MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
Sponsored by CMR Educational Society
(Affiliated to JNTU, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – 'A' Grade - ISO 9001:2015 Certified)
Maisammaguda, Dhulapally (Post Via. Kompally), Secunderabad – 500100, Telangana State, India.
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BACHELOR OF TECHNOLOGY
UNDERGRADUATE PROGRAM

ACADEMIC REGULATIONS
(Batches admitted from the academic year 2018 - 2019)

Note: The regulations hereunder are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.

PRELIMINARY DEFINITIONS AND NOMENCLATURES

- ”Autonomous Institution /College” means an institution/college designated as autonomous institute / college by University Grants Commission (UGC), as per the UGC Autonomous College Statutes.
- “Academic Autonomy” means freedom to the College in all aspects of conducting its academic programs, granted by the University for promoting excellence.
- “Commission” means University Grants Commission.
- “AICTE” means All India Council for Technical Education.
- “University” the Jawaharlal Nehru Technological University, Hyderabad.
- “College” means Malla Reddy College of Engineering & Technology, Secunderabad unless indicated otherwise by the context.
- “Program” means:
  - Bachelor of Technology (B.Tech) degree program
  - UG Degree Program: B.Tech
- “Branch” means specialization in a program like B.Tech degree program in Electronics & Communication Engineering, B.Tech degree program in Computer Science and Engineering etc.
- “Course” or “Subject” means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester.
- T–Tutorial, P–Practical, D–Drawing, L-Theory, C-Credits

FOREWORD

The autonomy is conferred on Malla Reddy College of Engineering & Technology (MRCET) by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but under its observance.

Malla Reddy College of Engineering & Technology (MRCET) is proud to win the credence of all the above bodies monitoring the quality of education and has gladly accepted the responsibility of sustaining, and also improving upon the values and beliefs for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several experts drawn from academics, industry and research, in accordance with the vision and mission of the college which reflects the mindset of the institution in order to produce quality engineering graduates to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought at appropriate time with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The cooperation of all the stakeholders is sought for the successful implementation of the autonomous system in the larger interests of the institution and brighter prospects of engineering graduates.

"A thought beyond the horizons of success committed for educational excellence"

PRINCIPAL

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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VISION

- To establish a pedestal for the integral innovation, team spirit, originality and competence in the students, expose them to face the global challenges and become technology leaders of Indian vision of modern society.

MISSION

- To become a model institution in the fields of Engineering, Technology and Management.
- To impart holistic education to the students to render them as industry ready engineers.
- To ensure synchronization of MRCET ideologies with challenging demands of International Pioneering Organizations.

QUALITY POLICY

- To implement best practices in Teaching and Learning process for both UG and PG courses meticulously.
- To provide state of art infrastructure and expertise to impart quality education.
- To groom the students to become intellectually creative and professionally competitive.
- To channelize the activities and tune them in heights of commitment and sincerity, the requisites to claim the never - ending ladder of **SUCCESS** year after year.

For more information: www.mrcet.ac.in

ACADEMIC REGULATIONS FOR B. TECH. (REGULAR)

Applicable for the students of B. Tech. (Regular) from the Academic Year 2018-19 and onwards

The college affiliating to JNTUH, Hyderabad offers a 4-year (8 semesters) Bachelor of Technology (B.Tech.) degree programme, under Choice Based Credit System (CBCS) for the following branches of Engineering.

1.0 Award of B. Tech. Degree

A student will be declared eligible for the award of B. Tech. Degree if he fulfills the following academic regulations:

1.1 The candidate shall pursue a course of study for not less than four academic years and not more than eight academic years.

1.2 After eight academic years of course of study, the candidate is permitted to write the examinations for two more years.

1.3 The candidate shall register for 160 credits and secure 160 credits with compulsory subjects as listed in Table-1.

Table 1: Compulsory Subjects

S.No	Subject Particulars
1	All practical Subjects
2	Mini Project
3	Project Work

1.4 In addition to 1.3, the candidate has to register for Mandatory courses (Non-credit course), in which 50% of scoring is required for the award of the degree.

2.0 The students, who fail to fulfill all the academic requirements for the award of the degree within ten academic years from the year of their admission, shall forfeit their seats in B. Tech. course.

3.0 Courses of study

The following courses of study are offered at present as specializations for the B. Tech. Course:

S.No	Department
01	Aeronautical Engineering
02	Computer Science Engineering
03	Electronics & Communication Engineering
04	Information Technology
05	Mechanical Engineering
06	Electrical and Electronics Engineering

4.0 Credits

Particulars	Semester	
	*** Periods per week**	**Credits**
Theory	04	04
	03	03
Practical	03	1.5
	04	02
Drawing	03	1.5
	04	02
Mini Project	--	03
Major Project	18	09

***Duration of each period is 60 minutes.**

5.0 Distribution and Weightage of Marks

5.1 The performance of a student in each semester shall be evaluated subject-wise for a maximum of 100 marks for a theory and 100 marks for a practical subject. In addition, Mini Project and Major Project work shall be evaluated for 100 and 300 marks, respectively.

5.2 For theory subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.

5.3 For theory subjects, during a semester there shall be 2 mid-term examinations. Each mid- term examination consists of a descriptive paper and assignment. The descriptive paper shall be for 24 marks with a total duration of 2 hours. The descriptive paper shall contain 6 full questions out of which, the student has to answer 4 questions, each carrying 6 marks. Six (6) marks are allocated for Assignments (as specified by the subject teacher concerned). The first Assignment should be submitted before the conduct of the first mid-examination, and the second Assignment should be submitted before the conduct of the second mid-examination. While the first mid-term examination shall be conducted from 1 to 2 units of the syllabus, the second mid-term examination shall be conducted from 3 to 5 units. The total marks secured by the student in each mid-term examination are evaluated for 30 marks, and the average of the two mid-term examinations shall be taken as the final marks secured by each candidate.

However, if any student is absent/scoring internal marks less than 40% in any subject of a mid-term examination he/she will be given a chance to write the internal exam once again after he/she re-registering for the internal exam in the concerned subject and paying stipulated fees as per the norms.

The end examination will be conducted for 70 marks with 5 questions consisting of two parts each (a) and (b), out of which the student has to answer either (a) or (b), not both and each question carrying 14 marks.

5.4 For practical subjects, there shall be a continuous evaluation during a semester for 30 sessional marks and 70 end semester examination marks. Out of the 30 marks for internal evaluation, day-to-day work in the laboratory shall be evaluated for 15 marks and internal practical examination shall be evaluated for 15 marks conducted by the laboratory teacher concerned. The end semester examination shall be conducted with an external examiner and the laboratory teacher. The external examiner shall be appointed from the clusters of colleges which are decided by the examination branch of the College.

5.5 For the subject having design and/or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and Estimation, the distribution shall be 30 marks for internal evaluation (15 marks for day-to-day work and 15 marks for internal tests) and 70 marks for end semester examination. There shall be two internal tests in a Semester and the average of the two shall be considered for the award of marks for internal tests.

5.6 There shall be a Mini Project to be taken in III year II Semester examination which carries 3 credits. The Mini Project shall be submitted in a report form and presented before the committee. It shall be evaluated for 100 marks out of which 30 marks for Internal and 70 marks External evaluation. The committee consists of an External Examiner, Head of the Department, and the Supervisor of the Mini Project and a Senior Faculty member of the department.

5.7 Out of a total of 300 marks for the Major Project work which is implemented in two phases i.e., Project I and Project II out of which Project I has to be implemented in IV Year I Semester for which 100 marks shall be allotted. Out of the 100 marks, 30 marks for Internal and 70 marks for External evaluation. Project I shall carry 3 credits and the Internal evaluation shall be on the basis of one seminar given by each student on the topic of his/her project.

5.8 Project II has to be implemented in IV Year II Semester for which 200 marks shall be allotted. Out of the 200 marks, 60 marks are for Internal and 140 marks are for External evaluation. The End Semester Examination of the Major Project work shall be conducted by the same committee as appointed for the Project I. In addition, the project supervisor shall also be included in the committee. The topics for mini project and project work shall be different from one another. The evaluation of project work shall be made at the end of the IV year. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of his/her project.

5.9 The Laboratory marks and the sessional marks awarded by the College are subject to scrutiny and scaling by the college wherever necessary. In such cases, the sessional and laboratory marks awarded by the College will be referred to Academic Council. The Academic Council will arrive at a scaling factor and the marks will be scaled accordingly. The recommendations of the Academic Council are final and binding. The laboratory records and internal test papers shall be preserved in the College as per the Affiliation University rules and produced before the Committees/Academic Council as and when asked for.

6.0 Attendance Requirements

6.1 A student is eligible to write the University examinations only if he acquires a minimum of 75% of attendance in aggregate of all the subjects.

6.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above, and below 75%) in each semester may be granted by the College Academic Committee

6.3 Shortage of Attendance below 65% in aggregate shall not be condoned.

6.4 A student who is short of attendance in semester may seek re-admission into that semester when offered within 4 weeks from the date of the commencement of class work.

6.5 Students whose shortage of attendance is not condoned in any semester are not eligible to write their end semester examination of that class and their registration stands cancelled.

6.6 A stipulated fee as determined by the examination branch shall be payable towards condonation of shortage of attendance.

6.7 A student will be promoted to the next semester if he/she satisfies the attendance requirement of the present semester, as applicable, including the days of attendance in sports, games, NCC and NSS activities.

6.8 The candidate fulfills the attendance requirement in the present semester, he/she shall not be permitted for readmission into the same class.

7. Course Registration:

7.1 Every student has to register for a set of Courses in each Semester, with the total number of their Credits being limited by considering the permissible weekly Contact Hours (typically: 30/Week); For this, an average Course Registration of minimum 15 Credits/Semester (e.g., 6-7 Courses) and a maximum of 24 credits are generally acceptable on recommendation of concerned academic advisor by satisfying the pre-requisite conditions.

7.2 Approval of the Course Registration will be informed by the concerned Head of the Department on the beginning of the semester by taking the number of students registered (minimum **one-third** students per class) and availability of the faculty into consideration.

7.3 Dropping of the Course Registration can be permitted up to two weeks from the commencement of the semester. Thereafter no droppings are permitted.

7.4 Interchanging of Course Registrations are not permitted.

7.5 The Pre-requisite conditions for the additional course(s) registration by the students are based on the slots available in the Time Table, Class rooms and Faculty availability.

8.0 Minimum Academic Requirements

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.6.

8.1 A student is deemed to have satisfied the minimum academic requirements if he has earned the credits allotted to each theory/practical design/drawing subject/project and secures not less than 35% of marks in the mid examination (rounded to 10 marks out of 30 marks) and also not less than 35% in end semester examination and minimum 40% of marks in the sum total of the mid-term and end semester exams put together.

8.2 A student will be eligible to be promoted from I year to II year, upon fulfilling the academic requirements of 50 % credits up to I year II semester examinations and secures prescribed minimum attendance in I year.

8.3 A student will be eligible to be promoted from II year to III year, upon fulfilling the academic requirements of 60 % credits up to II year II semester examinations and secures prescribed minimum attendance in II year.

8.4 A student will be eligible to be promoted from III year to IV year, upon fulfilling the academic requirements of 60 % credits up to III year II semester examinations and secures prescribed minimum attendance in III year.

8.5 A student shall register and put up minimum attendance in all 160 credits and shall earn total 160 credits for the award of B.Tech degree. Further, marks obtained in the 160 credits shall be considered for the calculation of percentage of marks as well as overall CGPA.

8.6 Students who fail to earn 160 credits as indicated in the course structure within ten academic years (8 years of study + 2 years additionally for appearing for exams only) from the year of their admission, shall forfeit their seat in B.Tech course and their admission stands cancelled.

9.0 Course pattern

9.1 The entire course of study is for four academic years. I,II,III and IV years shall be on semester pattern.

9.2 A student, eligible to appear for the end examination in a subject, but absent for it or has failed in the end semester examination, may write the exam in that subject during the period of supplementary exams.

9.3 When a student is detained for lack of credits/shortage of attendance, he/she will not be promoted to the next semester for that particular academic year. However, the academic regulations under which he was first admitted shall continue to be applicable to him.

10.0 Grading Procedure

10.1 Marks will be awarded to indicate the performance of student in each theory subject, laboratory/practicals, seminar, UG mini project and UG major project. Based on the percentage of marks obtained (Continuous Internal Evaluation plus Semester End Examination, both taken grade together) as specified in item 8 above, a corresponding letter shall be given.

10.2 As a measure of the performance of student, a 10-point absolute grading system using the following letter grades (as per UGC/AICTE guidelines) and corresponding percentage of marks shall be followed.

10.3 Letter Grades and Grade Points:

The UGC recommends a 10-point grading system with the following letter grades as given below:

Letter Grade	Points	% of Marks secured in a subject or course (Class Intervals)
O (Outstanding)	10	Greater than or equal to 90
A+(Excellent)	9	80 and less than 90
A(Very Good)	8	70 and less than 80
B+(Good)	7	60 and less than 70
B(Average)	6	50 and less than 60
C(Pass)	5	40 and less than 50
F(Fail)	0	Below 40
Ab (Absent)	0	-

A student obtaining Grade F shall be considered failed and will be required to reappear in the examination

10.4 Computation of SGPA and CGPA

The UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

Credit points (CP) = grade point (GP) x credits …. For a course

i. The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e

$$SGPA\ (Si) = \Sigma(Ci \times Gi) / \Sigma Ci$$

where Ci is the number of credits of the ith course and Gi is the grade point scored by the student in the ith course.

ii. The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

$$CGPA = \Sigma(Ci \times Si) / \Sigma\ Ci$$

where Si is the SGPA of the ith semester and Ci is the total number of credits in that semester.

iii. The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

10.5. A student obtaining 'F' grade in any subject shall be deemed to have 'failed' and is required to reappear as a 'supplementary student' in the semester end examination, as and when offered. In such cases, internal marks in those subjects will remain the same as those obtained earlier.

10.6 A student who has not appeared for examination in any subject '**Ab'** grade will be allocated in that subject, and student shall be considered **'failed'**. Student will be required to reappear as a 'supplementary student' in the semester end examination, as and when offered.

10.7 A letter grade does not indicate any specific percentage of marks secured by the student, but it indicates only the range of percentage of marks.

10.8 A student earns grade point (GP) in each subject/ course, on the basis of the letter grade secured in that subject/ course. The corresponding 'credit points' (CP) are computed by multiplying the grade point with credits for that particular subject/ course.

Credit points (CP) = grade point (GP) x credits …. For a course

10.9 The student passes the subject/ course only when **GP $\geq$ 5 ('C' grade or above)**

Illustration of calculation of SGPA

Course/Subject	Credits	Letter Grade	Grade Points	Credit Points
Course 1	4	A	8	4 x 8 = 32
Course 2	4	O	10	4 x 10 = 40
Course 3	4	C	5	4 x 5 = 20
Course 4	3	B	6	3 x 6 = 18
Course 5	3	A+	9	3 x 9 = 27
Course 6	3	C	5	3 x 5 = 15
	21			152

SGPA = 152/21 = 7.24

Illustration of calculation of CGPA:

Course/Subject	Credits	Letter Grade	Grade Points	Credit Points
I Year I Semester				
Course 1	4	A	8	4 x 8 = 32
Course 2	4	A+	9	4 x 9 = 36
Course 3	4	B	6	4 x 6 = 24
Course 4	3	O	10	3 x 10 = 30
Course 5	3	B+	7	3 x 7 = 21
Course 6	3	A	8	3 x 8 = 24

I Year II Semester				
Course 7	4	B+	7	4 x 7 = 28
Course 8	4	O	10	4 x 10 = 40
Course 9	4	A	8	4 x 8 = 32
Course 10	3	B	6	3 x 6 = 18
Course 11	3	C	5	3 x 5 = 15
Course 12	3	A+	9	3 x 9 = 27
	Total Credits = 42			Total Credit Points = 327

CGPA = 327/42 = 7.79

10.10 For merit ranking or comparison purposes or any other listing, **only** the **'rounded off'** values of the CGPAs will be used.

10.11 For calculations listed in regulations 10.4 to 10.9, performance in failed subjects/ courses (securing **F** grade) will also be taken into account, and the credits of such subjects/courses will also be included in the multiplications and summations. After passing the failed subject(s) newly secured letter grades will be taken into account for calculation of SGPA and CGPA. However, mandatory courses will not be taken into consideration.

11.0 Passing standards

11.1 student shall be declared successful or 'passed' in a semester, if student secures a GP $\geq$ 5 ('C' grade or above) in every subject/course in that semester (i.e. when student gets an SGPA $\geq$ 5.00 at the end of that particular semester); and a student shall be declared successful or 'passed' in the entire under graduate programme, only when gets a CGPA $\geq$ 5.00 for the award of the degree as required.

11.2 After the completion of each semester, a grade card or grade sheet (or transcript) shall be issued to all the registered students of that semester, indicating the letter grades and credits earned. It will show the details of the courses registered (course code, title, no. of credits, and grade earned etc.), credits earned, SGPA, and CGPA.

12.0 Declaration of results

12.1 Computation of SGPA and CGPA are done using the procedure listed in 10.4 to 10.9.

12.2 For final percentage of formula marks equivalent to the computed final CGPA, the following formula maybe used.

% of Marks = (final CGPA – 0.5) x 10

13.0 Award of Degree

In assessing the performance of the students in examinations, the usual approach is to award marks based on the examinations conducted at various stages (sessional, mid-term, end-semester etc.,) in a semester. As per UGC Autonomous guidelines, the following system is implemented in awarding the grades and CGPA under the **Choice Based Credit System (CBCS).**

13.1 A student shall register and put up minimum attendance in all 160 credits and shall earn a total of 160 credits for the award of B.Tech degree. Further, marks obtained in the 160 credits shall be considered for the calculation of percentage of marks as well as overall CGPA ≥ 5.0, within 8 academic years from the date of commencement of the first academic year, shall be declared to have **'qualified'** for the award of the B.Tech. Degree in the chosen branch of Engineering as selected at the time of admission.

13.2 A student who qualifies for the award of the degree as listed in 13.1 shall be placed in the following classes.

13.3 Students with final CGPA (at the end of the under graduate programme) ≥ 7.50, and shall be placed in **'first class with distinction'**.

13.4 Students with final CGPA (at the end of the under graduate programme) ≥ 6.50 but < 7.50, shall be placed in **'first class'**.

13.5 Students with final CGPA (at the end of the under graduate programme) ≥ 5.50 but < 6.50, shall be placed in **'Second class'.**

13.6 All the other students who qualify for the award of the degree (as per item 13.1), with final CGPA (at the end of the under graduate programme) ≥ 5.00 but < 5.50, shall be placed in **'pass class'** provided they secure a total of 160 credits.

13.7 A student with final CGPA (at the end of the under graduate programme) < 5.00 will not be eligible for the award of the degree.

13.8 Students fulfilling the conditions listed under item 13.3 alone will be eligible for award of **'university rank'** and **'gold medal'.**

14.0 Withholding of results

14.1 If the student has not paid the fees to the university/ college at any stage, or has dues pending due to any reason whatsoever, or if any case of indiscipline is pending, the result of the student may be withheld, and student will not be allowed to go into the next higher semester. The award or issue of the degree may also be withheld in such cases.

15.0 Transitory regulations.

15.1 A student who has discontinued for any reason, or has been detained for want of attendance or lack of required credits as specified, or who has failed after having undergone the degree programme, may be considered eligible for readmission to the same subjects/ courses (or equivalent subjects/ courses, as the case may be), and same professional electives/ open electives (or from set/category of electives or equivalents suggested, as the case may be) as and when they are offered (within the time-frame of 8 years from the date of commencement of student's first year first semester).

15.2 After the revision of the regulations, the students of the previous batches will be given two chances for passing in their failed subjects, one supplementary and the other regular. If the students cannot clear the subjects in the given two chances, they shall be given equivalent subjects as per the revised regulations which they have to pass in order to obtain the required number of credits.

15.3 In case of transferred students from other Universities, the credits shall be transferred to JNTUH as per the academic regulations and course structure of the MRCET.

16 Minimum Instruction Days

The minimum instruction days for each semester shall be 90days.

17.0 General

17.1 Wherever the words he, him, his, occur in the regulations, they include she, her, hers.

17.2 The academic regulation should be read as a whole for the purpose of any interpretation.

17.3 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.

17.4 The regulations hereunder are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.

17.5 The students seeking transfer to colleges affiliated to JNTUH from various other Universities/Institutions, have to pass the failed subjects which are equivalent to the subjects of prescribed curriculum of the institute, and also pass the subjects of prescribed curriculum of the institute which the candidates have not studied at the earlier Institution on their own without the right to sessional marks. Further, though the students have passed some of the subjects at the earlier institutions, if the same subjects are prescribed in different semesters of prescribed curriculum of the institute, the candidates have to study those subjects in prescribed curriculum of the institute in spite of the fact that those subjects are repeated.

18.0 Scope

18.1 The academic regulations should be read as a whole, for the purpose of any interpretation.

18.2 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Academic senate is final.

18.3 The college may change or amend the academic regulations, course structure or syllabi at any time, and the changes or amendments made shall be applicable to all students with effect from the date notified by the academic senate of the college.

Academic Regulations for B.Tech. (Lateral Entry Scheme) w.e.f the AY 2018-19

1. **Eligibility for award of B. Tech. Degree (LES)**
   The LES students after securing admission shall pursue a course of study for not less than three academic years and not more than six academic years.

2. The student shall register for 120 credits and secure total 120 credits with CGPA ≥ 5 from II year to IV year B.Tech. programme (LES) for the award of B.Tech. degree.

3. The students, who fail to fulfill the requirement for the award of the degree in six academic years from the year of admission, shall forfeit their seat in B.Tech.

4. The attendance requirements of B. Tech. (Regular) shall be applicable to B.Tech. (LES).

5. Promotion rule

5.1 A student is deemed to have satisfied the minimum academic requirements if he has earned the credits allotted to each theory/practical design/drawing subject/project and secures not less than 35% of marks in the mid examination (rounded to 10 marks out of 30 marks) and also not less than 35% in end semester examination and minimum 40% of marks in the sum total of the mid-term and end semester exams put together.

5.2 A student will be eligible to be promoted from II year to III year, upon fulfilling the academic requirements of 60 % credits up to II year II semester examinations and secures prescribed minimum attendance in II year.

5.4 A student will be eligible to be promoted from III year to IV year, upon fulfilling the academic requirements of 60 % credits up to III year II semester examinations and secures prescribed minimum attendance in III year.

6. All the other regulations as applicable to B. Tech. 4-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme)

MALPRACTICES RULES

DISCIPLINARY ACTION FOR IMPROPER CONDUCT IN EXAMINATIONS

S.No	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 and sent to the University.
3.	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 imposter is an outsider, he will be handed over to the police and a case is registered against him.
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 performance in that subject and all the 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.	Using objectionable, abusive or offensive	Cancellation of the performance

	language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	in that subject.
6.	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-incharge, 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 of 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.
7.	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 performance in that subject and all the 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.
8.	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 the seat.
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.	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 for the remaining examinations of the

		subjects of that semester/year.
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 University for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.
2. Punishment for institutions: (if the squad reports that the college is also involved in encouraging malpractices)
    i. A show cause notice shall be issued to the college.
    ii. Impose a suitable fine on the college.
    iii. Shifting the examination centre from the college to another college for a specific period of not less than one year.

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MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
EEE COURSE STRUCTURE

I Year B. Tech – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R18A0001	English	2	-	-	2	30	70
2	R18A0021	Mathematics – I	3	1	-	4	30	70
3	R18A0013	Physics	3	-	-	3	30	70
4	R18A0301	Engineering Graphics	1	-	4	3	30	70
5	R18A0501	Programming for Problem Solving	3	-	-	3	30	70
6	R18A0082	Engineering / IT Workshop	-	-	4	2	30	70
7	R18A0581	Programming for Problem Solving Lab	-	-	3	1.5	30	70
8	R18A0081	English Language Communication Skills Lab	-	-	3	1.5	30	70
		TOTAL	**12**	**1**	**14**	**20**	**240**	**560**

I Year B. Tech – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R18A0002	Professional English	2	-	-	2	30	70
2	R18A0022	Mathematics – II	3	1	-	4	30	70
3	R18A0012	Engineering Chemistry	3	-	-	3	30	70
4	R18A0502	Object Oriented Programming	3	-	-	3	30	70
5	R18A0201	Basic Electrical Engineering	3	-	-	3	30	70
6	R18A0083	Engineering Physics **/** Chemistry Lab	-	-	4	2	30	70
7	R18A0582	Object Oriented Programming Lab	-	-	3	1.5	30	70
8	R18A0281	Basic Electrical Engineering Lab	-	-	3	1.5	30	70
9*	R18A0003	Human Values & Societal Perspectives	2	-	-	**0**	100	-
		TOTAL	**16**	**1**	**10**	**20**	**340**	**560**

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

B. Tech (EEE) – III Semester (II Year I Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R18A0023	Mathematics-III	**4**	**0**	**0**	**3**	30	70
2	R18A0401	Analog Electronics	**4**	**0**	**0**	**3**	30	70
3	R18A0202	Electrical Machines - I	**3**	**1**	**0**	**3**	30	70
4	R18A0205	Electromagnetic Fields	**4**	**0**	**0**	**3**	30	70
5	R18A0206	Electrical Circuit Analysis	**4**	**0**	**0**	**3**	30	70
6	R18A0366	Elements of Mechanical Engineering	**3**	**0**	**0**	**2**	30	70
7	R18A0023	Analog Electronics Lab	**0**	**0**	**3**	**1.5**	30	70
8	R18A0393	Elements of Mechanical Engineering Lab	**0**	**0**	**3**	**1.5**	30	70
9*	R18A0004	Foreign Language: French	**2**	**-**	**-**	**0**	100	-
		TOTAL	**24**	**01**	**06**	**20**	**340**	**560**

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

B. Tech (EEE) – IV Semester (II Year II Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R18A0203	Electrical Machines - II	3	1	0	3	30	70
2	R18A0207	Power Systems-I	3	1	0	3	30	70
3	R18A0209	Control systems	4	0	0	3	30	70
4	R18A0404	Switching Theory & Logic Design	4	0	0	3	30	70
5	R18A0061	Managerial Economics & Financial Analysis (MEFA)	3	0	0	2	30	70
6	******	**OPEN ELECTIVE I**	4	0	0	3	30	70
7	R18A0282	Electrical Machines -I Lab	0	0	3	1.5	30	70
8	R18A0284	Electrical Circuits & Simulation Lab	0	0	3	1.5	30	70
9*	R18A0014	Environmental Science	2	-	-	0	100	-
		TOTAL	24	01	06	20	340	560

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

OPEN ELECTIVE I		
S.NO	**SUBJECT CODE**	**SUBJECT**
1	R18A0451	DIGITAL ELECTRONICS
2	R18A0551	DATA BASE SYSTEMS
3	R18A0553	INTRODUCTION TO DATA STRUCTURES
4	R18A0351	INTELLECTUAL PROPERTY RIGHTS
5	R18A0352	GREEN ENERGY SYSTEMS

B. Tech (EEE) – V Semester (III Year I Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R18A0208	Power Systems - II	3	1	0	3	30	70
2	R18A0204	Electrical Machines - III	4	0	0	3	30	70
3	R18A0210	Power Electronics	4	0	0	3	30	70
4	R18A0409	Linear & Digital IC	3	0	0	2	30	70
5	R18A0463 R18A0211 R18A0212	1.Systems & Signal Processing 2.High VoltageEngineering 3. Digital Control Systems	4	0	0	3	30	70
6	******	**Open Elective II**	4	0	0	3	30	70
7	R18A0283	Electrical Machines -II Lab	0	0	3	1.5	30	70
8	R18A0285	Control Systems & Simulation Lab	0	0	3	1.5	30	70
9*	R18A0006	Technical Communication & Soft SkillsLab	2	-	-	0	100	-
		Total	24	01	06	20	340	560

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

OPEN ELECTIVE II		
S.NO	**SUBJECT CODE**	**SUBJECT**
1	R18A1253	MANAGEMENT INFORMATION SYSTEMS
2	R18A0552	INTRODUCTION TO JAVA PROGRAMMING
3	R18A1252	SOFTWARE PROJECT MANAGEMENT
4	R18A0353	ENTERPRISE RESOURCE PLANNING
5	R18A0354	NANO TECHNOLOGY

B. Tech (EEE) – VI Semester (III Year II Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R18A0213	Electrical Measurements & Instrumentation	4	0	0	3	30	70
2	R18A0415	Microprocessors & Microcontrollers	3	1	0	3	30	70
3	R18A0214	Electrical Drives	4	0	0	3	30	70
4	R18A0215	Power System Analysis	3	0	0	2	30	70
5	R18A0216 R18A0217 R18A0218	1. EHV AC & HVDC Transmission 2. Electrical Estimation and Costing 3. Optimization Techniques	4	0	0	3	30	70
6	******	**OPEN ELECTIVE III**	4	0	0	3	30	70
7	R18A0286	Power Electronics & Simulation Lab	0	0	3	1.5	30	70
8	R18A0487	Microprocessors & Microcontrollers Lab	0	0	3	1.5	30	70
9*	R18A0007	Indian Constitution	2	-	-	0	100	-
			24	01	06	20	340	560

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

OPEN ELECTIVE III		
S.NO	**SUBJECT CODE**	**SUBJECT**
1	R18A0452	ROBOTICS & AUTOMATION
2	R18A0453	INTERNET OF THINGS & ITS APPLICATIONS
3	R18A0553	OPERATING SYSTEM CONCEPTS
4	R18A0355	TOTAL QUALITY MANAGEMENT
5	R18A0251	ELECTRICAL SYSTEMS & APPLICATIONS

B. Tech (EEE) – VII Semester (IV Year I Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R18A0219	Switch Gear and Protection	4	0	0	3	30	70
2	R18A0220	Industrial and Allied Electrical Systems	3	0	0	2	30	70
3	R18A0221	Power System Operation & Control	3	1	0	3	30	70
4	R18A0465	PLC Systems	4	0	0	3	30	70
5	R18A0513 R18A0222 R18A1262	1. Computer Networks 2. Advanced Power Electronics 3. Artificial Neural Networks	4	0	0	3	30	70
6	R18A0223 R18A0224 R18A0225	1. Solar Electrical Systems 2. Quality & Reliability Engineering 3. Power Plant Engineering	4	0	0	3	30	70
7	R18A0287	Power Systems Lab	0	0	3	1.5	30	70
8	R18A0288	Electrical Measurements Lab	0	0	3	1.5	30	70
		Total	22	01	06	20	240	560

B. Tech (EEE) – VIII Semester (IV Year II Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R18A0226 R18A0227 R18A0228	1. Wind Electrical Systems 2. Power System Dynamics and Stability 3. Electrical Machine Design	4	0	0	3	30	70
2	R18A0229 R18A0230 R18A0231	1. Power Quality & FACTS Devices. 2. Power System Reliability 3. Electrical and Hybrid Vehicles	4	0	0	3	30	70
3	R18A0290	Industry Internship Project	0	0	4	2	30	70
4	R18A0291	Major Project	0	0	18	9	30	70
5		Total	12	0	22	17	120	280

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I- YEAR- I- SEM -EEE **L T/P/D C**

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(R18A0001) ENGLISH

COURSE OBJECTIVES:

- To enable students to enhance their lexical, grammatical and communicative
- competence.
- To equip the students to study the academic subjects with better perspective through theoretical and practical components of the designed syllabus.
- To familiarize students with the principles of writing to ensure error-free writing.
- To know to use sentence structure effectively and to understand how to convert ideas logically within a sentence.
- To expose students to various techniques of reading skills which hone their comprehensive skills.

UNIT –I

Chapter entitled "***The Road Not Taken***" *by* Robert Frost
Grammar –Tenses and Punctuation (Sequences of Tenses)
Vocabulary –Word Formation - Prefixes and Suffixes
Writing – Paragraph writing –I (Focusing on Tenses and Punctuations)
Reading – Techniques for effective reading-Reading Exercise –Type 1

UNIT – II

Chapter entitled "***Abraham Lincoln's Letter to His Son's Teacher***"
Grammar – Voices, Transitive and Intransitive Verbs
Vocabulary – Synonyms, Antonyms
Writing – E-mail Writing, Letter Writing (complaints, requisitions, apologies).
Reading – Skimming, scanning- Reading Exercise –Type 2

UNIT – III

Chapter entitled "***War***" by L. Pirandello
Grammar –Degrees of Comparison, Prepositions
Vocabulary – Phrasal Verbs
Writing – Essay Writing (Introduction, body and conclusion)
Reading – Comprehension- Reading Exercise – Type 3

UNIT – IV

Chapter entitled "***J K Rowling's Harvard Speech***"
Grammar – Articles, Misplaced Modifiers
Vocabulary – One-Word Substitutes
Writing – Précis Writing
Reading – Intensive and Extensive reading - Reading Exercise – Type 4

UNIT –V

Sentence Structures (phrases and clauses)

Grammar – Subject-Verb Agreement, Noun-Pronoun Agreement
Vocabulary – Commonly Confused Words
Writing – Memo Writing
Reading – Identifying Errors - Reading Exercise – Type 5

* Exercises apart from the text book shall also be used for classroom tasks.

