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
ELECTRONICS AND COMMUNICATION ENGINEERING

ACADEMIC REGULATIONS
(Batches admitted from the academic year 2017 - 2018)

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 a 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 and with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The Cooperation of all the stake holders 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 2017-18 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 192 credits and secure 192 credits with compulsory subjects as listed in Table-1. However, student will earn minimum of 184 credits for the award of the B.Tech Degree.

Table 1: Compulsory Subjects

S.No	Subject Particulars
1	All practical Subjects
2	Mini Project
3	Technical Seminar
4	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	02
Drawing	03	02
	04	04
Mini Project	--	04
Technical Seminar	04	02
Major Project	12	10

***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 75 marks for a practical subject. In addition, Mini Project, Technical seminar and Major Project work shall be evaluated for 100, 50 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 25 sessional marks and 50 end semester examination marks. Out of the 25 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 10 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 up during the vacation after III year II Semester examination. However, the Mini-Project and its report shall be evaluated along with the Major Project work in IV year II Semester. The Mini Project shall be submitted in a report form and presented before the committee. It shall be evaluated for 100 marks. 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. There shall be no internal marks for Mini Project.

5.7 There shall be a Technical Seminar presentation in IV year II Semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding of the topic, and submit it to the department. It shall be evaluated by the departmental committee consisting of head of the department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for 50 marks. There shall be no external examination for the seminar.

5.8 Out of a total of 300 marks for the Major Project work, 100 marks shall be allotted for Internal Evaluation and 200 marks for the End Semester Examination (Viva Voce). The End Semester Examination of the Major Project work shall be conducted by the same committee as appointed for the mini-project. In addition, the project supervisor shall also be included in the committee. The topics for mini project, seminar 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 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 20 Credits/Semester (e.g., 6-7 Courses) and a maximum of 28 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 shall be promoted from I year to II year upon fulfilling the minimum required attendance.

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

8.5 A student shall register and put up minimum attendance in all 192 credits and shall earn a minimum of 184 credits for the award of B.Tech degree. Further, marks obtained in the 184 credits shall be considered for the calculation of percentage of marks as well as overall CGPA.

8.6 Students who fail to earn 184 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 from 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 Credits 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 ≥ 5 ('C' grade or above) in every subject/course in that semester (i.e. when student gets an SGPA ≥ 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 ≥ 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 who registers for all the specified subjects/ courses as listed in the course structure and secures the required number of 192 credits (with 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) ≥ 8.00, and fulfilling the following conditions shall be placed in **'first class with distinction'**.

i. Should have passed all the subjects/courses within the first 4 academic years (or 8 sequential semesters) from the date of commencement of first year first semester.
ii. Should have secured a CGPA ≥ 8.00, at the end of each of the 8 sequential semesters, starting from first year first semester onwards.

13.4 Students with final CGPA (at the end of the under graduate programme) ≥ 6.50 but < 8.00, 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 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'.**

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 2017-18

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 144 credits and secure 144 credits with CGPA ≥ 5 from II year to IV year B.Tech. programme (LES) for the award of B.Tech. degree. **Out of the 144 credits secured, the student can avail exemption up to 6 credits**, that is, one open elective subject and one professional elective subject or two professional elective subjects resulting in 138 credits for B.Tech programme performance evaluation.

3. The students, who fail to fulfil 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 shall be promoted from II year to III year upon fulfilling the minimum required attendance.

5.3 A student will be eligible to be promoted from II year to III year, upon fulfilling the academic requirements of 50 % credits up to II year I 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 50 % credits up to III year I 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 language in the answer paper or in letters to the	Cancellation of the performance in that subject.

	examiners or writes to the examiner requesting him to award pass marks.	
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.

* * * * *

PRE-REQUISITES FOR CORE ELECTIVES

Core Elective Number	Subject Code	Title of the Subject	Pre-Requisite Subject Code	Pre-Requisite Subject Title
1	R17A0411	Digital System Design	R17A0407	Switching Theory and Logic Design
	R17A0412	Design of Fault Tolerance Systems	R17A0407	Switching Theory and Logic Design
	R17A0204	Digital Control Systems	R17A0203	Control Systems
2	R17A0417	Electronic Measurements & Instruments	R17A0401	Electronic Devices and Circuits
	R17A0418	Optical Communications	R17A0011	Engineering Physics-1
	R17A0419	Data Communications	R17A0409	Analog Communications
3	R17A0423	Satellite Communications	R17A0409 R17A0413	Analog Communications Digital Communications
	R17A0425	Embedded System Design	R17A0414	Microprocessors and Microcontrollers
	R17A0425	Television Engineering	R17A0404	Pulse and Digital Circuits
4	R17A0426	Digital Image Processing	R17A0415	Digital Signal Processing
	R17A0427	Speech Processing	R17A0415	Digital Signal Processing
	R17A0428	Multimedia & Signal Coding	R17A0415	Digital Signal Processing
5	R17A0429	Radar Systems	R17A0416 R17A0421	Antennas and Wave Propagation Microwave Engineering
	R17A0430	DSP Architectures	R17A0415	Digital Signal Processing
	R17A0431	RF Circuit Design	R17A0421	Microwave Engineering
6	R17A0432	Wireless Communications & Networks	R17A0422	Cellular & Mobile Communication
	R17A0511	Network Security & Cryptography	R17A0509	Computer Networks
	R17A0433	Telecommunication Switching System & Networks	R17A0409 R17A0509	Analog Communications Computer Networks

ELECTRONICS & COMMUNICATION ENGINEERING

VISION

To evolve into a center of excellence in Engineering Technology through creative and innovative practices in teaching-learning, promoting academic achievement & research excellence to produce internationally accepted competitive and world class professionals.

MISSION

To provide high quality academic programmes, training activities, research facilities and opportunities supported by continuous industry institute interaction aimed at employability, entrepreneurship, leadership and research aptitude among students.

QUALITY POLICY

- Impart up-to-date knowledge to the students in Electronics & Communication area to make them quality engineers.
- Make the students experience the applications on quality equipment and tools.
- Provide systems, resources and training opportunities to achieve continuous improvement.
- Maintain global standards in education, training and services.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: PROFESSIONALISM & CITIZENSHIP

To create and sustain a community of learning in which students acquire knowledge and learn to apply it professionally with due consideration for ethical, ecological and economic issues.

PEO2: TECHNICAL ACCOMPLISHMENTS

To provide knowledge based services to satisfy the needs of society and the industry by providing hands on experience in various technologies in core field.

PEO3: INVENTION, INNOVATION AND CREATIVITY

To make the students to design, experiment, analyze, interpret in the core field with the help of other multi disciplinary concepts wherever applicable.

PEO4: PROFESSIONAL DEVELOPMENT

To educate the students to disseminate research findings with good soft skills and become a successful entrepreneur.

PEO5: HUMAN RESOURCE DEVELOPMENT

To graduate the students in building national capabilities in technology, education and research.

PROGRAMME SPECIFIC OBJECTIVES (PSOs)

PSO1

To develop a student community who acquire knowledge by ethical learning and fulfill the societal and industry needs in various technologies of core field.

PSO2

To nurture the students in designing, analyzing and interpreting required in research and development with exposure in multi disciplinary technologies in order to mould them as successful industry ready engineers/entrepreneurs

PSO3

To empower students with all round capabilities who will be useful in making nation strong in technology, education and research domains.

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design / development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi disciplinary environments.
12. **Life- long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

COURSE STRUCTURE

I Year B. Tech (ECE) – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX.MARKS	
						Int	Ext
1	R17A0001	English	2		2	30	70
2	R17A0021	Mathematics-I	3	1	4	30	70
3	R17A0011	Engineering Physics-I	2		2	30	70
4	R17A0013	Engineering Chemistry	3		3	30	70
5	R17A0501	Computer Programming With C	3		3	30	70
6	R17A0302	Engineering Drawing	3	3	4	30	70
7	R17A0581	Computer Programming Lab	-	3	2	25	50
8	R17A0083	Engineering Physics / Engineering Chemistry Lab	-	3	2	25	50
9	R17A0081	English Language Communication Skills Lab-1	-	3	2	25	50
		TOTAL	16	13	24	255	570

I Year B. Tech (ECE) – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX.MARKS	
						Int	Ext
1	R17A0002	Professional English	2		2	30	70
2	R17A0022	Mathematics-II	3	1	4	30	70
3	R17A0012	Engineering Physics-II	2		2	30	70
4	R17A0502	Object Oriented Programming	3		3	30	70
5	R17A0201	Electrical Circuits	3	1	4	30	70
6	R17A0014	Environmental Studies	3		3	30	70
7	R17A0582	Object Oriented Programming Lab	-	3	2	25	50
8	R17A0084	It Workshop/Engineering Workshop	-	3	2	25	50
9	R17A0082	English Language Communication Skills Lab-II	-	3	2	25	50
*10	R17A0003	Human Values And Societal Perspectives	2	-	-	50	-
		TOTAL	18	11	24	305	570

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

II Year B. Tech (ECE) – I Semester

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R17A0023	Mathematics-III	3	-	3	30	70
2	R17A0401	Electronic Devices and Circuits	4	-	4	30	70
3	R17A0402	Signals and Systems	4	-	4	30	70
4	R17A0403	Probability Theory and stochastic Process	3	-	3	30	70
5	R17A0261	Electrical Technology	3	-	3	30	70
6	R17A0061	Managerial Economics and Financial Analysis	3	-	3	30	70
7	R17A0481	Electronic Devices & Circuits Lab	-	3	2	25	50
8	R17A0482	Basic Simulation Lab	-	3	2	25	50
*9	R17A0004 R17A0005	Foreign Language: French Foreign Language: German	2	-	-	50	-
Total			22	06	24	280	520

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

II Year B. Tech (ECE) – II Semester

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R17A0206	Control Systems	3	-	3	30	70
2	R17A0404	Pulse and Digital Circuits	3	-	3	30	70
3	R17A0405	Electronic Circuit Analysis	3	1	4	30	70
4	R17A0406	Electromagnetic Theory and Transmission Lines	3	-	3	30	70
5	R17A0407	Switching Theory and Logic Design	3	1	4	30	70
6	********	Open Elective I	3	-	3	30	70
7	R17A0483	EC& PC Lab	-	3	2	25	50
8	R17A0291	Electrical Technology Lab	-	3	2	25	50
9	R17A0006	Gender Sensitization	-	3	-	50	-
Total			18	11	24	280	520

OPEN ELECTIVE I		
S.NO	SUBJECT CODE	SUBJECT
1	R17A0451	Digital Electronics
2	R17A0251	Elements of Electrical Engineering
3	R17A0551	Database Systems
4	R17A0351	Elements of Mechanical Engineering
5	R17A0352	Green Energy Systems
6	R17A0051	Intellectual Property Rights

III Year B. Tech (ECE) – I Semester

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R17A0408	IC Applications	3	1	4	30	70
2	R17A0409	Analog Communications	3	1	4	30	70
3	R17A0569	Computer Organization & Operating Systems	3	-	3	30	70
4	R17A0410	Digital System Design Through Verilog	3	-	3	30	70
5	********	Core Elective I	3	-	3	30	70
6	********	Open Elective II	3	-	3	30	70
7	R17A0484	IC Applications & HDL Simulation Lab	-	3	2	25	50
8	R17A0485	Analog Communications Lab	-	3	2	25	50
*9	R17A0007	Technical Communications and Soft Skills	3	-	-	50	-
Total			21	08	24	280	520

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

CORE ELECTIVE I		
S.NO	SUBJECT CODE	SUBJECT
1	R17A0417	Instrumentation Engineering
2	R17A0412	Television Engineering
3	R17A0204	Digital Control Systems

OPEN ELECTIVE II		
S.NO	SUBJECT CODE	SUBJECT
1	R17A0452	Industrial Electronics
2	R17A0453	Communication Networks
3	R17A0552	Introduction to JAVA Programming
4	R17A1251	Introduction to Scripting Languages
5	R17A1252	Software Project Management
6	R17A0353	Enterprise Resource Planning

III Year B. Tech (ECE) – II Semester

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R17A0413	Digital Communications	3	-	3	30	70
2	R17A0414	Microprocessors and Microcontrollers	3	1	4	30	70
3	R17A0415	Digital Signal Processing	3	1	4	30	70
4	R17A0416	Antennas and Wave Propagation	3	-	3	30	70
4	********	Core Elective II	3	-	3	30	70
6	********	Open Elective III	3	-	3	30	70
7	R17A0486	Microprocessors and Microcontrollers Lab	-	3	2	25	50
8	R17A0487	Digital Signal Processing Lab	-	3	2	25	50
Total			18	08	24	230	520

CORE ELECTIVE II		
S.NO	SUBJECT CODE	SUBJECT
1	R17A0418	Fibre Optical Communications
2	R17A0419	Information Theory & Coding
3	R17A0434	Sensors & Actuators

OPEN ELECTIVE III		
S.NO	SUBJECT CODE	SUBJECT
1	R17A0454	Robotics & Automation
2	R17A0455	Embedded Systems
3	R17A0520	Web Technologies
4	R17A0553	Data Structures
5	R17A0354	Nano Technology
6	R17A0355	Total Quality Management

IV Year B. Tech (ECE) – I Semester

S.No.	SUBJECT CODE	SUBJECT	L	T/P/D	C	Max. Marks	
						Int	Ext
1	R17A0420	VLSI Design	4	-	4	30	70
2	R17A0421	Microwave Engineering	4	-	4	30	70
3	R17A0422	Cellular & Mobile Communications	3		3	30	70
4	R17A05	Computer Networks	3		3	30	70
4	********	Core Elective III	3		3	30	70
5	*********	Core Elective IV	3		3	30	70
7	R17A0488	eCAD& VLSI Lab	-	3	2	25	50
8	R17A0489	Microwave Engineering & Digital Communications Lab	-	3	2	25	50
Total			20	6	24	230	520

CORE ELECTIVE III		
S.NO	SUBJECT CODE	SUBJECT
1	R17A0423	Satellite Communications
2	R17A0424	Embedded Systems Design
3	R17A0425	Design of Fault Tolerance Systems

CORE ELECTIVE IV		
S.NO	SUBJECT CODE	SUBJECT
1	R17A0426	Digital Image Processing
2	R17A0427	Speech Processing
3	R17A0428	Multimedia & Signal Coding

IV Year B. Tech (ECE) – II Semester

S.No.	Subject Code	SUBJECT	L	T/P/D	C	Max. Marks	
						Int	Ext
1	*********	Core Elective V	3	-	3	30	70
2	*********	Core Elective VI	3	-	3	30	70
3	R17A0490	Mini Project	-	-	4	-	100
4	R17A0491	Technical Seminar	-	6	2	50	-
5	R17A0492	Major Project	15	-	12	100	200
Total			21	6	24	210	440

CORE ELECTIVE V		
S.NO	SUBJECT CODE	SUBJECT
1	R17A0429	Radar Systems
2	R17A0430	Digital Signal Processors & Architectures
3	R17A0431	RF Circuit Design

CORE ELECTIVE VI		
S.NO	SUBJECT CODE	SUBJECT
1	R17A0432	Wireless Communications & Networks
2	R17A0433	Network Security & Cryptography
3	R17A0434	Telecommunication Switching Systems & Networks

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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

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(R17A0001) ENGLISH

INTRODUCTION:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking, and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

OBJECTIVES:

- To provide amateur engineers with the critical faculties necessary in an academic environment, using the theoretical and practical components of English syllabus.
- To upgrade the capability of analyzing of texts from different periods and genres.
- To improve the language proficiency of the students in English with emphasis on LSRW skills to face complex engineering activities at work place.
- To understand the basics of grammar to speak correct English and communicate effectively both formally and informally.

SYLLABUS:

Listening Skills:

Objectives

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions. Students should be given practice in listening to the sounds of the language to be able to recognize them, to distinguish between them to mark stress and recognize and use the right intonation in sentences.
   • Listening for general content

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

Speaking Skills:

Objectives

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

Reading Skills:

Objectives

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

NOTE:

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

Writing Skills:

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill
2. To equip them with the components of different forms of writing, beginning with the lower order ones.
   - Writing sentences
   - Use of appropriate vocabulary
   - Paragraph writing
   - Coherence and cohesiveness
   - Narration / description
   - Note Making

- Formal and informal letter writing
- Describing graphs using expressions of comparison

TEXTBOOKS PRESCRIBED:

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following text and course content, is prescribed for this semester.

Textbook titled "Epitome of Wisdom", published by Maruthi Publications, Hyderabad.

Unit –I

Chapter entitled 'Mokshagundam Visvesvaraya' from *Epitome of Wisdom*

and

Listening – Conversations – introducing each other, talking about a course
Speaking – Jam sessions
Reading – The Palm Islands
Writing – Writing Paragraphs
Grammar – Conjunctions and Adverbs
Vocabulary – Prefixes and Suffixes

Unit – II

Chapter entitled "Three Days to See" from *Epitome of Wisdom*

and

Listening –Conversations-planning for an outing
Speaking –Telephone Etiquettes
Reading – Physically challenged athletes
Writing – Memo writing
Grammar –Modal Auxiliaries
Vocabulary – Synonyms & antonyms

Unit – III

Chapter entitled "The Road Not Taken" from *A Selection of Robert Frost's Poems (Owl Book)*, by Holt Paperbacks: 2 Revised Edition. 2002.

and

Listening – News items
Speaking – Public speaking
Reading – 'If' poem
Writing – Letter writing-formal/informal
Grammar – Knowing with questions (Wh –questions,) Question tags
Vocabulary –Similes and Metaphors

Unit – IV

Chapter entitled "The Last Leaf" from *Epitome of Wisdom*

and

Listening – Speech on environmental conservation

Speaking – Group discussion
Reading – Choose how to start your day
Writing – Writing a narrative
Grammar –Prepositions
Vocabulary – Idioms and one-word substitutes

Unit –V

5. Chapter entitled "The Convocation Speech" from *Epitome of Wisdom*

and

Listening – Speech on 'How do you make a teacher great'?
Speaking –Role plays
Reading – What is meant by entrepreneurship?
Writing – Essay writing
Grammar – Active voice and Passive voice
Vocabulary – Phrasal verbs

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

REFERENCES:

1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi. 2010.
2. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.
3. English Grammar Practice, Raj N Bakshi, Orient Longman.
4. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
5. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson.
6. Handbook of English Grammar& Usage, Mark Lester and Larry Beason, Tata Mc Graw – Hill.
7. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
8. Technical Communication, Meenakshi Raman, Oxford University Press
9. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
10. Grammar Games, Renuvolcuri Mario, Cambridge University Press.

OUTCOMES:

- Acquire and apply the critical thought process effectively on complex engineering activities.
- Utilize the analytical capability to comprehend and design any text effortlessly.
- Imbibe the English proficiency to receive clear instructions, make notes and draft letters vividly.
- Identify the basic grammatical structures and its application accurately to communicate with society at large.

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I Year B. Tech ECE -I Sem	L	T/P/D	C
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(R17A0021) MATHEMATICS – I

Objectives:

To learn

- Concept of rank of a matrix and applying the concept of rank to know the consistency of linear equations and to find all possible solutions if exist and concept of eigen values and eigen vectors of a matrix
- The mean value theorems and to understand the concepts geometrically , functions of several variables and optimization of these functions.
- Methods of solving the differential equations of first and higher order ,Newton's law of cooling, Natural growth and decay, bending of beams etc.
- 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: Matrix Theory

Introduction to matrices- Rank of a matrix - Finding rank of a matrix by reducing to Echelon and Normal forms-Consistency of system of linear equations (homogeneous and non-homogeneous) using the rank of a matrix-Cayley - Hamilton Theorem (without proof) – Verification- finding inverse of a matrix and powers of a matrix by Cayley-Hamilton theorem-Linear dependence and Independence of Vectors- Eigen values and eigen vectors of a matrix-Properties of eigen values and eigen vectors of real and complex matrices-Diagonalization of a matrix.

UNIT – II: Differential Calculus

Mean Value Theorms: Rolle's Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value theorems with geometrical interpretations (all theorems without proof)- verification of the Theorems and testing the applicability of these theorems to the given function-Taylor's series -Maclaurin's series.

Functions of Several Variables: Jacobian-Functional dependence- Maxima and Minima of functions of two variables without constraints and with constraints - Method of Lagrange multipliers.

UNIT – III: Ordinary Differential Equations of First Order and Applications

Introduction to ordinary differential equation - Variable Separable form- Homogeneous-Non homogeneous- Exact-Non Exact-Linear and Bernoulli's equations-Applications of first order differential equations – Newton's Law of cooling- Law of natural growth and decay-Orthogonal trajectories.

UNIT - IV: Linear Differential Equations of Higher Order and Applications

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-Applications to bending of beams, Electrical circuits and simple harmonic motion.

