- **OBJECTIVES:**
  1. *To understand the fundamental concepts of professional ethics.*
  2. *To impart and inculcate ethical decision making.*
  3. *To apply ethical and human values in engineering profession.*
  4. *To prepare engineering students to meet global demands on human values.*
  5. *To explain the importance of environmental protection in engineering activities.*

UNIT-I

INTRODUCTION : Professionalism-models of professionalism-Ethics-Types of ethics and morality-Engineering ethics-Positive and negative faces of ethics-Responsibility for safety-Technology pessimism and perils of technological optimism.

UNIT-II

ETHICAL CONCEPTS : Human Values – morals-integrity-work ethics-Respect for others-respect for authority-conflicts of interests-moral dilemmas-honesty- courage-cooperation-valuing time-commitment-collegiality-loyalty-self -interest-Professional accountability-royalty-Problem of bribery, extortion and grease payments-problem of nepotism, excessive gifts-confidentiality-uses of ethical theories-Kohlberg's Theory- Gilligan`s Theory-Ethical codes of IEEE and Institution of Engineers –

UNIT III

ENGINEERS ROLE IN SAFETY :Safety and risks-risk and costs-risk benefit analysis-Testing methods for safety-The promise of technology-Computer Technology Privacy-Social policy-Engineering standards-the standards care-Social and value dimensions of technology-

communicating risk and public policy-occupational crime-professional rights and employee rights-whistle blowing`

UNIT IV

ROLES OF ENGINEERS: Engineers as managers, Advisors, Consultants, Experts and witnesses- Engineers role in industry and society- models of professional roles-Theories about right action-paternalism-different business practices-Moral leadership- Cases - Bhopal gas tragedy, Nuclear power plant disasters-

UNIT V

ENVIRONMENTAL ETHICS: Global Issues-Multinational corporations-Living in harmony with NATURE-Holistic technology-Eco friendly production system-sustainable technology and development-weapon development-Four orders of living, their interconnectedness-Eco system-Ozone depletion-,pollution

- ## OUTCOMES:

After the completion of the course the students shall be able to

1. *Understand human values and ethical standards to lead career accordingly.*
2. *Able to incorporate appropriate safety measures in designing systems.*
3. *Play the role of "responsible engineer" in the society.*
4. *Use natural resources in a sustainable manner and be conscious of environment.*
5. *Incorporate safety measures in engineering and product design aspects.*

- ## TEXT BOOKS:

1. *Subramanian R, Professional Ethics,1st Edition, Oxford University Press. 2013.*
2. *Naagarazan , R.S., A Textbook on Professional Ethics and Human Values,1st edition, New Age International (P) Limited, Publishers New Delhi..2014*

- **REFERENCE BOOKS:**

1. *Fundamentals of Ethics for scientists and Engineers, Edmond G Seebauer and Robert L. Barry, 1st edition Oxford University Press, 2008.*
2. *R. R. Gaur, R. Sangal and G. P. Bagaria, Human Values and Professional Ethics:,Eecel Books,New Delhi.2010.*
3. *Professional Ethics and Human Values – M.Govindrajan, S.Natarajan and V.S. Senthil Kumar, PHI Learning Pvt. Ltd. Delhi.*

- **MAPPING OF COS WITH POS:**

COURSES	**PROGRAM OUTCOMES**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1								√			√	
CO2								√				
CO3									√			
CO4			√				√					
CO5								√				

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MOOC – II

IV B.TECH –II SEMESTER EEE

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14AEE43 PROJECT WORK

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