TEXT BOOKS:

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001

REFERENCE BOOKS:

1. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
2. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
3. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

COURSE OUTCOMES:

Students will be able to:

- Write formal or informal letters and applications for different purposes.
- Select and extract relevant information through skimming and scanning.
- Utilize the strategy of brainstorming in preparing analytical, argumentative and expository essays.
- Draft concise emails following professional email etiquette.
- Enhance their grammatical competency by spotting errors.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I- YEAR- I- SEM –EEE	**L**	**T/P/D**	**C**
	3	**1/-/-**	**4**

(R18A0021) MATHEMATICS - I

COURSE OBJECTIVES:

To learn

- The concept of rank of a matrix which is used to know the consistency of system of linear equations and also to find the eigen vectors of a given matrix.
- Finding maxima and minima of functions of several variables.
- Applications of first order ordinary differential equations. (Newton's law of cooling, Natural growth and decay)
- How to solve first order linear, non linear partial differential equations and also method of separation of variables technique to solve typical second order partial differential equations.
- Solving differential equations using Laplace Transforms.

UNIT I:

MATRICES: Introduction, types of matrices-symmetric, skew-symmetric, Hermitian, skew-Hermitian, orthogonal, unitary matrices. Rank of a matrix - echelon form, normal form, consistency of system of linear equations (Homogeneous and Non-Homogeneous). Eigen values and Eigen vectors and their properties (without proof), Cayley-Hamilton theorem (without proof), Diagonalisation.

UNIT II:

FUNCTIONS OF SEVERAL VARIABLES: Limit continuity, partial derivatives and total derivative. Jacobian-Functional dependence and independence. Maxima and minima and saddle points, method of Lagrange multipliers, Taylor's theorem for two variables.

UNIT III:

ORDINARY DIFFERENTIAL EQUATIONS: First order ordinary differential equations: Exact, equations reducible to exact form. Applications of first order differential equations - Newton's law of cooling, law of natural growth and decay.

Linear differential equations of second and higher order with constant coefficients: Non-homogeneous term of the type f(x) = e^{ax}, sinax, cosax, x^n, e^{ax} V and x^n V. Method of variation of parameters.

UNIT IV:

PARTIAL DIFFERENTIAL EQUATIONS: Introduction, formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange's linear equation and non-linear equations, Charpit's method, Method of separation of variables for second order equations and applications of PDE to one dimensional (Heat equation).

UNIT V:

LAPLACE TRANSFORMS: Definition of Laplace transform, domain of the function and Kernel for the Laplace transforms, Existence of Laplace transform, Laplace transform of standard functions, first

shifting Theorem, Laplace transform of functions when they are multiplied or divided by “t”, Laplace transforms of derivatives and integrals of functions, Unit step function, Periodic function. Inverse Laplace transform by Partial fractions, Inverse Laplace transforms of functions when they are multiplied or divided by ”s”, Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem, Solving ordinary differential equations by Laplace transforms.

TEXT BOOKS:

1. Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.

REFERENCE BOOKS:

1. Advanced Engineering Mathematics by R.K Jain & S R K Iyenger, Narosa Publishers.
2. Advanced Engineering Mathematics by Michael Green Berg, Pearson Publishers .
3. Engineering Mathematics by N.P Bali and Manish Goyal.

COURSE OUTCOMES:

After learning the concepts of this paper the student will be able to

- Analyze the solution of the system of linear equations and to find the Eigen values and Eigen vectors of a matrix.
- Find the extreme values of functions of two variables with / without constraints.
- Solve first and higher order differential equations.
- Solve first order linear and non-linear partial differential equations.
- Solve differential equations with initial conditions using Laplace Transform.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B.TECH – I YEAR – I SEM - EEE	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(R18A0011) APPLIED PHYSICS

COURSE OBJECTIVES:

- To understand dual nature of the matter and behavior of a particle quantum mechanically.
- To understand band structure of the solids and classification of materials.
- To be able to distinguish pure, impure semiconductors and characteristics of PN junction diode.
- To understand dielectric and magnetic properties of the materials and enable them to design and apply in different fields.
- To be able to distinguish ordinary light with a laser light and realize the transfer of light through optical fibers.

UNIT – I

QUANTUM MECHANICS

Wave nature of particles, deBroglie's hypothesis, matter waves, Heisenberg's uncertainty principle, Davisson and Germer's experiment, G.P Thomson experiment, Schrodinger time-independent wave equation-significance of wave function, particle in one dimensional square well potential.

UNIT – II

ELECTRONIC MATERIALS

Free electron theory, Fermi level, Density of states, Periodic potential-Bloch's theorem, Kronig – Penny modal, E – K diagram, Effective mass, Origin of energy bands in solids, Classification of materials on the basis of energy bands: Metals, semi conductors and insulators.

UNIT – III

SEMICONDUCTOR PHYSICS

Intrinsic and extrinsic semiconductors, Direct and indirect band gap semi conductors, Carrier concentration in intrinsic and extrinsic semi conductors. Dependence of Fermi level on carrier concentration and temperature, carrier transport: diffusion and drift, Formation of PN junction, V-I characteristics of PN diode, energy diagram of PN diode, Hall experiment, semiconductor materials for optoelectronic devices - LED, Solar cell.

UNIT-IV

DIELECTRICS AND MAGNETIC PROPERTIES OF MATERIALS

Dielectrics: Introduction, Types of polarizations (Electronic and Ionic) and calculation of their polarizabilities, internal fields in a solid, Clausius-Mossotti relation.

Magnetism: Introduction, Bohr magneton, classification of dia, para and ferro magnetic materials on the basis of magnetic moment, Properties of anti-ferro and ferri magnetic materials, Hysteresis curve based on domain theory, Soft and hard magnetic materials.

UNIT – V:

LASERS & FIBER OPTICS

Characteristics of lasers, Absorption, Spontaneous and Stimulated emissions, Einstein's Coefficients,

Population inversion, Meta stable state, types of pumping, lasing action, Construction and working of Ruby Laser, Helium-Neon Laser, Applications of lasers.

Introduction to optical fiber, Construction and working principle of an Optical Fiber, Acceptance angle and Numerical aperture, Types of Optical fibers - Mode and Propagation through step and graded index fibers, Attenuation, Optical Fiber in Communication System, Applications of optical fibers.

TEXT BOOKS:

1. Engineering Physics by Arumugam, Anuradha publications.
2. Engineering Physics- B.K.Pandey, S.Chaturvedi, Cengage Learning.

REFERENCES:

1. Engineering Physics – R.K. Gaur and S.L.Gupta, Dhanpat Rai Publishers.
2. Engineering Physics, S Mani Naidu- Pearson Publishers.
3. Engineering physics 2nd edition –H.K.Malik and A.K. Singh.
4. Engineering Physics – P.K. Palaniswamy, Scitech publications.
5. Physics by Resnick and Haliday.

COURSE OUTCOMES:

After completion of studying Applied Physics the student is able to,

- Know the basic principles of quantum mechanics and the importance of behavior of a particle.
- Realize the importance of band structure of solids and their applications in various electronic devices.
- Learn concentration estimation of charge carriers in semiconductors and working principles of PN diode.
- Learn dielectric, magnetic properties of the materials and apply them in material technology.
- Learn the principles and production of LASER beams and transfer of information by optical fiber communication systems.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH – I- YEAR –I SEM- EEE

L	T/P/D	C
1	-/4-/-	3

(R18A0301) ENGINEERING GRAPHICS

COURSE OBJECTIVES:

- Learn to sketch and take field dimensions.
- Learn to take data and transform it into graphic drawings.
- Learn basic engineering drawing formats

UNIT – I

INTRODUCTION TO ENGINEERING DRAWING: Principles of Engineering Drawing/Graphics – Various Drawing Instruments – Conventions in Drawing- Dimensioning – Lettering practice – BIS Conventions.

a) Polygons – Construction of regular polygons (General Method only)
b) Conic Sections (General Method only- Eccentricity Method)
c) Cycloid, Epicycloid and Hypocycloid
d) Scales-Plain, Diagonal and Vernier

UNIT – II

ORTHOGRAPHIC PROJECTION IN FIRST ANGLE ONLY: Principles of Orthographic Projections – Conventions – First and Third Angle projections (Introduction).

Projections of Points. Points in all four quadrants.

Projections of Lines – Parallel and inclined to both planes.

UNIT – III

PROJECTIONS OF PLANES: Projection of regular planes, Plane inclined to both reference planes (No conditional problems).

PROJECTIONS OF SOLIDS: Projections of regular solids prism and pyramid inclined to both planes (No conditional problems).

UNIT – IV

ISOMETRIC PROJECTIONS: Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Plane Figures, Simple and Compound Solids.

UNIT – V

TRANSFORMATION OF PROJECTIONS: Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects, Basic Principles of ACAD – Demo Only.

COURSE OUTCOMES:

1. Student's ability to convert sketches to engineered drawings will increase.
2. Students will be able to draw orthographic projections and sections.
3. Student's ability to perform basic sketching techniques will improve.

TEXT BOOKS:

1. Engineering Drawing, Special Edition-MRCET, McGrahill Publishers, 2017.
2. Engineering Drawing, N.D. Bhatt
3. Engineering Drawing by K.Venu Gopal& V.Prabu Raja New Age Publications.

REFERENCE BOOKS:

1. Engineering drawing – P.J. Shah .S.Chand Publishers.
2. Engineering Drawing- Johle/Tata Macgraw Hill Book Publishers.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH – I- YEAR –I SEM- EEE	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(R18A0501) PROGRAMMING FOR PROBLEM SOLVING

COURSE OBJECTIVES

1. To understand the various steps in Program development.
2. To understand the basic concepts in C Programming Language.
3. To learn how to write modular and readable C Programs
4. To learn to write programs (using structured programming approach) in C to solve problems.

UNIT - I

INTRODUCTION TO COMPUTING – Computer Systems-Hardware and Software, Computer Languages, Algorithm, Flowchart, Representation of Algorithm and Flowchart with examples.

Introduction to C– History of C, Features of C, Structure of C Program, Character Set, C Tokens-Keywords, Identifiers, Constants, Variables, Data types, Operators.

UNIT-II

STATEMENTS-Selection statements (Decision Making)- if and switch statements with examples, Repetition statements (loops)- while, for, do-while statements with examples, Unconditional statements- break, continue, goto statements with examples.

UNIT – III

FUNCTIONS-Designing Structured Programs, Types of Functions-User defined functions, Standard functions, Categories of functions, Parameter Passing techniques, Storage classes, Recursion.

UNIT-IV

ARRAYS- Declaration and Initialization, One dimensional Arrays, Two dimensional Arrays.

STRINGS- Declaration and Initialization, String Input / Output functions, String manipulation functions.

UNIT-V

POINTERS- Introduction, Definition and Declaration of pointers, address operator, Pointer variables, Pointers with Arrays.

STRUCTURES- Introduction, Declaration and Initialization, Array of Structures, Unions.

TEXT BOOKS:

1. Computer Programming with C, Special Edition-MRCET, Mc Graw Hill Publishers 2017.
2. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg. Third Edition, Cengage Learning.

REFERENCE BOOKS:

1. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
2. Computer Programming, E.Balagurusamy, First Edition, TMH.
3. C and Data structures – P. Padmanabham, Third Edition, B.S. Publications.
4. Programming in *C, Ashok Kamthane*. Pearson Education India.
5. Let us C ,Yashwanth Kanethkar, 13th Edition, BPB Publications.

COURSE OUTCOMES:

- Demonstrate the basic knowledge of computer hardware and software.
- To formulate simple algorithms for arithmetic and logical problems.
- To translate the algorithms to programs (in C language).
- To test and execute the programs and correct syntax and logical errors.
- Ability to apply solving and logical skills to programming in C language and also in other languages.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH – I- YEAR –I SEM- EEE	**L**	**T/P/D**	**C**
	-	**-/-/ 4**	**2**

(R18A0082) ENGINEERING WORKSHOP/ IT WORKSHOP

COURSE OBJECTIVES:

- Student able to learn about different tools used in the lab
- Student able to learn about foundry, welding, plumbing, house wiring and Tin smithy operations
- Student able to learn about different Carpentry and Fitting tools

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.
4. Black Smithy
5. House-wiring

2. TRADES FOR DEMONSTRATION & EXPOSURE:

1. Plumbing
2. Machine Shop
3. Welding
4. Foundry
5. Metal Cutting (Water Plasma)

TEXT BOOKs:

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
   Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition

COURSE OUTCOMES:

- Students can understand different machine shop operations
- Students can understand Foundry, welding, plumbing, house wiring and Tin smithy operations
- Student learned about metal cutting processes

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B. TECH- I YEAR- I SEM-EEE

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(R18A0082) IT WORKSHOP LAB

COURSE OBJECTIVES:

- The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, and Power Point
- PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows; In addition hardware and software level troubleshooting process, tips and tricks would be covered.
- Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.
- Productivity tools module would enable the students in crafting professional word documents, excel spread sheets, power point presentations and personal web sites using the Microsoft suite of office tools.
- HTML introduction for creating static web pages

PC HARDWARE

Week 1:

Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral

Week 2:

Assembling and disassembling of PC

Week 3:

Every student should individually install MS windows on the personal computer. Basic DOS Commands

Week 4: Hardware Troubleshooting

Students have to be given a PC which does not boot due to improper assembly or defective peripherals Software Troubleshooting: Students have to be given amalfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

Week 5: INTERNET & WEB BROWSERS

Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers And How to access the websites and email& Search Engines & various threats on the internet and would be asked to configure their computer to be safe on the internet, Antivirus downloads to avoid viruses and/or worms.

MS OFFICE

Week 6: MICROSOFT WORD

Word Orientation: an overview of Microsoft (MS) office 2007/ 10: Importance of MS office 2007/10,

overview of toolbars, saving files, Using help and resources, rulers, format painter. Table of Content,
Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.
Using Word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word &Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Week 7: MICROSOFT EXCEL
Excel Orientation: The importance of MS office 2007/10 tool Excel as a Spreadsheet tool, Accessing, overview of toolbars, saving excel files, Using help and resources.
Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text
Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting .

Week 8: MICROSOFT POWER POINT
Basic power point utilities and tools which helpful to create basic power point presentation. Topic covered during this includes PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both Latex and Power point.

Create the presentation using the following tools:
Formatting: Color, font type, font size, font style etc.
Header and Footer
Bullets and Numbering
Drawing Toolbar: Auto shapes, Textboxes, etc
Design Template
Introduction to custom animation.

b) Create a presentation to conduct a creativity session using the following tools:

1. Slide transition
2. Master slide view
3. Insert picture – clipart, image
4. Action button
5. Drawing tool bar – lines, arrows
6. Hyperlink
7. Custom animation
8. Hide slide
9. Wash out

Week 9: **HTML**
Introduction to HTML & Basic HTML Tags: Understand what are the tasks used for creation of website
Designing a static web page: Understand how to create a webpage

TEXT BOOKS:

1. Introduction to Information Technology,ITL Education Solutions limited,Pearson Education
2. PC Hardware and A+ Handbook-Kate J.Chase PHI(Microsoft)

COURSE OUTCOMES:

1. The Students are able to identify the major components of a computer and its basic peripherals. They are capable of assembling a personal computer, and can perform installation of system software like MS Windows and required device drivers.
2. Students can detect and perform minor hardware and software level troubleshooting.
3. The Students are capable of working on Internet & World Wide Web and can make effective usage of the internet for academics.
4. The Students develop ability to prepare professional word documents, excel spread sheets and power point presentations using the Microsoft suite of office tools.
5. The students are able to create a static webpage's using HTML.

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B. TECH- I YEAR- I SEM-EEE

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(R18A0581) PROGRAMMING FOR PROBLEM SOLVING LAB

COURSE OBJECTIVES:

- Understand the basic concept of C Programming, and its different modules that include conditional and looping expressions, Arrays, Strings, Functions, Pointers, and Structures.
- Acquire knowledge about the basic concept of writing a program.
- Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
- Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
- Role of Functions involving the idea of modularity.
- Programming using gcc compiler in Linux.

Week 1:

a) Write a C program to find sum and average of three numbers.

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

Week 2:

a) Write a C program to generate the first n terms of the Fibonacci sequence.

b) Write a C program to generate prime numbers from 1 to n.

c) Write a C program to check whether given number is Armstrong Number or not.

Week 3:

a) Write a C program to check whether given number is perfect number or not.

b) Write a C program to check whether given number is strong number or not.

Week 4:

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

b) Write a C program to perform arithmetic operations using switch statement.

Week 5:

a) Write a C program to find factorial of a given integer using non-recursive function.

b) Write a C program to find factorial of a given integer using recursive function.

Week 6:

a) Write C program to find GCD of two integers by using recursive function.

b) Write C program to find GCD of two integers using non-recursive function.

Week 7:

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

b) Write a C program to Sort the Array in an Ascending Order

c) Write a C program to find whether given matrix is symmetric or not.

Week 8:

Revision of programs

Week 9:

a) Write a C program to perform addition of two matrices.

b) Write a C program that uses functions to perform multiplication of two Matrices.

Week 10:

a) Write a C program to use function to insert a sub-string in to given main string from a given position.

b) Write a C program that uses functions to delete n Characters from a given position in a given string.

Week 11:

a) Write a C program using user defined functions to determine whether the given string is palindrome or not.

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

Week 12:

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

b) Write a C program to find the sum of integer array elements using pointers.

Week 13:

a) Write a C program to Calculate Total and Percentage marks of a student using structure.

Week 14:

Revision of Programs

TEXT BOOKS

1. C Programming and Data Structures, P.Padmanabham, Third Edition, BS Publications
2. Computer programming in C.V.RAjaraman, PHI Publishers.
3. C Programming, E.Balagurusamy, 3rd edition, TMH Publishers.
4. C Programming, M.V.S.S.N Venkateswarlu and E.V.Prasad,S.Chand Publishers
5. Mastering C,K.R.Venugopal and S.R.Prasad, TMH Publishers.

COURSE OUTCOMES:

- Acquire knowledge about the basic concept of writing a program.
- Understand the Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
- Learn how to use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
- Understand the Role of Functions involving the idea of modularity.
- Understand the Concept of Array and pointers dealing with memory management.
- Learn Structures and unions through which derived data types can be formed.

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B. TECH- I YEAR- I SEM-EEE **L T/P/D C**
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(R18A0081) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

COURSE OBJECTIVES:

- To expose students to a variety of self-instructional, learner-friendly modes of language learning
- To enable students to learn accurate pronunciation through stress on word accent, intonation and rhythm.
- To enable students to overcome public speaking anxiety and equip them to become employable.
- To familiarize students with formal telephonic expressions by means of appropriate tone.
- To foster sentence-level and holistic understanding of the context through active listening.

Syllabus: English Language Communication Skills Lab has two parts:

a. Computer Assisted Language Learning (CALL) Lab
b. Interactive Communication Skills (ICS) Lab

The following course content is prescribed for the English Language Communication Skills Lab.

UNIT –I
CALL Lab: Introduction to Phonetics –Speech Sounds –Vowels and Consonants- Transcriptions
ICS Lab: Ice-Breaking Activity - JAM Session- Greetings – Taking Leave – Introducing Oneself and Others.

UNIT –II
CALL Lab: Syllabification - Stress &Intonation- Rules of Stress Markings and Intonation
ICS Lab: Situational Dialogues/Role Plays - Making Requests and Seeking Permissions.

UNIT –III
CALL Lab: Listening Activities (Its Importance – Purpose- Process- Listening for General and Specific Details.)
ICS Lab: Communication at Work Place - Professional Etiquettes, Telephone Etiquette.

ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.

System Requirement (Hardware component):

Computer network with LAN with minimum 60 multimedia systems with the following specifications:

i) P –IV Processor
a)Speed –2.8 GHZ
b)RAM –512 MB Minimum
c)HardDisk –80 GB
ii) Headphones of High quality

2. Interactive Communication Skills (ICS) Lab :

A spacious room with movable chairs and audio-visual aids with a public address system, a T. V, a digital stereo –audio & video system and camcorder etc.

COURSE OUTCOMES:

Students will be able to:

- understand the importance of learning phonetics.
- learn how to pronounce words using phonetic transcription.
- know the importance of speaking English with rhythm and intonation.
- effectively participate in JAM session.
- use polite expressions in all formal situations.
- effectively communicate through telephone.

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B. TECH- I YEAR- II SEM-EEE

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(R18A0002) PROFESSIONAL ENGLISH

COURSE OBJECTIVES:

- To enrich students to express themselves appropriately and fluently in professional contexts.
- To enhance their employability through regular participation in group discussions and interview skills.
- To lay foundation with writing strategies for the future workplace needs.
- To acquaint students with different components of professional presentation skills.
- To equip students with necessary training in listening to comprehend dialects of English language.

UNIT-I

Listening - Bill Gate's TED talk on Solving Big Problems
Speaking - Description of Pictures, Places, Objects and Persons
Grammar - Finite and Non-finite verbs
Vocabulary - Business Vocabulary
Writing - Paragraph Writing

Unit –II

Listening - Google CEO Sundar Pichai's Speech I/O 2017 Keynote
Speaking - Oral presentations
Grammar - Transformation of Sentences
Vocabulary - Idioms
Writing - Abstract Writing

Unit –III

Listening - Sample Interviews (videos)
Speaking - Mock Interviews
Grammar - Direct and Indirect Speech
Vocabulary - Standard Abbreviations (Mini Project)
Writing - Job applications I (Cover Letter)

Unit – IV

Listening - Telephonic Interviews
Speaking - Telephonic Expressions
Grammar - Auxiliary verbs
Vocabulary - Word Analogy-I
Writing - Job Application II (Resume)

Unit – V

Listening - Tanmay Bhakshi's ITU interview
Speaking - Professional Etiquette
Grammar - Common Errors
Vocabulary - Word Analogy-II
Writing - Report Writing

* Exercises apart from the text book shall also be referred for classroom tasks.

TEXT BOOKS:

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001

REFERENCE BOOKS:

1. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
2. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
3. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

COURSE OUTCOMES:

Students will be able to:

- draft coherent and unified paragraphs with adequate supporting details.
- demonstrate problem solving skills, decision-making skills, analytical skills.
- comprehend and apply the pre-interview preparation techniques for successful interview.
- achieve expertise in writing resume and cover letter formats.
- understand the steps of writing 'Reports and Abstract'.

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B. TECH- I YEAR- II SEM-EEE **L T/P/D C**

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(R18A0022) MATHEMATICS-II

COURSE OBJECTIVES:

- The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data and also used to find the roots of an equation.
- To learn the concepts curve fitting, numerical integration and numerical solutions of first order ordinary differential equations.
- Evaluation of improper integrals using Beta and Gamma functions.
- Evaluation of multiple integrals.
- In many engineering fields the physical quantities involved are vector valued functions. Hence the vector calculus aims at basic properties of vector valued functions and their applications to line, surface and volume integrals.

UNIT – I:

SOLUTIONS OF ALGEBRAIC, TRANSCENDENTAL EQUATIONS AND INTERPOLATION SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS: Introduction, Bisection Method, Method of false position, Newton Raphson method and their graphical interpretations.

Interpolation: Introduction, errors in polynomial interpolation, Finite differences - Forward differences, backward differences, central differences. Newton's formulae for interpolation, Gauss's central difference formulae. Interpolation with unevenly spaced points - Lagrange's Interpolation.

UNIT – II:

NUMERICAL METHODS - NUMERICAL INTEGRATION: Generalized quadrature - Trapezoidal rule, Simpson's $1/3^{rd}$ and Simpson's $3/8^{th}$ rules.

NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS: Solution by Taylor's series method, Euler's method, Euler's modified method, Runge-Kutta fourth order method.

CURVE FITTING: Fitting a straight line, second degree curve, exponential curve, power curve by method of least squares.

Unit III:

BETA AND GAMMA FUNCTIONS: Introduction of improper integrals- Beta and Gamma functions - Relation between them, their properties, Evaluation of improper integrals using Beta and Gamma functions.

Unit IV:

DOUBLE AND TRIPLE INTEGRALS: Double and triple integrals (Cartesian and polar), change of order of integration in double integrals, Change of variables (Cartesian to polar).

Unit V:

VECTOR CALCULUS: Introduction, Scalar point function and vector point function, Directional derivative, Gradient, Divergence, Curl and their related properties, Laplacian operator, Line integral - Work done, Surface integrals, Volume integral. Vector integral theoerem-Green's Theorem, Stoke's theorem and Gauss's Divergence Theorems (Statement & their Verification).

TEXT BOOKS:

1. Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Mathematical Methods by S.R.K Iyenger, R.K.Jain, Narosa Publishers.

REFERENCE BOOKS:

1. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
2. Advanced Engineering Mathematics by Michael Greenberg –Pearson publishers.
3. Introductory Methods of Numerical Analysis by S.S. Sastry, PHI

COURSE OUTCOMES:

After learning the contents of this paper the student must be able to

- Find the roots of algebraic, non algebraic equations and predict the value of the data at an intermediate point from a given discrete data.
- Find the most appropriate formula for a guesses relation of the data variables using curve fitting and this method of analysis data helps engineers to understand the system for better interpretation and decision making.
- Find a numerical solution for a given differential equation.
- Evaluate multiple integrals and to have a basic understanding of Beta and Gamma functions..
- Evaluate the line, surface, volume integrals and converting them from one to another using vector integral theorems.

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(R18A0013) ENGINEERING CHEMISTRY

COURSE OBJECTIVES:

- To apply the electrochemical principles in batteries, understand the fundamentals of corrosion and development of different techniques in corrosion control.
- To analyze microscopic chemistry in terms of atomic and molecular orbitals.
- To analyze water for its various parameters and its significance in industrial and domestic applications.
- To impart the knowledge of organic reaction mechanisms which are useful for understanding the synthesis of organic compounds.
- To analyze different types of fuels and their applications in various engineering fields.

UNIT-I:

Electrochemistry and Corrosion

Electrochemistry: Introduction to electrochemistry; Electrochemical cells - electrode potentials, construction and working of a galvanic cell, EMF and its applications - potentiometric titration; Nernst equation and its applications; Batteries - classification of batteries, primary cell - lithium cells and secondary cells - lead acid battery and lithium ion battery; Fuel cells - H_2-O_2 fuel cell, its applications and advantages.

Corrosion: Introduction, causes and effects of corrosion; Theories of corrosion- chemical (oxidation corrosion) and electrochemical corrosion, mechanism of electrochemical corrosion; Corrosion control methods - cathodic protection - sacrificial anodic protection & impressed current cathodic protection; Methods of application of metallic coatings - hotdipping - galvanizing & tinning, electroplating (Cu plating) and electroless plating (Ni plating) - advantages and applications of electroplating/electroless plating.

UNIT -II:

Atomic and Molecular Structure

Atomic and molecular orbitals; Postulates of molecular orbital theory - Linear Combination of Atomic Orbitals (LCAO); Molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N_2 and O_2; Metallic bonding, limitations of Valence Bond Theory (VBT).

Crystal field theory (CFT) – Salient features of CFT, crystal field splitting of transition metal ion d-orbitals in tetrahedral and octahedral geometries.

UNIT -III:

Water and its Treatment

Hardness of water- Types and units of hardness; Estimation of hardness of water by EDTA method; Softening of water by Ion exchange process; Potable water- specifications, methods of disinfectation-chlorination and ozonization; Desalination of water by Reverse Osmosis.

UNIT-IV:

Organic Reactions

Introduction to Organic Reactions - Types of reactions; Substitution - Nucleophilic substitution reactions, mechanism of S_N1 and S_N2; Addition - electrophilic and nucleophilic addition reactions;

addition of HBr to propene - Markownikoff and Anti-Markownikoff's additions; Elimination reactions - dehydrohalogenation of alkyl halides; Oxidation reactions - oxidation of alcohols using $KMnO_4$ and chromic acid; Reduction reactions - reduction of carbonyl compounds using $LiAlH_4$ and $NaBH_4$.

UNIT-V:

Energy Sources

Fuels- Definition, classification (solid, liquid & gaseous fuels) - characteristics of a good fuel; Coal - analysis of coal - proximate and ultimate analysis and their significance; Petroleum - refining, knocking - octane and cetane number, cracking - fluid bed catalytic cracking; Natural gas, LPG, CNG - constituents, characteristics and uses.

TEXT BOOKS:

1. Engineering Chemistry by P.C. Jain & M. Jain, Dhanpat Rai Publishing Company (P) Ltd, 16thEdition, New Delhi.
2. Engineering Chemistry by Prasanta Rath, B. Rama Devi, C. H. Venkata Ramana Reddy, Subhendu Chakroborty, Cengage Learning Publication, India Private Limited , 2018.

REFERENCE BOOKS:

1. University Chemistry by B. H. Mahan, Pearson, IV Edition.
2. Engineering Chemistry by Shashi Chawla, Dhanpat Rai Publishing Company (P) Ltd, New Delhi.
3. Reactions, Rearrangements and Reagents by S.N. Sanyal, Bharati Bhavan Publishers.

COURSE OUTCOMES:

The basic concepts included in this course will help the student to:

- Understand the operating principles of various types of electrochemical cells, including fuel cells and batteries. Analyze and develop a technically sound, economic and sustainable solution to corrosion problems related to engineering service.
- Achieve basic concepts of atomic, molecular and electronic changes related to conductivity and magnetism.
- Familiarize the student with the fundamentals of the treatment technologies and the considerations for its design and implementation in water treatment plants.
- Gain knowledge on synthesis of organic compounds by using different reaction mechanisms.
- Comprehend the types of fuels, characteristics and combustion systems with emphasis on engineering applications.

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(R18A0502)OBJECT ORIENTED PROGRAMMING

COURSE OBJECTIVES

1. To teach the student the concepts of object oriented and generic programming.
2. To differentiate between object oriented programming and procedural programming.
3. To design applications using object oriented features
4. To teach the student to implement object oriented concepts

UNIT I

Introduction to Object Oriented Programming: Object oriented paradigm-Differences between Object Oriented Programming and Procedure oriented programming, Basic concepts of Object Oriented Programming, Encapsulation, Inheritance and Polymorphism, Benefits of OOP, Structure of a C++ program, namespace, Data types, C++ tokens, Identifiers, Variables, Constants, Operators, Control structures & Loops.

UNIT-II

Functions, Classes and Objects:

Introduction of Classes, Class Definition, Defining a Members,Objects,Access Control, Class Scope, Scope Resolution Operator, Inline functions, Memory Allocation for Objects, Static Data Members, Static Member Functions, Arrays of Objects, Objects as Function Arguments, Friend Functions.

UNIT-III

Constructors, Destructors, Inheritance:

Introduction to Constructors, Default Constructors, Parameterized Constructors, Copy Constructors, Multiple Constructors in a Class, Destructors.

Inheritance :

Introduction to inheritance, Defining Derived Classes, Single Inheritance, Multiple Inheritance, Multi level Inheritance, Hierarchical Inheritance, Hybrid Inheritance.

UNIT-IV

Pointers, Virtual Functions and Polymorphism:

Introduction to Memory management, new operator and delete operator, Pointers to objects, Pointers to Derived Classes, Polymorphism, Compile time polymorphism, Run time polymorphism, Virtual Functions, Overloading- Function Overloading, Operator overloading.

UNIT-V

Templates and Exception handling:

Introduction to Templates, Class Templates, Class Templates with Multiple Parameters, Function Templates, Function Templates with Multiple Parameters.

Exception handling:

Basics of Exception Handling, Types of exceptions, Exception Handing Mechanism, Throwing and Catching Mechanism, Rethrowing an Exception, Specifying Exceptions.

TEXT BOOKS:

1. Object Oriented Programming with C++ by Balagurusamy
2. C++, the Complete Reference, 4th Edition, Herbert Schildt, TMH.

REFERENCE BOOKS:

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2. The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Educ

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B.TECH- I- YEAR- II- SEM –EEE

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(R18A0201) BASIC ELECTRICAL ENGINEERING

COURSE OBJECTIVES:

- This course introduces the basic concepts of electrical circuits & networks and their analysis which is the foundation for all the subjects in the electrical engineering discipline.
- The emphasis is laid on the basic elements in electrical circuits.
- Analysis of Circuits Which Includes Network Analysis & Network Theorems.
- Analysis of Single Phase AC Circuits, Magnetic Circuits and Basic Treatment of Single Phase Transformers and DC Machines is introduced.

UNIT –I:

Introduction to Electrical Circuits: Concept of Circuit and Network, Types of elements, R-L-C Parameters, Independent and Dependent sources, Source transformation and Kirchhoff's Laws

UNIT –II:

Network Analysis: Network Reduction Techniques- Series and parallel connections of resistive networks, Star–to-Delta and Delta-to-Star Transformations for Resistive Networks, Mesh Analysis, and Nodal Analysis,

Network Theorems**:** Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem and Superposition theorem, Illustrative Problems.

UNIT-III:

Single Phase A.C. Circuits: Average value, R.M.S. value, form factor and peak factor for sinusoidal wave form, Complex and Polar forms of representation. Steady State Analysis of series R-L-C circuits. Concept of Reactance, Impedance, Susceptance, Admittance, Phase and Phase difference, Concept of Power Factor, Real, Reactive and Complex power, Illustrative Problems.

UNIT –IV:

Electrical Machines (elementary treatment only):

Single phase transformers: principle of operation, constructional features and emf equation.

DC.Generator: principle of operation, constructional features, emf equation. DC Motor: principle of operation, Back emf, torque equation.

UNIT –V:

Electrical Installations:

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption and battery backup.

TEXT BOOKS:

1. Engineering Circuit Analysis - William Hayt, Jack E. Kemmerly, S M Durbin, Mc Graw Hill Companies.
2. Electric Circuits - A. Chakrabarhty, Dhanipat Rai & Sons.
3. Electrical Machines – P.S.Bimbra, Khanna Publishers.