UNIT – V : Vector Calculus

Introduction- Scalar point function and vector point function, Gradient- Divergence- Curl and their related properties - Laplacian operator, Line integral – work done – Surface integrals -Volume integral. Green's Theorem,Stoke's theorem and Gauss's Divergence Theorems (Statement & their Verification).

TEXT BOOKS:

1. "Mathematics – I", Special Edition – MRCET, Mc Graw Hill Publications, 2017
2. Engineering Mathematics – I by T.K.V Iyenger ,B.Krishna Gandhi and Others ,S Chand Publishers.

REFERENCES:

1. Engineering Mathematics by P. Sivaramakrishna Das, Pearson Publishers.
2. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.

Outcomes:

- After learning the contents the student is able to write the matrix representation of a set of linear equations and to analyze solutions of system of equations.
- The student will be able to understand the methods of differential calculus to optimize single and multivariable functions.
- The student is able to identify the type of differential equation and uses the right method to solve the differential equations. Also able to apply the theory of differential equations to the real world problems.
- The student will be able to evaluate multiple integrals(line, surface volume integrals) and convert line integrals to area integrals and surface integrals to volume integrals.

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(R17A0011) ENGINEERING PHYSICS – I

OBJECTIVES:

- The information in optics is required for engineering technology students to understand wave nature of light for applying accurate measurements by means of optical instruments.
- From the study of quantum and statistical aspects dual behavior of electron and solid state physics can be realized by the engineering students.
- The basic information regarding electrons and holes and their functioning in semiconductors is evident to the students. The semiconductor devices provide basic information for the present communication system

UNIT-I

OPTICS:

Interference-Coherence-Coherent sources, Constructive and destructive interference. Theory of interference fringes(Expression for band width). Interference in thin films by reflected light, Newton's rings Experiment. Diffraction-Types of diffraction, Difference between interference and diffraction, Fraunhofer's diffraction (Single Slit), Diffraction grating, Polarization, Types of polarization, Double Refraction, Nicol Prism.

UNIT-II

LASERS:

Characteristics of lasers, Spontaneous and Stimulated emissions, Einstein's Coefficients, Population inversion, Meta stable state, pumping, lasing action, Construction and working of Ruby Laser, Helium-Neon Laser, Semi conductor lasers, Applications of lasers.

FIBER OPTICS:

Construction and Working Principle of an optical fiber, Advantages of optical fibers, Numerical aperture and Acceptance angle, Types of Optical fibers - Mode and Propagation through step and graded index fibers, Optical Fiber Communication System, Attenuation, Applications of optical fibers.

UNIT-III

PRINCIPLES OF QUANTUM MECHANICS:

Wave nature and particle nature-de Broglie's Hypothesis, GP Thomson's Experiment, Davisson and Germer's experiment, Matter Waves, Heisenberg's uncertainty principle, physical significance of wave function, Schrodinger time-independent wave equation, Particle in One dimensional infinite potential box.

UNIT-IV

ELEMENTS OF STATISTICAL MECHANICS & BAND THEORY OF SOLIDS:

Micro and Macro states, Maxwell Boltzmann, Bose Einstein, Fermi Dirac Statistical distributions (Qualitative), Density of States, Fermi Energy, Introduction to electron theory of metals, Bloch Theorem (Qualitative), Kronig Penny model(Qualitative), EK curve (Brillouin Zone)-Effective mass of electron, Origin of energy bands in solids, Classification of solids-conductors, semi conductors and insulators.

UNIT-V

SEMICONDUCTOR PHYSICS:

Types of semi conductors**,** Carrier concentration and Fermi level of intrinsic and Extrinsic Semiconductors, Hall Effect and applications, Direct and indirect band gap of semiconductors.

SEMICONDUCTOR DEVICES:

Formation of PN junction diode, Energy level diagram of PN junction diode. V-I characteristics of PN junction diode- PN junction diode as LED and Solar cell.

TEXT BOOKS:

1. Engineering Physics - S Mani Naidu- Pearson Publishers.
2. A Text Book of Engineering Phyiscs- P.G. Kshirsagar, Avadhanulu – S.Chand

REFERENCES:

1. Solid State Physics, Kittel- Wiley International.
2. Solid State Physics – AJ DekKer-Macmillan Publishers.
3. Engineering Physics, P.K. Palaniswamy, Scitech Publishers

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(R17A0013)ENGINEERING CHEMISTRY

Objectives

- To impart the basic concepts and ideas in chemistry, to develop scientific attitudes and enable the students to correlate the concepts of chemistry with the core programmes.
- *Electrochemistry unit give conceptual knowledge about spontaneous processes and how can they be harnessed for producing electrical energy and efficiency of systems. Fuel cells which are the alternate energy sources for generating electrical energy on spot and portable applications.*
- *Understand various techniques involved in polymerization and application of polymer technology in the area of various engineering fields and manufacturing process of important metallurgical materials.*

UNIT I: Electrochemistry: Conductance - Specific, Equivalent, Molar conductance and their unit, Applications of Conductance-Conductometric titrations (Acid base and Precipitation titrations); EMF-electrode and electrode potentials; Nernst equation and its applications; Electrochemical cells-Galvanic cell (Daniel cell) and Concentration cell (electrolytic concentration cell); Types of Electrodes–(construction and functioning of Calomel, Quinhydrone and Glass electrodes); determination of P^H using glass electrode; Potentiometric titrations (Acid Base and Redox titrations); electrochemical series and its applications; Numerical problems on conductance.

Batteries: Primary (Lithium cells) and Secondary cells (Lead-Acid cell and Ni-Cd cell); **Fuel cells** - Hydrogen -Oxygen fuel cell and Methanol-Oxygen fuel cell - construction, functioning, advantages and applications.

Unit II: Corrosion and its Control: Causes and effects of corrosion; Theories of corrosion – Chemical corrosion (oxidation corrosion) & Electrochemical corrosion (mechanism of evolution of Hydrogen and Absorption of oxygen); Galvanic corrosion; Factors affecting rate of corrosion – Nature of metal (position of metal in galvanic series, overvoltage, relative areas of anodic and cathodic parts, purity of metal and passivity) and Nature of environment (temperature, humidity and pH effect)

Corrosion control methods: Cathodic protection (Sacrificial Anodic and Impressed Current Cathodic protection). Surface coatings: Metallic coatings & methods of application of metallic coatings - hot dipping (galvanization & tinning), cladding, electroplating (Cu plating) and Electroless plating (Ni plating) – advantages and applications of electroplating/electroless plating.

UNIT- III: Engineering Materials

Polymers: Classification of Polymers, Types of Polymerization (Chain growth, Step growth & Zeigler Natta) **Plastics:** Thermoplastic & Thermosetting resins, Preparation, properties, engineering applications of PVC, Teflon and Bakelite. **Fibers-** Characteristics of fibers – preparation, properties and uses of Nylon – 6,6 and Dacron – Fiber Reinforced Plastics (FRP) – applications. **Rubbers**–Natural rubber and its vulcanization; **Elastomers**–Buna-S and Butyl rubber; **Conducting polymers:** Polyacetylene-Mechanism of conduction, doping; applications of conducting polymers; **Bio-degradable Polymers:** preparation and applications of Poly vinylacetate and Poly lactic acid.

Lubricants: Characteristics of a good lubricant; Classification with examples; properties of lubricants: viscosity, cloud point, pour point, flash and fire point.

Refractories: Classification of refractories with examples, characteristics of a good refractory and applications of refractories.

Nanomaterials: Introduction and applications of nanomaterials.

UNIT IV: Water and its Treatment:

Hardness of Water: Causes of hardness, types of hardness, units of hardness; determination of hardness of water by EDTA method - numerical problems. Boiler troubles – Scales & Sludges, Priming, Foaming, and Caustic Embrittlement; Treatment of boiler feed water – Internal treatment (Phosphate, Colloidal and Calgon conditioning); External treatment– Zeolite process and Ion exchange process; **Potable Water**-Its Specifications–Disinfectation of water by ozonisation, chlorination (break point chlorination and its significance); Reverse Osmosis.

UNIT V: Fuels

Fuels – Characteristics of a good fuel, Classification – Solid fuels: Coal – analysis of coal - proximate and ultimate analysis and their significance, Liquid fuels – petroleum and its refining; Cracking – Fixed bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol- Fischer-Tropsch's process: Gaseous fuels - constituents, characteristics and applications of Natural gas, LPG and CNG; Calorific value of fuel – HCV, LCV; Determination of calorific value by Junker's gas calorimeter.

TEXT BOOKS:

1. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company 14th Edition (2013)
2. Engineering Chemistry by B. Rama Devi, Ch. Venkataramana Reddy and R.P. Mani, CENGAGE learning (2016)

REFERENCE BOOKS

1. Engineering Chemistry by M. Thirumala Chary and E. Laxminarayana, Scitech publications (2016).
2. Engineering Chemistry by Bharathi Kumari and Jyotsna Cherukuri, VGS Techno Series (2016).

Course Outcomes:

- Familiarize the student with the fundamentals of the treatment technologies and the considerations for its design and implementation in water treatment plants.
- 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.
- Be able to apply core concepts in Materials Science to solve engineering problems
- To learn about types of fuels and their characteristics, and combustion systems with emphasis on engineering applications.
- Recently modern materials synthesized find applications in industry and creating instruments for solving problems of electronics, telecommunications, health care, agriculture, and technology etc., In order to emphasize the above the topics like composite materials, polymers, conducting polymers and nanomaterials have been incorporated in the curriculum.

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(R17A0501) COMPUTER PROGRAMMING WITH C

Objectives

- To understand the various steps in Program development.
- To understand the basic concepts in C Programming Language.
- To learn how to write modular and readable C Programs
- To learn to write programs (using structured programming approach) in C to solve problems.
- To introduce the students to basic data structures such as lists, stacks and queues.
- To make the student understand simple sorting and searching methods

UNIT - I

Introduction to Computing – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Software Development Life Cycle, Algorithm, Flowchart.

Introduction to C – History of C, Features Of C, Structure Of C Program, Character Set, C Tokens-keywords, Identifiers, Constants, Data types, Variables, Operators, Expressions, Precedence and Associativity, Expression Evaluation, Type conversion, Statements- Selection Statements(Decision Making) – if and switch statements, Repetition statements (loops)- while, for, do-while statements, other statements related to looping –break, continue, goto.

UNIT-II

Functions-Designing Structured Programs, Types of Functions- user defined functions, Standard Functions, Inter function communication, Categories of functions ,Parameter Passing techniques, Scope, Storage classes-auto, register, static, extern, Type qualifiers, Recursion- recursive functions, Preprocessor commands.

UNIT – III

Arrays – Declaration and Initialization, Arrays with functions , Array Applications, Two dimensional arrays, Multi dimensional arrays.

Strings – Declaration and Initialization, String Input / Output functions, Arrays of strings, String manipulation functions.

UNIT-IV

Pointers- Introduction, Definition and uses of pointers, address operator, Pointer variables, Pointer constants , void pointers, Pointer arithmetic, Pointers to Pointers, Pointers with Arrays, Pointers with Functions, Pointers to functions, Array of pointers, Pointers with Strings. Dynamic Memory Management functions: malloc(), calloc(), realloc() and free()

UNIT-V

Structures and Unions - **I**ntroduction, Declaration and Initialization, Structure within a structure, Operations on structures, Array of Structures, Pointer to Structures, Structures with Functions, Self referential structures, Typedef, enum, bitfields, Unions.

Files – Concept of a file, Streams, Text files and Binary files, Opening and Closing files, File input / output functions, File Status functions (Error handling), Positioning functions, Command line arguments.

TEXT BOOKS:

1. "Computer Programming with C", Special Edition – MRCET, McGraw Hill Publications, 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.

Outcomes:

- Demonstrate the basic knowledge of computer hardware and Software.
- Ability to apply solving and logical skills to programming in C language and also in other languages.

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I Year B. Tech ECE -I Sem

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(R17A0302) ENGINEERING DRAWING

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.

TEXT BOOKS

1. "Engineering Drawing", Special Edition – MRCET, McGraw Hill Publications, 2017.
Engineering Drawing, N.D. Bhatt
3. Engineering Drawing by K.Venu Gopal& V.Prabu Raja New Age Publications.

REFERENCES

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

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(R17A0581) COMPUTER PROGRAMMING LAB

Objectives:

- Understand the basic concept of C Programming, and its different modules that includes conditional and looping expressions, Arrays, Strings, Functions, Pointers, Structures and File programming
- 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.
- Concept of Array and pointers dealing with memory management.
- Structures and unions through which derived data types can be formed
- File Handling for permanent storage of data or record.
- 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.

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

Week 2:

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

b)Write a C program to Check whether given number is Armstrong Number or Not.

c) Write a C program to evaluate algebraic expression (ax+b)/(ax-b).

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 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 length of the string using Pointer.

Week 13:

a) Write a C program to Display array elements using calloc( ) function.

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

Week 14:

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

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

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

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

Week 15:

a)Write a C program to copy the contents of one file to another.

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

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

Week 16:

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.

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
- Learn File Handling for permanent storage of data or record.

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(R17A0083) ENGINEERING PHYSICS / ENGINEERING CHEMISTRY LAB

ENGINEERING PHYSICS LAB

(Any EIGHT experiments compulsory)

OBJECTIVES

- The students are exposed to various experimental skills which is very essential for an Engineering student.
- The experiments are selected from various areas of physics like physical optics, Lasers, Fiber optics, Sound, Mechanics, Electricity & Magnetism and Basic Electronics.
- The students are exposed to various tools like Screw gauge, Vernier calipers, and physics.

OUTCOMES

- The student learns the concept of error and its analysis and try formulate new solutions to problems related to engineering physical balance, Spectrometer and Microscope.
- The student develops experimental skills to design new experiments in Engineering that accelerates development of society considering the public health and safety of society.
- Comprehension power of the engineering student increases with exposure to these experiments that helps them to compare the theory and correlate with experiment.

This course on physics lab is designed with 12 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. Dispersive power of the material of a prism - Spectrometer.
2. Wave length of light –Diffraction grating-using laser.
3. Newton's Rings –Radius of curvature of Plano convex lens.
4. Melde's experiment –Transverse and Longitudinal modes.
5. Time Constant of an R-C circuit.
6. L-C-R circuit.
7. Magnetic field along the axis of current carrying coil – Stewart and Gee's method.
8. Study the characteristics of LED.
9. Evaluation of numerical aperture of given fiber.
10. Energy gap of a material of p-n junction.
11. Rigidity modulus of given wire - Torsional pendulum.

12. Characteristics of a Solar cell.

ENGINEERING CHEMISTRY LAB

List of Experiments (Any Eight experiments compulsory)

OBJECTIVES

This course on chemistry lab is designed with 12 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.

OUTCOMES

- Students are able to estimate the total hardness and alkalinity present in a sample of water.
- Ability to select lubricants for various purposes.
- Ability to determine the surface tension of a given liquid.
- Ability to prepare advanced polymer materials.
- Ability to know the strength of an acid by conductometric and potentiometric method.
- Ability to find the $Fe^{+2,}$ and Mn^{+2} present in unknown substances/ ores using titrimetric and instrumental methods.

List of Experiments

Titrimetry:

1. Estimation of hardness of water by EDTA method.
2. Estimation of alkalinity of water.

Mineral analysis:

3. Estimation of manganese dioxide in pyrolusite.

Instrumental Methods:

Colorimetry:

4. Determination of ferrous iron in cement by colorimetric method

Conductometry:

5. Conductometric titration of strong acid vs strong base.
6. Conductometric titration of mixture of acids vs strong base.

Potentiometry:

7. Titration of strong acid vs strong base by Potentiometry.
8. Titration of weak acid vs strong base by Potentiometry.

Preparation:

9. Preparation of Phenol Formaldehyde Resin(Bakelite)-Demonstration
10. Preparation of Aspirin.

Physical properties:

11. Determination of Viscosity of sample oil by Redwood Viscometer.
12. Determination of Surface Tension of a given liquid by Stalagmometer

TEXT BOOKS:

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Inorganic quantitative analysis, Vogel.

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R. N. Goyal and HarrmendraGoel, Ane Books
2. Private Ltd.,
3. A text book on experiments and calculation Engg. S.S. Dara.
4. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

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(R17A0081) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB - I

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

Objective:

- To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
- To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
- To bring about a consistent accent and intelligibility in their pronunciation, ample speaking opportunities are provided.
- To improve the fluency in spoken English and neutralize mother tongue influence
- To train students to use language appropriately for interviews, group discussions and public speaking

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

UNIT –II

CALL Lab: Pronunciation: Past Tense Markers and Plural Markers, Mispronounced sounds, Silent letters

ICS Lab: Situational Dialogues/Role Plays – Informal

UNIT -III

CALL Lab: Syllable and Syllabification
ICS Lab: Situational Dialogues/Role Plays – Formal

WORKSHEETS FOR LETTER WRITING

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.

DISTRIBUTION AND WEIGHTAGE OF MARKS

English Language Laboratory Practical Examination:

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year-end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the other institution.

OUTCOMES:

- Learning with precision through computer-assisted individualized and independent language learning to work independently in engineering set up.
- Improved conversational reception and articulation techniques in the course of repetitive instruction thereby gaining confidence both in institutional and professional environment.
- Accuracy in pronunciation and restoring Standard English thereby crafting better command in English language so that the students have a cutting edge over others in society.
- Imbibing appropriate use of language in situations to work as an individual and as o leader in diverse teams

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(R17A0002) PROFESSIONAL ENGLISH

INTRODUCTION:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking, and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

OBJECTIVES:

- Provide amateur engineers with the critical faculties necessary in an academic environment, using the theoretical and practical components of English syllabus.
- Upgrade the capability of analyzing of texts from different periods and genres.
- Improve the language proficiency of the students in English with emphasis on LSRW skills to face complex engineering activities at work place.
- Understand the basics of grammar to speak correct English and communicate effectively both formally and informally.

SYLLABUS:

Listening Skills:

Objectives

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions. Students should be given practice in listening to the sounds of the language to be able to recognize them, to distinguish between them to mark stress and recognize and use the right intonation in sentences.
   - Listening for general content
   - Listening to fill up information
   - Intensive listening

- Listening for specific information

Speaking Skills:
Objectives

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

Reading Skills:
Objectives

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

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

Writing Skills:
Objectives

1. To develop an awareness in the students about writing as an exact and formal skill
2. To equip them with the components of different forms of writing, beginning with the lower order ones.
   - Writing sentences
   - Use of appropriate vocabulary
   - Paragraph writing
   - Coherence and cohesiveness
   - Narration / description
   - Note Making
   - Formal and informal letter writing
   - Describing graphs using expressions of comparison

TEXTBOOKS PRESCRIBED:

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following text and course content is prescribed.

Text book entitled "Skills Annexe: Functional English for Success", published by Orient Black Swan, Hyderabad.

UNIT-I

Chapter entitled "Of parents and children" from *"The essays of Francis Bacon"*, paperback-Import, 11 Oct 2008.

and

Listening – Listening for the theme and gist
Speaking – Describing situations and objects
Reading – Why pure science in India lags behind? – By P Rajendran
Writing – Note-taking and Note-making
Grammar – Nouns and Articles
Vocabulary – Homonyms, Homographs, Homophones

Unit –II

Chapter entitled "Sachin Tendulkar" from *Skills Annexe -Functional English for Success*,

and

Listening – listening for opinions
Speaking – Project Oral Presentations
Reading – Benefits of physical activity
Writing – Report writing
Grammar – Common Errors
Vocabulary –Technical Vocabulary

Unit –III

Job applications: Cover letter & Curriculum vitae

and

Listening – listening for main and sub-points
Speaking –Giving directions and instructions
Reading – Editorial letters from newspapers
Writing –Formal letter writing
Grammar – Tenses
Vocabulary – Collocations

Unit – IV

Chapter entitled "Human Values and Professional Ethics" from *Skills Annexe -Functional English for Success*

and

Listening – Listening for details
Speaking – Talking about hypothetical situations
Reading – What I Cherish Most
Writing – E-mail writing
Grammar – Types of verbs: Transitive, Intransitive, Ergative, finite and non – finite
Vocabulary – Commonly confused words

Unit – V

Chapter entitled "The fringe benefits of failure and the importance of imagination" a speech by J.K. Rowlings

and

Listening – listening for information
Speaking – Oral Presentations
Reading – The one thing every business executive must understand about social media
Writing –Picture composition
Grammar – Concord
Vocabulary –Commonly misspelt Words

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

REFERENCES:

1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi. 2010.
2. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.
3. English Grammar Practice, Raj N Bakshi, Orient Longman.
4. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
5. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson.
6. Handbook of English Grammar& Usage, Mark Lester and Larry Beason, Tata Mc Graw –Hill.
7. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
8. Technical Communication, Meenakshi Raman, Oxford University Press
9. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
10. Grammar Games, Renuvolcuri Mario, Cambridge University Press.