REFERENCE BOOKS:

1. Network analysis by M.E Van Valkenburg, PHI learning publications.
2. Network analysis - N.C Jagan and C. Lakhminarayana, BS publications.
3. Electrical Circuits by A. Sudhakar, Shyammohan and S Palli, Mc Graw Hill Companies.
4. Electrical Machines by I.J. Nagrath & D. P. Kothari, Tata Mc Graw-Hill Publishers.

COURSE OUTCOMES:

At the end of this course the student would get

- A thorough knowledge of the basic RLC circuit elements
- Understanding of the basic concepts of networks and circuits with RLC
- Concepts of single phase AC circuits
- Network theorems and their application to solve problems in Network analysis
- Fundamentals Of Constructional Details And Principle Of Operation Of DC Machines And Transformers

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B.TECH- I YEAR – II- SEM - EEE

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(R18A0083) ENGINEERING PHYSICS / CHEMISTRY LAB
(Any 8 experiments compulsory)

COURSE OBJECTIVES

1. The engineering students are exposed in physics lab to understand physical parameters practically.
2. The list of experiments enables the students to know different branches like mechanics, optics and electronics.
3. The students are thoroughly trained in learning practical skills by completing all the experiments in physics lab.

This course on physics lab is designed with 10 experiments in an academic year. It is common to all branches of Engineering in B.Tech 1st year.

LIST OF EXPERIMENTS: (Any eight experiments compulsory)

1. Torsional pendulum-Rigidity modulus of given wire.
2. Melde's experiment –Transverse and Longitudinal modes.
3. Stewart and Gee's method- Magnetic field along the axis of current carrying coil.
4. Spectrometer-Dispersive power of the material of a prism
5. Diffraction grating-using laser -Wave length of light.
6. Newton's Rings –Radius of curvature of Plano convex lens.
7. C-R circuit – Time Constant of RC circuit
8. Characteristics of LED.
9. Characteristics of a Solar cell.
10. Evaluation of numerical aperture of optical fiber.

Reference practical physics books:

1. Practical physics by **Dr. Aparna**, V.G.S.publications.
2. Engineering physics practical lab manual – **MRCET.**

COURSE OUTCOMES

- The students learn the concepts of error, analyze and try to formulate new solutions to the problems related to engineering physics.
- B.Tech students basically learning the mechanical behavior of the wire and practically determining the elastic constant. Transverse and longitudinal waves are practically studied. Variation of the magnetic fields along with terrestrial magnetism is practically studied.
- Dispersion of the composite light is clearly observed by the students. Wavelengths of the source of light/laser are determined experimentally.
- Opto electronic devices and their working are practically realized by the students. In addition the functioning of optical fiber is practically studied.
- The students learn experimental skills to design new experiments suitable for requirements in different fields (industrial, medical, scientific fields etc.)

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B.TECH- I YEAR – II- SEM - EEE

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(R18A0083) ENGINEERING CHEMISTRY LAB
(Any Eight Experiment Compulsory)

COURSE OBJECTIVES

This course on chemistry lab is designed with 10 experiments in an academic year. It is common to all branches of Engineering in 1st B.Tech.

The objective of the course is that the student will have exposure to various experimental skills which is very essential for an Engineering student. At the end of the course the student is expected to

- Provide the students with a solid foundation in chemistry laboratory required to solve engineering problems.
- Practical implementation of fundamental concepts.
- The students are thoroughly trained in learning practical skills by completing all the experiments in chemistry lab.

List of Experiments

Titrimetry:

1. Estimation of hardness of water by EDTA method.

Instrumental Methods:

Colorimetry:

2. Determination of Ferrous iron in cement by Colorimetric method
3. Estimation of Copper by Colorimetric method.

Conductometry:

4. Estimation of HCl by Conductometric titrations.
5. Estimation of Acetic acid in a mixture of HCl and Acetic acid by Conductometric titrations.

Potentiometry:

6. Estimation of HCl by Potentiometric titrations.
7. Estimation of Fe^{2+} by Potentiometry using $KMnO_4$.

Preparation:

8. Preparation of Aspirin.

Physical properties:

9. Determination of Viscosity of sample oil by Redwood Viscometer.
10. Determination of Surface Tension of a given liquid by Stalagmometer.

TEXT BOOKS:

1. Inorganic quantitative analysis, Vogel
2. A text book on experiments and calculation in Engineering Chemistry by S.S. Dara

REFERENCE BOOKS:

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Text Book of Engineering Chemistry by R. N. Goyal and Harrmendra Goel, Ane Books Private Ltd.

COURSE OUTCOMES:

At the end of the course students will be able to

- Estimate the total hardness present in a sample of water.
- Select lubricants for various purposes and determine the surface tension of a given liquid.
- Prepare synthetic drug molecule.
- Determine the strength of an acid by conductometric and potentiometric methods.
- Find the amount of Fe^{+2} and Cu^{2+} present in unknown substances using titrimetric and instrumental methods.

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B.TECH- I YEAR – II- SEM - EEE **L T/P/D C**

- -/3/- 1.5

(R18A0582)OBJECT ORIENTED PROGRAMMING LAB

COURSE OBJECTIVES:

- To strengthen problem solving ability by using the characteristics of an object-oriented approach.
- To design applications using object oriented features
- To handle Exceptions in programs.
- To teach the student to implement object oriented concepts

Week 1:

Basic C++ Programs

Week2:

a) Write a C++ program to find the sum of individual digits of a positive integer.
b) Write a C++ program to generate the first n terms of the sequence.

Week 3:

a) Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
b) Write a C++ program to find both the largest and smallest number in a list of integers.

Week 4:

a) Write a C++ program to sort a list of numbers in ascending order.
b) Write a Program to illustrate New and Delete Keywords for dynamic memory allocation

Week 5

a) Write a program Illustrating Class Declarations, Definition, and Accessing Class Members.
b) Program to illustrate default constructor, parameterized constructor and copy constructors
c) Write a Program to Implement a Class STUDENT having Following Members:

Member	Description
Data members	
Sname	Name of the student
Marks array	Marks of the student
Total	Total marks obtained
Tmax	Total maximum marks
Member functions	
Member	Description
ssign()	Assign Initial Values
compute()	to Compute Total, Average
display()	to Display the Data.

Week 6:

a) Write a Program to Demonstrate the i)Operator Overloading.ii) Function Overloading.
b) Write a Program to Demonstrate Friend Function and Friend Class.

Week 7:

a) Write a Program to Access Members of a STUDENT Class Using Pointer to Object Members.
b) Write a Program to Generate Fibonacci Series use Constructor to Initialize the Data Members.

Week 8:

Revision laboratory

Week 9

Write a C++ program to implement the matrix ADT using a class. The operations supported by this ADT are:

a) Reading a matrix. b) Addition of matrices. c) Printing a matrix.

d) Subtraction of matrices. e) Multiplication of matrices

Week 10

Write C++ programs that illustrate how the following forms of inheritance are supported:

a)Single inheritance b)Multiple inheritance c)Multi level inheritance d)Hierarchical inheritance

Week 11

a.)Write a C++ program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class.

b) Write a Program to Invoking Derived Class Member Through Base Class Pointer.

Week 12

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

b) Write a C++ program that uses function templates to find the largest and smallest number in a list of integers and to sort a list of numbers in ascending order.

Week 13

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

b) Write a Program to Demonstrate the Catching of All Exceptions.

Week 14

Revision

TEXT BOOKS:

1. Object Oriented Programming with C++ by Balagurusamy
2. C++, the Complete Reference, 4th Edition, Herbert Schildt, TMH.

REFERENCE BOOKS:

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2. The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Education.

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B.TECH- I YEAR – II- SEM - EEE **L T/P/D C**

- -/3/- 1.5

(R18A0281) BASIC ELECTRICAL ENGINEERING LAB

COURSE OBJECTIVES:

To Design Electrical Systems.

- To Analyze A Given Network By Applying Various Network Theorems.
- To Expose The Students To The Operation Of DC Generator
- To Expose The Students To The Operation Of DC Motor and Transformer.
- To Examine The Self Excitation In DC Generators.

CYCLE –I

1. Verification of KVL and KCL.
2. Verification of Thevenin's theorem.
3. Verification of Norton's theorem.
4. Verification of Superposition theorem.
5. Verification of Maximum power transfer theorem.
6. Verification of Reciprocity theorem.

CYCLE-II

7. Magnetization characteristics of DC shunt generator.
8. Swinburne's test on DC shunt machine.
9. Brake test on DC shunt motor.
10. OC & SC tests on single phase transformer.
11. Load test on single phase transformer.

NOTE: Any 10 of Above Experiments Are To Be Conducted

COURSE OUTCOMES:

After successfully studying this course, students will:

- Explain the concept of circuit laws and network theorems and apply them to laboratory measurements.
- Be able to systematically obtain the equations that characterize the performance of an electric circuit as well as solving both single phase and DC Machines
- Acknowledge the principles of operation and the main features of electric machines and their applications.
- Acquire skills in using electrical measuring devices.

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B.TECH- I YEAR – II- SEM - EEE

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(MANDATORY COURSE)

(R18A0003) HUMAN VALUES AND SOCIETAL PERSPECTIVE

COURSE OBJECTIVES:

This introductory course input is intended:

- To help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of value based living in a natural way.
- To highlight plausible implications of such a holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.

UNIT - I:

COURSE INTRODUCTION - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education.

Self Exploration - what is it? - its content and process; 'Natural Acceptance' and Experiential Validation - as the mechanism for self exploration. Continuous Happiness and Prosperity

A look at basic Human Aspirations- Right understanding, Relationship and Physical Facilities - the basic requirements for fulfillment of aspirations of every human being with their correct priority.

Understanding Happiness and Prosperity correctly - A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT - II:

UNDERSTANDING HARMONY IN THE HUMAN BEING - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'.

Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer).

Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

UNIT - III:

UNDERSTANDING HARMONY IN THE FAMILY AND SOCIETY - Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.

Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship.

Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astiva as comprehensive Human Goals. Visualizing a universal harmonious

order in society - Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) - from family to world family!

UNIT - IV:

UNDERSTANDING HARMONY IN THE NATURE AND EXISTENCE - Whole existence as Coexistence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature - recyclability and self-regulation in nature.

Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

UNIT - V:

IMPLICATIONS OF THE ABOVE HOLISTIC UNDERSTANDING OF HARMONY ON PROFESSIONAL ETHICS: Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basic for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

a. Ability to utilize the professional competence for augmenting universal human order.
b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems.
c. Ability to identify and develop appropriate technologies and management patterns for above production systems.

TEXT BOOKS:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

REFERENCE BOOKS:

1. Ivan IIlich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E. F. Schumancher, 1973, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain.
3. A Nagraj, 1998 Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986, 1991.
5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6. A. N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth - Club of Rome's report, Universe Books.
9. E G Seebauer & Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
10. M Govindrajan, S Natrajan & V. S Senthil kumar, Engineering Ethics (including Humna Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, http://www.uptu.ac.in
2. Story of Stuff, http://www.storyofstuff.com
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology - the Untold Story

COURSE OUTCOMES:

- The students will be able to obtain happiness and prosperity in their life.
- They will develop harmony at all levels.
- They can have satisfying human behavior throughout their life.

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(R18A0023) MATHEMATICS – III

COURSE OBJECTIVES:

To learn

- The expansion of a given function by Fourier series.
- The Fourier sine and cosine transforms, properties, inverse transforms, and finite Fourier transforms.
- Differentiation, integration of complex valued functions and evaluation of integrals using Cauchy's integral formula.
- Taylor's series, Laurent's series expansions of complex functions and evaluation of integrals using residue theorem.
- Transform a given function from z - plane to w – plane. Identify the transformations like translation, magnification, rotation, reflection, inversion, and Properties of bilinear transformations.

UNIT – I

FOURIER SERIES: Definition of periodic function, Fourier expansion of periodic functions in a given interval of length 2π, Fourier series of even and odd functions, Half-range Fourier sine and cosine expansions, Fourier series in an arbitrary interval.

UNIT – II

FOURIER TRANSFORMS: Fourier integral theorem - Fourier sine and cosine integrals. Fourier transforms – Fourier sine and cosine transforms, properties. Inverse transforms and Finite Fourier transforms.

UNIT – III

ANALYTIC FUNCTIONS: Complex functions and its representation on Argand plane, Concepts of limit, continuity, differentiability, Analyticity, and Cauchy-Riemann conditions, Harmonic functions – Milne – Thompson method. Line integral – Evaluation along a path and by indefinite integration – Cauchy's integral theorem (singly and multiply connected regions) – Cauchy's integral formula – Generalized integral formula.

UNIT – IV:

SINGULARITIES AND RESIDUES: Radius of convergence, expansion of given function in Taylor's series and Laurent series. Singular point – Isolated singular point, pole of order m and essential singularity. Residues – Evaluation of residue by formula and by Laurent series. Residue theorem- Evaluation of improper integrals of the type

(a) $\int_{-\infty}^{\infty} f(x)dx$ **(b)** $\int_{c}^{c+2\pi} f(cos\Theta, sin\Theta)d\Theta$

UNIT – V

CONFORMAL MAPPING: Transformation of z-plane to w-plane by a function, conformal transformation. Standard transformations- Translation; Magnification and rotation; inversion and reflection, Transformations like e^z , log z, z^2, and Bilinear transformation. Properties of Bilinear transformation, determination of bilinear transformation when mappings of 3 points are given (cross ratio).

TEXT BOOKS:

1. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
2. Higher Engineering Mathematics by B.V Ramana , Tata McGraw Hill.
3. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.

REFERENCE BOOKS:

1. Complex Variables and Applications by James W Brown and Ruel Vance Churchill-Mc Graw Hill
2. Mathematics-III by T K V Iyenger,Dr B Krishna Gandhi, S Ranganatham and Dr MVSSN Prasad, S chand Publications.
3. Advanced Engineering Mathematics by Michael Greenberg –Pearson publishers.

COURSE OUTCOMES:

After going through this course the students will be able to

- Find the expansion of a given function by Fourier series in the given interval.
- Find Fourier sine, cosine transforms and inverse transformations.
- Analyze the complex functions with reference to their analyticity and integration using Cauchy's integral theorem.
- Find the Taylor's and Laurent series expansion of complex functions. Solution of improper integrals can be obtained by Cauchy's-Residue theorem.
- Understand the conformal transformations of complex functions can be dealt with ease.

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(R18A0401) ANALOG ELECTRONICS

COURSE OBJECTIVES

The main objectives of the course are:

- To familiarize the student with the principal of operation, analysis and design of junction diode, BJT and FET transistors and amplifier circuits.
- To understand diode as a rectifier.
- To study basic principal of filter of circuits and various types

UNIT-I

P-N Junction diode: Qualitative Theory of P-N Junction, P-N Junction as a diode , diode equation, volt-ampere characteristics temperature dependence of V-I characteristic , ideal versus practical, Resistance levels(static and dynamic), transition and diffusion capacitances, diode equivalent circuits, load line analysis, breakdown mechanisms in semiconductor diodes , Zener diode characteristics.

UNIT-II

RECTIFIERS &FILTERS: P-NJunction as a rectifier ,Half wave rectifier, Full wave rectifier, Bridge rectifier , Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L- section filter and Voltage regulation using Zener diode.

UNIT-III

BIPOLAR JUNCTION TRANSISTOR: The Junction transistor, Transistor construction ,Transistor current components, Transistor as an amplifier, Input and Output characteristics of transistor in Common Base, Common Emitter, and Common collector configurations. α and β Parameters and the relation between them, BJT Specifications. H-parameter representation of a transistor, Analysis of single stage CE amplifier using h-parameters: voltage gain, current gain, Input impedance and Output impedance.

UNIT-IV

TRANSISTOR BIASING AND STABILISATION: Operating point, the D.C and A.C Load lines, Need for biasing , criteria for fixing operating point, B.J.T biasing, Fixed bias, Collector to base bias, Self bias techniques for stabilization, Stabilization factors(s, s^{I}, s^{II}), Bias Compensation using Diode Thermal run away, Condition for Thermal stability.

UNIT-V

FIELD EFFECT TRANSISTOR AND FET AMPLIFIER: JFET (Construction, principal of Operation and Volt –Ampere characteristics)-Pinch- off voltage, Small signal model of JFET. FET as Voltage Variable Resistor, Comparison of BJT and FET.MOSFET (Construction, Principle of Operation and symbol), MOSFET characteristics in Enhancement and Depletion modes.

TEXT BOOKS:

1. "ElectronicDevices&Circuits", SpecialEdition–MRCET, McGrawHillPublications,2017.
2. IntegratedElectronicsAnalogDigitalCircuits, JacobMillmanandD.Halkias, McGrawHill.
3. ElectronicDevicesandCircuitsTheory, Boylsted, PrenticeHallPublications.

4. ElectronicDevicesandCircuits, S.Salivahanan, N.Sureshkumar, McGrawHill.
5. Electronic Devices and Circuits,Balbir kumar,shail b.jain, PHI Privated Limted,Delhi.

REFERENCE BOOKS:

1. Electronic Devices and Circuits,K.Lal Kishore B.SPublications
2. Electronic Devices and Circuits, G.S.N. Raju, I.K. International Publications, New Delhi, 2006.
3. Electronic Devices and Circuits,A.P Godse, U.A Bakshi , TechnicalPublications
4. Electronic Devices and Circuits K.S. Srinivasan AnurdhaAgencies

COURSE OUTCOMES:

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

- Understand and Analyse the different types of diodes, operation and its characteristics
- Design and analyse the DC bias circuitry of BJT andFET
- Design biasing circuits using diodes and transistors.
- To analyze and design diode application circuits, amplifier circuits and oscillators employing BJT, FET devices.

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(R18A0202) ELECTRICAL MACHINES – I

COURSE OBJECTIVES:

- To introduce 'Electrical machines' which is is one of the important Subjects of the Electrical Engineeringcourse.
- To understand the basic working principle, constructional details, operational features & characteristics and testing of different types of DC generators and Motors which are widely used inindustry
- To expose the students to the concepts of various types of electrical machines and their applications.

UNIT – I

INTRODUCTION TO MAGNETIC CIRCUITS & D.C GENERATORS: Faraday's laws of electromagnetic induction, concept of self and mutual inductance, dot convention, coefficient of coupling.

D.C GENERATORS: Action of commutator – armature windings – lap and wave windings – simplex and multiplex windings – use of laminated core – Problems.Armature reaction – Cross magnetizing and de-magnetizing AT/pole – compensating winding- Commutation - methods of improving commutation.

UNIT – II

TYPES OF D.C GENERATORS & LOAD CHARACTERISTICS: Methods of Excitation – separately excited and self excited generators – build-up of E.M.F - critical field resistance and critical speed - causes for failure to self excited and remedial measures. Load characteristics of shunt, series and compound generators – parallel operation of d.c series generators – use of equalizer bar and cross connection of field windings – loadsharing.

UNIT – III

D.C. MOTORS: D.C Motors – Types of DC motors, characteristics and application of separately excited, shunt, series and compound motors –Armature reaction and commutation.

UNIT – IV

Speed control of DC Motors: Armature voltage and field flux control methods. Ward-Leonard system. Principle of 3 point and 4 point starters – protective devices.

UNIT – V

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's test – Field's test – Retardation test – separation of stray losses in a DC motortest.

TEXT BOOKS:

1. Electrical Machines, P.S. Bimbra, KhannaPublishers.
2. Principles of Electrical Machines, V. K. Mehta, Rohit Mehta, S. ChandPublishing.
3. Electric Machines by I.J. Nagrath & D.P. Kothari, Tata Mc Graw – HillPublishers.

REFERENCE BOOKS:

1. Electric Machines, Mulukutla S. Sarma, Mukesh K. Pathak, CengageLearning.
2. Fundamentals of Electric Machines, B. R. Gupta, Vandana Singhal, New Age

InternationalPublishers.
3. Electrical Machines, M. V. Deshpande, PHI Learning PrivateLimited.
4. Electrical Machines, R. K. Srivastava, CengageLearning.

COURSE OUTCOMES:

At the end of this course the student would get

- Basic knowledge on principles of electromechanical energy conversion
- Knowledge on the Constructional features of DC Generators and DCmotors
- Full understanding of the basic principle of operation of thesemachines
- Clear understanding of Operational characteristics and speed control methods of these machines.
- Testing of different types of DC Generators and DCmotors

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II Year B.Tech EEE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(R18A0205) ELECTROMAGNETIC FIELDS

COURSE OBJECTIVES:

- To introduce the concepts of electric field, magnetic field.
- Applications of electric and magnetic fields in the development of the theory for power transmission lines and electrical machines.

UNIT – I

ELECTROSTATICS: Electrostatic Fields – Coulomb's Law – Electric Field Intensity (EFI) – EFI due to a line and a surface charge – Work done in moving a point charge in an electrostatic field – Electric Potential – Properties of potential function – Potential gradient – Gauss's law– Application of Gauss's Law – Maxwell's first law, div (D)=ρv – Laplace's and Poison's equations. Electric dipole – Dipole moment– potential and EFI due to an electric dipole – Behavior of conductors in an electric field.

UNIT – II

DIELECTRICS & CAPACITANCE: Behavior of conductors in an electric field – Conductors and Insulators – Electric field inside a dielectric material – polarization – Dielectric – Conductor and Dielectric – Dielectric boundary conditions – Capacitance – Capacitance of parallel plates– spherical co-axial capacitors–– Current density – conduction and Convection current densities – Ohm's law in point form – Equation of continuity

UNIT – III

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

AMPERE'S LAW & APPLICATIONS: Ampere's circuital law and its applications viz. MFI due to an infinite sheet of current and a long current carrying filament – Point form of Ampere's circuital law – Maxwell's third equation, Curl (H)=Jc

UNIT – IV

FORCE IN MAGNETIC FIELDS AND MAGNETIC POTENTIAL: Magnetic force Moving charges in magnetic field – Lorentz force equation – force on a current element in a magnetic field – Force on a straight and a long current carrying conductor in a magnetic field – Force between two straight long and parallel current carrying conductors – Magnetic dipole and dipole moment – a magnetic potential and its limitations – vector magnetic potential and its properties. Self and Mutual inductance – Neumann's formulae – determination of self-inductance of a solenoid and toroid and mutual inductance between a straight long wire and a square loop wire in the same plane – energy stored and density in a magnetic field.

UNIT – V

TIME VARYING FIELDS: Time varying fields – Faraday's laws of electromagnetic induction – Its integral and point forms – Maxwell's fourth equation, Curl (E)=-dB/dt – Statically and Dynamically induced EMFs – Simple problems -Modification of Maxwell's equations for time varying fields – Displacement current

TEXT BOOKS:

1."William H. Hayt& John. A. Buck", "Engineering Electromagnetic" ,Mc. Graw-HillCompanies, 7th Edition,2009.
2. "Sadiku", "Electromagnetic Fields", Oxford Publications, 4th Edition, 2009.

REFERENCE BOOKS:

1. "CRPaulandS.A.Nasar", "IntroductiontoElectromagnetic", McGrawHillPublications, 3rd Edition, 1997.
2. "Nathan Ida", "Engineering Electromagnetic", Springer (India) Pvt. Ltd. 2ndEdition, 2015.
3. "DJGriffiths","IntroductiontoElectroDynamics",Prentice-HallofIndiaPvt.Ltd,3rdedition, 1999.
4. "J. D Kraus", "Electromagnetics", Mc Graw-Hill Inc. 4th edition, 1992.

COURSE OUTCOMES:

Upon completion of course, student will be able to apply vector calculus to static electric – magnetic fields.

- Compute the force, fields & Energy for different charge & current configurations& evaluate capacitance and inductance.
- Analyze Maxwell's equation in different forms (Differential and integral) in Electrostatic, Magnetic time varying fields.
- Ability to solve the problems in different Magnetic fields
- Ability to analyse moving charges on Magnetic fields.
- Ability to Solve Electromagnetic Relation using Maxwell Formulae.

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II Year B.Tech EEE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**3**

(R18A0206) ELECTRICAL CIRCUIT ANALYSIS

COURSE OBJECTIVES:

- This course introduces the analysis of transients in electrical systems, to understand three phase circuits, to evaluate network parameters of given electrical network, to draw the locus diagrams and to know about the networkfunctions
- To prepare the students to have a basic knowledge in the analysis of ElectricNetworks

UNIT-I

D.C TRANSIENT ANALYSIS: Transient response of R-L, R-C, R-L-C circuits (Series and parallel combinations) for D.C. excitations, Initial conditions, Solution using differential equation and Laplace transform method.

UNIT - II

A.C TRANSIENT ANALYSIS: Transient response of R-L, R-C, R-L-C Series circuits for sinusoidal excitations, Initial conditions, Solution using differential equation and Laplace transform method.

UNIT - III

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 three phase circuits

UNIT – IV

LOCUS DIAGRAMS & RESONANCE: Series and Parallel combination of R-L, R-C and R-L-C circuits with variation of various parameters.Resonance for series and parallel circuits, concept of band width and Q factor.

UNIT - V

NETWORK PARAMETERS: Two port network parameters – Z,Y, ABCD and hybrid parameters.Condition for reciprocity and symmetry.Conversion of one parameter to other, Interconnection of Two port networks in series, parallel and cascaded configuration and image parameters.

TEXT BOOKS:

1. William HartHayt,Jack EllsworthKemmerly,StevenM.Durbin(2007),EngineeringCircuit Analysis, 7 th edition, McGraw-Hill Higher Education, New Delhi, India
2. JosephA.Edminister(2002),Schaum'soutline ofElectricalCircuits,4thedition,TataMcGraw Hill Publications, New Delhi, India.
3. A.Sudhakar, ShyammohanS.Palli(2003), ElectricalCircuits, 2ndEdition, TataMcGrawHill, NewDelhi

REFERENCE BOOKS:

1. C. L. Wadhwa(2008), Electric Circuits Analysis, 2 nd edition,New Age International Publications, NewDelhi.
2. A.Chakrabarthy(2010),CircuitTheory,5thedition,DhanpatRai&SonsPublications, New Delhi.
3. Van Valkenburg, M. E. (1974), Network Analysis, 3rd Edition, Prentice Hall of India, New Delhi.
4. A Text Book on Electrical Technology. –B L THERAJA, Vol 1, S.ChandPublications.

COURSE OUTCOMES:

After going through this course the student gets thorough knowledgeon basic parameters of two port network.

- Will able to articulate in working of various components of acircuit.
- Will be familiar with ac and dc circuitssolving.
- Ability to measure Three phase voltages and current, active, reactivepowers
- Ability to convert Three phase Star to Three phase Delta circuits andVice-Versa.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech EEE-I Sem	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(R18A0366) ELEMENTS OF MECHANICAL ENGINEERING

COURSE OBJECTIVES:

- To give an insight to students about the behaviour of materials under external forces.
- The concept of stress, strain, elasticity etc. as applied to various structures under loading are included.
- The student able to learn about concept of fluids, turbines and engines .

UNIT – I

STRESSES AND STRAINS: kinds of – stress-strains, elasticity and plasticity, Hooks law, stress –strain diagrams, modules of elasticity, Poisson's ratio, linear and volumetric strain, relation between E, N, and K, bars of uniform strength, compound bars and temperature stresses.

UNIT – II

ENGINEERING MATERIALS AND JOINING PROCESSES (ENGINEERING MATERIALS): Types and applications of nonferrous metals and alloys

COMPOSITES: Introduction, Definition, Classification and applications (Air Craft and Automobiles)

SOLDERING, BRAZING AND WELDING: Definitions, Classification and method of soldering, Brazing an welding. Difference between Soldering, Brazing and Welding. Description of electric Arc Welding and Oxy-Acetylene Welding

UNIT – III

PROPERTIES OF FLUID : Stream line , streak line , path line , continuity equation pipes are in series, pipes are in parallel, HGL, TGL , Bernoullis equation .

HYDRAULIC PUMPS AND TURBINES: working principles and velocity diagrams.

UNIT – IV

INTERNAL COMBUSTION ENGINES: classification of IC engines, basic engine components and nomenclature, working principle of engines, Four strokes and two stroke petrol and diesel engines, comparison of CI and SI engines, comparison of four stroke and two stroke engines, simple problems such as indicated power, brake power, friction power, specific fuel consumption, brake thermal efficiency, indicated thermal efficiency and mechanical efficiency.

UNIT - V

BELTS - ROPES AND CHAIN: Belt And Rope Drives, Velocity Ratio, Slip, Length Of Belt , Open Belt And Cross belt drives, ratio of friction tensions, centrifugal tension in a belt, power transmitted by belts and ropes, initial tensions in the belt, simple problems.

GEAR TRAINS: classification of gears, gear trains velocity ratio, simple, compound –reverted and epicyclic gear trains

TEXT BOOKS:

1. Strength of Materials, R.K. Bansal, S.Chand Publications
2. Thermal Engineering, Ballaney,P.L., Khanna Publishers, 2003 .
3. Theory of Machines, S.S. Rattan , Tata McGraw Hill.
4. Fluid Mechanics and Hydraulic Machinery R.K. Bansal .

REFERENCE BOOKS:

1. Thermal Engineering, R.K. Rajput , Laxmi Publications .
2. Theory of Machines, R.S. Khurmi, S. Chand Publications.
3. Fluid Mechanics and Hydraulic Machinery, Modi & Seth.
4. Manufacturing Technology, P.N.Rao.

COURSE OUTCOMES:

- The student would be exposed to basic mechanical engineering machinery.
- The student learned about mechanical components.
- Students understand about engines and turbines.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. EEE-I Sem	**L**	**T/P/D**	**C**
	-	**- / 3 /-**	**1.5**

(R18A0494) ANALOG ELECTRONICS LAB

PART A: (Only for Viva-voce Examination)

ELECTRONIC WORKSHOP PRACTICE (In 3 Lab Sessions):

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB's
2. Identification, Specifications and Testing of Active Devices, Diodes, BJT's, Low power JFET's, MOSFET's, Power Transistors, LED's, LCD's, SCR, UJT.
3. Study and operation of
   i. Multimeters (Analog and Digital)
   ii. Function Generator
   iii. Regulated Power Supplies
   iv. CRO.
   v.

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

1. P-N junction diode characteristics
2. Zener diode characteristics and Zener as voltage regulator
3. Half -Wave Rectifier with and without filter
4. Full - Wave Rectifier with and without filter
5. Input and output characteristics of transistor in CB configuration
6. Input and output characteristics of transistor in CE configuration
7. FET Characteristics
8. h-parameters of CE configuration
9. Frequency response of CE amplifier
10. Frequency response of CC amplifier
11. Frequency response of common source FET amplifier
12. UJT CHARACTERISITCS

PART C: Equipment required for Laboratories:

1. Regulated Power supplies (RPS)	0-30 V
2. CRO's	0-20 MHz
3. Function Generators	0-1 MHz
4. Multimeters	
5. Decade Resistance Boxes / Rheostats	
6. Decade Capacitance Boxes	
7. Ammeters (Analog or Digital)	0-20 µA, 0-50µA, 0-100µA, 0-200µA, 0-10 mA
8. Voltmeters (Analog or Digital)	0-50V, 0-100V, 0-250V
9. Electronic Components	Resistors, Capacitors, BJT's, LCD's, SCR's, UJTs, FET's,LED's, MOSFET's, Diodes- Ge & Si type, Transistors – NPN, PNP type

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. EEE-I Sem	**L**	**T/P/D**	**C**
	-	**- / 3 /-**	**1.5**

(R18A0393) ELEMENTS OF MECHANICAL ENGINEERING LAB

COURSE OBJECTIVES:

- To measure performance parameters of the systems such as Brake power, Efficiency,
- To understand the basic principles in the areas of internal combustion engines.
- To impart practical exposure on the performance evaluation of hydraulic turbines and pumps.

Part-A

1. I.C. Engine Valve / Port Timing Diagram.
2. I.C. Engine Performance Test on 4 -Stroke Diesel Engine.
3. Determination of FHP By Retardation and Motoring Test on I.C Engine
4. I.C. Engine Heat Balance Test on Petrol / Diesel Engine.
5. Study of Boilers.
6. I.C. Engine Performance Test on 2-Stroke Petrol Engine.

Part-B

1. Impact of Jet on Vanes
2. Performance Test on Pelton Wheel Turbine.
3. Performance Test on Francis Turbine.
4. Performance Test on Kaplan Turbine.
5. Performance Test on Single Stage Centrifugal Pump.
6. Performance Test on Reciprocating Pump.

Note: Total 10 experiments are to be conducted.

COURSE OUTCOMES:

- Analyze the performance characteristics of an internal combustion engines.
- Analyze the air compressor characteristics.
- To provide the students knowledge in calculating performance analysis in turbines, pumps and can be used in power plants.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech.EEE- I Sem **L T/P/D C**

2 -/ - /- -

(MANDATORY COURSE – II)

(R18A0004) FOREIGN LANGUAGE-FRENCH

COURSE OBJECTIVES:

- To inculcate the basic knowledge of the French language.
- To hone the basic sentence constructions in day to day expressions for communication in theirvocation.
- To culminate their major with evidence of a purposeful education.

UNIT - I:

Speaking: Introduction to the French language and culture – Salutations - French alphabet - Introducing people

Writing: Understand and fill out a form

Grammar: The verbs “to be ' and “to have '' in the present tense of the indicative

Vocabulary: The numbers from 1 to 20 - Professions – Nationalities

UNIT - II:

Speaking: Talk about one’s family – description of a person - express his admirations and preferences - express possession - express negation

Writing: Write and understand a short message

Grammar: Nouns (gender and number) - Articles - The –er verbs in the present - Possessive adjectives Qualifying adjectives

Vocabulary: The family – Clothes - Colors - The numbers from 1 to 100 - The classroom

UNIT - III

Speaking: Talk about your daily activities - be in time - ask and indicate the date and time - talk about sports and recreation - express the frequency

Writing: A letter to a friend

Grammar: The expression of time – The –ir verbs in the present - The verbs do, go, take, come,- Adverbs - Reflexiveverbs

Vocabulary: The days and months of theyear- The sports –Hobbies

UNIT - IV

Speaking: Express the quantity - ask and give the price - express the need, the will and the capacity - compare (adjective) - speak at the restaurant / in the shops

Writing: A dialogue between a vendor and a customer at the market

Grammar: Verbs “to want”, “to can” - Express capacity / possibility - Express will / desire – the future tense

Vocabulary: The food – Meals - Fruits and vegetables – The parts of the body

UNIT - V

Speaking: Express the prohibition and the obligation - describe an apartment - talk about the weather / ask the weather - ask the opinion - give your opinion - express your agreement ordisagreement

Writing: Descriptions

Grammar: Demonstrative adjectives -Prepositions - The verb 'must' to indicate obligation and necessity in the present

Vocabulary: Seasons – Holidays - The city – Furniture

TEXT BOOKS*:*

1. Apprenons le Français 1& 2, New Saraswati House,2015
2. A propos, A1, Langers International,2010
3. Easy French Step-by-step by Myrna BellRochester

REFERENCE BOOKS:

1. Ultimate French Beginner-Intermediate (Coursebook) By LividLanguage
2. Ã L'Aventure: An Introduction to French Language and Francophone Cultures by Evelyne Charvier-Berman, Anne C.Cummings.

COURSE OUTCOMES*:*

- The students will be able to communicate in French at A1level.
- The student will have an advantage in the competitive jobmarket.
- This course benefits the graduates when pursuing study *opportunities* in the countries where French is the official language.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech EEE-II Sem	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(R18A0203) ELECTRICAL MACHINES – II

COURSE OBJECTIVES:

To Understand:

- The working principle, constructional details, operational features &characteristics of single phase and three phase transformers.
- Testing of Single Phase Transformer and Three phase transformer.
- working principle, constructional details, operational features &characteristics of three phase induction motors
- Methods of Starting and speed control of Three phase induction motors

UNIT-I

SINGLE PHASE TRANSFORMERS: Single phase transformers- - types - equivalent circuit – operation on no load and on load- phasor diagrams –losses- minimization of hysteresis and eddy current losses-efficiency-all day efficiency-regulation-effect of variations of frequency and supply voltage on iron losses.

UNIT-II

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

UNIT-III

POLYPHASE TRANSFORMERS: Poly phase transformers – Polyphase connections – Y/Y, Y/D, D/Y, D/D and open D, Third harmonics in phase voltages-three winding transformers-tertiary windings-determination of Zp, Zs and Zt transients in switching – off load and on load tap changing; Scott connection.

UNIT-IV

POLYPHASE INDUCTION MOTORS: Polyphase induction motors-construction details of cage and wound rotor machines-production of a rotating magnetic field – principle of operation – rotor emf and rotor frequency – rotor reactance, rotor current and Power factor at standstill and during operation. Rotor power input, rotor copper loss and mechanical power developed and their inter relation-torque equation – expressions for maximum torque and starting torque – torque slip characteristic – double cage and deep bar rotors – equivalent circuit – phasor diagram – crawling andcogging

UNIT-V

CIRCLE DIAGRAM OF INDUCTION MOTORS& SPEED CONTROL METHODS: Circle diagram-no load and blocked rotor tests-predetermination of performance-methods of starting and starting current and torque calculations. Speed control-change of frequency; change of poles and methods of consequent poles; cascade connection. Injection of an emf into rotor circuit (qualitative treatment only)-induction generator-principle of operation.

TEXT BOOKS:

1. Electric machinery – A.E. Fitzgerald, C.Kingsley and S.Umans, Mc Graw Hill Companies,5
2. Electrical machines-PS Bhimbra, KhannaPublishers.
3. Electric Machines, I. J. Nagrath & D. P. Kothari, Tata Mc Graw HillPublishers.

REFERENCE BOOKS:

1. Performance and Design of AC Machines by MG.Say, BPB Publishers.
2. Theory of Alternating Current Machinery- by Langsdorf, Tata McGraw-Hill Companies, 2ndedition.
3. Electromechanics-II (transformers and induction motors) S. Kamakashaiah Hitech publishers.
Textbook of Electrical Technology: volume 2 AC & DC Machines by B.L.THERAJA, A.K.THERAJA.

COURSE OUTCOMES:

At the end of this course the student would get

- Knowledge on the Constructional features of Transformers and Inductionmotors
- Full understanding of the basic principle of operation of thesemachines
- Clear understanding of Operational characteristics and speed control methods
- of Inductionmotors.
- Testing of different types of Transformers and Inductionmotors
- Calculate motor currents, power, speed and torque using an equivalent circuitmodel.
- Measure and calculate motor losses and efficiency.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech EEE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(R18A0207) POWER SYSTEMS - I

COURSE OBJECTIVES:

- To introduce and describe the various methods of power generation like hydro, thermal and nuclear generating stations.
- To study and understand the various parameters concerning the design installation and operation of A.C.Transmissionlines
- To illustrate the economic aspects of power generation and tariff methods.

UNIT-I

THERMAL POWER STATIONS: Line diagram of Thermal Power Station (TPS) showing paths of coal, steam, water, air, ash and flue gases. Brief description of TPS components- Economizers, Boilers, Superheaters, Turbines, Condensers, Chimney and cooling towers

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 hazards: Shielding and Safety precautions – Types of Nuclear reactors and brief description of PWR, BWR and FBR.

UNIT-II

HYDRO ELECTRIC POWER STATIONS: Elements of hydro electric power station – types - concept of pumped storage plants - storage requirements, mass curve, estimation of power developed from a given catchment area, heads and efficiencies.

UNIT III:

TRANSMISSION LINE PARAMETERS: Types of conductors - calculation of resistance for solid conductors - Calculation of inductance for single phase and three phase, single and double circuit lines, concept of GMR & GMD, symmetrical and asymmetrical conductor configuration with and without transposition, Numerical Problems. Calculation of capacitance for 2 wire and 3 wire systems, effect of ground on capacitance, capacitance calculations for symmetrical and asymmetrical single and three phase, single and double circuit lines, Numerical Problems.

UNIT IV:

PERFORMANCE OF SHORT, MEDIUM AND LONG TRANSMISSION LINES: Classification of Transmission Lines - Short, medium and long line and their model representations - Nominal-T, Nominal-Pie, Numerical Problems. 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.

UNIT-V:

FACTORS GOVERNING THE PERFORMANCE OF TRANSMISSION LINES: Skin and Proximity effects - Description and effect on Resistance of Solid Conductors - Ferranti effect - Charging Current - Effect on Regulation of the Transmission Line - Surge Impedance and SIL of Long Lines- Corona - Description of the phenomenon, factors affecting corona, critical voltages and power loss, Radio Interference.

TEXTBOOKS:

1. "C. L. Wadhawa", "Generation and utilization of Electrical Energy",NewageInternational (P) Limited, Publishers 1997.
2. "C.L.Wadhawa","ElectricalPowerSystems",NewageInternational(P)Limited,Publishers1997.
3. "M.L.Soni, P.V.Gupta, U.S.Bhatnagar and A.Chakraborti", "AText Book on Power System Engineering", Dhanpat Rai and Co.Pvt.Ltd, 1999.

REFERENCE BOOKS:

1. "M.V. Deshpande", "Elements of Power Station design and practice", Wheeler Publishing, 3rd Edition 1999.
2. "S.N.Singh", "ElectricalPowerGeneration, Transmission and Distribution", PHI, 2003.
3. "V.KMehta and Rohit Mehta", "Principlesof PowerSystems", S.Chand &Company Ltd, New Delhi, 2004.

COURSE OUTCOMES:

At the end of this course the student would

- Get Basic understanding of different types power generationstations
- Be able to draw the layout of different types of power plants like hydropowerplant,thermalpowerstation,Nuclearpowerplantandgaspowerplant
- Get a clear understanding of different transmission line parameters, installation and their performance details.
- Understand the various economical aspects of thepower plant erection,operation anddifferenttariffmethods
- Evaluatevoltage drop and line loss calculations and design the capacitors and voltage regulating equipment to improve the power factor and voltageprofile

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.TechEEE - II Sem

L	T/P/D	C
3	1/-/-	3

(R18A0209) CONTROL SYSTEMS

COURSE OBJECTIVES:

The main objectives of the course are:

- Introduce the principles and applications of linear control systems and Laplace transform.
- The basic concepts of block diagram reduction, transfer function representation, time response and time domain analysis, solutions to linear time invariant systems.
- Study and analyze the different methods of stability analysis.

UNIT - I:

INTRODUCTION: Concept of control system, Classification of control systems - Open loop and closed loop control systems, Differences, Examples of control systems- Effects of feedback, Feed Back Characteristics.

TRANSFER FUNCTION REPRESENTATION: Block diagram algebra, Representation by 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 systems, Transient response of second order systems - Time domain specifications, Steady state response, Steady state errors and error constants. PID controllers, Effects of proportional derivative, proportional integral systems on steady state error.

UNIT - III:

STABILITY ANALYSIS IN S-DOMAIN: The concept of stability – Routh-Hurwitz's stability criterion – qualitative stability and conditional stability – Limitations of Routh-Hurwitz's stability.

ROOT LOCUS TECHNIQUE: Concept of root locus - Construction of root locus, Effects of adding poles and zeros to G(s) H(s) on the root loci.

UNIT - IV:

FREQUENCY RESPONSE ANALYSIS: Introduction, Frequency domain specifications, Bode plot diagrams-Determination of Phase margin and Gain margin, Stability analysis from Bode plots. Polar plots.

UNIT - V:

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 its properties, Concepts of Controllability and Observability.

TEXT BOOKS:

1. Control Systems Engineering -I.J.Nagrath and M.Gopal, New Age International (P) Limited, Publishers.
2. Control Systems - A. Anand Kumar, PHI.
3. Control Systems Engineering by A. Nagoor Kani, RBAPublications.

REFERRENCE BOOKS:

1. Control Systems Theory and Applications - S. K. Bhattacharya, Pearson.
2. Control Systems Engineering - S. Palani, TMH.
3. Control Systems - N. K. Sinha, New Age International (P) LimitedPublishers.
4. Control Systems by S.Hasan Saeed, KATSONBOOKS.
5. Solutions and Problems of Control Systems by A.K. Jairath, CBSPublishers.

COURSE OUTCOMES:

After going through this course the student gets

- Athoroughknowledgeonopenloopand closedloopcontrol systems,conceptof feedbackin controlsystems.
- Understanding of transfer function representation through block diagram algebra and signal flowgraphs.
- Time response analysis of different order systems through their characteristicequation.
- Time domain specifications, stability analysis of control systems in s-domain throughR-H criteria.
- Root locus techniques, frequency response analysis through Bode diagrams and Polar plots.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. EEE-I Sem	**L**	**T/P/D**	**C**
	3	**-/ - /-**	**3**

(R18A0404) SWITCHING THEORY AND LOGIC DESIGN

COURSE OBJECTIVES:

This course provides in-depth knowledge of switching theory and the logic design techniques of digital circuits, which is the basis for design of any digital circuit. The course objectives are:

- To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
- To implement simple logical operations using combinational logic circuits
- To design combinational logic circuits, sequential logic circuits.
- To impart to student the concepts of sequential circuits, enabling them to analyze sequential systems in terms of state machines.
- To implement synchronous state machines using flip-flops.

UNIT -I

NUMBER SYSTEM AND BOOLEAN ALGEBRA AND SWITCHING FUNCTIONS: Number Systems, Base Conversion Methods, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal Code and its Properties, Unit Distance Codes, Error Detecting and Correcting Codes, Hamming Code.

BOOLEAN ALGEBRA: Basic Theorems and Properties, Switching Functions, Canonical and Standard Forms, Algebraic Simplification of Digital Logic Gates, Properties of XOR Gates, Universal Logic Gates. Multilevel NAND/NOR realizations.

UNIT -II

MINIMIZATION AND DESIGN OF COMBINATIONAL CIRCUITS: K- Map Method, up to Five variable K- Maps, Don't Care Map Entries, Prime and Essential prime Implications, Quine Mc Cluskey Tabular Method, Combinational Design, Arithmetic Circuits, Comparator, decoder, Encoder, Multiplexers, DeMultiplexers, Code Converters.

UNIT -III

SEQUENTIAL MACHINES FUNDAMENTALS: Introduction, Basic Architectural Distinctions between Combinational and Sequential circuits, classification of sequential circuits, The binary cell, The S-R-Latch Flip-Flop The D-Latch Flip-Flop, The "Clocked T" Flip-Flop, The " Clocked J-K" Flip-Flop, Design of a Clocked Flip-Flop, Conversion from one type of Flip-Flop to another, Timing and Triggering Consideration.

UNIT -IV

SEQUENTIAL CIRCUIT DESIGN AND ANALYSIS: Introduction, State Diagram, Analysis of Synchronous Sequential Circuits, Approaches to the Design of Synchronous Sequential Finite State Machines, Design Aspects, State Reduction, Design Steps, Realization using Flip-Flops Counters - Design of Ripple Counter, Synchronous counter, Ring Counter, Registers, Shift Register**.**

UNIT -V

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

ALGORITHMIC STATE MACHINES: Salient features of the ASM chart-Simple examples- Weighing machine and Binary multiplier.

TEXT BOOKS:

1. Digital Design- Morris Mano, PHI, 3rd Edition.
2. Switching Theory and Logic Design-A. Anand Kumar, PHI, 2nd Edition.
3. Switching and Finite Automata Theory- Zvi Kohavi & Niraj K. Jha, 3rd Edition, Cambridge.

REFERENCE BOOKS:

1. Introduction to Switching Theory and Logic Design – Fredriac J. Hill, Gerald R. Peterson, 3rd Ed,John Wiley & Sons Inc.
2. Digital Fundamentals – A Systems Approach – Thomas L. Floyd, Pearson, 2013.
3. Switching Theory and Logic Design – Bhanu Bhaskara –Tata McGraw Hill Publication, 2012
4. Fundamentals of Logic Design- Charles H. Roth, Cengage LEanring, 5th, Edition, 2004.
5. Digital Logic Applications and Design- John M. Yarbrough, Thomson Publications, 2006. 6. Digital Logic and State Machine Design – Comer, 3rd, Oxford, 2013.

COURSE OUTCOMES:

Upon completion of the course, student should possess the following skills:

- Be able to manipulate numeric information in different forms
- Be able to manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
- Be able to design and analyze small combinational circuits and to use standard combinational functions to build larger more complex circuits.
- Be able to design and analyze small sequential circuits and to use standard sequential functions to build larger more complex circuits.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech.EEE - II Sem	**L**	**T/P/D**	**C**
	3	**-/ -/-**	**3**

(R18A0061) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

COURSE OBJECTIVES:

- To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations that are needed for sound economic decision making.
- The main purpose is to provide inputs on an overall analysis of an individual firm namely: demand and supply, production function, cost analysis, markets etc.
- To understand and analyse the financial formats of the organisation for smooth running of the business.

UNIT-I

INTRODUCTION TO MANAGERIAL ECONOMICS: Definition, Nature and Scope of Managerial Economics, Micro and Macroeconomic Concepts.

DEMAND ANALYSIS: Demand Determinants, Law of Demand and exceptions.

ELASTICITY OF DEMAND: Definition, Types, Measurement and Significance of elasticity of Demand.

DEMAND FORECASTING: Factors governing Demand Forecasting, Methods of Demand Forecasting (Survey Methods, Expert Opinion, Test Marketing, Controlled Experience, Judgemental Approach, and Time Series Analysis).

UNIT-II

PRODUCTION & COST ANALYSIS: Production Function- Isocost and Isoquants, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production Function, Laws of Returns, Internal and External Economies of Scale.

COST ANALYSIS: Cost Concepts. Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems)

UNIT-III

MARKETS: Types of Competition and Markets, Features of Perfect Competition, Monopoly and Monopolistic Competition;

PRICING: Objectives, Methods of Pricing;

BUSINESS: Features of different forms of Business Organisation (Sole Trader, Partnership, Joint Stock Company, Cooperative Society, and Public Enterprises).

UNIT-IV

INTRODUCTION TO CAPITAL AND FINANCIAL ACCOUNTING: Need for Capital, Types of Capital, Working Capital Analysis, Methods and Sources of raising Finance.

ACCOUNTING: Definition, Concepts and Conventions (GAAP); Accounting Cycle; Formats for preparation of Trial Balance and Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet).

UNIT-V

INVESTMENT DECISION: Capital Budgeting - Features, Objectives, and Methods (Payback Method, Accounting Rate of Return and Net Present Value) - advantages & disadvantages. (Simple Problems)

FINANCIAL ANALYSIS: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, Capital Structure Ratios and Profitability Ratios. (Simple Problems)

TEXTBOOKS:

1. Varsheney & Maheswari, Managerial Economics, Sultan Chand, 2009.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age International Publishers, Hyderabad2013
3. M. Kasi Reddy & Sarawathi, Managerial Economics and Financial Analysis, PHI, New Delhi, 2010.

REFERENCE BOOKS:

1. Managerial Economics & Financial Analysis, Special Edition-MRCET. McGraw Hill Publications, 2017
2. D.N. Dwivedi, Managerial Economics, Vikas Publications.
3. Justin Paul, Leena, Sebastian, Managerial Economics, Cengage
4. P. L. Mehta, Managerial Economics: Analysis, Problems and Cases, Sultan Chand & Sons.
5. S. N. Maheswari & S. K. Maheswari, Financial Accounting, Vikas Publications.
6. M. Y. Khan and P. K. Jain, Financial Management, McGraw Hill

COURSE OUTCOMES:

Students should be able

- To understand the basic economic principles, forecast demand andsupply.
- Should be able to estimate cost and understand market structure, pricingpractices.
- Able to interpret the financial results of theorganisation.

OPEN ELECTIVE - I

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech II Sem	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(OPEN ELECTIVE – I)

(R18A0451) DIGITAL ELECTRONICS

COURSE OBJECTIVES:

The main objectives of the course are:

- To introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions.
- To introduce the methods for simplifying Boolean expressions.
- To outline the formal procedures for the analysis and design of combinational and sequential circuits.
- To introduce the concept of memories and programmable logic devices.
- To illustrate the concept of synchronous and asynchronous sequential circuits.

UNIT I

BINARY SYSTEMS AND LOGIC GATES: Binary Systems: The Advantage of Binary, Number Systems, The Use of Binary in Digital Systems, AND, OR, NOT, NAND, NOR, Exclusive-OR, Exclusive-NOR and Exclusive-NAND implementations of Logic Functions using gates, NAND-NOR implementations.

UNIT II

MINIMIZATION TECHNIQUES: Minimization Techniques: Boolean postulates and laws-De-Morgan's Theorem-Principle of Duality-Boolean expression-Minimization of Boolean expressions-Minterm-Maxterm-Sum of Products (SOP)-Product of Sums (POS)-Karnaugh map minimization-Don't care conditions-Quine Mc-Cluskey method of minimization.

UNIT III

COMBINATIONAL CIRCUITS: Design Procedure-Half Adder-Full Adder-Half Subtractor-Full Subtractor-Parallel binary adder-Parallel Binary Subtractor-Multiplexer/ Demultiplexer-Decoder-Encoder.

UNIT IV

SEQUENTIAL CIRCUITS: Latches, Flip-flops-SR, JK, D, T and Master-Slave-Characteristic table and equation-Application Table-Edge Triggering-Level Triggering-Realization of one flip-flop using other flip-flops-serial adder/subtractor-Asynchronous Counter-Asynchronous Up/Down Counter, Decade counter-Synchronous Counters-Synchronous Up/Down Counters, Decade Counters

UNIT V

MEMORY DEVICES: Classification of Memories-ROM_ROM Organization, PROM-EPROM-EEPROM-EAPROM, RAM-RAM Organization-Write operation-Read Operation-Programmable Logic Devices-Programmable Logic Array (PLA), Programmable Array Logic (PAL)-Implementation of combinational logic circuits suing ROM, PLA, PAL.

TEXT BOOKS:

1. M Morris Mano, "Digital Design", 4th Edition, Prentice Hall of India PVt., Ltd., 2008/Pearson Education (Singapore) Pvt., Ltd., New Delhi, 2003.
2. Donald P Leach and Albert Paul Malvino, "Digital Principles and Applications", 6th Edition, TMH, 2006.

REFERENCE BOOKS:

1. John F Wakerly. "Digital Design, Fourth Edition, Pearson/PHI, 2008
2. John M Yarbrough, "Digital Logic Applications and Design", Thomson Learning, 2006
3. Charles H Roth, "Fundamentals of Logic Design", 6th Edition, Thomson Learning, 2013
4. Thomas L Floyd, "Digital Fundamentals", 10th Edition, Pearson Education Inc, 2011.
5. Donald D Givone, "Digital Principles and Design", TMH, 2003.

COURSE OUTCOMES

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

- Analyze different methods used for simplification of Boolean expressions
- Design and implement Combinational and Sequential circuits.
- Design and implement Synchronous and Asynchronous Sequential Circuits

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech II Sem	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(OPEN ELECTIVE – I)

(R18A0551) DATABASE SYSTEMS

COURSE OBJECTIVES:

- To understand the basic concepts and the applications of database systems
- To Master the basics of SQL and construct queries using SQL
- To understand the relational database design principles
- To become familiar with the basic issues of transaction processing and concurrency control
- To become familiar with database storage structures and access techniques

UNIT I:

INTRODUCTION TO DATABASE: File Processing System Vs DBMS, History, Characteristic-Three schema Architecture of a database, Functional components of a DBMS.DBMS Languages-Database users and DBA.

UNIT II:

DATABASE DESIGN (ER MODEL): Objects, Attributes and its Type. Entity set and Relationship set-Design Issues of ER model-Constraints. Keys-primary key, Super key, candidate keys. Introduction to relational model-Tabular, Representation of Various ER Schemas. ER Diagram Notations- Goals of ER Diagram- Weak Entity Set- Views.

UNIT III:

STRUCTURED QUERY LANGUAGE: SQL: Overview, The Form of Basic SQL Query -UNION, INTERSECT, and EXCEPT– join operations: equi join and non equi join-Nested queries - correlated and uncorrelated- Aggregate Functions-Null values.

UNIT IV

DEPENDENCIES AND NORMAL FORMS: Importance of a good schema design, Problems encountered with bad schema designs, Motivation for normal forms- functional dependencies, - Armstrong's axioms for FD's- Closure of a set of FD's, - Minimal covers-Definitions of 1NF,2NF, 3NF and BCNF- Decompositions and desirable properties -

UNIT V

TRANSACTIONS: Transaction concept, transaction state, System log, Commit point, Desirable Properties of a Transaction, concurrent executions, serializability, recoverability, implementation of isolation, transaction definition in SQL, Testing for serializability**,** Serializability by Locks-Locking Systems with Several Lock Modes-Concurrency Control by Timestamps, validation.

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan," Database System Concepts", McGraw-Hill, 6th Edition, 2010.
2. Fundamental of Database Systems, by Elmasri, Navathe, Somayajulu, and Gupta, Pearson Education.

REFERENCE BOOKS:

1. Raghu Ramakrishnan, Johannes Gehrke, “Database Management System”, McGraw Hill., 3rd Edition 2007.
2. Elmasri&Navathe,”Fundamentals of Database System,” Addison-Wesley Publishing, 5th Edition, 2008.
3. Date.C.J, “An Introduction to Database”, Addison-Wesley Pub Co, 8th Edition, 2006.
4. Peter rob, Carlos Coronel, “Database Systems – Design, Implementation, and Management”, 9th Edition, Thomson Learning, 2009.

COURSE OUTCOMES:

- Demonstrate the basic elements of a relational database management system
- Ability to identify the data models for relevant problems
- Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data

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II Year B.Tech. II Sem	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(OPEN ELECTIVE I)

(R18A0553) INTRODUCTION TO DATA STRUCTURES

COURSE OBJECTIVES:

- Exploring basic data structures such as stacks and queues.
- Introduces a variety of data structures such as hash tables, search trees, heaps, graphs.
- Introduces sorting algorithms

UNIT - I

INTRODUCTION TO DATA STRUCTURES: Data types, data structures basics, abstract data types, the running time of a program, the running time and storage cost of algorithms, complexity, asymptotic complexity, big O notation, obtaining the complexity of an algorithm.
Searching- Linear Search, Binary Search. Sorting-Insertion Sort, Selection Sort, bubble sort, Quick sort, Merge sort, Comparison of Sorting methods.

UNIT - II

LINEAR LIST: singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations, queue applications

UNIT – III

DICTIONARIES: linear list representation, skip list representation, operations - insertion, deletion and searching. Hash table representation: hash functions, collision resolution-separate chaining, open addressing- linear probing, quadratic probing, double hashing, and rehashing, extendible hashing.

UNIT - IV

GRAPHS: Introduction, Definition, Terminology, Graph Representations-Adjacency matrix, Adjacency lists, Graph traversals- DFS and BFS. Trees – Terminology, Representation of Trees, Properties of Binary Trees, Binary Tree Representations-array and linked representations, Binary Tree traversals.

UNIT - V

PRIORITY QUEUE: Different Types, Heap-Definition, types, insertion and Deletion operation on heaps. Search Trees: Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion. AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching.

TEXT BOOKS:

1. Fundamentals of data structures in C, 2 ndedition, E.Horowitz, S.Sahni and Susan Anderson Freed, Universities Press.
2. Data structures using c – A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/pearson education.

REFERENCE BOOKS:

1. Data structures: A Pseudo code Approach with C, 2 nd edition, R.F.Gilberg and B.A.Forouzan, Cengage Learning.
2. Introduction to data structures in c, 1/e Ashok Kamthane.

COURSE OUTCOMES:

- Ability to select the data structures that efficiently model the information in a problem.
- Ability to assess efficiency trade-offs among different data structure implementations or Combinations.
- Implement and know the application of algorithms for sorting.
- Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, heaps, graphs, and AVL-trees.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech II Sem	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(OPEN ELECTIVE – I)

(R18A0351) INTELLECTUAL PROPERTY RIGHTS

COURSE OBJECTIVES:

- The objective of this course is to provide the knowledge on International IPR's and to make students efficient to take decisions in Global Corporate.

UNIT-I

INTRODUCTION: Intellectual property rights basics, the role and value of IP in international commerce, Issues affecting IP internationally. Agreement on trade related aspects of Intellectual Property Rights. (TRIPS) - Agreement on TRIPS and India.

UNIT-II

PARTIES TO IP RIGHTS: Owner, customer, authorized user, licensee, attorney, protection of the weak and strong, finalizing ownership and use rights.

UNIT-III

ENSURING THE VALUE OF IP: Ensuring the value of IP at creation stage, after creation stage, precise contractual protection of IP rights. Key issues related to IP internationally. IP rights in international forums. Fundamentals in Country legal systems, generalities. Validity of IP rights locally: specifics.

UNIT-IV

MANAGING IP RIGHTS: Acquiring IP Rights: letters of instruction, joint collaboration agreement, work made for hire agreement - Protecting IP Rights: non disclosure agreement, cease and desist letter, settlement memorandum. Transferring IP Rights: assignment contract, license agreement, deed of assignment or license agreement, addendum to unrecorded assignment or license.

Unit-V

REMEDIES AND IPR EVALUATION: GATT - WTO - Role of WTO in solving IPR issues.

TEXT BOOKS:

1. A short course in International Intellectual Property Rights – Karla C. Shippey, World Trade Press – 2nd Edition.
2. Intellectual Property Rights – Heritage, Science, & Society under international treaties – A. Subbian, - Deep & Deep Publications – New Delhi.

REFERENCE BOOKS:

1. Intellectual Property Rights: N K Acharya: ISBN: 9381849309
2. Intellectual Property Rights: C B Raju : ISBN-8183870341
3. Intellectual Property : Examples and Explanation – Stephen M McJohn, 2/e, ISBN-13: 978-0735556652
4. Intellectual Property Rights in the Global Economy – Keith E Maskus, PIIE, ISBN paper 0-88132-282-2

COURSE OUTCOMES:

- It allows students how to prepare and protect the Inventions , start up ideas and rights of patents and copy rights etc.,
- This subject brings awareness to the students the basic legal aspects at present following at Global level.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech II Sem	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(OPEN ELECTIVE – I)

(R18A0352) GREEN ENERGY SYSTEMS

COURSE OBJECTIVES:

- The course aims to highlight the significance of alternative sources of energy.
- Green energy systems and processes and provides the theory and working principles of probable sources of renewable and green energy systems that are environmental friendly.

UNIT-I

INTRODUCTION TO SOLAR RADIATION: Role and potential of new and renewable sources, the solar energy option, Environmental impact of solar power, structure of the sun, the solar constant, sun-earth relationships, coordinate systems and coordinates of the sun, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data, numerical problems. Photo voltaic energy conversion – types of PV cells, I-V characteristics.

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

UNIT – II

SOLAR ENERGY STORAGE AND APPLICATIONS: Different methods, sensible, latent heat and stratified storage, solar ponds, solar applications- solar heating/cooling technique, solar distillation and drying, solar cookers, central power tower concept and solar chimney.

WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, betz criteria, types of winds, wind data measurement.

UNIT – III

BIO-MASS: Principles of bio-conversion, anaerobic/aerobic digestion, types of bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, bio fuels, I.C. engine operation and economic aspects.

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

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

UNIT –IV

ENERGY EFFICIENT SYSTEMS: (A) ELECTRICAL SYSTEMS: Energy efficient motors, energy efficient lighting and control, selection of luminaire, variable voltage variable frequency drives (adjustable speed drives), controls for HVAC (heating, ventilation and air conditioning), demand site management.

(B) MECHANICAL SYSTEMS: Fuel cells- principle, thermodynamic aspects, selection of fuels & working of various types of fuel cells, Environmental friendly and Energy efficient compressors and pumps.

UNIT-V

ENERGY EFFICIENT PROCESSES: Environmental impact of the current manufacturing practices and systems, benefits of green manufacturing systems, selection of recyclable and environment

friendly materials in manufacturing, design and implementation of efficient and sustainable green production systems with examples like environmental friendly machining, vegetable based cutting fluids, alternate casting and joining techniques, zero waste manufacturing.

GREEN BUILDINGS: Definition features and benefits. Sustainable site selection and planning of buildings for maximum comfort. Environmental friendly building materials like bamboo, timber, rammed earth, hollow blocks, lime & lime pozzolana cement, agro materials and industrial waste, Ferro cement and Ferro-concrete, alternate roofing systems, paints to reduce heat gain of the buildings. Energy management.

TEXT BOOKS:

1. Sukhatme S.P. and J.K.Nayak, Solar Energy – Principles of Thermal Collection and Storage, TMH.
2. Khan B.H., Non-Conventional Energy Resources, Tata McGraw Hill, New Delhi, 2006.
3. Green Manufacturing Processes and Systems, Edited by J. Paulo Davim, Springer 2013.

REFERENCE BOOKS:

1. Alternative Building Materials and Technologies / K.S Jagadeesh, B.V Venkata Rama Reddy and K.S Nanjunda Ra.
2. Principles of Solar Energy / Frank Krieth & John F Kreider.
3. Non-Conventional Energy / Ashok V Desai /Wiley Eastern.
4. Renewable Energy Technologies /Ramesh & Kumar /Narosa
5. Renewable Energy Technologies/ G.D Roy

COURSE OUTCOMES:

- The student shall understand the principles and working of solar, wind, biomass, geo-thermal, ocean energies.
- Green energy systems and appreciate their significance in view of their importance in the current scenario and their potential future applications.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. EEE-II Sem	**L**	**T/P/ D**	**C**
	-	**- / 3 /-**	**1.5**

(R18A0282) ELECTRICAL MACHINES LAB – I

COURSE OBJECTIVES:

- To expose the students to the operation of DC Generator to expose the students to the operation of DC Motor.
- To examine the self excitation in DC generators.

The following experiments are required to be conducted compulsory experiments:

1. Load test on DC shunt generator. Determination of characteristics.
2. Load test on DC series generator. Determination of characteristics.
3. Load test on DC compound generator. Determination of characteristics.
4. Determination of critical resistance and critical speed of D.C. shunt generator
5. Hopkinson's test on DC shunt machines. Predetermination of efficiency.
6. Fields test on DC series machines. Determination of efficiency.
7. Speed control of DC shunt motor
8. Brake test on DC compound motor. Determination of performance curves.
9. Retardation test on DC shunt motor. Determination of losses at rated speed.
10. Separation of losses in DC shunt motor

COURSE OUTCOMES:

After successfully studying this course, students will:

- Be able to systematically obtain the equations that characterize the performance of
- An electric circuit as well as solving both single phase and DC Machines.
- Acknowledge the principles of operation and the main features of electric machines and their applications.
- Acquire skills in using electrical measuring devices.