OUTCOMES:

- Acquire and apply the critical thought process effectively on complex engineering activities.
- Utilize the analytical capability to comprehend and design any text effortlessly.
- Imbibe the English proficiency to receive clear instructions, make notes and draft letters vividly.
- Identify the basic grammatical structures and its application accurately to communicate with society at large.

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I Year B.Tech ECE -II SEM	L	T/P/D	C
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(R17A0022)MATHEMATICS-II

Objectives

- The objective of interpolation is to find an unknown function which approximates the given data points and the objective of curve fitting is to find the relation between the variables x and y from given data and such relationships which exactly pass through the data (or) approximately satisfy the data under the condition of sum of least squares of errors.
- 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 and to solve differential equations.
- In the diverse fields like electrical circuits, electronic communication, mechanical vibration and structural engineering, periodic functions naturally occur and hence their properties are very required. Indeed, any periodic and non periodic function can be best analyzed in one way by Fourier series method.
- PDE aims at forming a function with many variables and also their solution methods .Method of separation of variables technique is learnt to solve typical second order PDE.
- Properties of Laplace Transform, Inverse Laplace Transform and Convolution theorem

UNIT – I: Solution of Algebraic, Transcendental Equations and Interpolation

Solution of Algebraic and Transcendental Equations: Introduction – Graphical interpretation of solution of equations .The Bisection Method – Regula-Falsi Method – The Iteration Method – Newton-Raphson Method.

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

UNIT – II : Numerical techniques

Numerical integration: Generalized Quadrature-Trapezoidal rule, Simpson's $1/3^{rd}$ and $3/8^{th}$ Rule.

Numerical solution of Ordinary Differential equations: Solution by Taylor's series method – Picard's Method of successive Approximation- single step methods-Euler's Method-Euler's modified method, Runge-Kutta Methods.

Curve fitting: Fitting a straight line –Second degree curve-exponential curve-power curve by method of least squares.

UNIT – III: Fourier series

Definition of periodic function. Fourier expansion of periodic functions in a given interval of length 2π. Determination of Fourier coefficients – Fourier series of even and odd functions – Half-range Fourier sine and cosine expansions-Fourier series in an arbitrary interval .

UNIT-IV: Partial differential equations

Introduction -Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) 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 and Applications

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 – second shifting theorem – Dirac's delta 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.

PRESCRIBED TEXT BOOKS:

1. "Mathematics-II", Special Edition – MRCET, McGraw Hill Publications, 2017

2. Mathematical Methods by T.K.V Iyenger ,B.Krishna Gandhi and Others ,S Chand.

REFERENCES:

1. Introductory Methods by Numerical Analysis by S.S. Sastry, PHI Learning Pvt. Ltd.

2. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.

Outcomes:

- From a given discrete data, one will be able to predict the value of the data at an intermediate point and by curve fitting, one can find the most appropriate formula for a guesses relation of the data variables. This method of analysis data helps engineers to understand the system for better interpretation and decision making.
- The student will be able to find a root of a given equation and will be able to find a numerical solution for a given differential equation. Helps in describing the system by an ODE, if possible. Also, suggests to find the solution as a first approximation.
- One will be able to find the expansion of a given function by Fourier series.
- One will be able to find a corresponding Partial Differential Equation for an unknown function with many independent variables and to find their solution.
- The student is able to solve certain differential equations using Laplace Transform. Also able to transform functions on time domain to frequency domain using Laplace transforms

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(R17A0012) ENGINEERING PHYSICS-II

OBJECTIVES:

- To understand the basics of bonding in solids, crystal structures and characterization techniques.
- To make the students aware of X-ray diffraction and different techniques of it.
- To understand the behavior of dielectric materials, magnetic materials and nano materials.

UNIT-I

BONDING IN SOLIDS:

Types of bonds - Primary, Secondary, Forces between atoms, Expression for cohesive energy between two atoms**.**

CRYSTALLOGRAPHY:

Space lattice, Basis, Unit cell, lattice parameters, Crystal systems, Bravais lattices, Atomic number, coordination number, packing factor of SC,BCC,FCC crystals, Crystal planes and directions - Miller indices. Expression for inter planar distance in cubic crystal, Structure of NaCl and Diamond.

UNIT- II

X-RAY DIFFRACTION:

Bragg's law**,** Experimental techniques -Laue's method, powder method**,** Applications of x-ray diffraction.

DEFECTS IN CRYSTALS:

Classification of crystal defects**,** Point defects-Vacancies & Interstitials, Concentrations of Schottky and Frenkel defects, Line defects- edge dislocation and screw dislocation**,** Burger's vector.

UNIT-III

DIELECTRIC PROPERTIES:

Electric dipole, Dipole moment, Polarization vector (P), Displacement vector (D), Dielectric constant (K), Electric susceptibility (χ), Types of polarizations-Expression for Electronic and Ionic polarization, Internal fields in dielectrics, Classius Mosotti relation, Piezo electricity and Ferro electricity, Applications of dielectric materials.

UNIT-IV

MAGNETIC PROPERTIES:

Magnetic permeability, Field intensity, Magnetic field induction, Magnetization, Magnetic susceptibility, Origin of Magnetic moment - Bhor magneton**,** Classification of magnetic materials-Dia, Para and Ferro**,** Ferri and Anti ferro magnetic materials,

Explanation of Hysteresis loop on the basis of domain theory of ferromagnetism. Soft and hard magnetic materials.

SUPER CONDUCTIVITY:

Super conductivity, Properties of super conductors, Meissner effect**,** Types –I Type-II super conductors**,** Applications of super conductors.

UNIT-V

NANO SCIENCE & NANO TECHNOLOGY:

Nano scale, Types of Nano materials, Surface to volume ratio and Quantum confinement, Bottom up Fabrication- Sol gel ,Top down Fabrication- Physical Vapour Deposition, Characterisation of Nano particles –TEM and SEM, Applications of Nano materials.

TEXT BOOKS:

1. Engineering Physics - S Mani Naidu- Pearson Publishers.
2. A Text Book of Engineering Phyiscs- P.G. Kshirsagar, Avadhanulu – S.Chand

REFERENCES:

1. Solid State Physics, Kittel- Wiley International.
2. Solid State Physics – AJ DekKer-Macmillan Publishers.
3. Engineering Physics, P.K. Palaniswamy, Scitech Publishers

OUTCOMES:

- The students would be able to learn the fundamental concepts on behavior of crystalline solids.
- The student will be able to think about the applications of dielectric, magnetic and nano materials.
- Finally Engineering physics course helps the student to develop problem solving skills and analytical skills.

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(R17A0502)OBJECT ORIENTED PROGRAMMING THROUGH C++

Objectives

- To teach the student the concepts of object oriented and generic programming.
- To differentiate between object oriented programming andprocedural programming.
- To design applications using object oriented features
- To teach the student to implement object oriented concepts

UNIT I

Concepts of 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, identifiers, variables, constants, enum, operators, typecasting, 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, Default Arguments,Friend Functions

UNIT-III

Constructors, Destructors, Inheritance:

Introduction to Constructors, Parameterized Constructors, Multiple Constructors in a Class, Constructors with Default Arguments, Dynamic initialization of Objects, Copy Constructors, Dynamic Constructors, Destructors.

Inheritance : Introduction to inheritance, Defining Derived Classes, Single Inheritance, Multiple Inheritance, Multi-Level Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Constructors in Derived Classes.

UNIT-IV

Pointers, Virtual Functions and Polymorphism:

Introduction, Memory Management, new Operator and delete Operator, Pointers to Objects, this Pointer, Pointers to Derived Classes, Polymorphism, compile time polymorphism, Run time polymorphism, Virtual Functions, Pure Virtual Functions, Abstract Classes, Virtual Base Classes, Virtual Destructors. Function Overloading, Operator overloading, Rules for Operator overloading, overloading of binary and unary operators .

UNIT-V

Templates and Exception handling:

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

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" Special Edition – MRCET, McGraw Hill Publications, 2017
2. Object Oriented Programming with C++ by Balagurusamy.

REFERENCES:

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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(R17A0201)ELECTRICAL CIRCUITS

Objective:

This course introduces the basic concepts of network and circuit analysis which is the foundation of the Electrical Engineering discipline. The emphasis of this course if laid on the basic analysis of circuits which includes network analysis, single phase AC circuits, network theorems and magnetic circuits.

UNIT-I

Introduction to Electrical Circuits: Concept of Network and Circuit, Types of elements, Types of sources, Source transformation. R-L-C Parameters, Voltage–Current relationship for Passive Elements (for different input signals –Square, Ramp, Saw tooth and Triangular), Kirchhoff's Laws.

UNIT-II

Network Analysis: Network Reduction Techniques-Resistive networks, Inductive networks and capacitive networks- Series, Parallel, Series-Parallel combinations, Star–to-Delta and Delta-to-Star Transformation. Mesh Analysis and Super mesh, Nodal Analysis and Super node for DC Excitation. Network topology-Definitions, Graph, Tree, Basic Cut set and Basic Tie set Matrices for Planar Networks.

UNIT-III

Single Phase A.C. Circuits: Average value, R.M.S. value, form factor and peak factor for different periodic wave forms. J-notation, 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.

UNIT-IV

Network Theorems (D.C&A.C): Thevenin's, Norton's, Maximum Power Transfer, Superposition, Reciprocity, Tellegen's, Substitution, Compensation and Milliman's theorems.

UNIT-V

MAGNETIC CIRCUITS: Faraday's laws of electromagnetic induction, concept of self and mutual inductance, dot convention, coefficient of coupling, composite magnetic circuit, analysis of series and parallel magnetic circuits.

TEXT BOOKS:

1. "Electrical Circuits", Special Edition – MRCET, McGraw Hill Publications, 2017
2. Electric Circuits - A.Chakrabarhty, Dhanpat Rai & Sons.
3. A Text book of Electrical Technology by B.L Theraja and A.K Theraja, S.Chand publications.

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. Principles of Electrical Engineering by V.K Mehta,RohitMehta,S.Chand publications.

Outcome:

After going through this course the student gets a thorough knowledge on basics of network and circuit concepts, circuit elements, network analysis, single phase AC circuits, network theorems, magnetic circuits with which he/she can able to apply the above conceptual things to real-world problems and applications

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(R17A0014)ENVIRONMENTAL STUDIES

Objectives:

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations

UNIT-I

Introduction: Definition of Environment and multidisciplinary nature of environmental sciences.

Ecosystems: Definition, structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles (Carbon, Nitrogen, Water cycle) Bioaccumulation and Biomagnification with examples.

UNIT-II

Natural Resources: Classification of Resources: water resources:types: surface and ground water and over utilization effects of ground water. Dams: benefits and problems. Forest resources: functions, causes and effects of Deforestation, Energy resources: renewable and non-renewable energy sources, use of alternate energy resources.

UNIT-III

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. Hot spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation.

UNIT-IV

Environmental Pollution and Control Technologies: Environmental Pollution: **Classification of pollution, Air Pollution**: Primary and secondary pollutants, sources, causes, effects and control measures **Water pollution**: Sources and types of pollution, causes and effects, water treatment methods. **Soil Pollution**: Sources and types, Impacts of modern agriculture. Solid waste management, e-Waste management.

Global Environmental Problems: Green house effect, Global warming, Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS).

UNIT-V

Environmental Policy, Legislation & EIA: Environmental Protection act1986, Air act 1981, Forest conservation act 1980, Biomedical waste management and handling rules, International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol.
EIA: EIA structure, methods of baseline data acquisition. Concepts of Environmental Management Plan (EMP).
Towards Sustainable Future: Concept, threats and strategies of Sustainable Development, Environmental Education.

TEXT BOOKS:

1. Environmental Studies by Anubha Kaushik, 4th Edition, New age international Publishers.
2. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
3. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B.Botkin& Edward A.Keller, Wiley INDIA edition.
4. Principles of Environmental Science by William . P. Cunnningham& Mary Inn Cunnningham Tata McGRAW –Hill Publishing Company Ltd.
5. Environmental Studies by S. Rama Lakshmi & Purnima Smarath Kalyani Publishers.

Outcomes:

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of
Ecological principles and environmental regulations which in turn helps in sustainable development

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

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(R17A0582)OBJECT ORIENTED PROGRAMMING LAB THROUGH C++ LAB

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 aProgram 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
assign()	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.

REFERENCES:

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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(R17A0084) IT WORKSHOP LAB / ENGINEERING WORKSHOP

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

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:

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

Week 3:

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

INTERNET & WEB BROWSERS

Week 4:

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 5:

a) 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.

b) 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.

ENGINEERING WORKSHOP

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

1. 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.
2. Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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

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(R17A0082) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB- II

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

Objectives:

- To make students acquire language skills at their own pace with the usage of authentic learning environment through different media, e-materials and language lab.
- To make learners acquire listening and speaking skills in both formal and informal contexts through diverse interactive sessions and computer aided multi-media training.
- To impart nuances of linguistics to help novices to resolve mother tongue interference by ensuring precision in pronunciation to befit Standard English.
- To help develop the students communication skills by familiarizing them with different strategies to suit academic as well as workplace contexts.

Syllabus: English Language Communication Skills Lab shall have 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

Exercise –IV

CALL Lab: Word Accent – Rules of Stress and Stress shift
ICS Lab: Describing Object, Places, Persons, Events and Experiences.

Exercise –V

CALL Lab: Intonation
ICS Lab: Etiquette – Professional and telephone

Exercise –VI

CALL Lab: Neutralization of Mother Tongue Influence
ICS Lab: Oral Presentations (Team or Individual)

PROJECTS

PROJECTS

Students have to choose one of the following projects for their External Examinations, and submit before the end of the semester. This project carries 10 marks in the Lab External Examinations.

1. **Conduct interview using interrogative sentences.**

   Students should interview any teacher, or HOD, or Principal, record their responses and submit the project with those questions and answers. The questions asked should not be less than ten.

2. **Project on differences between group discussion and debate.**

   Students are supposed to do research on the differences between GD and debate and submit a project on it. There should a minimum of ten points with detailed explanation. Students can use pictures as well.

3. **Book Review**

   Choose any fiction of your choice and write a book review on the following parameters.

   - Characterization, plot, theme, message

   Please note that the review is not the summary of the story. The project should not be less than 250 words.

4. **Idioms and Phrasal Verbs**

   Collect at least ten idioms and ten phrasal verbs and concoct a story using those expressions. Word limit is 250.

5. **Project on Kinesics**

   Students are expected to read and research on body language and their implications. You have to make a list of at least ten body movements with pictures and explain them properly.

6. **UK and US vocabulary**

   Find words that are used differently in UK and US English. Make separate lists for different spellings and different pronunciations. The project can answer one or more of the following questions:

   - Which pronunciation do you think are Indians following?

- Which one is your choice? Which one do you feel comfortable in speaking?
- Are we Indians influenced by both UK and US English? How can you prove it?

7. Magazine Article Review

Pick a magazine article with a social relevance, which has around 2500 words. Write a review of 250 words as a project. Make sure you voice your opinion in the review.

8. Career Guidance Project

Browse the net and gather information on any professional competitive exam of your choice, like UPSC or GRE. Prepare and present a paper on the scope and relevance of the exam of your choice. The paper should have a minimum of 300-400 words. Students are expected to answer the questions asked by the audience after the paper presentation.

9. Mother Tongue Influence

Choose a particular paragraph of 250 words and ask five of your friends, from different states, to read that. One has to record their accent and pronunciation to check the difference. Make a list of ten words that each one pronounces differently. Find out the reasons behind the differences in pronunciations.

Also, mention the correct pronunciation in your project with transcription.

10. Correction of Letter Writing: Language, Sentences, Spelling, Tone and Format

Teacher will distribute a set of five letters with errors in spelling, tone, grammar and sentence construction. Give the correct form of the letters as the project

ELCS LAB:

3. 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

4. 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.

REFERENCES:

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

1. Suresh Kumar, E. & Sreehari, P. 2009. A Handbook for English Language Laboratories. New Delhi: Foundation
2. Speaking English Effectively 2ndEdition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
3. Sasi Kumar, V & Dhamija, P.V. How to Prepare for Group Discussion and Interviews. Tata McGraw Hill
4. Hancock, M. 2009. English Pronunciation in Use. Intermediate. Cambridge: CUP
5. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013.Orient Blackswan. Hyderabad.
6. Hewings, M. 2009. English Pronunciation in Use. Advanced. Cambridge: CUP
7. Marks, J. 2009. English Pronunciation in Use. Elementary. Cambridge: CUP
8. Nambiar, K.C. 2011. Speaking Accurately. A Course in International Communication. New Delhi: Foundation
9. Soundararaj, Francis. 2012. Basics of Communication in English. New Delhi: Macmillan
10. Spoken English(CIEFL) in 3 volumes with 6 cassettes, OUP.
11. English Pronouncing DictionaryDaniel Jones Current Edition with CD.
12. A textbook of English Phonetics for Indian Studentsby T.Balasubramanian (Macmillan)

DISTRIBUTION AND WEIGHTAGE OF MARKS

English Language Laboratory Practical Examination:

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year-end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the other institution.

OUTCOMES:

- Learning with precision through computer-assisted individualized and independent language learning to work independently in engineering set up.
- Improved conversational reception and articulation techniques in the course of repetitive instruction thereby gaining confidence both in institutional and professional environment.
- Accuracy in pronunciation and restoring Standard English thereby crafting better command in English language so that the students have a cutting edge over others in society.
- Imbibing appropriate use of language in situations to work as an individual and as o leader in diverse teams

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(R17A0003) HUMAN VALUES AND SOCIETAL PERSPECTIVES

(MANDATORY COURSE)

Objective: This introductory course input is intended

- To help the students appreciate the essential complementarity 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 form 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 behavior and mutually enriching interaction with Nature.

Unit-I

Course Introduction–Need, Basic Guidelines, Content and Process of Value Education: Understanding the need, basic guidelines, content and process for value Education. Animal consciousness vs Human consciousness, Self Exploration -What is it? Its content and process; 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

Understand 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 does, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I' . 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-astitva 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 Co-existence: 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-astiva) 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 Societal Perspectives: Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Basis of Humanistic Education, Humanistic Constitution and Humanistic Universal Order.

TEXT BOOKS

1. R R Gaur, R Sangal, G P BAgaria, 2009 A Foundation Course in Human Values and Professional Ethics.
2. Prof.KV Subba Raju, 2013, Success secrets for Engineering students , Smart student Publications, 3rd Edition.

REFERENCE BOOKS

1. Ivan llich, 1974, Energy & Equity, The Trinity press, Worcester and Harpercollins, USA.
2. E.F. Schumacher, 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 Sansathan Amarkantak.
4. Sussan George, 1976, How the other Half Dies, Penguin press Reprin ted 1986, 1991
5. PL Dhar, RR 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. Done lla H.Meadows, Dennis L. Meadows, Jorgen Randers, Willian A. Behrens lll, 1972, Limits to Growth – Club of Rome's report Universe Books.
9. E.G Seebauer & Robert L. Beery, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
10. M Govindrajran , S Natrajan & V.S Senthil kuma, Engineering Ethichs (including Human 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. Charlie Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology - the Untold Story

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(R17A0023) MATHEMATICS – III

OBJECTIVES

The main objectives of the course are:

1. The evaluation of improper integrals, Beta and Gamma functions.
2. Series solutions for Legendre and Bessel differential equations, analyzing the properties of Legendre and Bessel polynomials.
3. Differentiation and Integration of complex valued functions. Evaluation of integrals using Cahchy's integral formula.
4. Taylor's series, Maclaurin's series and Laurent's series expansions of complex functions Evaluation of integrals using residue theorem.
5. Transform a given function from z - plane to w – plane. Identify the transformations like translation, magnification, rotation and reflection and inversion , Properties of bilinear transformations

UNIT – I

Improper Integrals: Beta and Gamma functions – Relation between them, their properties – Evaluation of Improper Integrals using Beta and Gamma functions.

Unit – II

Special Functions: Legendre's Differential equation, General solution of Legendre's equation, Legendre polynomials Properties: Rodrigue's formula – Recurrence relations, Generating function of Legendre's polynomials – Orthogonality. Bessel's Differential equation, Bessel functions properties: – Recurrence relations, Orthogonality, Generating function , Trigonometric expansions involving Bessel functions.