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II Year B.Tech EEE-II Sem	**L**	**T/P/D**	**C**
	-	**-/-3/-**	**1.5**

(R18A0284) ELECTRICAL CIRCUITS AND SIMULATION LAB

COURSE OBJECTIVES:

- To design electrical systems.
- To analyze a given network by applying various Network Theorems.
- To measure three phase Active and Reactive power.
- To understand the locus diagrams

PART A

1) Millmann's Theorem
2) Locus Diagrams of RL and RC SeriesCircuits
3) Series and ParallelResonance
4) Z and Y Parameters
5) Transmission(ABCD) and Hybrid parameters
6) Measurement of Active Power for Star and Delta connected balanced loads
7) Measurement of Reactive Power for Star and Delta connected balanced loads

PART-B: PSPICE SIMULATION

1) Simulation of DC Circuits
2) DC Transient response
3) Mesh Analysis
4) Nodal Analysis

Note: Any 6 Experiments from PART-A, PART-B Is Mandatory

COURSE OUTCOMES: After successfully studying this course, students will:

- Design electrical systems.
- Analyze a given network by applying various Network Theorems.
- Measure three phase Active and Reactive power.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III B.Tech EEE I Sem	**L**	**T / P /D**	**C**
	3	**1 / - / -**	**4**

(R18A0208) POWER SYSTEMS - II

COURSE OBJECTIVES:

- To design the insulators for overhead lines
- Understand the construction and grading of cables in power transmission.
- To examine A.C. and D.C distribution systems.
- To examine the traveling wave performance and sag of transmission lines.

UNIT-I

OVERHEAD LINE INSULATORS, SAG AND TENSION CALCULATIONS: Types of Insulators, String efficiency and Methods for improvement, Numerical Problems - voltage distribution, calculation of string efficiency, Capacitance grading and Static Shielding 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-II

UNDERGROUND CABLES: Types of Cables, Construction, Types of Insulating materials, Calculations of Insulation resistance and stress in insulation, Numerical Problems. Capacitance of Single and 3-Core belted cables, Numerical Problems. Grading of Cables - Capacitance grading, Potential grading Numerical Problems, Description of Inter-sheath grading - HV cables.

UNIT-III

D.C. DISTRIBUTION SYSTEMS: Classification of Distribution Systems – Comparison of DC vs. AC and Underground vs.Overhead Distribution Systems - Requirements and Design features of Distribution Systems. Voltage Drop Calculations (Numerical Problems) in D.C Distributors for the following cases: Radial D.C Distributor fed one end and at the both the ends (equal / unequal Voltages) and Ring Main Distributor.

UNIT– IV

A.C. DISTRIBUTIONSYSTEMS: Voltage Drop Calculations (Numerical Problems) in A.C. distributors for the following cases: Power Factors referred to receiving end voltage and with respect to respective load voltages. Industrial and commercial distribution systems – Energy losses in distribution system – system ground for safety and protection.

UNIT-V

SUBSTATIONS & SYSTEM TRANSIENTS: Classification of substations – Air insulated substations – Indoor & Outdoor substations: Substations layout showing the location of all the substation equipment. Bus bar arrangements in the Sub-Stations: Simple arrangements like single busbar, sectionalized single busbar, main and transfer busbar system with relevant diagrams.

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. **(QUALITATIVE TREATMENT ONLY).**

TEXT BOOKS:

1. A Text Book on Power System Engineering by M.L. Soni, P.V. Gupta, U.S. Bhatnagar,
2. Electrical power systems - by C.L Wadhwa, New Age International (P) Limited, Publishers, 1998.
3. "C. L. Wadhwa", "Generation and utilization of Electrical Energy", New ageInternational (P)Limited,Publishers1997.

REFERENCE BOOKS:

1. Power system Analysis-by John J Grainger William D Stevenson, TMC Companies, 4th edition.
2. Power System Analysis and Design by B.R. Gupta, Wheeler Publishing
3. Power System Analysis by Hadi Sadat – TMH Edition.

COURSE OUTCOMES:

- Understand A.C. and D.C. distribution systems.
- Able to analyze the performance of distribution lines
- Able to analyze the performance of Sag and Tension Calculations
- Can understand transient's phenomenon of transmission lines.
- Able to understand overhead line insulators and underground cables.
- Able to distinguish between air and gas insulated substations.

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III B.Tech EEE I Sem

L	T/P/D	C
3	- / - / -	3

(R18A0204) ELECTRICAL MACHINES – III

COURSE OBJECTIVES:

- To understand the detailed analysis of Synchronous generators and motorswhich are the prime source of electrical power generation and its utilities.
- To get knowledge on different types of single phase motors and stepper motors which are having significant applications in house hold appliances, industrial applications and control systems.

UNIT - I:

SYNCHRONOUS MACHINE & CHARACTERISTICS: 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. Armature reaction - leakage reactance – synchronous reactance and impedance – experimental determination - phasor diagram – load characteristics.

UNIT - II:

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

UNIT - III:

PARALLEL OPERATION OF SYNCHRONOUS GENERATOR: Synchronizing alternators with infinite bus bars – synchronizing power torque – parallel operation and load sharing - Effect of change of excitation and mechanical power input.

UNIT - IV:

SYNCHRONOUS MOTORS: Theory of operation – phasor diagram – Variation of current and power factor with excitation – synchronous condenser – Mathematical analysis for power developed. Hunting and its suppression – Methods of starting – synchronous induction motor.

UNIT - V:

SINGLE PHASE MOTORS & SPECIAL MACHINES: Single phase Motors: Single phase induction motor – Constructional features-Double revolving field theory Equivalent circuit - split-phase motors - Capacitor start Capacitor run motors. Principles of A.C. Series motor-Universal motor, Stepper motor, shaded pole motor **(QUALITATIVE TREATMENT ONLY).**

TEXT BOOKS:

1. Electrical Machines – by P.S. Bimbra, Khanna Publishers.
2. Electrical Machines(Ac & Dc machines), by J B GUPTA, S K kataria and sons
3. Electric Machines, I. J. Nagrath & D. P. Kothari, Tata Mc Graw Hill Publishers.

REFERENCE BOOKS:

1. Electro mechanics - III (Synchronous and single phase machines), S. Kamakashiah, Right Publishers.
2. Performance and Design of AC Machines, MG. Say, BPB Publishers.
3. Theory of Alternating Current Machinery, Langsdorf, Tata McGraw-Hill Companies.
4. Electric machinery, A.E. Fitzerald, C. Kingsley and S. Umans, Mc Graw Hill Companies.

COURSE OUTCOMES:

After this course the student gets a thorough knowledge on:

- Construction, operation, characteristics, regulation, parallel-operation,starting & speed control methods of synchronous machines.
- Construction, operation and characteristics of single-phase motors & special machines.
- Ability to apply the above concepts to real-world electrical problems and applications.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III B.Tech EEE I Sem **L T/P/D C**
3 - / - / - 3

(R18A0210) POWER ELECTRONICS

COURSE OBJECTIVES:

- To get an understanding of semiconductor devices and systems which have a large application in the power generation, transmission, distribution and utilization.
- To get an in depth understanding of the basic concepts of different types of power semiconductor devices and their applications in converters, inverters, choppers, cycloconverter, dual converters, etc.

UNIT - I

POWER SEMI CONDUCTOR DEVICES & COMMUTATION CIRCUITS: Thyristors – Silicon Controlled Rectifiers (SCR's) - Two transistor analogy - Static and Dynamic characteristics - Turn on and turn off methods- UJT firing circuit - Series and parallel connections of SCR's – Snubber circuit details – Line Commutation and Forced Commutation circuits – Power MOSFET, Power IGBT, their characteristics and other form of thyristors.

UNIT - II

AC - DC CONVERTERS (1-PHASE & 3-PHASE CONTROLLED RECTIFIERS): Phase control technique – Single phase Line commutated converters –Bridge connections – Half controlled converters with R, RL and RLE loads – Derivation of average load voltage and current – Numerical problems. Semi and Fully controlled converters, Bridge connections with R, RL loads – Derivation of average load voltage and current. Three phase converters – Three pulse and six pulse converters – 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.

UNIT - III

DC - DC CONVERTERS (CHOPPERS):

Choppers – Time ratio control and Current limit control strategies – Step down choppers Derivation of load voltage and currents with R, RL loads- Step up Chopper and other class of chopper – load voltage expression, Problems.

UNIT - IV

AC - AC CONVERTERS (AC VOLTAGE CONTROLLERS) & FREQUENCY CHANGERS (CYCLO-CONVERTERS): AC voltage controllers – Single phase two SCR's in anti-parallel – With R and RL loads – modes of operation – Derivation of RMS load voltage, current and power factor wave forms -Numerical problems - Cyclo converters – Types- R and RL loads (Principle of operation only) – Bridge configuration of single phase cyclo converter (Principle of operation only) – Waveforms.

UNIT - V

DC - AC CONVERTERS (INVERTERS): Inverters – Single phase inverter – Basic series inverter - operation and waveforms - Three phase inverters (120, 180 degrees conduction modes of operation) - Voltage control techniques for inverters, Pulse width modulation techniques - Numerical problems.

TEXT BOOKS:

1. Power Electronics, Dr. P. S. Bimbhra, Khanna Publishers
2. Power Electronics, M. D. Singh & K. B. Kanchandhani, Tata Mc Graw - Hill Publishing Company.

REFERENCE BOOKS:

1. Power Electronics; Circuits, Devices and Applications, M. H. Rashid, Prentice Hall of India.
2. Power Electronics, Vedam Subramanyam, New Age International (P) Limited, Publishers.
3. Elements of Power Electronics, Philip T. Krein, Oxford University Press.
4. Power Electronics, P. C. Sen, Tata Mc Graw-Hill Publishing.

COURSE OUTCOMES:

At the end of the course the students get:

- A thorough knowledge on construction operation V-I characteristics commutation firing and protection of various power semiconductor devices, thyristors nature of the R, RL and RLE loads for different power inputs.
- AC-to-DC power conversion through 1-phase & 3-phase controlled rectifiers, DC-to-DC power conversion through step-up and step-down choppers.
- Different types of PWM (pulse-width modulation) techniques, steady-state and transient state analysis of all the power converters, which can be to applied to concepts of real-world electrical and electronics problems & applications.

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III Year B.Tech EEE-I Sem	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(R18A0409) LINEAR & DIGITAL IC

COURSE OBJECTIVES:

The main objectives of the course are:

- To introduce the basic building blocks of linear integrated circuits.
- To teach the linear and non-linear applications of operational amplifiers.
- To introduce the theory and applications of analog multipliers and PLL.
- To teach the theory of ADC and DAC.
- To introduce the concepts of waveform generation and introduce some special function ICs.

UNIT - I:

OPERATIONAL AMPLIFIER: Ideal and Practical Op-Amp, Op-Amp Characteristics, DC and AC Characteristics, Features of 741 Op-Amp, Modes of Operation - Inverting, Non-Inverting, Differential, Instrumentation Amplifier, AC Amplifier, Differentiators and Integrators, Comparators, Schmitt Trigger, Introduction to Voltage Regulators, Features of 723 Regulator, Three Terminal Voltage Regulators.

UNIT - II:

OP-AMP, IC-555 & IC 565 APPLICATIONS: Introduction to Active Filters, Characteristics of Band pass, Band reject and All Pass Filters, Analysis of 1st order LPF & HPF Butterworth Filters, waveform Generators - Triangular, Sawtooth, Square wave, IC555 Timer - Functional Diagram, Monostable and Astable Operations, Applications, IC565 PLL - Block Schematic, Description of Individual Blocks, Applications.

UNIT - III:

DATA CONVERTERS: Introduction, Basic DAC techniques, Different types of DACs-Weighted resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Different Types of ADCs - Parallel Comparator Type ADC, Counter Type ADC, Successive Approxiamtion ADC and Dual Slope ADC, DAC and ADC Specifications.

UNIT - IV:

DIGITAL INTEGRATED CIRCUITS: Classification of Integrated Circuits, Comparison of Various Logic Families, CMOS Transmission Gate, IC interfacing. TTL Driving CMOS & CMOS Driving TTL, Combinational Logic ICs - Specifications and Applications of TTL-74XX & CMOS 40XX Series ICs - Code Converters, Decoders, Demultiplexers, LED & LCD Decoders with Drivers, Encoders, Priority Encoders, Multiplexers, Demultiplexers, Priority Generators/Checkers, Parallel Binary Adder/ Subtractor, Magnitude Comparators.

UNIT - V:

SEQUENTIAL LOGIC IC'S AND MEMORIES: Familiarity with commonly available 74XX & CMOS 40XX Series ICs - All Types of Flip-flops, Synchronous Counters, Decade Counters, Shift Registers. Memories - ROM Architecture, Types of ROMS & Applications, RAM Architecture, Static & Dynamic RAMs.

TEXT BOOKS:

1. Communication Systems - Simon Haykin, 2 Ed, Wiley Publications.
2. Communication Systems – B.P. Lathi, BS Publication, 2004.

REFERENCES BOOKS:

1. Electronic Communications - Dennis Roddy and John Coolean, 4th Edition, PEA, 2004.
2. Electrnic Communication Systems - Modulation and Transmission - Robert J. Schoenbeck, 2nd Edition, PHI.
3. Analog and Digital Communication - K. Sam Shanmugam, Wiley, 2005.
4. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004.
5. Principles of Communication Systems - H Taub & D. Schilling, Gautam Sahe, TMH, 2007, 3rd Edition

COURSE OUTCOMES:

Upon completion of the subject, students will be able to:

- Conceptually understand the baseband signal & system.
- Identify various elements, processes, and parameters in telecommunications systems, and describe their functions, effects, and interrelationship.
- Design procedure of AM Transmission & Reception, analyze, measure, and evaluate the performance of a telecommunication system against given criteria.
- Understand basic knowledge of FM Transmission & Reception.
- Understand various types of SSB Transmission & reception.

PROFESSIONAL ELECTIVE - I

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(PROFESSIONAL ELECTIVE – I)
(R18A0463) SYSTEMS AND SIGNAL PROCESSING

COURSE OBJECTIVES:

The main objectives of the course are:

- To understand the basic concepts of basic elementary signals and Fourier Series representation.
- To Master the representation of signals in the frequency domain using Fourier transforms and Discrete Fourier transform
- To learn the Mathematical and computational skills needed to understand the principal of Linear System and digital signal processing fundamentals.
- To understand the implementation of the DFT in terms of the FFT.
- To learn the Realization of Digital Filters

UNIT I:

INTRODUCTION TO SIGNALS: Elementary Signals- Continuous Time (CT) signals, Discrete Time (DT) signals, Classification of Signals, Basic Operations on signals.

FOURIER SERIES: Representation of Fourier series: Exponential Fourier Series, Discrete Fourier Series.

UNIT II:

FOURIER TRANSFORMS: Fourier transform of arbitrary signal, Fourier transform of standard signals, Properties of Fourier Transform.

DISCRETE FOURIER TRANSFORMS: Properties of DFT. Linear Convolution of Sequences using DFT. Computation of DFT: Over-lap Add Method, Over-lap Save Method.

UNIT III:

FAST FOURIER TRANSFORMS: Fast Fourier Transforms (FFT) - Radix-2 Decimation-in-Time and Decimation-in-Frequency FFT Algorithms, Inverse FFT.

UNIT IV:

INTRODUCTION TO LINEAR SYSTEMS: Introduction to Systems, Classification of Systems, Impulse response, Transfer function of a LTI system.

INTRODUCTION TO DIGITAL SIGNAL PROCESSING: Introduction to Digital Signal Processing, Linear Shift Invariant Systems, Stability, and Causality of Discrete time systems

UNIT V:

Z–TRANSFORMS: Concept of Z- Transform of a discrete sequence. Region of convergence in Z-Transform, Inverse Z- Transform.

REALIZATION OF DIGITAL FILTERS: Solution of Difference Equations Using Z-Transform, Realization of Digital Filters – Direct and Canonic form.

TEXT BOOKS:

1. Signals, Systems & Communications - B.P. Lathi, BS Publications, 2003.
2. Signals and Systems – A. Anand Kumar, PHI Publications, 3rd edition.
3. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education / PHI, 2007.
4. Digital Signal ProcessingA. Anand Kumar, PHI Publications.

REFERENCE BOOKS:

1. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2nd Edition.
2. Fundamentals of Signals and Systems Michel J. Robert, MGH International Edition, 2008.
3. Digital Signal Processing – S.Salivahanan, A.Vallavaraj and C.Gnanapriya, TMH, 2009.
4. Discrete Time Signal Processing – A. V. Oppenheim and R.W. Schaffer, PHI, 2009.

COURSE OUTCOMES:

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

- Understand the basic elementary signals.
- Representsignals in the frequency domain using Fourier Series, Discrete Fourier series, Fourier transform and Discrete Fourier transform techniques.
- Understand the principle of Linear System and digital signal processing fundamentals.
- Implement DFT of any signalusing FFT algorithm.
- Realize Digital Filters

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(PROFESSIONAL ELECTIVE – I)

(R18A0211) HIGH VOLTAGE ENGINEERING

COURSE OBJECTIVES:

To understand:

- The detailed analysis of Breakdown in gaseous, liquids and solid dielectrics.
- Information about generation and measurement of High voltage and current.
- High voltage testing methods.

UNIT – I

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

UNIT – II

BREAK DOWN IN GASEOUS, LIQUID DIELECTRICS AND SOLID DIELECTRICS: Gases as insulating media, collision process, Ionization process, Townsend's criteria of breakdown in gases, Paschen's law. Liquid as Insulator, pure and commercial liquids, breakdown in pure and commercial liquids.Intrinsic breakdown, electromechanical breakdown, thermal breakdown, breakdown of solid dielectrics in practice, Breakdown in composite dielectrics, solid dielectrics used in practice.

UNIT – III

GENERATION OF HIGH VOLTAGES AND CURRENTS: Generation of High Direct Current Voltages, Generation of High alternating voltages, Generation of Impulse Voltages, Generation of Impulse currents, Tripping and control of impulse generators.

MEASUREMENT OF HIGH VOLTAGES AND CURRENTS: Measurement of High Direct Current voltages, Measurement of High Voltages alternating and impulse, Measurement of High Currents-direct, alternating and Impulse, Oscilloscope for impulse voltage and current measurements.

UNIT – IV

OVER VOLTAGE PHENOMENON AND INSULATION CO-ORDINATION: Natural causes for over voltages – Lightning phenomenon, Overvoltage due to switching surges, system faults and other abnormal conditions, Principles of Insulation Coordination on High voltage and Extra High Voltage power systems.

UNIT – V

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

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

TEXT BOOKS:

1. M. S. Naidu, V. Kamaraju (2009), High Voltage Engineering, 4th edition, Tata McGraw Hill Publications, New Delhi.
2. E. Kuffel, W. S. Zaengl, J. Kuffel (2000), High Voltage Engineering: Fundamentals, 2nd edition, Elsevier Publishers, New York, USA.

REFERENCE BOOKS:

1. C. L. Wadhwa (2007), High Voltage Engineering, New Age Internationals (P) Limited, New Delhi.
2. Ravindra Arora Wolfgang Mosch (2011), High Voltage Insulation Engineering, 1st edition, New Age International (P) Ltd., New Delhi.

COURSE OUTCOMES:

After completing this course the student must demonstrate the knowledge and ability to:

- Explain the techniques for high voltage generation
- Measure high voltage in power systems and describe the electrostatic fields and its control, design insulators for high voltage applications,
- Capable to perform non-destructive insulation test techniques
- Describe the over-voltages, testing procedures and insulation coordination, learn how to design and do testing of external insulation

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(PROFESSIONAL ELECTIVE – I)

(R18A0212) DIGITAL CONTROL SYSTEMS

COURSE OBJECTIVES:

To get

- Knowledge about principles and techniques of A/D and D/A conversions and basics of Z-transform
- Knowledge in stability analysis of digital control systems
- Knowledge about the design of digital control systems for different engineering model

UNIT – I

SAMPLING AND RECONSTRUCTION:

Introduction, Examples of Data control systems – Digital to Analog conversion and Analog to Digital conversion, sample and hold operations.

Z – TRANSFORMS:

Introduction, Linear difference equations, pulse response, Z – transforms, Theorems of Z – Transforms, the inverse Z – transforms, Modified Z- Transforms-Plane analysis of discrete- time control system, Z-Transform method for solving difference equations; Pulse transforms function, block diagram analysis of sampled – data systems, mapping between S-plane andZ-plane

UNIT –II

STATE SPACE ANALYSIS:

State Space Representation of discrete time systems, Pulse Transfer Function Matrix solving discrete time state space equations, State transition matrix and it‘s Properties, Methods for Computation of State Transition Matrix, Discretization of continuous time state – space equations.

CONTROLLABILITY AND OBSERVABILITY:

Concepts of Controllability and Observability, Tests for controllability and observability. Duality between Controllability and Observability, Controllability and Observability conditions for Pulse Transfer Function.

UNIT – III

STABILITY ANALYSIS:

Mapping between the S-Plane and the Z-Plane – Primary strips and Complementary Strips – Constant frequency loci, Constant damping ratio loci, Stability Analysis of closed loop systems in the Z-Plane. Jury stability test – Stability Analysis by use of the Bilinear Transformation and Routh Stability criterion.

UNIT – IV:

DESIGN OF DISCRETE TIME CONTROL SYSTEM BY CONVENTIONAL METHODS:

Transient and steady – State response Analysis – Design based on the frequency response method – Bilinear Transformation and Design procedure in the w-plane, Lead, Lag, Lead-Lag and Lag- Lead compensators and digital PIDcontrollers.

UNIT – V

STATE FEEDBACK CONTROLLERS AND OBSERVERS:

Design of state feedback controller through pole placement – Necessary and sufficient conditions, Ackerman's formula. State Observers – Full order and Reduced order observers.

TEXT BOOKS:

1. Discrete-Time Control systems - K. Ogata, Pearson Education/PHI, 2nd Edition.
2. Digital Control and State Variable Methods by M.Gopal,TMH.
3. Digital Control System Analysis and Design, 3rd Edition by Charles L.Phillips, H. Troy Nagle.

REFERENCE BOOKS:

1. DigitalControlSystems, Kuo, OxfordUniversityPress, 2ndEdition, 2003.
2. Digital Control Engineering, M.Gopal New age internationalpublishers.
3. Advanced Control Theory by NAGOOR KANI, 2nd Edition, and RBAPublications.
4. Digital Control Systems, Design, Identification and Implementation by Landau, Iona Dore, ZitoGianluca, Springer, 1stedition.
5. Digital control systems by R.Isermann, Springer, 1stedition.

COURSE OUTCOMES:

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

- Learn the basics and digital control system for the real timeanalysis
- Design of controlsystems.
- Learn comprehensive knowledge of concepts of stabilityanalysis
- Understand the design of discrete timesystems
- Understand the concepts of optimal control for discretedomain.

OPEN ELECTIVE II

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OPEN ELECTIVE III

(R18A1253) MANAGEMENT INFORMATION SYSTEMS

COURSE OBJECTIVES:

- To understand the competitive advantage of using information systems in the organization for the needful assistance in decision making and management.
- To learn how to plan for information systems &implementation
- To study about security aspects of information systems

UNIT-I

INTRODUCTION : MIS importance, definition, nature and scope of MIS, Structure and Classification of MIS, Information and Systems Concept, Types of Information, Information systems for competitive advantage. Case Study: MIS at any business establishment.

UNIT-II

BUSINESS APPLICATIONS OF INFORMATION SYSTEMS: E-Commerce, ERP Systems, DSS, Business Intelligence and Knowledge Management System.
Case Study: Knowledge Management Systems at an Enterprise.

UNIT-III

MANAGEMENT OF IS: Information system planning, system acquisition, systems implementation, evaluation & maintenance of IS, IS Security and Control.
Effectiveness of MIS: A Case Study.

UNIT-IV

BUILDING OF INFORMATION SYSTEMS: System Development Stages, System Development Approaches.
Systems Analysis and Design- Requirement Determination, Strategies for Requirement Determination.
Structured Analysis Tools, System Design – Design Objectives, Conceptual Design, Design Methods. Detailed system design.

UNIT-V

INTRODUCTION TO CYBER CRIME : Cyber Crime Defination and orgin of the word,cyber crime and information security, cyber criminals. Classification of cyber criminals-Legal Perspectives-Indian Perspectives-Cyber crimes and indian ITA 2000, Global perspective on cybercrime-Cybercrime era. (Refer: Nina Godbole et al)

TEXT BOOKS:

1) D P Goyal, Management Information Systems–Managerial Perspective, MacMillan, 3rd Edition, 2010.
2) Nina Godbole & Sunit Belapure “Cyber Security” Wiley india 2012.

REFERENCE BOOKS:

1. Jawadekar, MIS Text and Cases, TMH, 2012.
2. Dr Milind M Oka "Cases in Management Information system 'Everest, 2012.
3. A K Gupta, Sharma "Management of Systems" Macmillan, 2012.
4. Sandra Senf "Information Technology Control and Audit" 3e, CRC Press, 2012.
5. Apache OFBiz for Ecommerce and ERP - https://ofbiz.apache.org/
6. Magneto for Ecommerce (B2B Commerce) - https://magento.com/
7. Adempiere – ERP : http://www.adempiere.net/web/guest/welcome
8. Analytica – DSS - http://www.lumina.com
9. OpenRules – Business Rules and Decision Management system - http://openrules.com/

COURSE OUTCOMES:

- Ability to apply Concepts & applications of Management Information Systems.
- Ability to perform Information Systems Planning & Implementations.
- Ability to adapt Cyber crime and information security procedures.

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(OPEN ELECTIVE II)

(R18A0552) INTRODUCTION TO JAVA PROGRAMMING

COURSE OBJECTIVES:

This subject aims to introduce students to the Java programming language. Upon successful completion of this subject, students should be able to:

- Create Java programs that leverage the object-oriented features of the Java language, such as encapsulation, inheritance and polymorphism;
- Use data types, arrays and strings;
- Implement error-handling techniques using exception handling,
- Create and event-driven GUI using AWT components.

UNIT - I

OOP CONCEPTS: Data abstraction, encapsulation, inheritance, Polymorphism, classes and objects, Procedural and object oriented programming paradigms.

JAVA BASICS: History of Java, Java buzzwords, data types, variables, constants, scope and life time of variables, operators, expressions, control statements, type conversion and casting, simple java programs, concepts of classes, objects, arrays, strings, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, BufferedReader class, Scanner class, StringTokenizer class, inner class.

UNIT - II

INHERITANCE: Types of Inheritance, super keyword, and preventing inheritance: final classes and methods.

POLYMORPHISM – Dynamic binding, method overriding, abstract classes and methods.

INTERFACES- Interfaces Vs Abstract classes, defining an interface, implement interfaces, extending interface.

PACKAGES- Defining, creating and accessing a package, importing packages.

UNIT - III

EXCEPTION HANDLING: Concepts of exception handling, benefits of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, checked exceptions and unchecked exceptions, built in exceptions.

MULTI THREADING: Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, inter thread communication.

UNIT - IV

APPLETS: Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

EVENT HANDLING: Events, Handling mouse and keyboard events, Adapter classes.

Files- Streams- Byte streams, Character streams, Text input/output.

UNIT - V

GUI PROGRAMMING WITH JAVA: AWT class hierarchy, component, container, panel, window, frame, graphics.

AWT CONTROLS: Labels, button, text field, check box, and graphics.

LAYOUT MANAGER – Layout manager types: border, grid and flow.

SWING – Introduction, limitations of AWT, Swing vs AWT.

TEXT BOOKS:

1. Java- the complete reference, 7th editon, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, pearson eduction.
3. Core Java an integrated approach, dreamtech publication, Dr. R.Nageswara Rao.

REFERENCE BOOKS:

1.Java for Programmers, P.J.Deitel and H.M.Deitel, PEA (or) Java: How to Program , P.J.Deitel and H.M.Deitel, PHI
2. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.
3.Thinking in Java, Bruce Eckel, PE
4. Programming in Java, S. Malhotra and S. Choudhary, Oxford Universities Press.

COURSE OUTCOMES:

- An understanding of the principles and practice of object oriented programming and design in the construction of robust, maintainable programs which satisfy their requirements;
- A competence to design, write, compile, test and execute straightforward programs using a high level language;
- An appreciation of the principles of object oriented programming;
- An awareness of the need for a professional approach to design and the importance of good documentation to the finished programs.
- Be able to implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.
- Be able to make use of members of classes found in the Java API.
- Demonstrate the ability to employ various types of selection constructs in a Java program. Be able to employ a hierarchy of Java classes to provide a solution to a given set of requirements.
- Able to develop applications using Applet, awt and GUI Programming.

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(OPEN ELECTIVE II)

(R18A01252) SOFTWARE PROJECT MANAGEMENT

COURSE OBJECTIVES:

The Objectives of the course can be characterized as follows:

- Understanding the specific roles within a software organization as related to project and process management
- Understanding the basic infrastructure competences (e.g., process modeling and measurement)
- Understanding the basic steps of project planning, project management, quality assurance, and process management and their relationships

UNIT-I

CONVENTIONAL SOFTWARE MANAGEMENT: The waterfall Model, Conventional Software Management Performance, evolution of Software Economics: software Economics. Pragmatic Software Cost Estimation. Improving Software Economics: Reducing Software Product Size, Improving Software Processes, Improving Team Effectiveness, Improving Automation, Achieving Required Quality, Peer Inspections.

UNIT-II

CONVENTIONAL AND MODERN SOFTWARE MANAGEMENT: Principles of Conventional Software Engineering, Principles of Modern Software Management, Transitioning to an interactive Process, Life Cycle Phases: Engineering and Production Stages Inception, Elaboration, Construction, Transition phases.

UNIT-III

ARTIFACTS OF THE PROCESS: The Artifact Sets. Management Artifacts, Engineering Artifacts, Programmatic Artifacts. Model Based Software Architectures: A Management Perspective and Technical Perspective.

UNIT-IV

FLOWS OF THE PROCESS: Software Process Workflows. Inter Trans Workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic Status Assessments. Interactive Process Planning: Work Breakdown Structures, Planning Guidelines, Cost and Schedule Estimating. Interaction Planning Process, Pragmatic Planning.

UNIT-V

PROJECT ORGANIZATIONS AND RESPONSIBILITIES: Line-of-Business Organizations, Project Organizations, and Evolution of Organizations. Process Automation Building Blocks, the Project Environment. Project Control and Process Instrumentation: Server Care Metrics, Management Indicators, Quality Indicators, Life Cycle Expectations Pragmatic Software Metrics Automation.

TEXT BOOKS:

1. Walker Royce, “Software Project Management”, 1998, PEA.
2. Henry, “Software Project Management”, Pearson.

REFERENCE BOOKS:

1. Richard H.Thayer.” Software Engineering Project Management”, 1997, IEEE Computer Society.
2. Shere K.D.: “Software Engineering and Management”, 1998, PHI.
3. S.A. Kelkar, “Software Project Management: A Concise Study”, PHI.
4. Hughes Cotterell, “Software Project Management”, 2e, TMH. 88 5. Kaeron Conway, “Software Project Management from Concept to D

COURSE OUTCOMES:

At the end of the course, the student shall be able to:

- Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project
- Compare and differentiate organization structures and project structures.
- Implement a project to manage project schedule, expenses and resource with the application of suitable project management tools

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(OPEN ELECTIVE II)

(R18A0353) ENTERPRISE RESOURCE PLANNING

COURSE OBJECTIVES:

- To know the basics of ERP
- To understand the key implementation of ERP
- To know the business modules of ERP
- To evaluate the current and future trends in ERP
-

UNIT 1

INTRODUCTION: Overview and Benefits of ERP, ERP Related Technologies- Business Process Reengineering (BPR), Online Analytical Processing (OLAP), Supply chain Management (SCM). Applications of ERP.

UNIT II

ERP IMPLEMENTATION: Implementation and Product Lifecycle, Implementation Methodology, Planning Evaluation and selection of ERP systems, Organizing the Project Management and Monitoring. Case Study on Manufacturing.

UNIT III

ERP MODULES: Business modules in an ERP Package- Manufacturing, Human Resources, Plant Maintenance, Materials Management, Data Warehousing, Data Mining, Quality Management, Sales and Distribution. Case Study in Banking Sector.

UNIT IV

POST IMPLEMENTATION: Overview of ERP software solution. Maintenance of ERP-Organizational and Industrial impact; Success and Failure factors of ERP Implementation. Case Study of Success Story and Failure of Processing Sector.

UNIT V

EMERGING TRENDS IN ERP: Extended ERP system, ERP add–ons –Customer Relations Management (CRM), Customer satisfaction (CS). Business analytics etc- Future trends in ERP systems-web enabled, Wireless technologies. Case Study in Service Sector.

TEXT BOOKS:

1. Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill, 2008
2. Alexis Leon, “ERP Demystified”, Tata McGraw Hill, New Delhi, 2000
3. Mahadeo Jaiswal and Ganesh Vanapalli, ERP Macmillan India, 2009.

REFERENCE BOOKS:

1. Alexis Leon, Enterprise Resource Planning, second edition, Tata McGraw-Hill, 2008.
2. Vinod Kumar Grag and N.K. Venkitakrishnan, ERP- Concepts and Practice, Prentice Hall of India,2 nd edition, 2006.

3. Joseph A Brady, Ellen F Monk, Bret Wagner, “Concepts in Enterprise Resource Planning”, Thompson Course Technology, USA, 2001.

COURSE OUTCOMES:

- To know the strategic importance of Enterprise Resource Planning
- To Understand and implement ERP in various Sectors.