UNIT – III

Complex Functions –Differentiation and Integration: Complex functions and its representation on Argand plane, Concepts of limit Continuity, Differentiability, Analyticity, 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

Power series expansions of complex functions and contour Integration: Radius of convergence – Expansion in Taylor's series, Laurent series. Singular point –Isolated singular point – pole of order m – essential singularity. Residue – Evaluation of residue by formula and by Laurent series – Residue theorem. Evaluation of integrals of the type

(a) Improper real integrals $\int_{-\infty}^{\infty} f(x)dx$ (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. Mathematics-III, Special Edition-MRCET, Mc Graw Hill Publishers 2017.

REFERENCES:

1. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons
2. Engineering Mathematics –III by T.K.V Iyenger ,B.Krishna Gandhi and Others ,S Chand Publishers.
3. Complex Variables and Applications by James W Brown and Ruel Vance Churchill
4. Engineering Mathematics- By P Sivaramakrishna Das, Pearson Publishers.

OUTCOMES:

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

1. Identify Bessel equation and Legendre equation and solve them under special conditions with the help of series solutions method. Also recurrence relations and orthogonality properties of Bessel and Legendre polynomials.
2. Analyze the complex functions with reference to their analyticity, Integration using Cauchy's integral theorem,
3. Find the Taylor's and Laurent series expansion of complex functions
4. The conformal transformations of complex functions can be dealt with ease.

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(R17A0401) ELECTRONIC DEVICES AND CIRCUITS

OBJECTIVES

The main objectives of the course are:

1. To familiarize the student with the principal of operation, analysis and design of junction diode, BJT and FET transistors and amplifier circuits.
2. To understand diode as a rectifier.
3. 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.

Special purpose electronic devices: Principal of operation and Characteristics of Tunnel Diode with the help of energy band diagrams, Varactar Diode, SCR and photo diode.

UNIT-II

RECTIFIERS, FILTERS: P-N Junction as a rectifier ,Half wave rectifier, Full wave rectifier, Bridge rectifier , Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L- section filter, π- section filter and comparison of various filters, 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.

BJT Hybrid Model: h-parameter representation of a transistor, Analysis of single stage transistor amplifier using h-parameters: voltage gain, current gain, Input impedance and Output impedance. Comparison of transistor configurations in terms of A_i, R_i ,A_v,and R_o

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 and transistor(Compensation against variation in V_{BE}, I_{CO}) 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.

FET Amplifiers: FET biasing, Generalized FET Amplifier, FET Common source Amplifier, Common Drain Amplifier.

TEXT BOOKS:

1. "Electronic Devices & Circuits", Special Edition – MRCET, McGraw Hill Publications, 2017.
2. Integrated Electronics Analog Digital Circuits, Jacob Millman and D. Halkias, McGraw Hill.
3. Electronic Devices and Circuits Theory, Boylsted, Prentice Hall Publications.
4. Electronic Devices and Circuits, S.Salivahanan,N.Suresh kumar, McGraw Hill.
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.S Publications
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 , Technical Publications
4. Electronic Devices and Circuits K.S. Srinivasan Anurdha Agencies

OUTCOMES:

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

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

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(R17A0402) SIGNALS AND SYSTEMS

OBJECTIVES:

The main objectives of the course are:

1. Coverage of continuous and discrete-time signals and representations and methods that is necessary for the analysis of continuous and discrete-time signals.
2. Knowledge of time-domain representation and analysis concepts as they relate to difference equations, impulse response and convolution, etc.
3. Knowledge of frequency-domain representation and analysis concepts using Fourier analysis tools, Z-transform.
4. Concepts of the sampling process.
5. Mathematical and computational skills needed in application areas like communication, signal processing and control, which will be taught in other courses.

UNIT I:

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

SIGNAL ANALYSIS: Analogy between vectors and signals, orthogonal signal space, Signal approximation using orthogonal functions, Mean square error, Closed or complete set of orthogonal functions, Orthogonality in complex functions.

FOURIER SERIES: Representation of Fourier series, Continuous time periodic signals, Dirichlet's conditions, Trigonometric Fourier Series, Exponential Fourier Series, Properties of Fourier series, Complex Fourier spectrum.

UNIT II:

FOURIER TRANSFORMS: Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Fourier transform of periodic signals, Properties of Fourier transforms.

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

UNIT III:

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

UNIT IV:

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

UNIT V:

LAPLACE TRANSFORMS: Review of Laplace transforms, Inverse Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, Properties of L.T's relation between L.T's, and F.T. of a signal. Laplace transform of certain signals using waveform synthesis. **Z–TRANSFORMS: Concept of Z-** Transform of a discrete sequence. Distinction between Laplace, Fourier and Z transforms, Region of convergence in Z-Transform, Inverse Z-Transform, Properties of Z-transforms.

TEXT BOOKS:

1. "Signals & Systems", Special Edition – MRCET, McGraw Hill Publications, 2017
2. Signals, Systems & Communications - B.P. Lathi, BS Publications, 2003.
3. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.
4. Signals and Systems – A. Anand Kumar, PHI Publications, 3rd edition.

REFERENCE BOOKS:

1. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2nd Edition.
2. Network Analysis - M.E. Van Valkenburg, PHI Publications, 3rd Edn., 2000.
3. Fundamentals of Signals and Systems Michel J. Robert, MGH International Edition, 2008.
4. Signals, Systems and Transforms - C. L. Philips, J. M. Parr and Eve A. Riskin, Pearson education.3rd Edition, 2004.

OUTCOMES:

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

1. Represent any arbitrary signals in terms of complete sets of orthogonal functions and understands
2. Arbitrary signal (discrete) as Fourier transform to draw the spectrum.
3. Concepts of auto correlation and cross correlation and power Density Spectrum.
4. For a given system, response can be obtained using Laplace transform, properties and ROC of L.T.
5. Study the continuous and discrete signal relation and relation between F.T., L.T. & Z.T, properties, ROC of Z Transform

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(R17A0403) PROBABILITY THEORY AND STOCHASTIC PROCESS

OBJECTIVES:

The main objectives of the course are:

1. To provide mathematical background and sufficient experience so that student can read, write and understand sentences in the language of probability theory.
2. To introduce students to the basic methodology of "probabilistic thinking" and apply it to problems.
3. To understand basic concepts of Probability theory and Random Variables, how to deal with multiple Random Variables.
4. To understand the difference between time averages statistical averages.
5. To teach students how to apply sums and integrals to compute probabilities, and expectations.

UNIT I:

Probability and Random Variable

Probability: Set theory, Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Mathematical Model of Experiments, Joint Probability, Conditional Probability, Total Probability, Bayes' Theorem, and Independent Events, Bernoulli's trials.

The Random Variable: Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete and Continuous, Mixed Random Variable

UNIT II:

Distribution and density functions and Operations on One Random Variable

Distribution and density functions: Distribution and Density functions, Properties, Binomial, Poisson, Uniform, Exponential Gaussian, Rayleigh and Conditional Distribution, Methods of defining Conditioning Event, Conditional Density function and its properties, problems.

Operation on One Random Variable: Expected value of a random variable, function of a random variable, moments about the origin, central moments, variance and skew, characteristic function, moment generating function, transformations of a random variable, monotonic transformations for a continuous random variable, non monotonic transformations of continuous random variable, transformations of Discrete random variable

UNIT III:

Multiple Random Variables and Operations on Multiple Random Variables

Multiple Random Variables: Vector Random Variables, Joint Distribution Function and Properties, Joint density Function and Properties, Marginal Distribution and density Functions, conditional Distribution and density Functions, Statistical Independence, Distribution and density functions of Sum of Two Random Variables and Sum of Several Random Variables, Central Limit Theorem - Unequal Distribution, Equal Distributions

Operations on Multiple Random Variables: Expected Value of a Function of Random Variables, Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, and Jointly Gaussian Random Variables: Two Random Variables case and N Random Variable case, Properties, Transformations of Multiple Random Variables

UNIT VI:

Stochastic Processes-Temporal Characteristics: The Stochastic process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, Statistical Independence and concept of Stationarity: First-Order Stationary Processes, Second-Order and Wide-Sense Stationarity, Nth-Order and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, Covariance Functions and its properties, Gaussian Random Processes.

Linear system Response: Mean and Mean-squared value, Autocorrelation, Cross-Correlation Functions.

UNIT V:

Stochastic Processes-Spectral Characteristics: The Power Spectrum and its Properties, Relationship between Power Spectrum and Autocorrelation Function, the Cross-Power Density Spectrum and Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function.

Spectral characteristics of system response: power density spectrum of response, cross power spectral density of input and output of a linear system

TEXT BOOKS:

1. "Probability Theory & Stochastic Process", Special Edition – MRCET, McGraw Hill Publications, 2017.
2. Probability, Random Variables & Random Signal Principles -Peyton Z. Peebles, TMH, 4th Edition, 2001.
3. Probability and Random Processes-Scott Miller, Donald Childers,2Ed,Elsevier,2012

REFERENCE BOOKS:

1. Theory of probability and Stochastic Processes-Pradip Kumar Gosh, University Press
2. Probability and Random Processes with Application to Signal Processing - Henry Stark and John W. Woods, Pearson Education, 3rd Edition.
3. Probability Methods of Signal and System Analysis- George R. Cooper, Clave D. MC Gillem, Oxford, 3rd Edition, 1999.
4. Statistical Theory of Communication -S.P. Eugene Xavier, New Age Publications 2003
5. Probability, Random Variables and Stochastic Processes Athanasios Papoulis and S.Unnikrishna Pillai, PHI, 4th Edition, 2002.

OUTCOMES:

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

1. Simple probabilities using an appropriate sample space.
2. Simple probabilities and expectations from probability density functions (pdfs)
3. Likelihood ratio tests from pdfs for statistical engineering problems.
4. Least -square & maximum likelihood estimators for engineering problems.
5. Mean and covariance functions for simple random processes.

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(R17A0261) ELECTRICAL TECHNOLOGY

OBJECTIVES

The main objectives of the course are:

1. To understand the basic concepts of transient analysis of the circuits.
2. To explain basic two-port network parameters, design analysis of the filters and attenuators and their use in the circuit theory
3. To do the analysis of the locus diagrams, resonance.
4. To understand the basic operation of DC machines which includes DC generators and DC motors.

UNIT - I:

Transient Analysis (First and Second Order Circuits): Introduction to transient response and steady state response, Transient response of series -RL, RC RLC Circuits for DC excitations, Initial Conditions, Solution using Differential Equations approach and Laplace Transform method.

UNIT - II:

Two Port Networks: Impedance Parameters, Admittance Parameters, Hybrid Parameters, Transmission (ABCD) Parameters, Conversion of one of parameter to another, Conditions for Reciprocity and Symmetry, Interconnection of two port networks in Series, Parallel and Cascaded configurations, Image Parameters, Illustrative problems.

UNIT-III:

Filters and Symmetrical Attenuators: Introduction to filters**,** Classification of Filters, Filter Networks, Characteristic Impedance, Classification of Pass Band and Stop Band, Characteristic Impedance in the Pass and Stop bands, Constant-k Low Pass and High Pass Filters-derived T-section and π-section, Band Pass Filter and Band Elimination Filter, Illustrative problems.

Symmetrical Attenuators: T-Type Attenuator, π-Type Attenuator, Bridged T-Type Attenuator, Lattice Attenuator.

UNIT - IV:

Locus diagrams and Resonance : Locus diagrams – Series and Parallel RL, RC, RLC circuits with variation of various parameters - Resonance-Series and Parallel circuits, Concept of band width and quality factor.

UNIT - V:

DC Machines: Principle of operation and operation of DC Generator, EMF equation, Types, Losses and Efficiency, Magnetization and Load Characteristics of DC Generators. DC Motors-Principle of operation, Types, Characteristics, Losses and Efficiency, Swinburne's Test, Speed control of DC Shunt Motor-Flux and Armature voltage control methods.

TEXT BOOKS:

1. “Electrical Technology”, Special Edition – MRCET, McGraw Hill Publications, 2017
2. Electrical Circuits - A. Chakrabarhty, Dhanipat Rai & Sons.
3. Network Analysis - N.C Jagan and C. Lakhminarayana, BS publications.
4. A Text book of Electrical Technology by B.L Theraja and A.K Theraja, S.Chand publications
5. Basic Concepts of Electrical Engineering - PS Subramanyam, BS Publications.

REFERENCE BOOKS:

1. Engineering Circuits Analysis - William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 7th Edition.
2. Basic Electrical Engineering - S.N. Singh PUI.
3. Electrical Circuits - David A. Bell, Oxford Printing Press.
4. Principles of Electrical Engineering by V.K Mehta, Rohit Mehta, S.Chand publications.
5. Electrical Circuit Analysis - K.S. Suresh Kumar, Pearson Education.

OUTCOMES:

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

1. Transient analysis of the circuits, filters, attenuators
2. The analysis of the locus diagrams, resonance.
3. The operation of DC machines with which he/she can able to apply the above conceptual things to real world problems and applications

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(R17A0061) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

OBJECTIVES:

The main objectives of the course are:

1. 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.
2. 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.
3. 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.

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) - Managerial Significance.

Unit-III

Markets & New Economic Environment: Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Objectives and Policies of Pricing- Methods of Pricing.

Business: Features of different forms of Business Organisation, Changing Business Environment in Post-liberalization scenario.

Unit-IV

Introduction to Capital and Financial Accounting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance – Trading forecast, Capital Budget, Cash Budget.

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

Unit-V

Investment Decision: Features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems). Financial Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios.

TEXTBOOKS:

1. ”Managerial Economics & Financial Analysis”, Special Edition – MRCET, McGraw Hill Publications, 2017.
2. Varsheney & Maheswari, Managerial Economics, Sultan Chand, 2009.
3. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age International Publishers, Hyderabad 2013
4. M. Kasi Reddy & Sarawathi, Managerial Economics and Financial Analysis, PHI, New Delhi, 2010.

REFERENCES:

1. S.N.Maheswari & S. K. Maheswari, Financial Accounting, Vikas, 2012.
2. D.N. Dwivedi, Managerial Economics, Vikas, 2012.
3. Justin Paul, Leena, Sebastian, Managerial Economics, Cengage, 2012
4. A,R.Aryasri: Managerial Economics and Financial Analysis, McGraw-Hill, 2011.

OUTCOMES:

Students should be able

1. To understand the basic economic principles, forecast demand and supply.
2. Should be able to estimate cost and understand market structure, pricing practices.
3. Able to interpret the financial results of the organisation.

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(R17A0481) ELECTRONIC DEVICES AND CIRCUITS 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.

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, SCR's, UJTs, FET's,LED's, MOSFET's, Diodes- Ge & Si type, Transistors – NPN, PNP type

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(R17A0482) BASIC SIMULATION LAB

Note:

1. All the experiments are to be simulated using MATLAB or equivalent software
2. Minimum of 15 experiments are to be completed

List of experiments:

1. Basic operations on matrices.
2. Generation on various signals and Sequences (periodic and aperiodic), such as unit impulse, unit step, square, sawtooth, triangular, sinusoidal, ramp, sinc.
3. Operations on signals and sequences such as addition, multiplication, scaling, shifting, folding.
4. Finding the even and odd parts of signal/sequence and real and imaginary part of signal.
5. Convolution between signals and sequences.
6. Auto correlation and cross correlation between signals and sequences.
7. Verification of linearity properties of a given continuous /discrete system.
8. Verification of time invariance properties of a given continuous discrete system.
9. Computation of unit sample, unit step and sinusoidal response of the given LTI system and verifying its stability.
10. Waveform synthesis using Laplace transform.
11. Finding the Fourier transform of a given signal and plotting its magnitude and phase spectrum.
12. Locating the zeros and poles and plotting the pole zero maps in s-plane and z-plane for the given transfer function.
13. Generation of Gaussian Noise (real and complex), computation of its mean, M.S. Value and its skew, kurtosis, and PSD, probability distribution function.
14. Sampling theorem verification.
15. Removal of noise by auto correlation/cross correlation.
16. Verification of Weiner-Khinchine relations.
17. Checking a random process for stationary in wide sense.

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MANDATORY COURSE – II

(R17A0004) FOREIGN LANGUAGE-FRENCH

INTRODUCTION:

In view of the growing importance of foreign languages as a tool for local communication in few countries French has been identified as one of the most required language after English. So the consequent emphasis on training students to acquire communicative competence in foreign language, the syllabus has been designed to develop linguistic and communicative competencies of engineering students. In the French classes, the focus is on the basic speaking skills.

OBJECTIVES:

1. To improve the basic speaking skills of the French language.
2. To hone the basic sentence constructions in day to day expressions for communication in their work place.

SYLLABUS

UNIT-I:

Pronunciation guidelines; Single vowels, Vowels and consonants combinations,; Numbers and Genders; articles verbs and their groups; present tense; adjectives from singular to plural

UNIT-II

Sentences Structures; Prepositions, affirmatives, Negative and, Interrogative Sentences, The Family, Conversation, Notes on Vocabulary, Grammar, Liaisons and mechanisms.

UNIT-III

D'où viens-tu (Where do you come from); Vocabulary, Conversation, Notes on Vocabulary, Liaisons Guidelines. Comparer (Comparing); Vocabulary, Conversation, Liaisons, Ordinal Number up to 100. Grammar.

UNIT-IV

Le temps (Time); Vocabulary, Grammar; Vocabulary related to - The Family, Vocabulary - Some more grammar.

UNIT-V

French Expressions and Idioms; Day-to-day Life, At Work, about Sports, Specia Events Other French Flavours; country of wine, pefumes and landscapes; - Québec and Accadie, , pass time in Suisse, people of france.

REFERENCE BOOKS:

1. Le Nouveau Sans Frontiere-1, Cle International 2013
2. Cahier d' activit'es ov Le Nouveau Sans Frontiere-1 Cle International 2013
3. Easy French Step-by-step by Myrna Bell Rochester
4. Ultimate French Beginner-Intermediate (Coursebook) By Livid Language
5. Ã L'Aventure: An Introduction to French Language and Francophone Cultures By by Evelyne Charvier-Berman, Anne C. Cummings.

OUTCOMES

1. The student will be in a position to speak in French, Which is the second most widely learned foreign language after English, and the ninth most widely spoken language in the world. French is also the only language, alongside English, that is taught in every country in the world.
2. The Student will get the ability to speak French is an advantage on the international job market.
3. Students with a good level of French are eligible for French government scholarships to enroll in postgraduate courses in France in any discipline and qualify for internationally recognized French degrees.

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MANDATORY COURSE – II

(R17A0005) FOREIGN LANGUAGES: GERMAN

OBJECTIVES

The main objectives of the course are:

1. To familiarize the students with a modern foreign language.
2. To familiarize the students with the sounds of German and their symbols.
3. To familiarize students with German for basic communication and functions in everyday situations.
4. To familiarize students with the basic of writing simple, direct sentences and short compositions.

SYLLABUS:

UNIT I

Current trends in German orthography, German grammar and lexical units, discourse models, oral and written.

UNIT- II

Communication patterns, prose passages, etc.

UNIT- III

Communication skills in everyday situations

UNIT-IV

Training in creative writing in German.

UNIT- V

Training in creative speaking in German.

TEXT BOOKS

1. Lernziel Deutsch

Reference books:

1. Themen
2. Tangram
3. Sprachkurs Deutsch
4. Schulz-Griesbach

Outcomes

1. Students familiarize with a modern foreign language – German
2. The students with German get acquainted for basic communication in everyday situations.
4. Students will know with the basics of writing simple direct sentences and short compositions.
4. Students get to know the basics of German language to communicate in the work place when they find the necessity.

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(R17A0206) CONTROL SYSTEMS

OBJECTIVES

The main objectives of the course are:

1. Introduce the principles and applications of control systems in everyday life.
2. The basic concepts of block diagram reduction, transfer function representation, time response and time domain analysis, solutions to time invariant systems and also deals with the different aspects of stability analysis of systems in frequency domain and time domain.

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. Mathematical models for mechanical systems – Differential equations and transfer functions. Analogous systems-Force–Voltage and Force-Current analogy.

Transfer Function Representation: Block diagram algebra, Block diagram representation for mechanical and electrical systems, 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- Nyquist plots, Stability analysis. Compensation techniques – Lag, Lead, Lead-Lag and Lag-Lead Controllers design in frequency Domain.

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 it's 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, RBA Publications.

REFERENCE 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) Limited Publishers.
4. Control Systems by S.Hasan Saeed, KATSON BOOKS.
5. Solutions and Problems of Control Systems by A.K. Jairath, CBS Publishers.

OUTCOMES

After going through this course the student gets

1. A thorough knowledge on open loop and closed loop control systems, concept of feedback in control systems.
2. Transfer function representation through block diagram algebra and signal flow graphs.
3. Time response analysis of different ordered systems through their characteristic equation.
4. Time domain specifications, stability analysis of control systems in s-domain through R-H criteria.
5. Root locus techniques, frequency response analysis through Bode diagrams, Nyquist, Polar plots.