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(OPEN ELECTIVE - II)

(R15A0354) NANO TECHNOLOGY

COURSE OBJECTIVES:

- To learn about basis of Nano Materials.
- In this course we focus on synthetic aspects for the design of nanostructured materials.
- We describe different approaches including both the bottom-up(includes both chemical and physical methods) and the top-down methods(mainly physical methods) for the synthesis of nanostructured materials.
- The course will then focus on different type of nanostructures with a special emphasis on carbon nanotubes(CNT), metal and metal oxide nanoparticles, core-shell nanostructures and self assembly of these nanostructures.
- The dependence of various properties (dielectric, magnetic and optical) with size will be discussed.

UNIT-I

GENERAL INTRODUCTION: Basics of Quantum Mechanics, Harmonic oscillator, magnetic Phenomena, band .structure in solids, Mossbauer and Spectroscopy, optical phenomena bonding in solids, Anisotropy.

SILICON CARBIDE: Application of Silicon carbide, nano materials preparation, Sintering of SiC, X-ray Diffraction data, electron microscopy sintering of nano-particles,nano particles of Alumina and Zirconia: Nano materials preparation, Characterization, Wear materials and nano composites.

UNIT-II

MECHANICAL PROPERTIES: Strength of nano crystalline SiC, Preparation for strength measurements, Mechanical properties, Magnetic properties.

ELECTRICAL PROPERTIES: Switching glasses with nanoparticles, Electronic conduction with nano-particles.

OPTICAL PROPERTIES: Optical properties, special properties and the coloured glasses.

MAGNETIC PROPERTIES: Soft magnetic Nanocrystalline alloy, Permanent magnetic Nanocrystalline materials, Giant Magnetic Resonance, Electrical Properties, Optical Properties, Thermal Properties, and Mechanical Properties.

UNIT–III

SYNTHESIS ROUTES: Top &Bottom up approaches: Physical Vapor Deposition, Micromulsion, Laser Ablation, Chemical Vapor Deposition, Molecular Beam Epitaxy, Solgel method, Spray Pyrolysis, Template Based synthesis, Lithography.

UNIT–IV

TOOLS TO CHARACTERIZE NANOMATERIALS: X-Ray Diffraction (XRD), Small Angle X-ray scattering (SAXS), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy

(TEM), Atomic Force Microscopy (AFM), Scanning Tunneling Microscope (STM), Field Ion Microscope (FEM), Three-dimensional Atom Probe (3DAP), Nanoindentation

UNIT–V

APPLICATIONS OF NANOMATERIALS: Nano-electronics, Micro- and Nano-electromechanical systems (MEMS/NEMS), Nanosensors, Nanocatalysts, Cosmetic and Consumer Goods, Structure and Engineering, Automotive Industry, Water Treatment and the environment, Nano-medical applications, Textiles, Paints, Energy, Defence and Space Applications.

TEXT BOOKS:

1) Text Book of Nano Science and Nano Technology – B.S. Murthy, P. Shankar, Baldev Raj, B.B. Rath and James Munday, University Press-IIM.
2) Introduction to Nanotechnology – Charles P. Poole, Jr., and Frank J. Owens, Wiley India Edition, 2012.
3) Guozhong Cao, Nanostructures and Nano-materials:Synthesis, Properties and Applications, Imperial College Press 2004.
4)

REFERENCES BOOKS:

1) Nano: The Essentials by T. Pradeep, McGraw- Hill Education.
2) Nanomaterials, Nanotechnologies and Design by Michael F. Ashby, Paulo J. Ferreira and Daniel L. Schodek.
3) Transport in Nano structures- David Ferry, Cambridge University press 2000
4) Nanofabrication towards biomedical application: Techniques, tools, Application and impact – Ed. Challa S.,S. R. Kumar, J. H. Carola.
5) Carbon Nanotubes: Properties and Applications- Michael J. O'Connell.
6) Electron Transport in Mesoscopic systems – S. Dutta, Cambridge University press.
7) Nanomaterials Synthesis, Properties and Applications Edited by A S Edelstein and R C Cammarata, IOP Publishing Ltd 1996.

COURSE OUTCOMES:

- Will familiarize about the science of Nano Technology.
- Will demonstrate the preparation of Nano Technology.
- Will develop knowledge in characteristic Nano Technology & Nano Materials.

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(R18A0283) ELECTRICAL MACHINES LAB – II

COURSE OBJECTIVES:

- To understand the operation of synchronous machines.
- To understand the analysis of power angle curve of a synchronous machine**.**
- To understand the equivalent circuit of a single phase transformer and single phase induction motor.
- To understand the circle diagram of an induction motor by conducting a blocked rotor test.

PART-A

The following experiments are required to be conducted as compulsory experiments

1. Sumpner's test on a pair of single phase transformers
2. No-load & Blocked rotor tests on three phase Induction motor
3. Regulation of a three –phase alternator by synchronous impedance method
4. Regulation of a three –phase alternator by MMF method
5. V and Inverted V curves of a three—phase synchronous motor.
6. Equivalent Circuit of a single phase induction motor
7. Determination of Xd and Xq of a salient pole synchronous machine
8. Load test on three phase Induction Motor

PART-B

In addition to the above experiments, at least any two of the following experiments are required to be conducted from the following list

9. Regulation of three-phase alternator by Z.P.F.
10. Measurement of sequence impedance of a three-phase alternator.
11. Scott Connection of transformer
12. Efficiency of 3 phase alternator.

COURSE OUTCOMES:

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

- Understand the performance of different machines using different testing methods to convert from three phase to two phase and vice versa.
- Compensate the changes in terminal voltages of synchronous generator after estimating the change by different methods.
- Control the active and reactive power flows in synchronous machines Start different machines and control the speed and power factor.

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(R17A0285) CONTROL SYSTEMS AND SIMULATION LAB

COURSE OBJECTIVES:

- To understand the different ways of system representations such as transfer function representation and state space representations and to assess the system dynamic response.
- To assess the system performance using time domain analysis and methods for improving it.
- To assess the system performance using frequency domain analysis and techniques for improving the performance to design various controllers and compensators to improve system performance.

PART-A

The following experiments are required to be conducted compulsory experiments:

1. Time response of Second order system
2. Characteristics of Synchros
3. Programmable logic controller – Study and verification of truth tables of logic gates, Simple Boolean expressions and application of speed control of motor.
4. Effect of feedback on DC servo motor
5. Transfer function of DC motor
6. Transfer function of DC generator
7. Temperature controller using PID
8. Characteristics of AC servo motor

PART-B

In addition to the above eight experiments, at least any two of the experiments from the Following list are required to be conducted

9. Effect of P, PD, PI, PID Controller on a second order systems
10. Lag and lead compensation – Magnitude and phase plot
11. a) Simulation of P, PI, PID Controller.
    b) Linear system analysis (Time domain analysis, Error analysis) using suitable software
12. Stability analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant system using Suitable software
13. State space model for classical transfer function using suitable software -Verification.
14. Design of Lead-Lag compensator for the given system and with specification using Suitable software

COURSE OUTCOMES:

After completion of this lab the student is able to

- Improve the system performance by selecting a suitable controller and/or a compensator for a specific application.

- Apply various time domain and frequency domain techniques to assess the system Performance.
- Apply various control strategies to different applications (example: Power systems, electrical drives etc)
- Test system controllability and observability using state space representation and applications of state space representation to various systems.

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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(MANDATORY COURSE)

(R18A0006)TECHNICAL COMMUNICATION AND SOFT SKILLS

INTRODUCTION:

Technical Communication and Soft skills focuses on enhancing students' communication. A thorough drill in grammar exercises is given. Various technical writing styles and skills are developed. The future placement needs of the students are met by giving them an exposure to group discussions and mock interviews.

The students hone these skills under the guidance of instructor whose constant evaluation helps in the professional development. This course fulfills the need of the aspirants in acquiring and improving the skills required for placements and professional success.

COURSE OBJECTIVES:

- To make the students recognize the role of Technical English in their academic and professional fields.
- To improve language proficiency and develop the required professional skills.
- To equip students with tools to organize, comprehend, draft short and long forms of technical work.

UNIT –I

PERSONAL EVALUATION: Self-Assessment and Self- Awareness - Self-Esteem - Perception and Attitudes - Values and Beliefs - Time Management- Concord

UNIT - II

PROFESSIONAL COMMUNICATION: Extempore - Oral Presentations – Presentation Aids- Email Writing, Business Letter Writing - Memo Writing - Transformation of Sentences

UNIT – III

CAREER PLANNING: Group Discussion, Interviews - Leadership Skills & Team Building - Personal Goal Setting and Career Planning - Complex Problem Solving - Creativity - Role and Responsibilities of an Engineer - Tenses

UNIT – IV

TECHNICAL WRITING: Principles of Effective Writing - Editing Strategies to Achieve Appropriate Technical Style – Technical Report Writing - Voice

UNIT – V

ETHICS AND RESPONSIBILITIES: Personality Development in Social and Office Settings – Netiquettes - Work Culture and Cubicle Etiquettes - Correction of Sentences

REFERENCE BOOKS:

1. David F. Beer and David Mc Murrey, Guide to writing as an Engineer, John Willey. New York, 2004
2. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)
3. Shiv Khera, You Can Win, Macmillan Books, New York, 2003.
4. Raman Sharma, Technical Communications, Oxford Publication, London, 2004.
5. Meenakshi Raman, Prakash Singh, Business communication, Oxford Publication, New Delhi 2012.
6. Dale Jung k, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)
7. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002.
8. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

COURSE OUTCOMES:

- The students will be able to understand information which assists in completion of the assigned job tasks more successfully.
- Students will be able to communicate their ideas by writing projects, reports, instructions, diagrams and many other forms of professional writing.
- Students will also be able to adhere to ethical norms of scientific communication.
- Students will be able to strengthen their individual and collaborative work strategies.

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(R18A0213) ELECTRICAL MEASUREMENTS & INSTRUMENTATION

COURSE OBJECTIVES:

- To introduce the basic principles of all Electrical measuring instruments
- To deal with the measurement of voltage, current, Power factor, power, energy, etc.
- To understand the basic principle of Electronics and digital metering.

UNIT–I

INTRODUCTION TO MEASURING INSTRUMENTS: Classification of Instrument – deflecting, controlling and damping torques – Ammeters and Voltmeters – PMMC, moving iron, Electrostatic, induction type instruments – expression for the deflecting torque and control torque – Errors and compensations, extension of range of instruments.

UNIT–II

MEASURMENT OF POWER & ENERGY: Single phase dynamometer wattmeter – Expression for deflecting and control torques. Measurement of active and reactive power in balanced and unbalanced systems, power factor meters, induction type energy meter. Single & Three phase – driving and braking torques –errors and compensations.

UNIT–III

DC, AC BRIDGES & CRO: Method of measuring low, medium and high resistance – sensitivity of wheat-stone's bridge –Kelvin's double bridge for measuring low resistance.Measurement of inductance-Maxwell's bridge, Hay's bridge, Anderson's bridge – Owens's bridge. Measurement of capacitance and loss angle – Desaunty's Bridge – Wien's bridge – ScheringBridge.Principle of CRO, Time, Frequency and phase angle measurements using CRO.

UNIT – IV

POTENTIOMETERS, INSTRUMENT TRANSFORMER & ELECTRONIC MEASUREMENTS: Principle and operation of D.C. Crompton's potentiometer standardization – Measurement of unknown resistance, current, voltage. A.C. Potentiometers: polar and coordinate type's standardization – application. CT and PT – Ratio and phase angle errors, Electronic Voltmeter, Millimeter, Wattmeter & energy meter.

UNIT–V

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

TEXT BOOKS:

1. A. K. Sawhney", "Electrical & Electronic Measurements", Dhanpat Rai & Co. Publications, 2005.

2. "G. K. Banerjee", "Electrical & Electronic Measurements", PHI Learning Pvt. Ltd., 2nd Edition, 2016
3. "S. C. Bhargava", "Electrical Measuring Instruments and Measurements ", BS Publications, 2012.

REFERENCE BOOKS:

1. "R. K. Rajput", "Electrical & Electronic Measurements & Instrumentation", S. Chand and Company Ltd., 2007.
2. "Buckingham and Price", "Electrical Measurements", Prentice – Hall. 1988.
3. "Reissland, M.U", "Electrical Measurements: Fundamentals, Concepts, Applications", New Age International (P) Limited Publishers, 1st Edition 2010.
4. "E. W. Golding and F. C. Widdis", "Electrical Measurements and measuring Instruments", fifth Edition, Wheeler Publishing, 2015.

COURSE OUTCOMES:

After completion of this course, the students will be able to

- Understand different types of measuring instrument, their construction, operation and characteristics
- Identify the instruments suitable for typical measurements
  Apply the knowledge about transducers and instrument transformer to use them practically and effectively.

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(R18A0415) MICROPROCESSORS AND MICROCONTROLLERS

COURSE OBJECTIVES:

- To understand the basics of microprocessors and microcontrollers architectures and its functionalities.
- To develop an in-depth understanding of the operation of microprocessors and microcontrollers, machine language programming & interfacing techniques.
- To design and develop Microprocessor/ microcontroller based systems for real time applications using low level language like ALP.
- To understand the concepts of ARM processor.

UNIT -I

8086 ARCHITECTURE: Architecture of 8086, Register Organization, Programming Model, Memory addresses, Memory Segmentation, Physical Memory Organization, Signal descriptions of 8086-Common Function Signals, Minimum and Maximum mode signals, Timing diagrams.

UNIT -II

INSTRUCTION SET AND ASSEMBLY LANGUAGE PROGRAMMING OF 8086: Instruction formats, Addressing modes, Instruction Set, Assembler Directives, Procedures, Macros, Simple Programs involving Logical, Branch and Call Instructions, Sorting, Evaluating Arithmetic Expressions, String Manipulations.

UNIT -III

I/O INTERFACE: 8255 PPI, Various Modes of Operation and Interfacing to 8086, D/A and A/D Converter, Stepper motor, Interfacing of DMA controller 8257

INTERFACING WITH ADVANCED DEVICES: Memory Interfacing to 8086, Interrupt Structure of 8086, Vector Interrupt Table, Interrupt Service Routine, architecture of 8259.

COMMUNICATION INTERFACE: Serial Communication Standards, Serial Data Transfer Schemes, 8251 USART Architecture and Interfacing..

UNIT -IV

INTRODUCTION TO MICROCONTROLLERS: Overview of 8051 Microcontroller, Architecture, I/O Ports, Memory Organization, Addressing Modes and Instruction set of 8051, Simple Programs, memory interfacing to 8051

UNIT -V

8051 REAL TIME CONTROL: Programming Timer Interrupts, Programming External Hardware Interrupts, Programming the Serial Communication Interrupts, Programming 8051 Timers and Counters

ARM PROCESSOR: Fundamentals, Registers, Current program status register, Pipeline, Interrupt and the vector table.

TEXT BOOKS:

1. D. V. Hall, Microprocessors and Interfacing, TMGH, 2nd Edition 2006.
2. Kenneth. J. Ayala, The 8051 Microcontroller, 3rd Ed., Cengage Learning.
3. ARM System Developer's Guide: Designing and Optimizing System Software- Andrew N. Sloss, Dominic Symes, Chris Wright, Elsevier Inc., 2007

REFERENCE BOOKS:

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandani, TMH, 2nd Edition 2006.
2. The 8051Microcontrollers, Architecture and Programming and Applications -K.Uma Rao, Andhe Pallavi, Pearson, 2009.
3. Micro Computer System 8086/8088 Family Architecture, Programming and Design - Liu and GA Gibson, PHI, 2nd Ed.
4. Microcontrollers and Application - Ajay. V. Deshmukh, TMGH, 2005.

COURSE OUTCOMES:

After going through this course the student will

1. Learn the internal organization of popular 8086/8051 microprocessors/microcontrollers.
2. Learn hardware and software interaction and integration.
3. Learn the design of microprocessors/microcontrollers-based systems

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(R17A0214) ELECTRICAL DRIVES

COURSE OBJECTIVES:

- To get an understanding of Power Electronics applications in AC and DC drives. Control of DC motor drives with single phase &three phase converters and choppers.
- To learn about AC motor drives using variable frequency converters VSI,CSI etc..

UNIT – I

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

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

UNIT-II

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

UNIT – III

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

UNIT-IV

CONTROL OF INDUCTION MOTOR THROUGH STATOR VOLTAGE AND STATOR 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 Cycloconverters-PWM control – Comparison of VSI and CSI operations – Speed torque characteristics – numerical problems on induction motor drives – Closed loop operation of induction motor drives (Block Diagram Only)

UNIT –V

CONTROL OF SYNCHRONOUS MOTORS AND INDUCTION MOTOR FROM ROTOR SIDE: Static rotor resistance control – Slip power recovery – Static Scherbius drive – Static Kramer Drive – their performance and speed torque characteristics – advantages applications – problems. Separate control & self - control of synchronous motors – Operation of self-controlled synchronous motors by VSI and CSI Cyclo converters. Load commutated CSI fed Synchronous Motor – Operation

– Waveforms – speed torque characteristics – Applications – Advantages and Numerical Problems – Closed Loop control operation of synchronous motor drives (Block Diagram Only), variable frequency control, Cyclo converter, PWM, VSI, CSI

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Power Electronics – MD Singh and K B Khanchandani, Tata – McGraw-Hill Publishing company,1998
2. Modern Power Electronics and AC Drives by B.K.Bose, PHI.
3. Thyristor Control of Electric drives – Vedam Subramanyam Tata McGraw Hill Publilcations.
4. A First course on Electrical Drives – S K Pillai New Age International(P) Ltd. 2nd Editon.

COURSE OUTCOMES:

At the end of the course the student would be able to:

- Identify the choice of the electric drive system based on their applications.
- Explain the operation of single and multi-quadrant electric drives.
- Analyze single phase and three phase rectifiers fed DC motors as well as chopper fed DC motor.
- Explain the speed control methods for AC-AC & DC-AC converters fed to Induction motors and Synchronous motors with closed loop, and open loop operations.

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(R17A0215) POWER SYSTEM ANALYSIS

COURSE OBJECTIVES:

- To understand and develop Y bus and Z bus matrices
- To know the importance of load flow studies and its importance
- To understand and applications of short circuit studies
- To explain rotor angle stability of power systems

UNIT I

POWER SYSTEM NETWORK MATRICES: Bus Incidence Matrix, Y-bus formation by Direct and Singular Transformation Methods, Numerical Problems.

FORMATION OF Z-BUS: Partial network, Algorithm for the Modification of Z Bus Matrix for addition element for the following cases: Addition of element from a new bus to reference, Addition of element from a new bus to an old bus, Addition of element between an old bus to reference and addition of element between two old buses (Derivations and Numerical Problems) - Modification of Z Bus for the changes in network (Numerical Problems).

UNIT II

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

UNIT III

POWER FLOW STUDIES II: Newton Raphson Method: Load Flow Solution with or without PV Busses- Derivation of Jacobian Elements, Algorithm and Flowchart. Decoupled and Fast Decoupled Methods.Comparison of Different Methods – DC load Flow.

UNIT IV

SHORT CIRCUIT ANALYSIS: Per-Unit system of representation**,** Per-unit equivalent reactance network of a three phase power system, Numerical Problems. Symmetrical Fault Analysis: Short Circuit Current and MVA Calculations, Fault levels. Symmetrical Component Theory: Symmetrical Component Transformation, Positive, Negative and Zero sequence components: Voltages, Currents and Impedances. Sequence Networks: Positive, Negative and Zero sequence Networks, Numerical Problems. Unsymmetrical Fault Analysis: LG, LL, LLG faults with and without fault impedance, Numerical Problems.

UNIT V

STABILITY ANALYSIS: Elementary concepts of Steady State, Dynamic and Transient Stabilities. Description of Steady State Stability Power Limit, Transfer Reactance, Synchronizing Power Coefficient, Determination of Steady State Stability and Methods to improve steady state stability.

Derivation of SwingEquation, Determination of Transient Stability by Equal Area Criterion and its applications. Methods to improve transient Stability. **(Qualitative Treatment only)**

TEXT BOOKS:

1. Power system Analysis Operation and control, Abhijit Chakrabarthi, Sunita Haldar, 3rd edition, PHI, 2010.
2. Modern Power system Analysis – by I.J.Nagrath & D.P.Kothari: Tata McGraw-Hill Publishing Company, 2nd edition.
3. Electrical power systems - by C.L Wadhwa, New Age International (P) Limited, Publishers, 1998.

REFERENCE BOOKS:

1. Computer Techniques in Power System Analysis by M.A.Pai, TMH Publications
2. Power System Analysis by Grainger and Stevenson, Tata McGraw Hill.
3. Computer techniques and models in power systems, By K.Uma rao, I.K.International
4. Power System Analysis by Hadi Saadat – TMH Edition.

COURSE OUTCOMES:

After this course, the student will be able to

- Develop the Y bus and Z bus matrices
- Develop load flow programs
- Understand the importance of short circuit studies
- Understand stability and instability power systems

PROFESSIONAL ELECTIVE - II

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III B.Tech EEE II Sem

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(PROFESSIONAL ELECTIVE – II)
(R18A0216) EHV AC & HVDC TRANSMISSION

COURSE OBJECTIVES:

- To understand the concept of extra high voltage AC and high voltage DC transmission.
- To study the behavior of line parameters for extra high voltages.
- To study the effect of corona, electrostatic field, voltage control at extra high voltage.
- To understand the basic concepts of HVDC, HVDC converters, HVDC system control, converter faults and protection.
- To study the effect of harmonics and methods of suppression of harmonics by using filters.

UNIT – I

INTRODUCTION: Necessity of EHV AC transmission – advantages and problems–power handling capacity and line losses- mechanical considerations – resistance of conductors – properties of bundled conductors – bundle spacing and bundle radius- Examples.Line and Ground Reactive Parameters:Line inductance and capacitance – sequence inductances and capacitances – modes of propagation – ground return - Examples.

UNIT-II

CORONA EFFECTS: Power loss and audible noise (AN) – corona loss formulae – charge voltage diagram – generation, characteristics - limits and measurements of AN – relation between single phase and three phase AN levels – Examples. Radio interference (RI)Electrostatic Field:Calculation of electrostatic field of EHV AC lines – effect on humans, animals and plants – electrostatic induction in unenergised circuit of double-circuit line – electromagnetic interference-Examples.

UNIT – III

VOLTAGE CONTROL: Power circle diagram and its use – voltage control using synchronous condensers – cascade connection of shunt and series compensation – sub synchronous resonance in series capacitor – compensated lines – static VAR compensating system.

UNIT – IV

HVDC BASIC CONCEPTS: Necessity of HVDC Transmission**.** Economics & Terminal equipment of HVDC transmission systems: Types of HVDC Links -Apparatus required for HVDC Systems - Comparison of EHV AC &HVDC Transmission, Application of HVDC Transmission System.

HVDC CONVERTERS & SYSTEM CONTROL: Choice of Converter configuration - analysis of Graetz - characteristics of six Pulse converters and twelve pulse converters - Cases of two three phase converters in star –star mode and their performance. 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.

UNIT –V

CONVERTER FAULT & PROTECTION: Converter faults, protection against over current and over voltage inconverter station. Surge arresters- smoothing reactors-DC breakers-Audible noise-space charge field- corona effects on DC lines-Radio interference.Harmonics**:**Generation of Harmonics – Characteristics harmonics, calculation of AC Harmonics, Non- Characteristic harmonics, adverse effects of harmonics – Calculation of voltage & Current harmonics – Effect of Pulse number on harmonics.Filters**:** Types of AC filters, Design of Single tuned filters –Design of High pass filters.

TEXT BOOKS:

1. EHVAC Transmission Engineering by R. D. Begamudre, New Age International (p) Ltd.
2. K. R. Padiyar (2005), HVDC Power Transmission Systems: Technology and system Interactions, 1st edition, New Age International (P) Ltd, New Delhi.
3. EHV AC and HVDC Transmission and Distribution Engineering by S. Rao, Khanna *Publishers*, 3rd edition.

REFERENCE BOOKS:

1. E. W. Kimbark (2006), Direct Current Transmission, 2nd edition, John Wiley & Sons, New Delhi.
2. K. R. Padiyar (2009), FACTS Controllers in power Transmission and Distribution, 1st edition, New Age International (P), Ltd, New Delhi.
3. N. G. Hingorani, L. Guygi (2001), Understanding FACTS, 1st edition, IEEE Press, USA.

COURSE OUTCOMES:

After going through this course, the student gets knowledge on

- The Concept of extra high voltage AC and high voltage DC transmission.
- The behavior of the line parameters for extra high voltages.
- The effect of corona, electrostatic field, voltage control for extra high voltages.
- The basic concepts of HVDC, HVDC converters, HVDC system control, converter faults and protection.
- The effect of harmonics and suppression of harmonics by using filters.

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III B.Tech EEE II Sem

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(PROFESSIONAL ELECTIVE – II)

(R18A0217) ELECTRICAL ESTIMATION AND COSTING

COURSE OBJECTIVES:

- Emphasize the estimating and costing aspects of all electrical equipment, installation and designs to analyze the cost viability.
- Exposure to design and estimation of wiring, design of overhead and underground distribution lines, substations and illuminations design.
- These techniques should help the students to successfully estimate costing of the products/projects that are part of our everyday usage.

UNIT-I:

DESIGN CONSIDERATIONS OF ELECTRICAL INSTALLATIONS: Electric Supply System, Three phase four wiredistribution system, Protection of Electric Installation against over load, short circuit and Earth fault, Earthing, General requirements of Electrical Installations, testing of installations, Indian Electricity rules, Neutral and Earth wire, Types of loads, Systems of wiring, Service connections, Service Mains, Sub-Circuits, Location of Outlets, Location of Control Switches, Location of Main Board and Distribution Board, guide lines for Installation of Fittings, Load Assessment, Permissible voltage drops and sizes of wires, estimating and costing of Electric installations.

UNIT-II:

ELECTRICAL INSTALLATION OF BUILDINGS AND SMALL INDUSTRIES: Electrical installations for residential buildings – estimating and costing of material, Electrical installations for commercial buildings, Electrical installations for small industries.

UNIT-III:

OVERHEAD AND UNDERGROUND TRANSMISSION AND DISTRIBUTION LINES: Introduction, Supports forTransmission lines, Distribution lines – Materials used, Underground cables, Mechanical Design of overhead lines, Design of underground cables.

UNIT-IV:

SUBSTATIONS: Introduction, Types of substations, Outdoor substation – Pole mounted type, Indoorsubstation, Floor mounted type.

UNIT-V:

DESIGN OF ILLUMINATION SCHEMES: Introduction, Terminology in Illumination, laws of illumination, varioustypes of light sources, Practical lighting schemes.

TEXT BOOKS:

1. Electrical Design Estimating and Costing, K.B.Raina, S.K.Bhattacharya, New Age International Publisher.
2. Design of Electrical Installations, Dr. V.K. Jain, Dr. Amitabh Bajaj, University Science Press.
3. Electricity pricing Engineering Principles and Methodologies, Lawrence J. Vogt, P.E., CRC Press.

REFERENCE BOOKS:

1. Guide for Electrical Layout in residential buildings, Indian Standard Institution, IS:4648-1968
2. Electrical Installation buildings Indian Standard Institution, IS: 2032.

COURSE OUTCOMES:

After going through this course the student gets knowledge on:

- The estimating and costing aspectsof all electrical equipment, installation and designs to analyze the cost viability.
- Exposure to design and estimation of wiring, design of overhead and underground distribution lines, substations and illuminations design.
- These techniques should help the students to successfully estimate costing of the products/projects that are part of our everyday usage and apply the above concepts to real- world electrical and electronics problems and applications.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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(PROFESSIONAL ELECTIVE – II)

(R17A0218) OPTIMIZATION TECHNIQUES

COURSE OBJECTIVES:

This course introduces various optimization techniques:

- To understand classical, linear programming, transportation problem, simplex algorithm, dynamic programming,
- Constrained and unconstrained optimization techniques for solving and optimizing an electrical and electronic engineering circuits design problems in real world situations.

UNIT-I

INTRODUCTION & CLASSICAL OPTIMIZATION TECHNIQUES: Statement of an Optimization problem — design vector — design constraints — constraint surface — objective function — objective function surfaces — classification of Optimization problems Single variable Optimization — multi variable Optimization without constraints — necessary and sufficient conditions for minimum/maximum multivariable Optimization with equality constraints. Solution by method of Lagrange multipliers — multivariable Optimization with inequality constraints — Kuhn — Tucker conditions.

UNIT — II

LINEAR PROGRAMMING: Standard form of a linear programming problem — geometry of linear programming problems — definitions and theorems — solution of a system of linear simultaneous equations — pivotal reduction of a general system of equations — motivation to the simplex method — simplex algorithm.

UNIT – III

TRANSPORTATION PROBLEM & UNCONSTRAINED OPTIMIZATION: Finding initial basic feasible solution by north — west corner rule, least cost method and Vogel's approximation method testing for optimality of balanced transportation problems, One dimensional minimization methods: Classification, Fibonacci method and Quadratic interpolation method. Univariate method, Powell's method and steepest descent method.

UNIT-IV

CONSTRAINED NONLINEAR PROGRAMMING: Characteristics of a constrained problem, Classification, Basic approach of Penalty FtIn method; Basic approaches of lnteñor and Exterior penalty function methods, Introduction to convex Programming Problem.

UNIT—V

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

TEXT BOOKS

1. Engineering optimization. Theory and practice."S. S.Rao, New Age International (P) Limited.
2. Optimization Methods in Operations Research and systems Analysis, K.V. Mittal and C. Mohan, New Age International (P) Limited.

REFERENCE BOOKS

1. Operations Research, Dr. S.D.Shama. Introductory Operations Research, H.S. Kasene & K.D. Kumar, Springer (India), Pvt .LTc.
2. Operations Research: An Introduction, H.A.Taha, Pearson Pvt. Ltd.
3. Operations Research, Rk, hard Bronson, Govindasami Naadimuthu, Tata Mc Graw — Hill Company Limited.

COURSE OUTCOMES:

After going through this course the student gets a thorough knowledge on:

- Optimization of electrical and electronics engineering problems through classical optimization techniques, linear programming, simplex algorithm, transportation problem, unconstrained optimization.
- Constrained non-linear programming and dynamic programming, with which he/she can able to apply the above conceptual things to real world electrical and electronics problems and applications.

OPEN ELECTIVE III

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. II Sem	**L**	**T/P/D**	**C**
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(OPEN ELECTIVE - III)

(R18A0452) ROBOTICS & AUTOMATION

COURSE OBJECTIVES:

- To study overview of Embedded Systems, Robots, Microprocessors & Microcontrollers.
- To study in detail about Robotics and sensors.
- To study about AVR RISC Microcontroller architecture in detail.
- To study about ARM Processor in detail.
- To study about Artificial Intelligence in Robotics.

UNIT -I

INTRODUCTION TO EMBEDDED SYSTEM DESIGN: Categories of ES, Overview of Embedded System Architecture, Recent Trends in Embedded Systems, Hardware Architecture of Embedded System, Real-time Embedded Systems and Robots, Robots and Robotics, Microprocessors and Microcontrollers, Microcontroller or Embedded Controller.

UNIT - II

ROBOTICS: Classification of Robots, Degree of freedom, Kinematics; Multidisciplinary approach: Motors-DC motors, Stepper Motors, Servo Motors; Power Transmission-Type of Gears, Gear Assembly, CAM follower, Sensors, Open loop and Closed-loop Controls, Artificial Intelligence.

UNIT- III

THE AVR RISC MICROCONTROLLER ARCHITECTURE: Introduction, AVR family architecture, register file, the ALU, memory access and instruction execution, I/O memory ,EEPROM ,I/O ports, timers, UART, Interrupt structure.

UNIT-IV

ARM PROCESSOR: Fundamentals, Registers, current program status register, pipeline concept, Interrupt and the vector table.

UNIT V

AI IN ROBOTICS: Robotic perception, localization, mapping- configuring space, planning uncertain movements, dynamics and control of movement, Ethics and risks of artificial intelligence in robotics.

TEXT BOOKS:

1. Subrata Ghoshal, "Embedded Systems & Robots", Cengage Learning
2. Stuart Russell, Peter Norvig, “Artificial Intelligence: A modern approch”, Pearson Education,
   India2003.
3. ARM System Developer’s Guide: Designing and Optimizing System Software- Andrew N. Sloss, Dominic Symes, Chris Wright, Elsevier Inc., 2007

REFERENCE BOOKS:

1. M.A. Mazidi, J.G. Mazidi, R.D. Mckinlay, "8051 Microcontroller and Embedded Systems", Pearson.
2. Dr. K.V.K. Prasad, "Embedded/Real-Time Systems: Concepts Design & Programming", Dreamtech
3. Microcontrollers and applications, Ajay V Deshmukh , TMGH,2005

COURSE OUTCOMES:

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

- Understand the overview of Embedded Systems, Robots, Microprocessors & Microcontrollers.
- Understand in detail about Robotics and sensors.
- Understand AVR RISC Microcontroller architecture in detail.
- Understand about ARM Processor in detail.
- Understand about Artificial Intelligence in Robotics.

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(OPEN ELECTIVE – III)

(R18A0453) INTERNET OF THINGS & ITS APPLICATIONS

COURSE OBJECTIVES:

- To study IoT Networking Core
- To study IoT related network fundamentals
- To study IoT Architecture.
- To study IoT Application Development procedure
- To study various case studies and IoT applications.
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UNIT - I

THE IOT NETWORKING CORE(TECHNOLOGIES INVOLVED IN IOT DEVELOPMENT): Internet/Web and Networking Basics OSI Model, Data transfer referred with OSI Model, IP Addressing, Point to Point Data transfer, Point to Multi Point Data transfer & Network Topologies, Sub-netting, Network Topologies referred with Web, Introduction to Web Servers, Introduction to Cloud Computing IoT Platform overview Overview of IoT supported Hardware platforms such as: Raspberry pi, ARM Cortex Processors, Arduino and Intel Galileo boards.

UNIT - II

NETWORK FUNDAMENTALS: Overview and working principle of Wired Networking equipment's – Router, Switches, Overview and working principle of Wireless Networking equipment's – Access Points, Hubs etc. Linux Network configuration Concepts: Networking configurations in Linux Accessing Hardware & Device Files interactions.

UNIT - III

IOT ARCHITECTURE: History of IoT, M2M – Machine to Machine, Web of Things, IoT protocols Applications: Remote Monitoring & Sensing, Remote Controlling, Performance Analysis. The Architecture The Layering concepts, IoT Communication Pattern, IoT protocol Architecture, The 6LoWPAN Security aspects in IoT.

UNIT IV:

IoT APPLICATION DEVELOPMENT: Application Protocols MQTT, REST/HTTP, CoAP, MySQL.
Back-end Application Designing Apache for handling HTTP Requests, PHP & MySQL for data processing, MongoDB Object type Database, HTML, CSS & jQuery for UI Designing, JSON lib for data processing, Security & Privacy during development, Application Development for mobile Platforms: Overview of Android / IOS App Development tools.

UNIT IV:

CASE STUDY & IOT APPLICATIONS: IoT applications in home, infrastructures, buildings, security, Industries, Home appliances, other IoT electronic equipments. Use of Big Data and Visualization in IoT, Industry 4.0 concepts. Sensors and sensor Node and interfacing using any Embedded target boards (Raspberry Pi / Intel Galileo/ARM Cortex/ Arduino)

TEXT BOOKS:

1. 6LoWPAN: The Wireless Embedded Internet, Zach Shelby, Carsten Bormann, Wiley
2. Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems, Dr. Ovidiu Vermesan, Dr. Peter Friess, River Publishers
3. Interconnecting Smart Objects with IP: The Next Internet, Jean-Philippe Vasseur, Adam Dunkels, Morgan Kuffmann

REFERENCE BOOKS:

1. The Internet of Things: From RFID to the Next-Generation Pervasive Networked Lu Yan, Yan Zhang, Laurence T. Yang, Huansheng Ning
2. Internet of Things (A Hands-on-Approach) , Vijay Madisetti , Arshdeep Bahga
3. Designing the Internet of Things , Adrian McEwen (Author), Hakim Cassimally
4. Asoke K Talukder and Roopa R Yavagal, "Mobile Computing," Tata McGraw Hill, 2010.
5. Computer Networks; By: Tanenbaum, Andrew S; Pearson Education Pte. Ltd., Delhi, 4th Edition
6. Data and Computer Communications; By: Stallings, William; Pearson Education Pte. Ltd., Delhi, 6th Edition

COURSE OUTCOMES:

At the end of the course, the student will be able to

- Understand IoT Networking Core
- Understand IoT related network fundamentals
- Understand IoT Architecture.
- Understand IoT Application Development procedure
- Understand various case studies and IoT applications.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech EEE - II Sem

L	T/P/D	C
3	1/-/-	4

(OPEN ELECTIVE – III)

(R18A0553) OPERATING SYSTEM CONCEPTS

COURSE OBJECTIVES:

- To learn the fundamentals of Operating Systems.
- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporary OS
- Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
- To know the components and management aspects of concurrency management

UNIT - I

INTRODUCTION: Objectives and functions of OS, Evolution of Operating Systems - Simple Batch, Multi programmed, time shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, OS services, system calls, system programs, virtual machines.

UNIT-II

PROCESS MANAGEMENT: Process concept, Process states, threads.
CPU SCHEDULING: Scheduling algorithms, multiple processors and real time scheduling.
PROCESS SYNCHRONIZATION: Critical section problems, Peterson's Solution, semaphores, monitors.

UNIT-III

MEMORY MANAGEMENT: Basic concept, Logical and Physical addresses, contiguous memory allocation, swapping, paging, segmentation.
VIRTUAL MEMORY – Basics of Virtual Memory, Demand Paging, Page Replacement algorithms, allocation of frames, thrashing.

UNIT-IV

FILE MANAGEMENT: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), Case study: UNIX, Windows.

UNIT-V:

DISK MANAGEMENT: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk attachment, disk management.
DEAD LOCKS: Characterization, Dead lock Prevention, Dead lock Avoidance, Dead lock Detection and Recovery.

TEXT BOOK:

1. Operating Systems Concepts –Avil Silberschatz j, Peter Galvin, GreyGagne

REFERENCE BOOKS:

1. Modern Operating Systems –Andrew S. Tanenbaum, PHI
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India

COURSE OUTCOMES:

At the end of the course the students are able to:

- Create processes and threads.
- Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, and Response Time.
- For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
- Design and implement file management system.
- For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. II Sem	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(OPEN ELECTIVE – III)

(R18A0355) TOTAL QUALITY MANAGEMENT

COURSE OBJECTIVES:

- To facilitate the understanding of Quality Management principles and process.
- To understand Customer focus, Employee focus and their involvement and Supplier Management.

UNIT – I

INTRODUCTION: The concept of TQM, Quality and Business performance, attitude, and involvement of top management, communication, culture and management systems. Management of Process Quality: Definition of quality, Quality Control, a brief history, Product Inspection vs. Process Control, Statistical Quality Control, Control Charts and Acceptance Sampling.

UNIT -II

CUSTOMER FOCUS AND SATISFACTION: internal customer conflict, quality focus, Customer Satisfaction, role of Marketing and Sales, Buyer – Supplier relationships. Bench Marking: Evolution of Bench Marking, meaning of bench marking, benefits of bench marketing, the bench marking procedure, pitfalls of bench marketing.

UNIT- III

ORGANIZING FOR TQM: The systems approach, organizing for quality implementation, making the transition from a traditional to a TQM organization, Quality Circles, seven Tools of TQM: Stratification, check sheet, Scatter diagram, Kepner &Tregoe Methodology.

UNIT- IV

THE COST OF QUALITY: Definition of the Cost of Quality, Quality Costs, Measuring Quality Costs, use of Quality Cost information, Accounting Systems and Quality Management.

UNIT –V

ISO 9000: Universal Standards of Quality: ISO around the world, The ISO9000 ANSI/ASQC Q- 90. Series Standards, benefits of ISO9000 certification, the third party audit, Documentation ISO9000 and services, the cost of certification implementing the system.

TEXT BOOKS:

1. Total Quality Management / Joel E. Ross/Taylor and Franscis Limited
2. Total Quality Management/P. N. Mukherjee/PHI

REFERENCE BOOKS:

1. Beyond TQM / Robert L.Flood
2. Total quality management by Paneer Selvam
3. Statistical Quality Control / E.L. Grant.
4. Total Quality Management:A Practical Approach/H. Lal
5. Quality Management/Kanishka Bedi/Oxford University Press/2011
6. Total Engineering Quality Management/Sunil Sharma/Macmillan

COURSE OUTCOMES:

- The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.
- To give the students an overview of TQM, various Quality aspects and importance of Top Management Commitment in any organization for maintaining product / services quality.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. II Sem	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(OPEN ELECTIVE - III)

(R18A0251) ELECTRICAL SYSTEMS & APPLICATIONS

COURSE OBJECTIVES:

- To introduce the fundamental concepts of electro mechanical energy conversion
- To familiarize the students with the principle of operation, constructional features and operational characteristics of various types of Motors used in the engineering and consumer Industry

UNIT- I

ELECTRICAL SYSTEM COMPONENTS: LT system wiring components, Selection of Cables, Wires, Switches, Distribution Box, Metering System, Tariff structure, Protection Components- Fuse, MCB, MCCB, ELCB, Inverse current characteristics, Symbols, Single Line Diagram (SLD) of a wiring system, Contactor, Isolator,Relays, MPCB, Electric shock and Electrical safety practices.

UNIT- II

RESIDENTIAL AND COMMERCIAL ELECTRICAL SYSTEMS: Types of residential and commercial wiring systems, general rules and guidelines for installation. Load calculation and sizing of wire, rating of main switch, distribution board and protection devices. Earthing system calculations.Requirements of commercial installation- deciding lighting scheme and number of lamps, earthing of commercial installation, selectionand sizing of components.

UNIT- III

ILLUMINATION SYSTEMS: Understanding various terms related to light intensity, Lumens, candle power, lamp efficiency,specific consumption.Various illumination schemes- Incandescent lamps, modern luminaries like CFL, LED andtheir operation, energy saving in illumination systems, design of a lighting scheme for residential and commercial premises, flood lighting.

UNIT-IV:

INDUSTRIAL ELECTRICAL SYSTEMS: UPS System-Types, Principle of operation.Battery banks, sizing theUPS and Battery Banks, Selection of UPS and Battery Banks.

UNIT-V:

SINGLE PHASE AC MOTOR AND SPECIAL MOTORS: Constructional features, Principle of operation, Characteristics, Speed control and Applications of Single phase AC motor, Stepper motor, Brushless DC motor and Universal motor(Qualitative Treatment only).

TEXT BOOKS:

1. S. L. Uppal and G. C. Garg, “Electrical Wiring, Estimating & Costing”, Khannapublishers, 2008.
2. K. B. Raina, “Electrical Design, Estimating & Costing”, New age International, 2007.
3. H. Joshi, “Residential Commercial and Industrial Systems”, McGraw Hill Education, 2008.

REFERENCE BOOKS:

1. N.V. Suryanarayana, “Utilization of Electrical Power including Electric drives and Electric traction”, New Age International (P) Limited Publishers, 1st Edition, 1994.
2. E. Open Shaw Taylor, “Utilization of Electric Energy”, Orient Longman,1st Edition,1937

COURSE OUTCOMES:

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

- Maintain/Troubleshoot various lamps and fittings in use.
- Design Illumination systems for various applications.
- Utilize effectively the electrical systems in industries.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III B.Tech EEE II Sem	**L**	**T/P/D**	**C**
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(R17A0285) POWER ELECTRONICS AND SIMULATION LABORATORY

COURSE OBJECTIVES:

The student will understand:

- The characteristics of power electronic devices with gate firing circuits various forced commutation techniques.
- The operation of single-phase voltage controller, converters and Inverters circuits with R and RL loads. Analyze the TPS7A4901, TPS7A8300 and TPS54160 buck regulators.

The following experiments are required to be conducted compulsory experiments:

1. Study of Characteristics of SCR, MOSFET & amp; IGBT
2. Gate firing circuits for SCR's
3. Single Phase AC Voltage Controller with R and RL Loads
4. Single Phase fully controlled bridge converter with R and RL loads
5. Forced Commutation circuits (Class A, Class B, Class C, Class D & Class E)
6. DC Jones chopper with R and RL Loads
7. Single Phase Parallel, inverter with R and RL loads
8. Single Phase Cycloconverters with R and RL loads
9. Single Phase Half controlled converter with R load
10. Three Phase half controlled bridge converter with R-load
11. Single Phase series inverter with R and RL loads
12. Single Phase Bridge converter with R and RL loads
13. Single Phase dual converter with RL loads
14. Operation of MOSFET based chopper.

Any two simulation experiments with PSPICE/PSIM

1. Single-phase full converter using RLE loads and single-phase AC voltage controller using RLE loads.
2. Resonant pulse commutation circuit and Buck chopper.
3. Single phase Inverter with PWM control.

COURSE OUTCOMES:

After completion of this course, the student is able to

- Understand the operating principles of various power electronic converters.
- Use power electronic simulation packages& hardware to develop the power converters.
- Analyze and choose the appropriate converters for various applications.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV B.Tech EEE ISem **L T/P/D C**

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(R17A0487) MICROPROCESSORS AND MICROCONTROLLERSLAB

COURSE OBJECTIVES:

- To develop and execute variety of assembly language programs of Intel 8086 including arithmetic and logical, sorting, searching, and string manipulationoperations.
- To develop and execute the assembly language programs for interfacing Intel 8086 with peripheraldevices.
- To develop and execute simple programs on 8051 microcontroller.

The Following programs/experiments are to be written for assembler and execute the same with 8086 and 8051 kits.

1. Programs for 16 bit arithmetic operations for 8086 (using Various AddressingModes).
2. Program for sorting an array for8086.
3. Program for searching for a number or character in a string for 8086.
4. Program for string manipulations for8086.
5. Program for digital clock design using8086.
6. Interfacing ADC and DAC to8086.
7. Parallel communication between two microprocessors using8255.
8. Serial communication between two microprocessor kits using8251.
9. Interfacing to 8086 and programming to control steppermotor.
10. Programming using arithmetic, logical and bit manipulation instructions of8051.
11. Program and verify Timer/ Counter in8051.
12. Program and verify Interrupt handling in8051
13. UART Operation in8051.
14. Communication between 8051 kit andPC.
15. Interfacing LCD to8051.
16. Interfacing Matrix/ Keyboard to8051.
17. DataTransferfromPeripheraltoMemorythroughDMAcontroller8237/8257.

Note: - Minimum of 12 experiments to be conduct

COURSE OUTCOMES:

After going through this course the student will be able to

- Apply the concepts in the design of microprocessor/microcontroller based systems in real time applications
- Develop and execute the assembly language programs for interfacing Intel 8086 with peripheraldevices.
- Develop and execute simple programs on 8051 microcontroller.

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B. TECH III YEAR II SEM (ECE, CSE, IT, EEE)

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(MANDATORY COURSE)
(R18A0007) INDIAN CONSTITUTION

INTRODUCTION

The Indian judiciary and particularly the Supreme Court of India has played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it "as one of the strongest court in the world".

This course "Indian Constitution" has been designed to develop understanding of the Indian Constitution among the students.

COURSE OBJECTIVES:

- To enable the students to understand the constitution's origin and its power.
- To enable the students to analyze the political principles.
- To enable the students to be aware of their fundamental rights and duties.

The following course content is prescribed for this course.

UNIT –I (4hrs)

Meaning of constitution law and constitutionalism, Historical perspective of the constitution of India. Salient features and characteristics of the constitution of India

UNIT –II (4hrs)

Scheme of fundamental rights,The scheme of the fundamental duties and its legal status. The Directive Principles of State Policy- its importance and implementation

UNIT –III (4hrs)

Federal structure and distribution of legislative and financial powers between the Union and the States. Parliamentary Form of Government in India-the constitution powers and status of the president of India. Amendment of the Constitutional Powers and Procedure

UNIT –IV (5hrs)

The historical perspectives of the constitutional amendments in India. Emergency provisions: National Emergency, President Rule, Financial Emergency Local self government-Constitutional scheme in India

UNIT –V (3hrs)

Scheme of fundamental Right to Equality Scheme of fundamental Right to certain Freedom under Article 19 Scope of the Right to Life and Personal Liberty under Article 21.

COURSE OUTCOMES:

Students will be able to:

- Improve their knowledge about Indian constitution
- Value their identity and exercise their fundamental rights.
- Understand how differently government bodies function.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV B.Tech EEE I Sem **L T/P/D C**

3 1 / - / - 4

(R17A0219) SWITCHGEAR AND PROTECTION

COURSE OBJECTIVES:

- To introduce protection equipment like Circuit Breakers and Relays
- To introduce protection of Generators, Transformers and feeder bus bars from over Voltages and other hazards.
- To emphasize neutral for overall protection.

UNIT - I:

CIRCUIT BREAKERS: Circuit Breakers: Elementary principles of arc interruption, Recovery, Restriking Voltage and Recovery voltages. - Restriking Phenomenon, Average and Max. RRRV, Current Chopping and Resistance Switching - CB ratings and Specifications: Types and Numerical Problems. Auto reclosures. Description and Operation of following types of circuit breakers: Minimum Oil Circuit breakers, Air Blast Circuit Breakers, Vacuum and SF6 circuit breakers.

UNIT – II:

ELECTROMAGNETIC AND STATIC RELAYS: Principle of Operation and construction of attracted armature, Balanced Beam, induction Disc and Induction Cup relays. Relays Classification: Instantaneous, DMT and IDMT types. Application of relays: Over current/Under voltage relays, Direction relays, Differential Relays and Percentage Differential Relays. Universal torque equation. Distance relays: Impedance, Reactance and Mho and Off-Set Mho relays, Characteristics of Distance Relays and Comparison. Static Relays: Static Relays Vs Electromagnetic Relays.

UNIT - III:

GENERATOR & TRANSFORMER PROTECTION: Protection of generators against Stator faults, Rotor faults, and Abnormal Conditions. Restricted Earth fault and Inter-turn fault Protection. Protection of transformers: Percentage Differential Protection, Numerical Problem on Design of CT s Ratio, Buchholtz relay Protection.

UNIT-IV:

FEEDER AND BUS-BAR PROTECTION & GROUNDING: Protection of Lines: Over Current, Carrier Current and Three-zone distance relay protection using Impedance relays. Translay Relay. Protection of Bus bars - differential protection. Neutral Grounding: Grounded and Ungrounded Neutral Systems.- Effects of Ungrounded Neutral on system performance. Methods of Neutral Grounding: Solid, Resistance, Reactance - Arcing Grounds and Grounding Practices.

UNIT -V:

PROTECTION AGAINST OVER VOLTAGES: Generation of Over Voltages in Power Systems.-Protection against Lightning over Voltages - Valve type and Zinc-Oxide Lighting Arresters - Insulation Coordination -BIL, Impulse Ratio, Standard Impulse Test Wave, Volt-Time Characteristics.

TEXT BOOKS:

1. Switchgear and Protection by Sunil S Rao, Khanna Publlishers
2. Power System Protection and Switchgear, Bhavesh Bhalaji, R.P.Mahesheari, Nilesh G.Chothani, Oxford University Press.

REFERENCE BOOKS:

1. Fundamentals of Power System Protection by Paithankar and S.R.Bhide., PHI, 2003. Art & Science of Protective Relaying by C R Mason, Wiley Eastern Ltd.
2. Electrical Power Systems by C.L.Wadhwa, New Age international (P) Limited, Publishers, 3rd editon
3. A Text book on Power System Engineering by B.L.Soni, Gupta, Bhatnagar, Chakrabarthy, Dhanpat Rai & Co Pvt.Ltd.

COURSE OUTCOMES:

After this course, the student

- Gets a thorough knowledge on, various types of protective devices (circuit breakers, relays etc.) and their co-ordination, protection of generators, transformers, feeders, bus-bars,

  through different types of protective devices, overvoltage protection, lightening, concept of earthing andgrounding

- By applying the above concepts to real-world electrical and electronics problems and applications.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV B.Tech EEE I Sem **L T/P/D C**

3 1 / - / - 4

(R18A0220) INDUSTRIAL AND ALLIED ELECTRICAL SYSTEMS

COURSE OBJECTIVES:

- To give a basic knowledge on residential, commercial and wiring systems.
- To understand the different applications like heating, welding and illumination.
- To gives a comprehensive idea on UPS, Electric Traction and industrial electrical systems.

UNIT - I:

ILLUMINATION: Introduction, terms used in illumination, laws of illumination, polar curves, photometry. Sources of light Discharge lamps: Mercury Vapor and Sodium Vapor lamps – comparison between tungsten filament lamps and fluorescent lamps.Basic principles of light control, Types and design of lighting and flood lighting.

UNIT - II:

RESIDENTIAL AND COMMERCIAL ELECTRICAL SYSTEMS: Types of residential and commercial wiring systems, general rules and guidelines for installation, load calculation and sizing of wire, rating of main switch, distribution board and protection devices, earthing system calculations, requirements of commercial installation, deciding lighting scheme and number of lamps, earthing for commercial installations. Selection and sizing of components.

UNIT - III:

ELECTRIC HEATING AND WELDING: Electric Heating: Advantages and methods of electric heating, resistance heating, induction heating and dielectric heating. Electric welding: resistance and arc welding, electric welding equipment, comparison between A.C. and D.C. Welding.

UNIT - IV:

INDUSTRIAL ELECTRICAL SYSTEMS: Industrial loads, motors, startingof motors, Lightning Protection, methods of earthing, UPS System, Electrical Systems for the elevators, Battery banks, Selection of UPS and Battery Banks.

UNIT - V:

ELECTRIC TRACTION: Traction Systems: types, overview of existing electric traction systems in India. Special features of traction motor. Speed-time curves for different services – trapezoidal and quadrilateral speed time curves.Calculations of tractive effort, power, specific energy consumption for a given run, effect of varying acceleration and braking retardation, adhesive weight and braking retardation adhesive weight and coefficient of adhesion.

TEXT BOOKS:

1. J.B. Gupta, *"Utilization of Electric Power and ElectricTraction"*, Kataria & Sons publishers, Delhi, IX Edtion, 2004.
2. C.L. Wadhwa, *"Generation, Distribution and Utilization of electrical Energy"*, New Age International (P) Limited Publishers, 3rd Edition, 2010
3. S. L.Uppal and G.C.Garg," Electrical wiring Estimating & costing" Khanna publishers,2008
4. Utilization of electric Energy by E. Openshaw Taylor , Orient Longman Private Limited,1971.

REFERENCE BOOKS:

1. N.V. Suryanarayana, *"Utilization of Electrical Power including Electric drives and Electric traction"*, New Age International (P) Limited Publishers, 1st Edition, 1994.
2. E. Open Shaw Taylor, *"Utilization of Electric Energy"*, Orient Longman,1st Edition,1937

COURSE OUTCOMES:

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

- Maintain/Troubleshoot various lamps and fittings in use.
- Understand various types of Heating, Welding and traction system.
- Design Illumination systems for various applications.
- Work in the areas of UPS systems and traction systemsproduction, commissioning and maintenance.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV B.Tech EEE I Sem

L	T/P/D	C
3	-/-/-	3

(R18A0221) POWER SYSTEM OPERATION AND CONTROL

COURSE OBJECTIVES:

- To understand real power control and operation
- To know the importance of frequency control
- To analyze different methods to control reactive power
- To understand unit commitment problem and importance of economic load dispatch
- To understand real time control of power systems.

UNIT – I:

LOAD FREQUENCY CONTROL: Basics of speed governing mechanism and modeling – speed - load characteristics – load sharing between two synchronous machines in parallel. Control area concept. LFC control of a single area system. Static & dynamic analysis of uncontrolled and controlled cases. Integration of economic dispatch control with LFC. Two area system – modeling - static analysis of uncontrolled case - tie line with frequency bias control of two-area system - state variable model.

UNIT– II:

REACTIVE POWER VOLTAGE CONTROL: Basics of reactive power control. Excitation systems – modelling. Static and dynamic analysis: stability compensation generation and absorption of reactive power. Relation between voltage, power and reactive power at a node - method of voltage control – tap – changing transformer. System level control using generator voltage magnitude setting. Tap setting of OLTC transformer. MVAR injection of switched capacitors to maintain acceptable voltage profile and to minimize transmission loss.

UNIT – III:

ECONOMIC OPERATION OF POWER SYSTEMS: Statement of economic dispatch problem – cost of generation – incremental cost curve - co-ordination equations without loss and with loss, solution by direct method and λ-iteration method. 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.

UNIT – IV

UNIT COMMITMENT: Statement of Unit Commitment problem – constraints, spinning reserve, thermal unit constraints, hydro constraints, fuel constraints and other constraints. Solution methods - Priority-list methods - forward dynamic programming approach. Numerical problems on priority-list method using full-load average production cost and Forward DP method.

UNIT–V

COMPUTER CONTROL OF POWER SYSTEMS: Need for computer control of power systems. Concept of energy control centre (or) load dispatch centre and the functions – system monitoring - data acquisition and control. System hardware configuration – SCADA and EMS functions.

TEXT BOOKS:

1. D.P. Kothari and I.J. Nagrath, 'Modern Power System Analysis', Third Edition, Tata McGraw Hill Publishing Company Limited, New Delhi, 2003.
2. Olle. I. Elgerd, 'Electric Energy Systems Theory – An Introduction', Tata McGraw Hill Publishing Company Ltd, New Delhi, 30th reprint,2007.

REFERENCE BOOKS

1. Chakrabarti & Haldar, "Power System Analysis: Operation and Control", Prentice Hall of India, 2004 Edition.
2. C.L.Wadhwa , 'Power System Analysis', New Age International- 6th Edition, 2010,
3. Robert Miller, James Malinowski, 'Power System Operation', Tata McGraw Hill Publishing Company Ltd, New Delhi, 3E, JUN-09.
4. P. Kundur, Neal J. Balu, 'Power System Stability & Control', IEEE, 1998 .
5. Power System Analysis by Hadi Saadat – TMH Edition.

COURSE OUTCOMES:

- Know importance of frequency and real power control
- Know the reactive power control methods and importance of reactive power
- Compare unit commitment and economic dispatch and their importance
- Understand real time control of power systems.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV B.Tech EEE I Sem

L	T/P/D	C
3	- / - / -	3

(R18A0465) PLC SYSTEMS

COURSE OBJECTIVES:

For programmable logic controllers & embedded systems, the course will enable the students

- To provide and ensure a comprehensive understanding of using advanced controllers in measurement and control instrumentation.
- To analyze Programmable Logic Controller (PLC), IO Modules and internal features, Programming in Ladder Logic.
- Understand the core of an embedded system
- To learn the design process of embedded system applications.
- To understands the RTOS and inter-process communication.
- To understand different communication interfaces.

UNIT-I:

PLC BASICS: PLC system, I/O modules and interfacing, CPU processor, programming Equipment, programming formats, construction of PLC ladder diagrams, Devices connected to I/O modules. PLC Programming: Input instructions, outputs, operational procedures, programming examples using contacts and coils. Drill press operation.

UNIT-II:

LADDER DIAGRAMS FOR PROCESS CONTROL: Ladder diagrams and sequence listings, ladder diagram construction and flowchart for spray process system.

PLC REGISTERS: Characteristics of Registers, module addressing, holding registers, Input Registers, Output Registers.

UNIT-III:

INTRODUCTION TO EMBEDDED SYSTEMS: Complex systems and microprocessors-embedding computers, characteristics of embedded computing applications, challenges in embedded computing system design, performance in embedded computing; The embedded system design process-requirements, specification, architecture design, designing hardware and software, components, system integration.

UNIT-IV:

TYPICAL EMBEDDED SYSTEM: Core of the embedded system-general purpose and domain specific processors, ASICs, PLDs, COTS; Memory-ROM, RAM, memory selection for embedded systems; Sensors and actuators , Onboard communication interfaces-I2C, SPI.

EMBEDDED FIRMWARE DESIGN AND DEVELOPMENT: Embedded firmware design approaches-super loop based approach, operating system based approach; embedded firmware development languages-assembly language based development, high level language based development.

UNIT-V:

RTOS BASED EMBEDDED SYSTEM DESIGN: Operating system basics, types of operating systems, tasks, process and threads, multiprocessing and multitasking, task scheduling: non-preemptive and pre-emptive scheduling, How to choose an RTOS.

TEXT BOOKS:

1. Programmable Logic Controllers- Principles and Applications by John W. Webb and Ronald A. Reiss, Fifth Edition, PHI.
2. Computers as Components –Wayne Wolf, Morgan Kaufmann (second edition).
3. Introduction to Embedded Systems - shibu k v, Mc Graw Hill Education.

REFERENCE BOOKS:

1. Programmable Logic Controllers- Programming Method and Applications by JR.Hackworth and F.D Hackworth Jr., Pearson, 2004.
2. Embedded Systems- An integrated approach - Lyla b das, Pearson education 2012.

COURSE OUTCOMES:

After going through this course the student will be able to

- Describe the main functional units in a PLC and be able to explain how they interact
- Develop ladder logic programming for simple process.
- Understand and design the embedded systems
- Understand Embedded Firmware design approaches
- Learn the basics of RTOS

PROFESSIONAL ELECTIVE - III

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B.Tech EEE - I Sem

L	T/P/D	C
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(PROFESSIONAL ELECTIVE - III)
(R18A0513) COMPUTER NETWORKS

COURSE OBJECTIVES:

- To introduce the fundamental types of computer networks.
- To demonstrate the TCP/IP & OSI model merits & demerits.
- To know the role of various protocols in Networking.

UNIT - I

INTRODUCTION: Network, Uses of Networks, Types of Networks, Reference Models: TCP/IP Model, The OSI Model, Comparison of the OSI and TCP/IP reference model. Architecture of Internet. Physical Layer: Guided transmission media, Wireless transmission media, Switching

UNIT - II

DATA LINK LAYER: Design issues, Error Detection & Correction, Elementary Data Link Layer Protocols, Sliding window protocols

MULTIPLE ACCESS PROTOCOLS - ALOHA, CSMA,CSMA/CD, CSMA/CA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer, Data link layer switching: Use of bridges, learning bridges, spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways.

UNIT - III

NETWORK LAYER: Network Layer Design issues, store and forward packet switching connection less and connection oriented networks-routing algorithms-optimality principle, shortest path, flooding, Distance Vector Routing, Count to Infinity Problem, Link State Routing, Path Vector Routing, Hierarchical Routing; Congestion control algorithms,

IP addresses, CIDR, Subnetting, SuperNetting, IPv4, Packet Fragmentation, IPv6 Protocol, Transition from IPv4 to IPv6, ARP, RARP.

UNIT - IV

TRANSPORT LAYER: Services provided to the upper layers elements of transport protocol-addressing connection establishment, Connection release, Error Control & Flow Control, Crash Recovery.

The Internet Transport Protocols: UDP, Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Sliding Window, The TCP Congestion Control Algorithm.

UNIT - V

APPLICATION LAYER: Introduction, providing services, Applications layer paradigms: Client server model, HTTP, E-mail, WWW, TELNET, DNS; RSA algorithm,

TEXT BOOKS:

1. Computer Networks - Andrew S Tanenbaum, 4th Edition, Pearson Education.
2. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH, 2013.

REFERENCES BOOKS:

1. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W. A. Shay, Cengage Learning.
3. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Education.

COURSE OUTCOMES:

- To understand and explore the basics of Computer Networks and Various Protocols. Student will be in a position to understand the World Wide Web concepts.
- Able to administrate a network and flow of information further Student can understand easily the concepts of network security, Mobile, and ad hoc networks.

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(PROFESSIONAL ELECTIVE - III)

(R18A0222) ADVANCED POWER ELECTRONICS

COURSE OBJECTIVES:

- With the advent of semiconductor devices, revolution is taking place in the power transmission distribution and utilization.
- This course introduces the basic concepts of power semiconductor devices, converters and choppers and their analysis

UNIT-I:

ADVANCED SOLID STATE DEVICES: MOSFETs, IGBT, GTO, IGCT. Power modules, intelligent power modules, gating circuits Thermal design, protection. Digital signalprocessors used in their control.Non-isolated DC-DC converters: Buck, boost, buck-boost, Cuk SEPIC, Zeta in DCM and CCM Isolated dc-dc converters: Fly back, forward, Cuk, SEPIC, Zeta, half bridge, push-pull and bridge in DCM and CCM. Single-phase, single-stage converters (SSSSC), power factor correction at ac mains in these converters. Their application in SMPS, UPS, welding and lighting systems.

UNIT-II:

SINGLE-PHASE IMPROVED POWER QUALITY AC-DC CONVERTERS: Buck, boost, buck-boost, PWM VSC (Voltage source converters), multilevel VSCs, PWM CSC (Current voltage source converters).Three-phase improved power quality ac-dc converters: VSC , multilevel VSCs, multi pulse VSCs, PWM CSC (Current voltage source converters).Multi pulse ac-dc converters: Diode and thyristor based converters.

UNIT-III:

POWER QUALITY MITIGATION DEVICES: Passive filters, active filters, hybrid filters. FACTS devices: TCR (thyristor controlled reactor), TSC (thyristor switched capacitors). STATCOM (Static synchronous compensator).SSSC(Static series synchronous compensator). UPFC (Unified power flow controller), IPFC (Interline power flow controller).

UNIT-IV:

HVDC (HIGH VOLTAGE DIRECT CURRENT) SYSTEM: 12-pulseconverter based HVDC systems. HVDC light, HVDC PLUS (Power universal link). Multi pulse and multilevel VSC based flexible HVDC systems.

UNIT-V:

SOLID STATE CONTROLLERS FOR MOTOR DRIVES: Vector control and direct torque control of induction, synchronous, permanent magnet fed, synchronous reluctance motors. Permanent magnet brushless DC(PMLDC) and switched reluctance motors.LCI (load commutated inverter)fed large rating synchronous motor drives. Energy conservation and power quality improvements in these drives.

TEXT BOOKS

1. R.S. Ramshaw,"Power Electronics Semiconductor Switches", Champman& Hall, 1993.
2. N. Mohan, T. M. Undeland and W.P. Robbins,"Power Electronics, Converter,Application and Design", Third Edition, John Willey & Sons, 2004.
3. M. H. Rashid,"Power Electronics, circuits, Devices and Applications",Pearson, 2002, India.

REFERENCE BOOKS

1. K. Billings,"Switch Mode Power Supply Handbook", McGraw-Hill, 1999,Boston.
2. A. I.Pressman,"Switch Mode Power Supply Design", McGraw-Hill, 1999, New York.
3. B. K.Bose,"Power Electronics and Variable Frequency Drive",Standard Publishers Distributors, 2000.