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(R17A0404) PULSE AND DIGITAL CIRCUITS

OBJECTIVES

The main objectives of the course are:

1. Wave shaping concepts of both linear and non-linear circuits.
2. Study about the designing of multivibrators.
3. Study about Time Base Generator.
4. To demonstrate basic understanding sampling gates and Logic Gates.

UNIT 1

LINEAR WAVE SHAPING:

High pass and low pass RC circuits and their response for sinusoidal, step voltage, pulse, and square wave and ramp inputs. High pass RC circuit as a differentiator. Low pass RC circuit as an integrator, Attenuators. RL and RLC circuits and their response for step input. Ringing circuit.

UNIT 2

NON-LINEAR WAVE SHAPING:

Diode clippers. Transistor clippers. Clipping at two independent levels, Comparator, applications of voltage comparators, diode comparator. Clamping operation, Clamping circuits using diode with different inputs. Clamping circuit theorem. Practical clamping circuits.

UNIT 3

MULTIVIBRATORS:

Transistor as a switch, switching times of a transistor. Analysis & design of Bistable Monostable and Astable Multivibrators , Schmitt trigger using transistors.

UNIT 4

TIME BASE GENARATORS:

Voltage Time Base Generators: General features of a Time Base Signal, Methods of Generating Time Base Wave forms, Basic Principles of Transistor Miler Time Base Generator and Transistor Bootstrap. Time Base Generator. The Transistor Miler Time Base Generator and The Transistor Bootstrap Time Base Generator

Current Time Base Generators: Simple current sweep circuit, Methods of Linearity Improvement, Transistor current Time base generator

UNIT 5

SAMPLING GATES AND LOGIC GATES

Sampling gates: Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates, Four Diode sampling gates, Reduction of pedestal in sampling gates.

Realization of Logic gates using Diodes & Transistors: AND, OR and NOT gates using Diodes and Transistors, DCTL, RTL, DTL, & TTL and its comparison.

TEXT BOOKS:

1. Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, McGraw-Hill, 1991.
2. Solid State Pulse circuits - David A. Bell, PHI, 4th Edn., 2002 .

REFERENCES:

1. Pulse and Digital Circuits – A. Anand Kumar, PHI, 2005.
2. Wave Generation and Shaping - L. Strauss.
3. Pulse, Digital Circuits and Computer Fundamentals - R.Venkataraman.

OUTCOMES

At the end of the course, the student will be able to;

1. Understand the concepts of integrators, differentiators,
2. Understand the concepts of clippers and clamper circuits
3. Design of multivibrators for various applications,
4. Understand the concepts of Time Base Generators
5. Understand the concepts of sampling gates and logic gates

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(R17A0405) ELECTRONIC CIRCUIT ANALYSIS

OBJECTIVE

The main objectives of the course are:

1. To familiarize the student with the analysis and design of basic transistor amplifier circuits and their frequency response characteristics, feedback amplifiers, oscillators, large signal amplifiers and tuned amplifiers
2. To demonstrate basic understanding of amplifier operation.
3. To analyze amplifier circuits using hybrid model.

UNIT - I

SINGLE STAGE AMPLIFIERS: Classification of amplifiers, Transistor hybrid model, Analysis of a transistor CE, CB & CC amplifier circuit using simplified h-parameters, Analysis of CE amplifier with emitter resistance and emitter follower. Design of single stage RC coupled amplifier using BJT

MULTISTAGE AMPLIFIERS: Distortion in amplifiers, Analysis of cascaded RC coupled BJT amplifier, Cascode amplifier, Darlington pair, Coupling schemes-RC coupled amplifier, Transformer coupled amplifier, Direct coupled Amplifier, multistage amplifier using JFET

UNIT – II

BJT Amplifiers- Frequency Response: Logarithms, Decibels, general frequency considerations, Frequency response of an amplifier Analysis at low and High Frequencies, Hybrid-pi (π) common emitter transistor model, Hybrid - π conductances and capacitances, validity of hybrid- π model, variation of hybrid – π parameters, Millers theorem and its dual, the CE short circuit current gain, current gain with resistive load, gain-bandwidth product, emitter follower at high frequencies.

UNIT - III

FEEDBACK AMPLIFIERS: Concept of Feedback and types, transfer gain with feedback, general characteristics of negative feedback amplifiers, Effect of negative feedback on amplifiers characteristics, voltage series, current series, current shunt, and voltage shunt feedback amplifiers.

OSCILLATORS: Classification of oscillators, Constituents of an oscillator, Barkhausen criterion, RC phase shift oscillator, Wein-bridge oscillator, Generalized analysis of LC oscillators- Hartley and Colpitts oscillator, Crystal oscillator, Stability of oscillator, frequency stability.UJT relaxation oscillator.

UNIT - IV

LARGE SIGNAL AMPLIFIERS: Classification, Distortion in amplifiers, class A large signal amplifiers, transformer coupled class A power amplifier, efficiency of class A amplifier, class B power amplifier, efficiency of class B amplifier, class B push pull amplifier Complementary

symmetry class B push pull amplifiers, class AB push pull amplifier, class C amplifiers, class D amplifier, thermal stability, heat sink.

UNIT - V

TUNED AMPLIFIERS: Introduction, classification of tuned amplifiers, small signal tuned amplifier, Effect of cascading single tuned amplifier on bandwidth, Effect of cascading Double tuned amplifier on bandwidth, Staggered tuned amplifier, stability of Tuned Amplifier

TEXT BOOKS:

1. Integrated Electronics-Jacob Millman and Christos C. Halkias,1991 Ed -2008,TMH.
2. Electronic Devices and Circuits, B.P Singh, Rekha Singh,Pearson, 2013.

REFERENCE BOOKS:

1. Electronic Circuit Analysis- Rashid, Cengage Lerning, 2013.
2. Electronic Devices and Circuit Theory-Robert L. Boylestad, Louis Nashelsky, 9 Ed,2008 PE.
3. Microelectric Circuits-Sedra and Smith-5 Ed., 2009, Oxford University press.
4. Electronic Circuit Analysis-K.LalKishore, 2004, BSP.
5. Electronic Devices and Circuits-S.Salivahanan ,N.Suresh Kumar,A Vallavaraj,2Ed.,2009, TMH.

OUTCOMES

1. Design and analyze the DC bias circuitry of BJT and FET.
2. Analyze the different types of amplifiers, operation and its characteristics
3. Design circuits like amplifiers, oscillators using the transistors diodes and oscillators

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(R17A0406) ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

OBJECTIVES

The main objectives of the course are:

1. To introduce the student to the coordinate system and its implementation to electromagnetics.
2. To elaborate the concept of electromagnetic waves and transmission lines, and their practical applications.
3. To study the propagation, reflection, and transmission of plane waves in bounded unbounded media.
4. To present the concepts of transmission lines, and this is a prerequisite course for "Antennas"

UNIT - I:

Electrostatics: Review of coordinate system, Coulomb's Law, Electric Field Intensity - Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Maxwell's Equations for Electrostatic Fields, Energy Density, Divergence theorem, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations; Capacitance - Parallel plate, Illustrative Problems.

UNIT - II:

Magnetostatics: Biot - Savart's Law , Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductance and Magnetic Energy, Illustrative Problem.

Maxwell's Equations (Time Varying Fields): Faraday's Law and Transformer EMF, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms, Conditions at a Boundary Surface: Dielectric - Dielectric, Illustrative Problems.

UNIT - III:

EM Wave Characteristics - I: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves - Definition, All Relations Between E & H, Sinusoidal Variations, Wave Propagation in Lossless and Conducting Media, Wave Propagation in Good Conductors and Good Dielectrics, Illustrative Problems.

EM Wave Characteristics - II: Reflection and Refraction of Plane Waves - Normal incidence for perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Poynting Vector and Poynting Theorem, Illustrative Problems.

UNIT - IV:

Transmission Lines - I: Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristics Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Lossless/Low Loss Characterization, Distortion - Condition for Distortionless and Minimum Attenuation, Illustrative Problems.

UNIT - V:

Transmission Lines - II: SC and OC Lines, Input Impedance Relations, Reflection Coefficient, VSWR, λ/4, λ 2, λ /8 Lines - Impedance Transformations, Smith Chart - Configuration and Applications, Single Stub Matching, Illustrative Problems.

TEXT BOOKS:

1. Elements of Electromagnetics - Matthew N. O. Sadiku, 4th., Oxford Univ. Press.
2. Electromagnetic Waves and Radiating Systems - E.C. Jordan and K. G. Balmain, 2nd Ed., 2000, PHI.
3. Transmission Lines and Networks - Umesh Sinha, Satya prakashan, 2001, (Tech. India Publications), New Delhi.

REFERENCES BOOKS:

1. Engineering Electromagnetics - Nathan Ida, 2ndEd., 2005, Springer (India) Pvt. Ltd., New Delhi.
2. Engineering Electromagnetics - William H. Hay Jr. and John A. Buck, 7thEd., 2006, TMH.
3. Electromagnetics Fields Theory and Transmission Lines - G. Dashibhushana Rao, Wiley India, 2013.
4. Networks, Lines and Fields - John D. Ryder, 2nd Ed., 1999, PHI.

OUTCOMES

Upon the successful completion of the course, students will be able to;

1. Determine the relationship between time varying electric and magnetic field and electromotive force
2. Analyze wave propagation in dielectrics and lossy media.
3. Demonstrate the reflection and refraction of waves at boundaries.
4. Analyze basic transmission line parameters in phasor domain

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(R17A0407) SWITCHING THEORY AND LOGIC DESIGN

OBJECTIVES

The main objectives of the course are:

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

UNIT -I:

Number System and Gates:

Number Systems, Base Conversion Methods, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal Code and its Properties, Excess-3 code, Unit Distance Code, Error Detecting and Correcting Codes, Hamming Code. Digital Logic Gates, Properties of XOR Gates, Universal Logic Gates.

UNIT -II:

Boolean Algebra and Minimization:

Basic Theorems and Properties, Switching Functions, Canonical and Standard Forms, Multilevel NAND/NOR realizations. K- Map Method, up to Five variable K- Maps, Don't Care Map Entries, Prime and Essential prime Implications, Quine Mc Cluskey Tabular Method

UNIT -III:

Combinational Circuits Design:

Combinational Design, Half adder,Full adder,Half subtractor,Full subtractor,Parallel binary adder/subtracor,BCD adder, Comparator, decoder, Encoder, Multiplexers, DeMultiplexers, Code Converters.

UNIT -IV:

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 -V:

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 Asynchronous and Synchronous counters, Decade Counter,Register-Shift Register, Bidirectional Shift Register,universal shifteregister,shift registers using Ring Counter

.

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.

OUTCOMES

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

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

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(R17A0483) ELECTRONIC CIRCUITS AND PULSE CIRCUITS LAB

Part - I: Electronic Circuits

Minimum eight experiments to be conducted:

I) Design and Simulation in Simulation Laboratory using any Simulation Software. (Minimum 6 Experiments):

1. Common Emitter Amplifier.
2. Common Source Amplifier.
3. Two Stage RC Coupled Amplifier
4. Current shunt and Voltage Feedback Amplifier
5. Cascade Amplifier.
6. Wien Bridge Oscillator using Transistors
7. RC Phase Shift Oscillator using Transistors
8. Class A Power Amplifier (Transformer less)
9. Class B Complementary Symmetry Amplifier
10. Common base (BJT) / Common gate(JFET) Amplifier.

II) Testing in the Hardware Laboratory (Minimum 2 Experiments):

1. Class A Power Amplifier (with transformer load)
2. Class C Power Amplifier
3. Single Tuned Voltage Amplifier
4. Hartley & Colpitt's Oscillators
5. Darlington Pair
6. MOS Common Source Amplifier

Equipments required for Laboratories:

1. For software simulation of Electronic circuits
   i. Computer Systems with latest specifications
   ii. Connected in LAN (Optional)
   iii. Operating system (Windows XP)
   iv. Suitable Simulations software
   v.
2. For Hardware simulations of Electronic Circuits
   i. Regulated Power Supply (0-30V)
   ii. CROs
   iii. Functions Generators
   iv. Multimeters
   v. Components
3. Windows XP/ Linux etc.

Part - II: Pulse Circuits

Minimum eight experiments to be conducted:

1. Linear Wave Shaping.
    a. RC Low Pass Circuit for different time constants.
    b. RC High Pass Circuit for different time constants.
2. Non - Linear Wave Shaping.
    a. Transfer Characteristics and response of Clippers:
        i. Positive and Negative Clippers
        ii. Clipping at two independent levels
    b. The Steady state output waveform of clampers for a square wave input
        i. Positive and Negative Clampers
        ii. Clamping at reference voltage
3. Comparison Operation of Comparators
4. Switching characteristics of a transistor
5. Design a Bistable Multivibrator and draw its waveforms
6. Design a Astable Multivibrator and draw its waveforms
7. Design a Monostable Multivibrator and draw its waveforms
8. UJT relaxation Oscillator

Equipment required for Laboratories:

1. Regulated Power Supply (0-30V)
2. CROs
3. Functions Generators
4. Multimeters
5. Components

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(R17A0291) ELECTRICAL TECHNOLOGY LAB

PART – A

1. Verification of KVL and KCL.
2. Series and Parallel Resonance.
3. Determination of two port network parameters – Z and Y Parameters.
4. Determination of two port network parameters – ABCD and h – Parameters.
5. Verification of Superposition and Reciprocity theorems.
6. Verification of Maximum power transfer theorem.
7. Verification of Thevenin's and Norton's theorems.

PART – B

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

Note: Any **10** of the above experiments are to be conducted

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(R17A0006) GENDER SENSITIZATION
(An Activity-based Course)

Course Objectives:

The main objectives of the course are:

1. To develop students sensibility with regard to issues of gender in contemporary India.
2. To provide a critical perspective on the socialization of men and women.
3. To introduce students to information about some key biological aspects of genders.
4. To expose the students to debates on the politics and economics of work.
5. To help students reflect critically on gender violence.
6. To expose students to more egalitarian interactions between men and women.

Unit-I:

UNDERSTANDING GENDER:

Gender: Why should we study It? (Towards a world of Equals: Unit-1)

Socialization: Making Women, making Men(Towards a world of Equals:Unit-2)

Introduction. Preparing for Womanhood. Growing up male, First lessons in /caste, Different Masculinities.

Just Relationships: Being Together as Equals (Towards a World of Equals:Unit-12)

Mary Kom and Onler, Love and Acid just do not Mix, Love Letters, Mothers and Fathers, Further Reading: Rosa Parks-The Brave Heart.

Unit-II:

GENDER AND BIOLOGY:

Missing Women: Sex Selection and its Consequences (Towards a World of Equals: Unit-4)

Declining Sex Ratio, Demographic Consequences.

Gender Spectrum : Beyond The Binary(Towards a World of Equals: Unit-10)

Two or Many? Struggles with Discrimination

Additional Reading : Our Bodies, Our Bodies, Our Health(Towards a World of Equals:Unit-13)

Unit-III:

GENDER AND LABOUR:

Housework: the Invisible Labour(Towards a World of Equals: Unit-3)

" My Mother doesn't Work." " Share the Load"

Women's Work: Its Politics and Economics(Towards a World of Equals: Unit-7)

Fact and Fiction Unrecognized and Unaccounted work. Further Reading: Wages and Conditions of Work.

Unit-IV:

ISSUES OF VIOLENCE:

Sexual Harassment: Say No! (Towards a World of Equals: Unit-6)

Sexual Harassment,not-eve-teasing-coping with everyday harassment-further Reading: " Chupulu".
Domestic Violence: Speaking Out (Towards a World of Equals: Unit-8)
Is Home a safe Place?-When Women Unite(Film). Rebuilding Lives. Further Reading: New Forums for Justice.
Thinking about Sexual Violence (Towards a World of Equals: Unit-11)
Blaming the Victim-"I fought for my Life…"- Further Reading: The Caste Face of Violence

Unit-V:
GENDER STUDIES:
Knowledge: Through the Lens of Gender (Towards a World of Equals: Unit-5)
Point of View, Gender and the Structure of Knowledge. Further Reading : Unackowledged Women Artists of Telengana.
Whose History? Questions for Historians and others(Towards a World of Equals: Unit-9)
Reclaiming a Past. Writing other Histories. Further Reading: Missing Pages from Modern Telangana History.

Essential Reading : All The Units in the Textbook, "Towards a World of Equals: A Bilingual Textbook on Gender" written by A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu.
Note: Since it is interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field.

REFERENCE BOOKS:

1. Sen, Amartya, " More than One Million Women are Missing," New York Review of Books 37.20(20 December 1990) Print ' We were Making History…' Life Stories of Women in Telangana Peoples Struggle , New Delhi: Kali for Women,1989.
2. Tripti Lahiri " By the Numbers: Where Indian Women Work " Womens Studies Journal (14 November 2012) Available Online at: http://blogs,wsj.com/India real time/2012/11/14/by- the numbers-where-Indian-women-work/>
3. K. Satyanarayana and Susie Tharu(Ed) Steel Nibs are Sprouting: New Dalit Writing from South India, Dossier 2: Telugu And Kannada http://harpercollins.co.in/BookDetail.asp?Book Code-3732
4. Vimala 'Vantillu (The Kitchen)" Women Writing in India:600 BC to the Present Volume II: The 20th Century.Ed.Susie Tharu and K. Lalita Delhi: Oxford University Press,1995 559-601
5. Shatrughuna, Veena et al Womens Work and its Impact on child Health and Nutitution, Hydeabad, National Institute of Nutrition, India Council of Medical Research,1993.
6. Stree Shakti Sanghatana "We were making history…' Life Life Stories of Women in Telangana Peoples Struggle , New Delhi: Kali for Women,1989.
7. Menon, Nivedita Seeing like a feminist, New Delhi: Zubaan-Penguin Books,2012.

8. Jayaprabha, A. 'Chupulu(stares), Women Writing in India:600 BC to the Present Volume II: The 20th Century.Ed.Susie Tharu and K. Lalita Delhi: Oxford University Press,1995 596-697
9. Javeed, Shayan and Anupam Manuhaar " Women and Wage Discrimination in India: A Critical Analysis"International Journal of Humanities and social science Invention2.4(2013)
10. Gautam, Liela and Gita Ramaswamy " A Conversation between a Daughter and a mother" Broardsheet on Contemporary Politics, Special Issue on Sexuality and Harassment : Gender Politics on Campus Today Ed Madhumeeta Sinha and Asma Rasheed Hyderabad: Anveshi Research Center for Women's Studies 2014
11. Abdulali Sohaila " I fought for my life and Won" Available online at : http://www.thealterative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/
12. Jeganathan Pradeep,Partha Chatterjee (ED) " Community, Gender and Violence Subaltern Studies Xf Permanent Black and Ravi Dayal Publishers, New Delhi,2000.
13. K. Kapadia, The Violence of Development: The Politics of Identity, Gender and Social Inequalities in India London: Zed Books,2002
14. S. Benhabib, Situating the Self: Gender, Community and Post modernism in contemporary Ethics, London: Routledge,1992
15. Virginia Woolf, A Room of One's own Oxford: Black Swan 1992
16. T. Banuri and M. Mahmood , Just Development: Beyond Adjustment with a Human Face, Karachi: Oxford University Press,1997.

Course Outcomes:

1. Students will have developed a better understanding of important issues related to gender in contemporary India.
2. Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
3. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
4. Students will acquire insight into the gendered division of labor and its relation to politics and economics.
5. Men and Women students and professionals will be better equipped to work and live together as equals.
6. Students will develop a sense of appreciation of women in all walks of life.
7. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women the textbook will empower students to understand and respond to gender violence.

OPEN ELECTIVE - I

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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OPEN ELECTIVE - I

(R17A0451) DIGITAL ELECTRONICS

OBJECTIVES:

The main objectives of the course are:

1. To introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions.
2. To introduce the methods for simplifying Boolean expressions.
3. To outline the formal procedures for the analysis and design of combinational and sequential circuits.
4. To introduce the concept of memories and programmable logic devices.
5. 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.

OUTCOMES

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

1. Analyse different methods used for simplification of Boolean expressions
2. Design and implement Combinational and Sequential circuits.
3. Design and implement Synchronous and Asynchronous Sequential Circuits.

TEXT BOOK:

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.

REFERENCES:

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.

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L	T/P/D	C
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OPEN ELECTIVE - I

(R17A0251) ELEMENTS OF ELECTRICAL ENGINEERING

OBJECTIVES:

1. To introduce the fundamental concepts of electromechanical energy conversion
2. 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

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

UNIT – II

D.C. Generators & Motors :

D.C. Generators – Principle of operation – Action of commutator – constructional features – armature windings –– simplex and multiplex windings – use of laminated armature – E. M.F Equation

D.C. Motors**:** Principle of operation – Back E.M.F. - Torque equation – characteristics and application of shunt, series and compound motors – Armature reaction and commutation. Speed control of DC Motors**:** Armature voltage and field flux control methods. Ward-Leonard system. – protective devices.