COURSE OUTCOMES:

- Competency in function of various power electronics devices.
- Skill of analyzing power electronic devices, Know-how of advance Power electronics converter, Fitness in mitigating converter harmonics.
- Competency in developing Dynamic model of drive system, Fitness' in solving typical drive issues. Ability in control strategy of cyclo converter based Drives, Skill in Transient analysis of drive system.
- Competency in designing FACTS controllers, Capability in designing isolated converters.
- Ability to dynamic analysis of power Converters, Competency in operation of resonant converter.
- Capability in Control of Switched Reluctance Motor Drives, Competency in Control of BLDC Motor Drives. Proficiency in HVDC converter systems design. Know-how of operation of Power electronics in HVDC system.

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(PROFESSIONAL ELECTIVE - III)

(R18A1262) ARTIFICIAL NEURAL NETWORKS

COURSE OBJECTIVES:

The objectives of this course are to:

- Understand the basic building blocks of artificial neural networks (ANNs)
- Understand the role of neural networks in engineering and artificial intelligence modeling
- Provide knowledge of supervised/unsupervised learning in neural networks
- Provide knowledge of single layer and multilayer perceptrons.
- To know about self-organizational maps and Hopfield models.

UNIT -I:

INTRODUCTION: A Neural Network, Human Brain, Models of a Neuron, Neural Networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks Learning Process: Error Correction Learning, Memory Based Learning, Hebbian Learning, Competitive, Boltzmann Learning, Credit Assignment Problem, Memory, Adaption, Statistical Nature of the Learning Process

UNIT -II:

SINGLE LAYER PERCEPTRONS: Adaptive Filtering Problem, Unconstrained Organization Techniques, Linear Least Square Filters, Least Mean Square Algorithm, Learning Curves, Learning Rate Annealing Techniques, Perceptron –Convergence Theorem, Relation Between Perceptron and Bays Classifier for a Gaussian Environment Multilayer Perceptron: Back Propagation Algorithm XOR Problem, Heuristics, Output Representation and Decision Rule, Computer Experiment, Feature Detection

UNIT -III:

BACK PROPAGATION: Back Propagation and Differentiation, Hessian Matrix, Generalization, Cross Validation, Network Pruning Techniques, Virtues and Limitations of Back Propagation Learning, Accelerated Convergence, Supervised Learning

UNIT -IV:

SELF-ORGANIZATION MAPS (SOM): Two Basic Feature Mapping Models, Self Organization Map, SOM Algorithm, Properties of Feature Map, Computer 168 ELECTRONICS AND COMMUNICATION ENGINEERING 2013-14 Simulations, Learning Vector Quantization, Adaptive Patter Classification

UNIT -V:

NEURO DYNAMICS: Dynamical Systems, Stability of Equilibrium States, Attractors, Neuro Dynamical Models, Manipulation of Attractors as a Recurrent Network Paradigm Hopfield Models – Hopfield Models, Computer Experiment

TEXT BOOKS:

1. Neural Networks a Comprehensive Foundations, Simon Haykin, PHI edition.
2. Introduction to Artificial Neural Systems Jacek M. Zurada, JAICO Publishing House Ed. 2006.

REFERENCE BOOKS:

1. Artificial Neural Networks - B. Vegnanarayana Prentice Hall of India P Ltd 2005
2. Neural Networks in Computer Inteligance, Li Min Fu TMH 2003
3. Neural Networks -James A Freeman David M S Kapura Pearson Education 2004.
4. Introduction to Artificial Neural Systems Jacek M. Zurada, JAICO Publishing House Ed. 2006.

COURSE OUTCOMES:

After the course the student should be able to:

- Explain the function of artificial neural networks of the Back-prop, Hopfield and SOM type
- Explain the difference between supervised and unsupervised learning
- Describe the assumptions behind, and the derivations of the ANN algorithms dealt with in the course
- Give example of design and implementation for small problems
- Implement ANN algorithms to achieve signal processing, optimization, classification and process modeling

PROFESSIONAL ELECTIVE - IV

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(PROFESSIONAL ELECTIVE - IV)

(R18A0223) SOLAR ELECTRICAL SYSTEMS

COURSE OBJECTIVES:

- To understand the basic concepts of solar energy and solar radiation.
- To study about solar thermal systems and their applications.
- To understand the fundamentals of solar cells and design of PV systems.
- To study the classification of PV systems.

UNIT-I

SOLAR ENERGY BASIC CONCEPTS: Role and potential of new and renewable energy source - The solar energy option -Environmental impact of solar power - Physics of the sun - The solar constant - Extraterrestrial and terrestrial solar radiation - solar radiation on tilted surface - Solar Radiation on inclined Plane Surface – Atmospheric effects on Solar radiation - Solar radiation measurement and Instrumentation - Solar radiation data.

UNIT-II

SOLAR ENERGY THERMAL SYSTEMS: Introduction – Solar Collectors - Sensible, latent heat and stratified storage - Types of Solar Water Heaters: Built-in-storage type, separate collector and storage type systems, Natural circulation and forced circulation systems - Solar Passive Space Heating and Cooling Systems - Solar Industrial Heating Systems – Solar concentrators.

UNIT-III

SOLAR CELL FUNDAMENTALS: Photovoltaic effect - Principle of direct solar energy conversion into electricity in a solar cell - Semiconductor properties, energy levels, basic equations - Solar cell- P-N junction - structure - Solar cell properties and design. I-V characteristics, output power. I-V characteristics of PV module - maximum power point – principles of maximum power point trackers- cell efficiency - Fill factor - Effect of irradiation and temperature.

UNIT-IV

MANUFACTURING OF PV CELLS & DESIGN OF PV SYSTEMS: Commercial solar cells - Production process of single crystalline silicon cells - Multi crystalline silicon cells - Amorphous silicon - Cadmium telluride, and copper indium gallium dieseline cells - Design of solar PV systems and cost estimation - Case study of design of solar PV lantern -Stand-alone PV system - Home lighting and other appliances - solar water pumping systems. PV arrays and modules, inverters, batteries, charge controls, - PV array installation, operation, costs, reliability.

UNIT-V

CLASSIFICATION OF PV SYSTEMS AND COMPONENTS: Classification - Central Power Station System - Distributed PV System - Stand-alone PV system - Grid Interactive PV System - Small system for consumer applications - Hybrid solar PV system - Concentrator Solar Photovoltaic Systems.

TEXT BOOKS:

1. Solar Energy Fundamentals and Applications, H. P. Garg and J Prakash, Tata McGraw Hill Education Private Limited, New Delhi, 2000.
2. Solar Cells – Operating Principles, Technology and System Applications, Martin A. Green, Prentice Hall Inc.
3. Solar Cells from Basics to Advanced Systems, Chenming Hu and Richard M. White, Tata McGraw Hill Education Private Limited.

REFERENCE BOOKS:

1. Renewable energy resources, Tiwari and Ghosal / Narosa, second edition (2008), McGraw Hill Company,
New Delhi.
2. Non-Conventional Energy Sources, G.D.Rai, fourth edition (2009), Khanna Publishers, New Delhi.
3. Fundamentals of Renewable Energy Systems, D.Mukherjee, S.Chakrabarti, New Age International.
4. Renewable Energy Sources and Emerging Technologies, D. P. Kothari, K. C. Singal, Rakesh Ranjan, PHI Learning Private Limited.

COURSE OUTCOMES:

After going through this course, the student gets knowledge on

- The basic concepts of solar energy and solar radiation.
- About solar thermal systems and their applications.
- The fundamentals of solar cells and design of PV systems.
- The classification of PV systems.

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(PROFESSIONAL ELECTIVE - IV)

(R18A0224) QUALITY AND RELIABILITY ENGINEERING

COUSRE OBJECTIVES:

- To introduce the basic concepts of reliability, various models of reliability
- To analyze reliability of various systems
- To introduce techniques of frequency and duration for reliability evaluation of repairable systems.

UNIT-I:

BASIC CONCEPTS: Definitions of quality and Reliability, Parameters and Characteristics, Quality control, statistical Quality Control, Reliability concepts. Concepts in Probability and Statistics : Events, Sample Space, Probability rules, Conditional probability, Dependent and Independent Events, Application of Probability concepts in Quality Control, Problems

UNIT-II:

INTRODUCTION TO PROBABILITY DISTRIBUTIONS: Normal, Poisson and Binomial distribution.Control Charts, Variable Chart – X Bar chart, R-chart and Sigma chart. Attribute Chart: P – Chart, nP Chart, C-Chart and U – Chart.Acceptance Sampling: Fundamentals of acceptance sampling, types of acceptance sampling, O.C Curve, AQL, LTPD, AOQL.

UNIT-III:

FAILURE DATA ANALYSIS: Introduction, Failure Data, Quantitative measures, MTTF, MTBF, Bathtub Curve, Mean Life, Life Testing, Problems, Introduction to Failure Mode and Effect Analysis.

UNIT-IV:

SYSTEM RELIABILITY: Series, parallel and mixed configuration, Block diagram concept, r- out-of-n structure solving problems using mathematical models.Reliability Improvement and Allocation : Difficulty in achieving reliability, Methods for improving reliability during design, Different techniques available to improve reliability, Optimization, Reliability-Cost trade off, Prediction and Analysis, Problems.

UNIT-V:

MAINTAINABILITY AND AVAILABILITY: Introduction, Formulas, Techniques available to improve maintainability and availability trade-off among reliability, maintainability and availability, Simple problems

TEXT BOOKS:

1. Roy Billinton, Ronald. N. Allan (2009), *Reliability Evaluation of Engineering Systems*, 4th edition, Plenum Press, New York, USA.

2. Hoang Pham (2003), *Handbook of Reliability Engineering,* 1st edition, Springer Verlag, New York.

3. Charles E. Ebeling (2010), *An Introduction to Reliability and Maintainability Engineering*, 3rd edition, Tata McGraw Hill Edition, New Delhi.

REFERENCE BOOKS:

1. Quality Planning and Analysis - Tata McGraw - Juran, J.M and Gryna, F.M. - Hill publishing Coimpany Ltd., New Delhi, India – 1982.
2. Maintainability and Reliability Handbook of Reliability Engineering and Management - Editors – Ireson. W.G. and Cooms - C.F. McGraw - Hill Book Company Inc. – 1988.
3. Concepts in Reliability Engineering- Srinath L S - Affiliated East-West Press Private Limited, New Delhi, India. – 1985.
4. An Introduction to Reliability and Maintainability Engineering - TMH Charles Ebeling - Tata Mcgraw Hill – 2000.
5. Reliability Engineering - A K Govil - Prentice Hall – 1981.

COURSE OUTCOMES:

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

- Model various systems applying reliability networks
- Evaluate the reliability of simple and complex systems
- Estimate the limiting state probabilities of repairable systems
- Apply various mathematical models for evaluating reliability of irreparable systems

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(PROFESSIONAL ELECTIVE - IV)

(R18A0225) POWER PLANT ENGINEERING

COURSE OBJECTIVES:

- To study operation and maintenance of Power Stations.
- Able to learn about different power plants.
- To study about Non-Conventional Power Generation.

UNIT-I:

INTRODUCTION: Energy resources and their availability, types of power plants, selection of the plants, review of basic thermodynamic cycles used in power plants. Hydro Electric Power Plants : Rainfall and run-off measurements and plotting of various curves for estimating stream flow and size of reservoir, power plants design, construction and operation of different components of hydro-electric power plants, site selection, comparison with other types of power plants.

UNIT-II:

STEAM POWER PLANTS: Flow sheet and working of modern-thermal power plants, super critical pressure steam stations, site selection, coal storage, preparation, coal handling systems, feeding and burning of pulverized fuel, ash handling systems, dust collection-mechanical dust collector and electrostatic precipitator.

COMBINED CYCLES: Constant pressure gas turbine power plants, Arrangements of combined plants (steam & gas turbine power plants), re-powering systems with gas production from coal, using PFBC systems, with organic fluids, parameters affecting thermodynamic efficiency of combined cycles.

UNIT-III:

NUCLEAR POWER PLANTS: Principles of nuclear energy, basic nuclear reactions, nuclear reactors-PWR, BWR, CANDU, Sodium graphite, fast breeder, homogeneous; gas cooled. Advantages and limitations, nuclear power station, waste disposal. Power Plant Economics: load curve, different terms and definitions, cost of electrical energy, tariffs methods of electrical energy, performance & operating characteristics of power plants- incremental rate theory, input-output curves, efficiency, heat rate, economic load sharing.

UNIT-IV:

NON-CONVENTIONAL POWER GENERATION: Solar radiation estimation, solar energy collectors, low, medium & high temperature power plants, OTEC, wind power plants, tidal power plants, geothermal power plants.

UNIT-V:

DIRECT ENERGY CONVERSION SYSTEMS: Fuel cell, MHD power generation-principle, open & closed cycle's systems, thermoelectric power generation, thermionic power generation.

TEXTBOOKS:

1. Power station Engineering and Economy by Bernhardt G.A. skrotzki and William A. Vopat – Tata Mc Graw Hill Publishing Campany Ltd., New Delhi
2. Power Plant Engineering: P.K. Nag Tata McGraw Hill second Edition 2001.
3. A Course in Power Plant Engineering: / Arora and S. Domkundwar/ Dhanpat Rai Publisher
4. Power Plant Engineering / P.C.Sharma / S.K.Kataria Publisher
5. A Text Book of Power Plant Engineering / R.K.Rajput / Laxmi Publications

REFERENCE BOOKS:

1. Power Plant Engineering/ P.K.Nag II Edition /TMH Publishers
2. An Introduction to Power Plant Technology / G.D. Rai/Khanna Publishers
3. Power plant Engg /Elanchezhian/I.K. International Publishers

COURSE OUTCOMES:

At the end of the course the students will be able

- To Study various non-conventional sources in remote areas of the country.
- Students get the exposure of different power plants.
- To analyze the thermionic power generation.

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(R17A0287) POWER SYSTEMS LAB

COURSE OBJECTIVES:

- To perform testing of CT, PT's and Insulator strings.
- To find sequence impedances of 3-Φ synchronous machine and Transformer.
- To perform fault analysis on Transmission line models and Generators.

Part – A

1. Characteristics of IDMT Over Current Relay.
2. Differential protection of 1-Φ transformer.
3. Characteristics of Micro Processor based Over Voltage/Under Voltage relay.
4. Testing of CT, PT's and Insulator strings.
5. Finding the sequence impedances of 3-Φ synchronous machine.
6. Finding the sequence impedances of 3-Φ Transformer.
   In addition to the above six experiments, at least any four of the experiments from the following list are required to be conducted.

Part – B

1. Formation of YBUS.
2. Load Flow Analysis using Gauss Seidal (GS) Method.
3. Load Flow Analysis using Fast Decoupled (FD) Method.
4. Formation of ZBUS.
5. LG, LL and 3-Φ fault analysis of 3-Φ synchronous machine.
6. Power circle diagrams of a 3-Φ transmission line model.
7. ABCD constants and Regulation of a 3-Φ transmission line model.
8. Transient Stability Analysis for Single Machine connected to Infinite Bus by Point by Point method.

COURSE OUTCOMES:

After completion of this lab, the student will be able to

- Perform various load flow techniques
- Understand Different protection methods
- Analyze the experimental data and draw the conclusions.

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(R18A0288) ELECTRICAL MEASUREMENTS LABORATORY

COURSE OBJECTIVES:

- To calibrate LPF Watt Meter, energy meter, P.F Meter using electro dynamo meter type instrument as the standard instrument.
- To determine unknown inductance, resistance, capacitance by performing experiments on D.C Bridges &A.C Bridges.
- To determine three phase active & reactive powers using single wattmeter method practically.
- To determine the ratio and phase angle errors of current transformer and potential transformer.

Part - A

The following experiments are required to be conducted compulsory experiments:

1.Calibration and Testing of single phase energy Meter
2.Measurement of tolerance of batch of low resistances by Kelvin's double bridge
3.Measurement of voltage, current and resistance using dc potentiometer
4.Schering Bridge and Anderson bridge.
5.Measurement of parameters of a choke coil using 3 voltmeter and 3 ammeter methods.
6.Calibration of LPF wattmeter by Phantom testing
7.Measurement of Iron loss in a bar specimen using Epstein square.
8.Dielectric testing of transformer oil
9.Calibration of dynamometer type power factor meter.
10.Measurement of reactive power using single wattmeter in three-phase circuit.

PART – B

In addition to the above experiments, at least any two of the following experiments are required to be conducted from the following list

1.Measurement of Displacement with the help LVDT
2.Measurement of different ranges of temperatures using i)RTD ii)Thermo couple
3.Measurement of voltage, frequency &phase with the help of CRO
4.Measurement of load with the help of strain gauges
5.Measurement of % ratio error and phase angle of given C.T. by Silsbee's method.

COURSE OUTCOMES:

After completion of this course the student is able to:

- Get the ability to choose instruments andcan test any instrument can find the accuracy of any instrument by performing experiment can calibrate PMMC instrument using D.C potentiometer.

PROFESSIONAL ELECTIVE - V

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(PROFESSIONAL ELECTIVE - V)
(R18A0226) WIND ELECTRICAL SYSTEMS

COURSE OBJECTIVES:

- To understand the fundamentals of wind turbines.
- To analyze the wind site selection.
- To understand the generation schemes with variable speed turbines.
- To study about the grid connected and self-excited induction generator.

UNIT-I:

FUNDAMENTALS OF WIND TURBINES: Power contained in wind - Thermodynamics of wind energy – Efficiency limit for wind energy conversion. Design of the wind turbine rotor: Diameter of the rotor – Choice of the number of blades – Choice of the pitch angle – The tower – The transmission system and gear box – Power speed characteristics – Torque speed characteristics. Wind turbine control systems: Pitch angle control – Stall control – Power electronic control – Yaw control – Control strategy.

UINIT-II:

WIND SITE ANALYSIS AND SELECTION: Wind speed measurements – Robinson cup anemometer – Pressure tube anemometer – Hot wire anemometer – Wind speed statistics – Statistical wind speed distributions – site and turbine selection.

UNIT-III:

GENERATION SCHEMES WITH VARIABLE SPEED TURBINES: Classification of schemes - Operating area. Induction generators: Cage rotor induction generator – Doubly fed induction generator – Wound field synchronous generator – The permanent magnet generator.

UNIT-IV:

GRID CONNECTED AND SELF EXCITED INDUCTION GENERATOR (PART-I): Constant voltage, constant frequency generation - single output system – Double output system with a current converter – Equivalent circuits – Reactive power and harmonics – Double output system with a voltage source inverter - Reactive power compensation.

UNIT-V:

GRID CONNECTED AND SELF EXCITED INDUCTION GENERATOR (PART-II): Variable voltage ,variable frequency generation – The self excitation process – Circuit model for the self excited induction generator – Analysis of the steady state operation - The steady state characteristics - The excitation requirement - Effect of a wind generator on the network.

TEXT BOOKS:

1. Wind Electrical Systems, S.N. Bhardra, D.Kastha and S.Banerjee, Oxford University Press.
2. Wind Power Technology 2nd Edition, Kindle Edition, Joshua Earnest, PHI learning.

3. Wind Energy Systems and Applications, D.P. Kothari, S. Umashankar, Alpha Science International, 2014.

REFERENCE BOOKS:

1. Wind Energy Systems Control and Engineering Design, Mario Garcia-Sanz, Constantine H.Houpis, CRC Press.
2. Renewable Energy Systems, David M.Buchla, Thomas E. Kissell, Thomas L. Floyd, Pearson publications.
3. Renewable Energy Sources, Twidell &Weir, fourth Edition (2009), Tata McGraw Hill Education Private Limited, New Delhi.

COURSE OUTCOMES:

After going through this course, the student gets knowledge on

- The fundamentals of wind turbines.
- Wind site analysis and selection.
- The generation schemes with variable speed turbines.
- About the grid connected and self-excited induction generator.

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(PROFESSIONAL ELECTIVE - V)
(R18A0227) POWER SYSTEM DYNAMICS AND STABILITY

COURSE OBJECTIVES:

- To remember the dynamic characteristics of power system equipment,
- To recognize dynamic performance of power systems
- To illustrate the system stability and controls.

UNIT –I:
INTRODUCTION: General basic concept of Power System Stability, States of operation & System Security, System Dynamics Problems, Review of Classical Model, System Model, Analysis of Steady State Stability & Transient Stability

UNIT –II:
MODELLING OF SYNCHRONOUS MACHINE: Synchronous Machine, Park's Transformation, Analysis of Steady State Performance, P. U. Quantities, Equivalent Circuit of Synchronous Machine

UNIT –III:
EXCITATION SYSTEMS & PRIME MOVER CONTROLLERS: Simplified Representation of Excitation Control, Excitation systems, Modeling, Block Diagram, State Equations, Prime Mover Control System, Transmission Line & Load Modeling

UNIT –IV:
DYNAMICS OF SYNCHRONOUS GENERATOR CONNECTED TO INFINITE BUS: System Model, Synchronous Machine Model, System Simulation, Consideration of other Machine Models including SVC Model

UNIT –V:
SMALL SIGNAL STABILITY:-Single and multi-machine system, Damping and Synchronizing torque Analysis, Power System Stabilizers Transient Stability and Voltage Stability controllers. Voltage Stability: Introduction, affecting factors, analysis, comparison with angle stability

TEXT BOOKS:
1. K. R. Padiyar, Power System Dynamics – Stability & Control, BS Publications
2. I.J. Nagrath and M. Gopal, Control system engineering, Wiley Eastern Ltd, 3rd edition, 2000.

REFERENCE BOOKS:
1. Benjamin C. Kuo, Automatic Control system, Prentice Hall of India Pvt Ltd. 2Prabha Kundur, Power System Stability and Control, Tata McGraw Hill
2. Power System Dynamics and Stability by Jan Machowski, Janusz Bialek, James Richard Bumby, Dr Jim Bumby

COURSE OUTCOMES:

Upon the completion of the subject, the student will be able to

- Choose the fundamental dynamic behavior and controls of power systems to perform basic stability analysis.
- Comprehend concepts in modeling and simulating the dynamic phenomena of power systems Interpret results of system stability studies
- Analyze theory and practice of modeling main power system components, such as synchronous machines, excitation systems and governors

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(PROFESSIONAL ELECTIVE - V)

(R18A0228) ELECTRICAL MACHINE DESIGN

COURSE OBJECTIVES:

- To understand basic design aspects of static and rotating electrical machines.
- To understand the design concepts, pertaining to dimensions, materials, winding configurations, cooling systems etc.
- To understand and appreciate the major design aspects pertaining to temperature ratings efficiency etc.

UNIT – I:

INTRODUCTION TO ELECTRICAL MACHINE DESIGN: Design concepts, factors, Material selection, manufacturing techniques, Review of basic principles, Heating, cooling techniques

UNIT – II:

CONSTRUCTIONAL DETAILS OF MACHINES (DC & AC): Constructional details – output equation – Choice of specific electric and magnetic loadings – Separation of D and L for rotating machines. Estimation of number of conductors / turns – coils – armature Slots – Conductor dimension, Slot dimension, Choice of number of poles – Length of air gap – Design of field system, Interpoles, Commutator and Brushes.

UNIT – III

TRANSFORMERS: Construction –Core and Yoke Design – cross section, cooling of transformers, Number of tubes ,Transformer windings, Coil design, output equation , determination of number of turns and length of mean turn of winding, Resistance, Leakage reactance no load current calculation, losses and efficiency.

UNIT – VI

INDUCTION MOTORS: Choice of specific electric and magnetic loadings, Stator design (Frames), output equation, choice of conductor rating, stator winding, and stator slots. Squirrel cage rotor design – air gap length, rotor slots and rotor bars. Design of wound rotor – rotor slots, windings, short circuit (blocked rotor currents)

UNIT – V

SYNCHRONOUS MACHINES: Constructional features – short circuit ratio – output equation – specific loadings – main dimensions – Stator design – design of Salient pole field coil.

TEXT BOOKS:

1. " Electrical machine design" – A.K Sawhney, Dhanpath Rao

REFERENCE BOOKS:

1. Performance and Design of DC machines, Clayton & Hancock, ELBS
2. Performance and Design of AC machines, M.G. Say, Pitman, ELBS

COURSE OUTCOMES:

Upon completing the course students will be able to:

- Understand the design aspects of various parts of DC machines and solve the problems of design
- Student should be able to understand the design concepts of transformers and know about how to design the parts.
- Student is able to understand the design concepts of synchronous machines and solve the problems related to design.
- Student understands the importance of design of machines based on their applications.

PROFESSIONAL ELECTIVE - VI

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(PROFESSIONAL ELECTIVE - VI)

(R18A0229) POWER QUALITY AND FACTS DEVICES

COURSE OBJECTIVES:

To study

- The various power quality issues in Distribution systems.
- The objectives of Shunt and Series Reactive Power compensation.
- The importance of controllable parameters and types of FACTS controllers & their benefits.
- STATCOM & SVC and their comparison. Regulation of STATCOM, Functioning and control of GCSC, TSSC and TCSC.

UNIT-I

POWER QUALITY PROBLEMS IN DISTRIBUTION SYSTEMS: Transient and Steady state variations in voltage and frequency. Unbalance, Sags, Swells, Interruptions. Wave-form Distortions: Harmonics, noise, notching, dc-offsets, fluctuations. Flicker and its measurement.

UNIT-II

TRANSMISSION LINES AND SERIES/SHUNT REACTIVE POWER COMPENSATION: Basics of AC Transmission. Analysis of uncompensated AC transmission lines.Passive Reactive Power Compensation.Shunt and series compensation at the mid-point of an AC line.Comparison of Series and Shunt Compensation.

UNIT-III

STATIC SHUNT COMPENSATORS: Objectives of shunt compensation, Methods of controllable VAR generation, Static VAR Compensator-its characteristics, TCR, TSC, FC-TCR configurations, STATCOM - basic operating principle, control approaches and characteristics.

UNIT-IV

STATIC SERIES COMPENSATORS: Objectives of series compensator, variable impedance type of series compensators, TCSC, TSSC- Operating principles and control schemes, SSSC, Power Angle characteristics, Control range and VAR rating, Capability to provide reactive power compensation, external control.

UNIT-V

COMBINED COMPENSATORS: Introduction to Unified Power Flow Controller, Basic operating principles, Conventional controlCapabilities, Independent control of real and reactive power.

TEXT BOOKS:

1. Electrical Power Systems Quality, Dugan Roger C. Santoso Surya, Mc Granaghan, Marks F.Beaty and H. Wayre, Mc Graw Hill.
2. Power Systems Quality Assessment, J.Arillaga, N.R.Watson, S.Clon, John Wiley.
3. "Understanding FACTS –Concepts and Technology of Flexible AC Transmission Systems" Narain G. Hingorani, Laszlo Gyugyi.

REFERENCE BOOKS:

1. Power Quality, C. Sankaran, CRC Press 4. Understanding power quality problems, Math H. Bollen, IEEE press.
2. A.T.John, "Flexible AC Transmission System", Institution of Electrical and Electronic Engineers (IEEE), 1999.

COURSE OUTCOMES:

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

- Know the severity of power quality problems in distribution system andunderstand the concept of voltage sag transformation from up-stream (higher voltages) to downstream (lower voltage).
- Understand the Concept of improving the power quality to sensitive load by various mitigating custom power devices.
- Understand the control circuits of Shunt Controllers SVC & STATCOM for various functions viz. Transient stability Enhancement, voltage instability prevention and power oscillation damping.
- Understand the Power and control circuits of Series Controllers GCSC, TSSC and TCSC.

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(PROFESSIONAL ELECTIVE - VI)

(R18A0230) POWER SYSTEM RELIABILITY

COURSE OBJECTIVES:

To study and understand:

- Concepts of probability theory
- Systems Modelling and Evaluation of Reliability with different methods
- Concepts of Time dependent probability and Discrete Markov Chains & Continuous Markov Processes
- Concepts of multi Component & Approximate System Reliability Evaluation

UNIT-I

Basic Probability Theory: Basic concepts – Rules for combining Probabilities of events – Failure Density and Distribution functions – Bernoulli's trials – Binomial distribution – Expected value and standard deviation for binomial distribution – Examples.

UNIT-II

Network Modeling and Reliability Evaluation: Basic concepts – Evaluation of network Reliability / Unreliability – Series systems, Parallel systems, Series - Parallel systems, partially redundant systems – Types of redundancies - Evaluation of network Reliability / Unreliability using conditional probability method – Paths based and Cutset based approach – complete event tree and reduced event tree methods -Examples.

UNIT-III

Time Dependent Probability: Basic concepts – Reliability functions f(t), F(t), R(t), h(t) – Relationship between these functions – Baths tubs curve – Exponential failure density and distribution functions - Expected value and standard deviation of Exponential distribution – Measures of reliability – MTTF, MTTR, MTBF – Evaluation of network reliability / Unreliability of simple Series, Parallel, Series-Parallel systems - Partially redundant systems - Evaluation of reliability measure – MTTF for series and parallel systems –Examples.

UNIT-IV

Discrete Markov Chains & Continuous Markov Processes: Basic concepts – Stochastic transitional Probability matrix – time dependent probability evaluation – Limiting State Probability evaluation – Absorbing states – Markov Processes-Modelling concepts – State space diagrams – time dependent reliability evaluation of single component repairable model – Evaluation of Limiting State Probabilities of one, two component repairable models – Frequency and duration concepts – Frequency balance approach - Examples.

UNIT-V

Multi Component & Approximate System Reliability Evaluation: Recursive relation for evaluation of equivalent transitional rates, cumulative probability and cumulative frequency and 'n' component repairable model - Series systems, Parallel systems, Basic reliability indices – Cutset approach – Examples.

TEXT BOOK:

1. System Reliability Concepts by V. Sankar, Himalaya Publishing House, 2015.

REFERENCE BOOKS:

1. Reliability Evaluation of Engineering Systems by Roy Billinton and Ronald N. Allan, Reprinted in India B. S. Publications,2007.
2. Reliability Engineering by E. Balagurusamy, Tata McGraw Hill,2003.
3. Reliability and Maintainability Engineering by Charles E. Ebeling, Tata McGraw Hill, 2000.
4. Probability concepts in Electric Power system – G.J.Anders- 1st edition –1990 – John wiley &sons.

COURSE OUTCOMES:

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

- Apply the Concepts of probability theory for Systems Modelling and Evaluation of Reliability in different methods
- Apply the Concepts of Time dependent probability and Discrete Markov Chains & Continuous Markov Processes in establishing the reliability figure of practical systems
- Carry out multi Component & Approximate System Reliability Evaluation

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(PROFESSIONAL ELECTIVE - VI)

(R18A0231) ELECTRICAL AND HYBRID VEHICLES

COURSE OBJECTIVES:

- To understand the models, describe hybrid vehicles and their performance.
- To understand the different possible ways of energy storage.
- To understand the different strategies related to hybrid vehicle operation & energy management.

UNIT 1:

INTRODUCTION: Conventional Vehicles: Basics of vehicle performance, vehicle power sourcecharacterization, transmission characteristics, and mathematical models to describe vehicleperformance.

UNIT 2:

INTRODUCTION TO HYBRID ELECTRIC VEHICLES: History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles, impact of modern drive-trains on energy supplies. Hybrid Electric Drive-trains: Basic concept of hybrid traction, introduction to various hybrid drive-train topologies, power flow control in hybrid drive-train topologies, fuel efficiency analysis.

UNIT 3:

ELECTRIC TRAINS: Electric Drive-trains: Basic concept of electric traction, introduction to various electric drivetraintopologies, power flow control in electric drive-train topologies, fuel efficiency analysis.Electric Propulsion unit: Introduction to electric components used in hybrid and electricvehicles, Configuration and control of DC Motor drives, Configuration and control ofInduction Motor drives, configuration and control of Permanent Magnet Motor drives,Configuration and control of Switch Reluctance Motor drives, drive system efficiency.

UNIT 4:

ENERGY STORAGE: Energy Storage: Introduction to Energy Storage Requirements in Hybrid and ElectricVehicles, Battery based energy storage and its analysis, Fuel Cell based energy storage andits analysis, Super Capacitor based energy storage and its analysis, Flywheel based energystorage and its analysis, Hybridization of different energy storage devices. Sizing the drivesystem: Matching the electric machine and the internal combustion engine (ICE), Sizing thepropulsion motor, sizing the power electronics, selecting the energy storage technology, Communications, supporting subsystems

UNIT 5:

ENERGY MANAGEMENT STRATEGIES: Energy Management Strategies: Introduction to energy management strategies used in hybridand electric vehicles, classification of different energy management strategies, comparison ofdifferent energy management strategiesand implementation issues of energy managementstrategies.

TEXT BOOKS:

1. C. Mi, M. A. Masrur and D. W. Gao, “Hybrid Electric Vehicles: Principles andApplications with PracticalPerspectives”, John Wiley & Sons, 2011.
2. S. Onori, L. Serrao and G. Rizzoni, “Hybrid Electric Vehicles: Energy Management Strategies”, Springer, 2015.

REFERENCE BOOKS:

1. M. Ehsani, Y. Gao, S. E. Gay and A. Emadi, “Modern Electric, Hybrid Electric, and FuelCell Vehicles: Fundamentals, Theory, and Design”, CRC Press, 2004.
2. T. Denton, “Electric and Hybrid Vehicles”, Routledge, 2016

COURSE OUTCOMES:

At the end of this course, students will demonstrate the ability to

- Study the models to describe hybrid vehicles and their performance.
- Implementthe different possible ways of energy storage.
- Adopt the different strategies related to hybrid vehicle operation & energy management.