UNIT – III:

Single Phase Transformers:

Single phase transformers-principle of operation-constructional details- types-emf equation-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 – IV:

Polyphase Induction Motors &Their Speed control

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 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

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

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, Reluctance Motors, Brushless DC motors (Qualitative Treatment only).

Text Books:

1. Electrical Machines, P.S. Bimbra, Khanna Publishers.
2. Principles of Electrical Machines, V. K. Mehta, Rohit Mehta, S. Chand Publishing.
3. Electric Machines by I.J. Nagrath & D.P. Kothari, Tata Mc Graw – Hill Publishers.

Reference Books:

1. Electric Machines, Mulukutla S. Sarma, Mukesh K. Pathak, Cengage Learning.
2. Fundamentals of Electric Machines, B. R. Gupta, Vandana Singhal, New Age International Publishers.
3. Electric machinery – A.E. Fitzgerald, C.Kingsley and S.Umans, Mc Graw Hill Companies, 5th edition.
4. Theory of Alternating Current Machinery- by Langsdorf, Tata McGraw-Hill Companies, 2nd edition

OUTCOMES:

At the end of the course the student will

1. Have a clear understanding of the materials used and features in the construction of the electrical machines like transformers, DC and AC motors and special purpose motors.
2. Acquire a basic knowledge on the principle of operation of all these machines
3. Have a basic knowledge on the Torque speed relations and the effect of load torque on their performance.
4. Will have fundamental concept on the speed control of the various types of motors.

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OPEN ELECTIVE - I

(R17A0551) DATABASE SYSTEMS

OBJECTIVES

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

UNIT I: INTRODUCTION

Data- 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 BOOK:

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.

REFERENCES:

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.

OUTCOMES

1. Demonstrate the basic elements of a relational database management system
2. Ability to identify the data models for relevant problems
3. 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 ECE-II Sem	L	T/P/D	C
	3	-/-/-	3

OPEN ELECTIVE - I

(R17A0351) ELEMENTS OF MECHANICAL ENGINEERING

OBJECTIVES:

1. To give an insight to students about the behaviour of materials under external forces.
2. The concept of stress, strain, elasticity etc. as applied to various structures under loading are included.
3. 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.

Shear force and bending moment: Types of supports – loads – Shear force and bending moment for cantilever and simply supported beams without overhanging for all types of loads.

UNIT - II

Theory of simple bending: simple bending formula, Distribution of Flexural and Shear stress in Beam section – Shear stress formula – Shear stress distribution for some standard sections.

Thin cylindrical shells: stress in cylindrical shells due to internal pressures, circumferential stress, longitudinal stress, design of thin cylindrical shells, spherical shells, change in dimension of the shell due to internal pressure, change in volume of the shell due to internal pressure

Thick Cylinders: Lame's equation- cylinders subjected to inside and outside pressures
Columns and Struts.

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 and Mechanics of Structures”, B.C.Punmia, Standard Publications and distributions, 9 th ed.
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.

OUTCOMES:

1. The student would be exposed to basic mechanical engineering machinery.
2. The student learned about mechanical components.
3. Student understand about engines and turbines .

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OPEN ELECTIVE - I

(R17A0352) GREEN ENERGY SYSTEMS

OBJECTIVES:

1. The course aims to highlight the significance of alternative sources of energy.
2. 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:

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,thermodynamic 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.

REFERENCES:

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

OUTCOMES:

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

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II Year B.Tech ECE-II Sem

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

OPEN ELECTIVE - I

(R17A0051) INTELLECTUAL PROPERTY RIGHTS

OBJECTIVES:

1. 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.

REFERENCES:

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.
3. Intellectual Property Rights: N K Acharya: ISBN: 9381849309
4. Intellectual Property Rights: C B Raju : ISBN-8183870341
5. Intellectual Property : Examples and Explanation – Stephen M McJohn, 2/e, ISBN-13: 978-0735556652

OUTCOMES

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

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

(R17A0408) IC APPLICATIONS

COURSE OBJECTIVES:

The main objectives of the course are:

1. To introduce the basic building blocks of linear integrated circuits.
2. To teach the linear and non-linear applications of operational amplifiers.
3. To teach the theory of ADC and DAC.
4. To introduce the concepts of waveform generation and introduce some special function ICs.
5. To understand and implement the working of basic digital circuits.

UNIT - I:

OPERATIONAL AMPLIFIER: Ideal and Practical Op-Amp, Op-Amp Characteristics, DC and AC Characteristics, Features of 741 Op-Amp, Block diagram of Op-Amp, Modes of Operation - Inverting, Non-Inverting, Differential, Instrumentation Amplifier, AC Amplifier, Differentiators and Integrators, Comparator and its applications, 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, Saw-tooth, 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 Approximation ADC and Dual Slope ADC, DAC and ADC Specifications.

UNIT - IV:

DIGITAL INTEGRATED CIRCUITS: Classification of Integrated Circuits, Combinational Logic ICs - Specifications and Applications of TTL-74XX & CMOS 40XX Series ICs - Code Converters, Decoder, Encoder, Priority Encoder, Multiplexer, De-multiplexer, Parallel Binary Adder/ Subtractor, Magnitude Comparator.

UNIT - V:

SEQUENTIAL LOGIC IC'S AND MEMORIES: Familiarity with commonly available 74XX & CMOS 40XX Series ICs - All Types of Flip-flops, conversion of Flip-flops, Synchronous Counter, Decade Counter, Shift Register.

Memories - ROM Architecture, Types of ROMS & Applications, RAM Architecture, Static & Dynamic RAMs.

TEXT BOOKS:

1. Linear Integrated Circuits – D. Roy Chowdhury, New Age International (p) Ltd, 2nd Edition,2003.
2. Op-Amps & Linear ICs - Ramakanth A. Gayakwad, PHI, 2003.
3. Digital fundamentals – Floyd and Jain, Pearson Education,8th Edition ,2005.

REFERENCE BOOKS:

1. Op Amps & Linear Integrated circuits-Concepts and Applications James M.Fiore,Cengage Learning/Jaico,2009.
2. Operational Amplifiers with linear integrated circuits by K.Lal kishore-Pearson,2009.
3. Linear integrated circuits and applications-Salivahana,TMH.
4. Modern digital electronics-RP Jain-4/e-TMH,2010.
5. Digital design principles and practices-John.F.Wakerly 3/e,2005.
6. Operational amplifiers with linear integrated cuircuits,4/e William D.Stanley,Pearson education India,2009.

COURSE OUTCOMES:

On completion of this course, the students will have:

1. A thorough understanding of operational amplifiers with linear integrated circuits.
2. Understanding of the different families of digital integrated circuits and their characteristics.
3. Also students will be able to design circuits using operational amplifiers for various applications.

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

(R17A0409) ANALOG COMMUNICATIONS

COURSE OBJECTIVES:

1. Emphasize on the study of principles of communication theory.
2. Focus on the fundamentals of communication system.
3. Introduce the techniques of transmitting and receiving information signals using analog carrier modulation techniques (AM, FM, PM) and evaluate their performance levels (SNR) in the presence of channel noise.
4. Introduce the techniques of analog pulse modulation.
5. Establish foundation for understanding the relationship among various technical factors useful in the design & operation of a communication system.

UNIT I

AMPLITUDE MODULATION: Introduction to communication system, Need for modulation, Frequency Division Multiplexing, Amplitude Modulation: Definition, Time domain and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves: square law Modulator, Switching modulator, Detection of AM Waves: Square law detector, Envelope detector.

DSB-SC MODULATION: Double side band suppressed carrier modulation, time domain and frequency domain description, Generation of DSBSC Waves: Balanced Modulators, Ring Modulator, Detection of DSBSC waves: Coherent detection, COSTAS Loop.

Radio Transmitters- Classification of Transmitters, AM Transmitter Block diagram and explanation of each block.

UNIT II

SSB MODULATION: Frequency domain description, Frequency discrimination method for generation of AM SSB Modulated Wave, Hilbert Transform & its Properties, Time domain description, Phase discrimination method for generating AM SSB Modulated waves, Demodulation of SSB Waves.

VESTIGIAL SIDE BAND MODULATION: Frequency description, Generation of VSB Modulated wave, Time domain description, Envelope detection of a VSB Wave plus Carrier, Comparison of AM Techniques, Applications of different AM Systems.

UNIT III

ANGLE MODULATION: Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave. Generation of FM Waves: Indirect FM, Direct FM: Varactor Diode and Reactance Modulator. Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Comparison of FM & AM. , Pre-emphasis & de-emphasis, FM Transmitter block diagram and explanation of each block.

UNIT IV

NOISE: Noise in communication System, White Noise, Narrowband Noise –In phase and Quadrature phase components. Noise Bandwidth, Noise Figure, Noise Temperature, Noise

in DSB& SSB System Noise in AM System, Noise in Angle Modulation System, and Threshold effect in Angle Modulation System.

UNIT V

RECEIVERS: Radio Receiver, Receiver Types: Tuned radio frequency receiver, Superhetrodyne receiver- RF section, Frequency mixers, tracking, Intermediate frequency, AGC. Receiver Parameters & Characteristics, FM Receiver and its comparison with AM Receiver.

PULSE MODULATION: Types of Pulse modulation, PAM: Generation (Single polarity, double polarity) and Demodulation. PWM: Generation & demodulation of PWM, PPM, Generation and demodulation of PPM.

TEXT BOOKS:

1. Communication Systems- Simon Haykin, 2nd Edition, Wiley Publications.
2. Communication Systems – B.P. Lathi, BS Publication, 2006.
3. Principles of Communication Systems – H Taub & D. Schilling, Gautam Sahe, TMH, 2007 3rd Edition.

REFERENCE BOOKS:

1. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004.
2. Communication Systems Second Edition – R.P. Singh, SP Sapre, TMH, 2007.
3. Analog & Digital Communication – K.Sam Shanmugam, Wiley 2005
4. Fundamentals of Communication Systems - John G. Proakis, Masond, Salehi PEA, 2006.
5. Electronic Communication Systems- Modulation & Transmission- Robert J.Schoenbeck, 2nd Edition, PHI

COURSE OUTCOMES:

Upon completion of the subject, students will be able:

1. Conceptually understand the baseband signal and system.
2. Identify various elements, processes and parameters in telecommunication systems and describe their functions, effects and inter relationship.
3. Design procedure of AM transmission and reception, analyze, measure and evaluate the performance of the telecommunication system against given criteria.

Understand basic knowledge of FM transmission and reception design typical telecommunication systems that consists of basic and essential building blocks.

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(R17A0569) COMPUTER ORGANIZATION AND OPERATING SYSTEMS

COURSE OBJECTIVES:

The course objectives are

1. To have a thorough understanding of the basic structure and operation of a digital computer.
2. To discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
3. To study the different ways of communicating with I/O devices and standard I/O interfaces.
4. To study the hierarchical memory system including cache memories and virtual memory.
5. To demonstrate the knowledge of functions of operating system memory management scheduling, file system and interface, distributed systems, security and dead locks.
6. To implement a significant portion of an Operating System.

UNIT - I

BASIC STRUCTURE OF COMPUTERS: Computer Types, Functional unit, Basic Operational Concepts, Bus, Structures, Software, Performance, Multiprocessors and Multi Computers, Data Representation, Fixed Point Representation, Floating Point Representation.

REGISTER TRANSFER LANGUAGE AND MICRO OPERATIONS: Register Transfer Language, Register Transfer Bus and Memory Transfers, Arithmetic Micro Operations, Logic Micro Operations, Shift Micro Operations, Arithmetic Logic Shift Unit, Instruction Codes, Computer Registers Computer Instructions - Instruction Cycle.

Memory - Reference Instructions, Input - Output and Interrupt, STACK Organization, Instruction Formats, Addressing Modes, DATA Transfer and Manipulation, Program Control, Reduced Instruction Set Computer.

UNIT - II

MICRO PROGRAMMED CONTROL: Control Memory, Address Sequencing, Microprogram Examples, Design of Control Unit, Hard Wired Control, Microprogrammed Control.

THE MEMORY SYSTEM: Basic Concepts of Semiconductor RAM Memories, Read-Only Memories, Cache Memories Performance Considerations, Virtual Memories secondary Storage, Introduction to RAID.

UNIT - III:

INPUT-OUTPUT ORGANIZATION: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer Modes, Priority Interrupt, Direct Memory Access, Input-Output Processor (IOP), Serial Communication; Introduction to Peripheral Components, Interconnect (PCI) Bus, Introduction to Standard Serial Communication Protocols like RS232, USB, IEEE1394.

UNIT - IV:

OPERATING SYSTEMS OVERVIEW: Overview of Computer Operating Systems Functions, Protection and Security, Distributed Systems, Special Purpose Systems, Operating Systems Structures-Operating System Services and Systems Calls, System Programs, Operating System Generation.

MEMORY MANAGEMENT: Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation, Virtual Memory, Demand Paging, Page-Replacement Algorithms, Allocation of Frames, Thrashing Case Studies - UNIX, Linux, Windows

PRINCIPLES OF DEADLOCK: System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery from Deadlock.

UNIT - V:

FILE SYSTEM INTERFACE: The Concept of a File, Access Methods, Directory Structure, File System Mounting, File Sharing, Protection.

FILE SYSTEM IMPLEMENTATION: File System Structure, File system Implementation, Directory Implementation, Allocation Methods, and Free-Space Management.

TEXT BOOKS:

1. Computer Organization - Carl Hamacher, Zvonks Vranesic, SafeaZaky, 5th Edition, McGraw Hill.
2. Computer System Architecture - M. moris mano, 3rd edition, Pearson
3. Operating System Concepts - Abreham Silberchatz, Peter B. Galvin, Greg Gagne, 8th Edition, John Wiley.

REFERENCE BOOKS:

1. Computer Organization and Architecture - William Stallings 6th Edition, Pearson
2. Structured Computer Organization - Andrew S. Tanenbaum, 4th Edition, PHI
3. Fundamentals of Computer Organization and Design - Sivaraama Dandamudi, Springer Int. Edition
4. Operating Systems - Internals and Design Principles, Stallings, 6th Edition - 2009, Pearson Education.
5. Modern Operating Systems, Andrew S Tanenbaum 2nd Edition, PHI
6. Principles of Operating System, B. L. Stuart, Cengage Learning, India Edition.

COURSE OUTCOMES:

Upon completion of the course, students will have thorough knowledge about:

1. Basic structure of a digital computer
2. Arithmetic operations of binary number system
3. The organization of the Control Unit, Arithmetic and Logical Unit, Memory Unit and the I/O unit.
4. Operating system functions, types, system calls.
5. Memory management techniques and dead lock avoidance
6. Operating systems file system and implementation and its interface.

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(R17A0410) DIGITAL SYSTEM DESIGN THROUGH VERILOG

COURSE OBJECTIVES:

This course teaches

1. Designing digital circuits, behavioral and RTL modeling of digital circuits using Verilog HDL, verifying these Models and synthesizing RTL models to standard cell libraries and FPGAs.
2. Students gain practical experience by designing, modeling, implementing and verifying several digital circuits.
3. Different technologies related to HDLs, construct, compile and execute Verilog HDL programs using provided software tools.
4. Designing of digital components and circuits that are testable, reusable, and synthesizable.

UNIT - I:

INTRODUCTION TO VERILOG HDL: Verilog as HDL, Levels of Design Description, Concurrency, Simulation and Synthesis, Function Verification, Programming Language Interface, Module.

Language Constructs and Conventions: Introduction, Keywords, Identifiers, White Space, Characters, Comments, Numbers, Strings, Logic Values, Data Types, Scalars and Vectors, Operators.

UNIT - II:

GATE LEVEL MODELING: Introduction, AND Gate Primitive, Module Structure, Other Gate Primitives, Illustrative Examples, Tristate Gates, Array of Instances of Primitives, Design of Flip-Flops with Gate Primitives, Delay, Strengths and Construction Resolution, Net Types, Design of Basic Circuit.

MODELING AT DATAFLOW LEVEL: Introduction, Continuous Assignment Structure, Delays and Continuous Assignments, Assignment to Vector, Operators.

UNIT - III:

BEHAVIORAL MODELING: Introduction, Operations and Assignments, 'Initial' Construct, Assignments with Delays, 'Wait 'Construct, Multiple Always Block, Design at Behavioral Level, Blocking and Non-Blocking Assignments, The 'Case' Statement, 'If' an 'if-Else' Constructs, 'Assign- De-Assign' Constructs, 'Repeat' Construct, for loop, 'The Disable' Construct, 'While Loop', Forever Loop, Parallel Blocks, Force-Release, Construct, Event.

UNIT - IV:

SWITCH LEVEL MODELING: Basic Transistor Switches, CMOS Switches, Bidirectional Gates, Time Delays with Switch Primitives, Instantiation with 'Strengths' and 'Delays' Strength Contention with Trireg Nets.

UNIT - V:

SYSTEM TASKS, FUNCTIONS AND COMPILER DIRECTIVES: Parameters, Path Delays, Module Parameters. System Tasks and Functions, File Based Tasks and Functions, Computer Directives, Hierarchical Access, User Defined Primitives.

SEQUENTIAL CIRCUIT DESCRIPTION: Sequential Models - Feedback Model, Capacitive Model, Implicit Model, Basic Memory Components, Functional Register.

TEXT BOOKS:

1. T.R. Padmanabhan, B Bala Tripura Sundari, Design Through Verilog HDL, Wiley 2009.
2. Zainalabdien Navabi, Verliog Digital System Design,TMH, 2nd Edition.

REFERENCE BOOKS:

1. Fundamentals of Digital Logic with Verilog Design - Stephen Brown,Zvonkoc Vranesic, TMH, 2nd Edition.
2. Advanced Digital Logic Design using Verilog, State Machines & Synthesis for FPGA - Sunggu Lee, Cengage Learning, 2012.
3. Verilog HDL - Samir Palnitkar, 2nd Edition, Pearson Education, 2009.
4. Advanced Digital Design with Verilog HDL - Michel D. Ciletti, PHI,2009.

COURSE OUTCOMES:

By the end of the course student should be able to:

1. Describe Verilog HDL
2. Design Digital circuits
3. Write & Verify behavioral and RTL models of digital circuits
4. Describe standard Cell Libraries and FPGAs
5. Synthesize RTL models to standard cell libraries and FPGAs
6. Implement RTL models on FPGAs and testing and verification

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CORE ELECTIVE – I
(R17A0417) INSTRUMENTATION ENGINEERING

COURSE OBJECTIVES:

1. An introduction to measurement techniques and instrumentation design and operation
2. The basic concept of units, measurement error and accuracy, the construction and design of measuring devices and circuits, measuring instruments and their proper applications.
3. To learn the working of different types of Signal generators.
4. To learn the basics of oscilloscope and it types.
5. To use different measuring techniques and the measurement of different physical parameters using different transducers.

UNIT - I

BLOCK SCHEMATICS OF MEASURING SYSTEMS: Performance characteristics, Static characteristics, Accuracy, Precision, Resolution, Types of Errors, Gaussian Error, Dynamic Characteristics, Repeatability, Reproducibility, Fidelity, Lag; Measuring Instruments: DC Voltmeters, D' Arsonval Movement, DC Current Meters, AC Voltmeters and Current Meters, Ohmmeters, Millimeters, Meter Protection, Extension of Range, True RMS Responding Voltmeters, Specifications of Instruments.

UNIT - II

SIGNAL ANALYZERS: AF, HF Wave Analyzers, Harmonic Distortion, Heterodyne wave Analyzers, Spectrum Analyzers, Capacitance-Voltage Meters, Signal Generators: AF, RF Signal Generators, Sweep Frequency Generators, Pulse and Square wave Generators, Function Generators, Arbitrary waveform Generator.

UNIT - III

OSCILLOSCOPES: CRT, Block Schematic of CRO, Time Base Circuits, Lissajous Figures, CRO Probes, High Frequency CRO Considerations, Delay lines, Applications: Measurement of Time, Period and Frequency.

SPECIAL PURPOSE OSCILLOSCOPES: Dual Trace, Dual Beam CROs, Sampling Oscilloscopes, Storage Oscilloscopes, Digital Storage CROs.

UNIT - IV

TRANSDUCERS: Classification, Strain Gauges, Bounded, unbounded; Force and Displacement Transducers, Resistance Thermometers, Hotwire Anemometers, LVDT, Thermocouples, Synchros, Special Resistance Thermometers, Piezoelectric Transducers, Magneto Strictive Transducers.

UNIT - V

BRIDGES: Wheat Stone Bridge, Kelvin Bridge, and Maxwell Bridge.

MEASUREMENT OF PHYSICAL PARAMETERS: Flow Measurement, Displacement Meters, Liquid level Measurement, Measurement of Humidity and Moisture, Velocity, Force, Pressure - High Pressure, Vacuum level, Temperature Measurements, Data Acquisition Systems.

TEXTBOOKS:

1. Electronic instrumentation: H.S.Kalsi - TMH, 2nd Edition 2004.
2. Modern Electronic Instrumentation and Measurement Techniques: A.D. Helbincs, W.D. Cooper: PHI, 5th Edition, 2003.

REFERENCE BOOKS:

1. Electronic Instrumentation and Measurements - David A. Bell, Oxford Uiv. Press, 1997.
2. Electronic Measurements and Instrumentation: B. M. Oliver, J. M. Cage TMH Reprint.
3. Measurement Systems - Emest O. Doebelin and Dhanesh N Manik, 6th Ed., TMH.
4. Electronic Measurements and Instrumentations by K. Lal Kishore, Pearson Education - 2010.
5. Industrial Instrumentation: T. R. Padmanabham Spiriger 2009.

COURSE OUTCOMES:

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

1. Describe the fundamental concepts and principles of instrumentation
2. Explain the operation of various instruments required in measurements
3. Apply the measurement techniques for different types of tests.
4. To select specific instruments for specific measurement function.
5. Students will understand functioning, specification and application of signal analyzing instruments.

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CORE ELECTIVE – I
(R17A0412) TELEVISION ENGINEERING

COURSE OBJECTIVES:

1. The objectives of the course are:
2. To familiarize the students with Television transmitters and receivers and TV signal transmission.
3. To make them understand different signal processing steps monochrome television.
4. To introduce colour television transmitters and receivers.

UNIT–I:

Introduction: TV transmitter and receivers, synchronization. Geometric form and aspect ratio, image continuity, interlaced scanning, picture resolution, Composite videosignal,TVstandards.Camera tubes:image Orthicon,Plumbicon,vidicon, silicon Diode Array vidicon, Comparison of camera tubes, Monochrome TV camera,

TV Signal Transmission and Propagation: Picture Signal transmission, positive and negative modulation, VSB transmission, sound signal transmission, standard channel BW,TV transmitter, TV signal propagation, interference, TV broadcast channels, TV transmission Antennas.

UNIT –II:

Monochrome TV Receiver:

RF tuner, IF subsystem, video amplifier, sound section, sync separation and processing, deflection circuits, scanning circuits, AGC, noise cancellation, video and inter carrier sound signal detection, vision IF subsystem of Black and White receivers, Receiver sound system: FM
detection, FM Sound detectors, and typical applications.

UNIT -III:

Sync Separation and Detection: TV Receiver Tuners, Tuner operation, VHF and UHF tuners, digital tuning techniques, remote control of receiver functions. Sync Separation, AFC and Deflection Oscillators: Synchronous separation, k noise in sync pulses, separation of frame and line sync pulses. AFC, single ended AFC circuit, Deflection Oscillators, deflection drive ICs, Receiver Antennas, Picture Tubes,

UNIT–IV:

Color Television:

Colour signal generation, additive colour mixing, video signals for colours, colour difference signals, encoding, Perception of brightness and colours luminance signal, Encoding of colour difference signals, formation of chrominance signals, color cameras, Colour picture tubes.

Color Signal Encoding and Decoding: NTSC colour system PAL colour system, PAL encoder, PAL-D Decoder, chrome signal amplifiers, separation of U and V signals, colour burst separation, Burst phase discriminator, ACC amplifier, Reference oscillator, Indent and colour killer circuits, U& V demodulators.

UNIT – V:

Color Receiver: Introduction to colour receiver, Electron tuners, IF subsystem, Y-signal

channel,Chroma decoder, Separation of U & V Color, Phasors, synchronous demodulators, Sub carrier generation, raster circuits.

Digital TV: Introduction to Digital TV, Digital Satellite TV, Direct to Home Satellite TV, Digital TV Transmitter, Digital TV Receiver, Digital Terrestrial TV, LCD TV, LED TV, CCD Image Sensors, HDTV.

TEXT BOOKS:

1. Television and Video Engineering-A.M.Dhake, 2ndEdition.
2. Modern Television Practice –Principles, Technology and Service-R.R.Gallatin, New Age International Publication, 2002.
3. Monochrome and Colour TV-R.R. Gulati, New Age International Publication, 2002.

REFERENCE BOOKS:

1. Colour Television Theory and Practice-S.P.Bali, TMH, 1994.
2. Basic Television and Video Systems-B.Grob and C.E.Herndon, McGraw Hill, 1999.

COURSE OUTCOMES:

1. Understand TV standards and picture tubes for monochrome TV.
2. Distinguish between monochrome and colour Television transmitters and receivers.
3. Analyze and Evaluate the NTSC and PAL colour systems.

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CORE ELECTIVE – I
(R17A0204) DIGITAL CONTROL SYSTEMS

COURSE OBJECTIVES:

To cater the knowledge of

1. Basic and digital control system for the real time analysis.
2. Design of control systems.
3. To provide comprehensive knowledge of concepts of stability analysis.
4. Design of discrete time systems.
5. To expose the students to the concepts of optimal control for discrete domain.

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 and Z-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 PID controllers.

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. Digital Control Systems, Kuo, Oxford University Press, 2nd Edition, 2003.
2. Digital Control Engineering, M.Gopal New age international publishers.
3. Advanced Control Theory by NAGOOR KANI, 2nd Edition, RBA Publications.
4. Digital Control Systems, Design, Identification and Implementation by Landau**,** Iona Dore, ZitoGianluca, Springer1st edition.
5. Digital control systems by R.Isermann, Springer; 1st edition.

COURSE OUTCOMES:

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

1. Learn the basics and digital control system for the real time analysis
2. Design of control systems.
3. Learn comprehensive knowledge of concepts of stability analysis
4. Understand the design of discrete time systems
5. Understand the concepts of optimal control for discrete domain.

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(R17A0484) IC APPLICATIONS AND HDL SIMULATION LAB

Note: To perform any twelve experiments (choosing at least five from each part).

Part - I: Linear IC Experiments

1. OP AMP Applications – Adder, Subtractor, Comparators.
2. Integrator and Differentiator Circuits using IC 741.
3. Active Filter Applications – LPF, HPF (first order)
4. IC 741 Waveform Generators - Sine, Square wave and Triangular waves.
5. IC 555 Timer - Monostable and Astable Multivibrator Circuits.
6. Schmitt Trigger Circuits - Using IC 741
7. IC 565 - PLL Applications.
8. Voltage Regulator using IC 723, Three Terminal Voltage Regulators - 7805, 7809, 7912.

EQUIPMENT REQUIRED:

1. 20 MHz / 40 MHz / 60 MHz Oscilloscope.
2. 1 MHz Function Generator (Sine, Square, Traingular and TTL).
3. Regulated Power Supply.
4. Multimeter / Volt Meter.

Part - II: HDL Simulation programs:

Programming can be done using any compiler. Download the programs on FPGA / CPLD boards and performance testing may be done using pattern generator / logic analyzer apart from verification by simulation using Cadence / Mentor Graphics / Synopsys / Equivalentfront end CAD tools.

1. HDL code to realize all the logic gates
2. Design of 2-to-4 decoder
3. Design of 8-to-3 encoder (without and with Priority)
4. Design of 8-to-1 multiplexer and 1 x 8 Demultiplexer.
5. Design of 4 bit binary to gray code converter
6. Design of 4 bit comparator
7. Design of Full adder using 3 modeling styles
8. Design of flip flops: SR, JK, T
9. Design of 4-bit binary, BCD counters (synchronous/ asynchronous reset)

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(R17A0485) ANALOG COMMUNICATIONS LAB

Note: Minimum 12 Experiments should be conducted:
All these experiments are to be simulated first using MATLAB, Comsim or any other simulation package and then to be realized in hardware.

LIST OF EXPERIMENTS:

1. Amplitude modulation and demodulation.
2. DSB-SC Modulator & Detector.
3. SSB-SC Modulator & Detector (Phase Shift Method).
4. Frequency modulation and demodulation.
5. Study of spectrum analyzer and analysis of AM and FM Signals.
6. Pre-emphasis & De-emphasis.
7. Frequency Division Multiplexing & De multiplexing.
8. Verification of Sampling Theorem.
9. Pulse Amplitude Modulation & Demodulation.
10. Pulse Width Modulation & Demodulation.
11. Pulse Position Modulation & Demodulation.
12. Frequency Synthesizer.
13. AGC Characteristics.
14. PLL as FM Demodulator.

Equipment required for the Laboratory:

1. RPS - 0-30 V.
2. CRO - 0-20 M Hz.
3. Function Generators - 0-1 M Hz.
4. RF Generators - 0-1000 M Hz/0-100 MHz.
5. Multimeters.
6. Lab Experimental kits for Analog Communication.
7. Radio Receiver/TV Receiver Demo kits or Trainees.
8. Spectrum Analyzer – 60 M Hz.
9. Any one Simulation Package.

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MANDATORY COURSE – III
(R17A0007) TECHNICAL COMMUNICATION AND SOFT SKILLS

INTRODUCTION:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

OBJECTIVES:

a. To improve the language proficiency of the students in English with emphasis on LSRW skills.
b. To equip the students to approach academic subjects more professionally using the theoretical and practical components of the English syllabus.
c. To develop the professional skills and communication skills in formal and informal situations and hone the required professional ethics.

UNIT-I: Factors affecting information and document design, Principles of effective writing , Technical Writing, Grammar and Editing- Technical writing process, Writing drafts and revising, Collaborative writing, technical writing style and language.

UNIT-II: Basics of grammar, study of advanced grammar, editing strategies to achieve appropriate technical style. Introduction to Advanced Technical Communication.

UNIT-III: Communication and Technical Writing- Public speaking, Group discussion, Oral; presentation, Interviews, Graphic presentation, Presentation aids. Writing reports, Email writing, Official Notes, Business Letters, Memos, Progress Reports, Minutes of Meetings, Event Report.

UNIT-IV: Self Development and Assessment- Self assessment, Awareness, Perception and Attitudes, Values and belief, Personal goal setting, career planning, self esteem.

UNIT-V: Ethics- Business ethics, , Personality Development in social and office settings, netiquettes, Telephone Etiquettes, Engineering ethics, Managing time, Role and responsibility of engineer, Work culture in jobs, Rapid reading, Complex problem solving, Creativity, Leadership skills ,Cubicle Etiquettes, Team building.

TEXT 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)

REFERENCE BOOKS:

1. Dale Jung k Applied Writing for Technicians,McGraw Hill, New York, 2004.(ISBN: 07828357-4)
2. Sharma,R.and Mohan, K. Business Correspondence and Report Writing,TMH New Delhi 2002.
3. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

OUTCOMES:

1. The student will become proficient in LSRW skills.
2. They develop formal LSRW skills approach to different situations.
3. They hone professional ethics and learn to be proficient formally.

OPEN ELECTIVES II

OPEN ELECTIVE II		
S.NO	**SUBJECT CODE**	**SUBJECT**
1	**R17A0452**	**INDUSTRIAL ELECTRONICS**
2	**R17A0453**	**COMMUNICATION NETWORKS**
3	**R17A0552**	**INTRODUCTION TO JAVA PROGRAMMING**
4	**R17A1251**	**INTRODUCTION TO SCRIPTING LANGUAGES**
5	**R17A1252**	**SOFTWARE PROJECT MANAGEMENT**
6	**R17A0353**	**ENTERPRISE RESOURCE PLANNING**

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OPEN ELECTIVE II
(R17A0452) INDUSTRIAL ELECTRONICS

COURSE OBJECTIVES:

1. To get an overview of semi-conductor devices (such as PN junction diode & Transistor) and their switching characteristics.
2. To understand the characteristics of AC to DC converters.
3. To understand about the practical applications Electronics in industries.

UNIT I

Scope of industrial Electronics, Semiconductors, Merits of semiconductors, crystalline structure, Intrinsic semiconductors, Extrinsic semiconductors, current flow in semiconductor, Open-circuited p-n junction, Diode resistance, Zener diode, Photoconductors and junction photo diodes, Photo voltaic effect, Light emitting diodes (LED)

UNIT II

Introduction, The junction transistor, Conventions for polarities of voltages and currents, Open circuited transistor, Transistor biased in the active region, Current components in transistors, Currents in a transistor, Emitter efficiency, Transport factor and transistor-α, Dynamic emitter resistance, Transistor as an amplifier, Transistor construction, Letter symbols for semiconductor Devices, Characteristic curves of junction transistor in common configuration, static characteristic curves of PNP junction transistor in common emitter configuration, The transistor in common collector Configuration.

UNIT III

AC to DC converters- Introduction, Classification of Rectifiers, Half wave Rectifiers, Full wave Rectifiers, Comparison of Half wave and full wave rectifiers, Bridge Rectifiers, Bridge Rectifier meter, Voltage multiplying Rectifier circuits, Capacitor filter, LC Filter, Metal Rectifiers, Regulated Power Supplies, Classification of Voltage Regulators, Short period Accuracy of Regulators, Long period .Accuracy of Voltage Regulator, Principle of automatic voltage Regulator, Simple D.C. Voltage stabilizer using Zener diode, D.C. Voltage Regulators, Series Voltage Regulators, Complete series voltage regulator circuit, Simple series voltage regulator.

UNIT IV

Resistance welding controls: Introduction, Resistance welding process, Basic Circuit for A.C. resistance welding, Types of Resistance welding, Electronic welding control used in Resistance welding, Energy storage welding. **Induction heating:** Principle of induction heating, Theory of Induction heating merits of induction heating, Application of induction heating, High frequency power source of induction heating. **Dielectric heating**: Principle of dielectric heating, theory of dielectric heating, dielectric properties of typical materials, electrodes used in dielectric heating, method of coupling of electrodes to the R.F. generator, Thermal losses in Dielectric heating, Applications.

UNIT V :

Ultrasonics: Introduction, Generation of Ultrasonic waves, Application of Ultrasonic waves, Ultrasonic stroboscope, ultrasonic as means of communication, ultrasonic flaw detection,

Optical image on non-homogeneities, ultrasonic study of structure of matter, Dispersive study of structure of matter, Dispersive and colloidal effect of Ultrasonic, Coagulating action of Ultrasonic, separation of mixtures by ultrasoni8c waves, cutting and machining of hard materials by ultrasonic vibrations, Degassing of liquids by ultrasonic waves, Physico-chemical effects of ultrasonics, chemical effects of ultrasonics, Thermal effects of Ultrasonics, soldering and welding by ultrasonics, Ultrasonic Drying

TEXT BOOKS:

1. G. K. Mithal, "Industrial Electronics", Khanna Publishers, Delhi, 2000.
2. J.Gnanavadivel, R.Dhanasekaran, P.Maruthupandi, "Industrial Electronics", Anuradha Publications, 2011.

REFERENCE BOOKS:

1. F. D. Petruzulla, "Industrial Electronics", McGraw Hill, Singapore, 1996.
2. M. H. Rashid, "power Electronics Circuits, Devices and Application", PHI, 3rd edition, 2004.
3. G. M. Chute and R. D. Chute, "Electronics in Industry", McGraw Hill Ltd, Tokyo, 1995.

COURSE OUTCOMES

After completion of the course the students will be able to

1. Get an overview of semi-conductor devices (such as PN junction diode & Transistor) and their switching characteristics.
2. Understand the characteristics of AC to DC converters.
3. Understand about the practical applications Electronics in industries.

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OPEN ELECTIVE II
(R17A0453) COMMUNICATION NETWORKS

COURSE OBJECTIVES

1. To understand the concept of computer communication.
2. To learn about the networking concept, layered protocols.
3. To understand various communications concepts.
4. To get the knowledge of various networking equipment.

UNIT – I: Overview of Computer Communications and Networking: Introduction to Computer Communications and Networking, Introduction to Computer Network, Types of Computer Networks, Network Addressing, Routing, Reliability, Interoperability and Security, Network Standards, The Telephone System and Data Communications.

UNIT – II: Essential Terms and Concepts: Computer Applications and application protocols, Computer Communications and Networking models, Communication Service Methods and data transmission modes, analog and Digital Communications , Speed and capacity of a Communication Channel, Multiplexing and switching, Network architecture and the OSI reference model.

UNIT – III: Analog and Digital Communication Concepts: Representing data as analog signals, representing data as digital signals, data rate and bandwidth reduction, Digital Carrier Systems.

UNIT – IV: Physical and Data Link Layer Concepts: The Physical and Electrical Characteristics of wire, copper media, fiber optic media, Wireless communications. Introduction to data link layer, logical link control and medium access control sub-layers.

UNIT – V: Network Hardware Components: Introduction to Connectors, Transreceivers and media convertors, repeaters, network interference cards and PC cards, bridges, switches, Switches vs Routers.

TEXT BOOKS:

1. Computer Communications and Networking Technologies, Michel A.Gallo and William H.Hancock, Thomson Brooks/Cole.
2. Data Communications and Networking – Behrouz A Forouzan, Fourth Edition, McGraw Hill Education, 2006.

REFERENCE BOOKS:

1. Principles of Computer Networks and Communications, M Barry Dumas, Morris Schwartz, Pearson.
2. Computer Networking: A Top-Down Approach Featuring the Internet, James F.Kurose, K W Ross, 3rd Edition, Pearson Education.

COURSE OUTCOMES

1. The student can get the knowledge of networking of computers, data transmission between computers.
2. Will have the exposure about the various communication concepts.
3. Will get awareness about the structure and equipment of computer network structures.

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OPEN ELECTIVE II

(R17A0552) 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

1) to create Java programs that leverage the object-oriented features of the Java language, such as encapsulation, inheritance and polymorphism;
2) use data types, arrays and strings;
3) implement error-handling techniques using exception handling,
4) 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:

1) An understanding of the principles and practice of object oriented programming and design in the construction of robust, maintainable programs which satisfy their requirements;
2) A competence to design, write, compile, test and execute straightforward programs using a high level language;
3) An appreciation of the principles of object oriented programming;
4) An awareness of the need for a professional approach to design and the importance of good documentation to the finished programs.
5) Be able to implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.
6) Be able to make use of members of classes found in the Java API.
7) 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.
8) Able to develop applications using Applet, awt and GUI Programming.

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OPEN ELECTIVE II

(R17A01251) INTRODUCTION TO SCRIPTING LANGUAGES

COURSE OBJECTIVES:

1) Learning the basics of scripting languages like PERL, JAVASCRIPT, PYTHON
2) Understanding the requirements and uses of Scripting.
3) In-depth knowledge of programming features of Perl and Python.
4) Knowing the implementation model for scripting and design of applications.

UNIT I

Introduction to PERL and Scripting Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

UNIT II

HTML: HTML basics, Elements, Attributes and Tags, Basic Tags, Advanced Tags, Frames, Images.

Cascading style sheets: Adding CSS, CSS and page layout.

JavaScript: Introduction, Variables, Literals, Operators, Control structure, Conditional statements, Arrays, Functions, Objects, Predefined objects, Object hierarchy, Accessing objects.

UNIT III

JavaScript programming of reactive web pages elements: Events, Event handlers, multiple windows and Frames, Form object and Element, Advanced JavaScript and HTML, Data entry and Validation, Tables and Forms.

Introduction to Python Programming: History of Python, Need of Python Programming, Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation, Types - Integers, Strings, Booleans.

UNIT IV

Operators and Expressions: Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations.

Data Structures: Lists - Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences.

UNIT V

Control Flow - if, if-else, for, while, break, continue, pass

Functions - Defining Functions, Calling Functions, Passing Arguments, Default Arguments, Variable-length arguments, Fruitful Functions(Function Returning Values), Scope of the Variables in a Function - Global and Local Variables. Development of sample scripts and web applications.

TEXT BOOKS:

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Learning Python, Mark Lutz, Orielly
3. Web Programming, building internet applications, Chris Bates 2nd Edition, WILEY
4. Beginning JavaScript with Dom scripting and AJAX, Russ Ferguson, Christian Heilmann, Apress.
5. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.

REFERENCES:

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware(Addison Wesley) Pearson Education.
2. Programming Python, M.Lutz, SPD.
3. Core Python Programming, Chun, Pearson Education.
4. Guide to Programming with Python, M.Dawson, Cengage Learning.
5. Perl by Example, E.Quigley, Pearson Education.
6. Programming Perl, Larry Wall, T.Christiansen and J.Orwant, O'Reilly, SPD.

COURSE OUTCOMES:

1. Analyze the differences between typical scripting languages and application programming languages.
2. Application of knowledge of scripting languages to design programs for simple applications.
3. Create software systems using scripting languages, including Perl and Python.

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OPEN ELECTIVE II

(R17A01252) SOFTWARE PROJECT MANAGEMENT

COURSE OBJECTIVES:

The Main goal of software development projects is to create a software system with a predetermined functionality and quality in a given time frame and with given costs. For achieving this goal, models are required for determining target values and for continuously controlling these values. This course focuses on principles, techniques, methods & tools for model-based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experience - based creation & improvement of models (process management).

The Objectives of the course can be characterized as follows:

1) Understanding the specific roles within a software organization as related to project and process management
2) Understanding the basic infrastructure competences (e.g., process modeling and measurement)
3) 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:

1) Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project
2) Compare and differentiate organization structures and project structures.
3) 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

(R17A0353) ENTERPRISE RESOURCE PLANNING

COURSE OBJECTIVES

1) To know the basics of ERP
2) To understand the key implementation of ERP
3) To know the business modules of ERP
4) 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:

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

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(R17A0413) DIGITAL COMMUNICATIONS

COURSE OBJECTIVES:

1. To understand different digital pulse modulation techniques such as PCM and DM.
2. To understand the concepts of various shift keying techniques.
3. To analyze error performance of a digital communication system in presence of noise and other interferences.
4. To understand different source coding and decoding techniques.
5. To study about different error detecting and correcting codes like Block codes, Cyclic Codes.

UNIT I

PULSE DIGITAL MODULATION: Elements of digital communication systems, Advantages of digital communication systems, Elements of PCM: Sampling, Quantization & Coding, Quantization error, Companding in PCM systems. Differential PCM systems (DPCM), Time Division Multiplexing & Demultiplexing.

DELTA MODULATION: Delta modulation & Demodulation, DM drawbacks, Adaptive delta modulation, Comparison of PCM and DM systems, Noise in PCM and DM systems. Illustrative Problems.

UNIT II

DIGITAL MODULATION TECHNIQUES: Introduction, ASK, FSK, PSK, DPSK, QPSK, similarity of BFSK and BPSK. Coherent reception of ASK, FSK, PSK & Non-coherent detection of ASK and FSK.

DATA TRANSMISSION: Base band signal receiver, Probability of error, Optimum filter, matched filter, Probability of error using matched filter, Eye diagrams, Illustrative Problems.

UNIT III

INFORMATION THEORY: Discrete messages, Concept of amount of information and its properties. Average information, Entropy and its properties, Information rate, Mutual information and its properties, Illustrative Problems.

UNIT IV

SOURCE CODING: Introduction, Shannon's theorem, Bandwidth –S/N trade off, Shannon-Fano coding, Huffman coding, Efficiency calculations, Channel capacity of discrete and analog Channels, capacity of a Gaussian channel, Illustrative Problems.

UNIT V

LINEAR BLOCK CODES: Introduction, Matrix description of Linear Block codes, Error detection and error correction capabilities of linear block codes, Hamming codes, Cyclic Codes.

CONVOLUTION CODES: Introduction, Encoding of convolution codes, Time domain approach, transform domain approach. Graphical approach: state, tree and trellis diagram, Decoding using Viterbi algorithm, Illustrative Problems.

TEXT BOOKS:

1. Digital communications - Simon Haykin, John Wiley, 2005
2. Principles of Communication Systems – H. Taub and D. Schilling, TMH, 2003

REFERENCE BOOKS:

1. Digital and Analog Communication Systems – K.Sam Shanmugam, John Wiley, 2005.
2. Digital Communications – John Proakis, TMH, 1983. Communication Systems Analog & Digital – Singh & Sapre, TMH, 2004.
3. Modern Analog and Digital Communication – B.P.Lathi, Oxford reprint, 3rd edition, 2004.

COURSE OUTCOMES:

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

1. Understand basic components of digital communication systems
2. Design Optimum receivers for digital modulation techniques
3. Analyze the error performance of digital modulation techniques
4. Know about different error detecting and error correcting codes

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(R17A0414) MICROPROCESSORS AND MICROCONTROLLERS

COURSE OBJECTIVES:

1. To understand the basics of microprocessors and microcontrollers architectures and its functionalities.
2. To develop an in-depth understanding of the operation of microprocessors and microcontrollers, machine language programming & interfacing techniques.
3. To design and develop Microprocessor/ microcontroller based systems for real time applications using low level language like ALP.
4. 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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(R17A0415) DIGITAL SIGNAL PROCESSING

COURSE OBJECTIVES:

1. To understand the basic concepts and techniques for processing signals and digital signal processing fundamentals.
2. To Understand the processes of analog-to-digital and digital-to-analog conversion and relation between continuous-time and discrete time signals and systems.
3. To Master the representation of discrete-time signals in the frequency domain, using z-transform, discrete Fourier transforms (DFT).
4. To Understand the implementation of the DFT in terms of the FFT, as well as some of its applications (computation of convolution sums, spectral analysis).
5. To learn the basic design and structure of FIR and IIR filters with desired frequency responses and design digital filters.
6. The impetus is to introduce a few real-world signal processing applications.
7. To acquaint in FFT algorithms, Multi-rate signal processing techniques and finite word length effects.

UNIT I

INTRODUCTION TO DIGITAL SIGNAL PROCESSING: Introduction, Discrete Time Signals & Sequences, Linear Shift Invariant Systems, Stability, and Causality, Linear Constant Coefficient Difference Equations, Frequency Domain Representation of Discrete Time Signals and systems.

REALIZATION OF DIGITAL FILTERS: Applications of Z - Transforms, Solution of Difference Equations of Digital Filters, System Function, Stability Criterion, Frequency Response of Stable Systems, Realization of Digital Filters - Direct, Canonic, Cascade and Parallel forms.

UNIT II

DISCRETE FOURIER SERIES: DFS Representation of Periodic Sequences. Properties of Discrete Fourier Series., Discrete Fourier Transforms: Properties of DFT. Linear Convolution of Sequences using DFT. Computation of DFT: Over-lap Add Method, Over-lap Save Method, Relation between DTFT, DFS, DFT and Z-Transform**.**

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

UNIT III

IIR DIGITAL FILTERS: Analog Filter Approximations - Butterworth and Chebyshev, Design of IIR Digital filters from Analog Filters, Step and Impulse Invariant Techniques, Bilinear Transformation Method.

UNIT IV

FIR DIGITAL FILTERS: Characteristics of FIR Digital Filters, Frequency Response. Design of FIR Filters: Fourier Method. Digital Filters using Window Techniques, Frequency Sampling Technique, Comparison of IIR & FIR filters.

UNIT V

MULTIRATE DIGITAL SIGNAL PROCESSING: Introduction, Down sampling, Decimation, Upsampling, Interpolation, Sampling Rate Conversion, Applications of Multi Rate Signal Processing.

FINITE WORD LENGTH EFFECTS: Limit cycles, Overflow oscillations, Round-off Noise in IIR

Digital Filters, Computational Output Round Off Noise, Methods to prevent Overflow, Dead band effects.

TEXT BOOKS:

1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education / PHI, 2007.
2. Discrete Time Signal Processing – A. V. Oppenheim and R.W. Schaffer, PHI, 2009.
3. Fundamentals of Digital Signal Processing – Loney Ludeman, John Wiley, 2009

REFERENCE BOOKS:

1. Digital Signal Processing – Fundamentals and Applications – Li Tan, Elsevier, 2008.
2. Fundamentals of Digital Signal Processing using MATLAB – Robert J. Schilling, Sandra L. Harris, b Thomson, 2007.
3. Digital Signal Processing – S.Salivahanan, A.Vallavaraj and C.Gnanapriya, TMH, 2009.
4. Discrete Systems and Digital Signal Processing with MATLAB – Taan S. EIAli, CRC press, 2009.
5. Digital Signal Processing - A Practical approach, Emmanuel C. Ifeachor and Barrie W. Jervis, 2nd Edition, Pearson Education, 2009.
6. Digital Signal Processing - Nagoor Khani, TMG, 2012.

COURSE OUTCOMES:

On completion of the subject the student must be able to:

1. Perform time, frequency and z-transform analysis on signals and systems.
2. Understand the inter relationship between DFT and various transforms.
3. Understand the significance of various filter structures and effects of rounding errors.
4. Design a digital filter for a given specification.
5. Understand the fast computation of DFT and Appreciate the FFT processing.
6. Understand the trade-off between normal and multi rate DSP techniques and finite length word effects.

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(R17A0416) ANTENNAS AND WAVE PROPAGATION

COURSE OBJECTIVES:

1. Understand basic terminology and concepts of Antennas.
2. To attain knowledge on the basic parameters those are considered in the antenna design process and the analysis while designing that.
3. Analyze the electric and magnetic field emission from various basic antennas and mathematical formulation of the analysis.
4. To have knowledge on antenna operation and types as well as their usage in real time.
5. Aware of the wave spectrum and respective band based antenna usage and also to know the propagation of the waves at different frequencies through different layers in the existing layered free space environment structure.

UNIT -I

ANTENNA BASICS: Introduction, Basic Antenna Parameters – Patterns, Beam Area, Radiation Intensity, Beam Efficiency, Directivity-Gain-Resolution, Antenna Apertures, Illustrative Problems. Field Zones, Front - to-back Ratio, Antenna Theorems, Radiation, Retarded Potentials – Helmholtz Theorem.

THIN LINEAR WIRE ANTENNAS : Radiation from Small Electric Dipole, Quarter Wave Monopole and Half Wave Dipole – Current Distributions, Field Components, Radiated Power, Radiation Resistance, Beam Width, Directivity, Effective Area, Effective Height, Natural Current Distributions, Far Fields and Patterns of Thin Linear Centre-fed Antennas of Different Lengths, Illustrative Problems.

UNIT –II

VHF, UHF AND MICROWAVE ANTENNAS - I : Arrays with Parasitic Elements, Yagi-Uda Array, Folded Dipoles and their Characteristics, Helical Antennas – Helical Geometry, Helix Modes, Practical Design Considerations for Monofilar Helical Antenna in Axial and Normal Modes, Horn Antennas – Types, Optimum Horns, Design Considerations of Pyramidal Horns, Illustrative Problems.

VHF, UHF AND MICROWAVE ANTENNAS - II: Micro strip Antennas – Introduction, Features, Advantages and Limitations, Rectangular Patch Antennas – Geometry and Parameters, Characteristics of Microstrip Antennas. Impact of Different Parameters on Characteristics, Reflector Antennas – Introduction, Flar Sheet and Corner Reflectors, Paraboloidal Reflectors – Geometry, Pattern Characteristics, Feed Methods, Reflector Types – Related Features, Illustrative Problems. Lens Antennas – Introduction, Geometry of Non-metallic Dielectric Lenses, Fermat's Principle, Zoning, Applications.

UNIT -III

ANTENNA ARRAYS: Point Sources – Definition, Patterns, arrays of 2 Isotropic Sources - Different Cases, Principle of Pattern Multiplication, Uniform Linear Arrays – Broadside Arrays, Endfire Arrays, Derivation of their Characteristics and Comparison, BSAs with Non-uniform Amplitude Distributions – General Considerations and Binomial Arrays, Illustrative Problems.

ANTENNA MEASUREMENTS: Introduction, Concepts - Reciprocity, Near and Far Fields, Coordinate System Patterns to be Measured, Pattern Measurement Arrangement, Directivity Measurement, Gain Measurements (by Comparison, Absolute and 3- Antenna Methods)

UNIT -IV

WAVE PROPAGATION – I: Introduction, Definitions, Categorizations and General Classifications, Different Modes of Wave Propagation, Ray/Mode Concepts, Ground Wave Propagation (Qualitative Treatment) – Introduction, Plane Earth Reflections, Space and Surface Waves, Wave Tilt, Curved Earth Reflections. Space Wave Propagation – Introduction, Field Strength Variation with Distance and Height, Effect of Earth‘s Curvature, Absorption, Super Refraction, M-Curves and Duct Propagation, Scattering Phenomena, Tropospheric Propagation.

UNIT -V

WAVE PROPAGATION – II: Sky Wave Propagation – Introduction, Structure of Ionosphere, Refraction and Reflection of Sky Waves by Ionosphere, Ray Path, Critical Frequency, MUF, LUF, OF, Virtual Height and Skip Distance, Relation between MUF and Skip Distance, Multihop Propagation.

TEXT BOOKS:

1. Antennas and Wave Propagation – J.D. Kraus, R.J. Marhefka and Ahmad S. Khan, TMH, New Delhi, 4th ed., (Special Indian Edition), 2010.
2. Electromagnetic Waves and Radiating Systems–E.C. Jordan and K.G. Balmain, PHI, 2nd ed.,
3. A.Harish, M.Sachidanada,” Antennas and Wave Propagation”, Oxford University Press,2007

REFERENCE BOOKS:

1. Antenna Theory - C.A. Balanis, John Wiley & Sons, 3rd Ed., 2005.
2. Antennas and Wave Propagation–K.D. Prasad, Satya Prakashan, Tech India Publications, New Delhi, 2001.
3. Transmission and Propagation – E.V.D. Glazier and H.R.L. Lamont, The Services Text Book of Radio, vol. 5, Standard Publishers Distributors, Delhi.
4. Antennas – John D. Kraus, McGraw-Hill (International Edition), 2nd Ed. 1988.
5. Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th edition, 1955.

COURSE OUTCOMES:

Student will be able to

1. Aware of antenna parameter considerations
2. Capable to analyze the designed antenna and field evaluation under various conditions and formulate the electric as well as magnetic fields equation set for far field and near field conditions
3. Understand the array system of different antennas and field analysis under application of different currents to the individual antenna elements
4. Understand the design issues, operation of fundamental antennas and their operation methodology in practice.
5. Design a lens structure and also the bench set up for antenna parameter measurement of testing for their effectiveness.
6. Knowledge about the means of propagation of electromagnetic waves

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CORE ELECTIVE – II
(R17A0418) FIBRE OPTICAL COMMUNICATIONS

COURSE OBJECTIVES:

1. To realize the significance of optical fiber communications.
2. To understand the construction and characteristics of optical fiber cable.
3. To develop the knowledge of optical signal sources and power launching.
4. To identify and understand the operation of various optical detectors.
5. To under the design of optical systems and WDM.

UNIT I

OVERVIEW OF OPTICAL FIBER COMMUNICATION: Historical development, The general system, advantages of optical fiber communications. Optical fiber wave guides- Introduction, Ray theory transmission, Total Internal Reflection, Acceptance angle, Numerical Aperture, Skew rays. Cylindrical fibers- Modes, V number, Mode coupling, Step Index fibers, Graded Index fibers.

Single mode fibers- Cut off wavelength, Mode Field Diameter, Effective Refractive Index. Fiber materials — Glass, Halide, Active glass, Chalgenide glass, Plastic optical fibers.

UNIT II

SIGNAL DISTORTION IN OPTICAL FIBERS: Attenuation, Absorption, Scattering and Bending losses, Core and Cladding losses. Information capacity determination, Group delay, Types of Dispersion - Material dispersion, Wave-guide dispersion, Polarization mode dispersion, Intermodal dispersion. Pulse broadening. Optical fiber Connectors- Connector types, Single mode fiber connectors, Connector return loss.

UNIT III

FIBER SPLICING: Splicing techniques, Splicing single mode fibers. Fiber alignment and joint loss- Multimode fiber joints, single mode fiber joints, Optical sources- LEDs, Structures, Materials, Quantum efficiency, Power, Modulation, Power bandwidth product. Injection Laser Diodes- Modes, Threshold conditions, External quantum efficiency, Laser diode rate equations, Resonant frequencies. Reliability of LED & ILD.

SOURCE TO FIBER POWER LAUNCHING: Output patterns, Power coupling, Power launching, Equilibrium Numerical Aperture, Laser diode to fiber coupling.

UNIT IV

OPTICAL DETECTORS:Physical principles of PIN and APD, Detector response time, Temperature effect on Avalanche gain, Comparison of Photo detectors. Optical receiver operation- Fundamental receiver operation, Digital signal transmission, error sources, Receiver configuration, Digital receiver performance, Probability of error, Quantum limit, Analog receivers.

UNIT V

OPTICAL SYSTEM DESIGN : Considerations, Component choice, Multiplexing. Point-to- point links, System considerations, Link power budget with examples. Overall fiber dispersion in Multi mode and Single mode fibers, Rise time budget with examples.

Transmission distance, Line coding in Optical links, WDM, Necessity, Principles, Types of WDM, Measurement of Attenuation and Dispersion, Eye pattern.

TEXT BOOKS:

1. Optical Fiber Communications – Gerd Keiser, Tata Mc Graw-Hill International edition, 4th Edition, 2008.
2. Optical Fiber Communications – John M. Senior, PHI, 2nd Edition, 2002.

RERFERENCE BOOKS:

1. Fiber Optic Communications – D.K. Mynbaev , S.C. Gupta and Lowell L. Scheiner, Pearson Education, 2005.
2. Text Book on Optical Fibre Communication and its Applications – S.C.Gupta, PHI, 2005.
3. Fiber Optic Communication Systems – Govind P. Agarwal , John Wiley, 3rd Ediition, 2004.
4. Fiber Optic Communications – Joseph C. Palais, 4th Edition, Pearson Education, 2004.

COURSE OUTCOMES:

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

1. Understand and analyze the constructional parameters of optical fibers.
2. Be able to design the optical system.
3. Estimate the losses due to attenuation, absorption, scattering and bending.
4. Compare various optical detectors and choose suitable one for different applications.

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CORE ELECTIVE – II

(R17A0419) INFORMATION THEORY AND CODING

COURSE OBJECTIVES:

1) To make the students aware about the coding for reliable digital transmission and storage.
2) To understand different types of cyclic codes
3) To understand convulutional codes and their significance
4) To understand different types of Turbo codes
5) To understand space-time codes and their significance.

UNIT – I : Coding for Reliable Digital Transmission and storage: Mathematical model of Information, A Logarithmic Measure of Information, Average and Mutual Information and Entropy, Types of Errors, Error Control Strategies. Linear Block Codes: Introduction to Linear Block Codes, Syndrome and Error Detection, Minimum Distance of a Block code, Error-Detecting and Error-correcting Capabilities of a Block code, Standard array and Syndrome Decoding, Probability of an undetected error for Linear Codes over a BSC, Hamming Codes. Applications of Block codes for Error control in data storage system

UNIT – II : Cyclic Codes : Description, Generator and Parity-check Matrices, Encoding, Syndrome Computation and Error Detection, Decoding ,Cyclic Hamming Codes, Shortened cyclic codes, Error-trapping decoding for cyclic codes, Majority logic decoding for cyclic codes.

UNIT – III : Convolutional Codes: Encoding of Convolutional Codes, Structural and Distance Properties, maximum likelihood decoding, Sequential decoding, Majority- logic decoding of Convolution codes. Application of Viterbi Decoding and Sequential Decoding, Applications of Convolutional codes in ARQ system.

UNIT – IV : Turbo Codes: LDPC Codes- Codes based on sparse graphs, Decoding for binary erasure channel, Log-likelihood algebra, Brief propagation, Product codes, Iterative decoding of product codes, Concatenated convolutional codes- Parallel concatenation, The UMTS Turbo code, Serial concatenation, Parallel concatenation, Turbo decoding

UNIT – V : Space-Time Codes: Introduction, Digital modulation schemes, Diversity, Orthogonal space- Time Block codes, Alamouti's schemes, Extension to more than Two Transmit Antennas, Simulation Results, Spatial Multiplexing : General Concept, Iterative APP Preprocessing and Per-layer Decoding, Linear Multilayer Detection, Original BLAST Detection, QL Decomposition and Interface Cancellation, Performance of Multi – Layer Detection Schemes, Unified Description by Linear Dispersion Codes.

TEXT BOOKS:

1) Shu Lin, Daniel J.Costello,Jr, "Error Control Coding- Fundamentals and Applications", Prentice Hall, Inc.
2) Man Young Rhee, "Error Correcting Coding Theory", 1989, McGraw-Hill

REFERENCE BOOKS:

1) Bernard Sklar, "Digital Communications-Fundamental and Application", PE.
2) John G. Proakis, "Digital Communications", 5 th Edition, 2008, TMH.
3) Salvatore Gravano, "Introduction to Error Control Codes", Oxford
4) Todd K.Moon, "Error Correction Coding – Mathematical Methods and Algorithms", 2006, Wiley India.
5) Ranjan Bose, "Information Theory, Coding and Cryptography", 2nd Edition, 2009, TMH.

COURSE OUTCOMES:

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

1) Understand about the coding for reliable digital transmission and storage.
2) Understand different types of cyclic codes
3) Understand convulutional codes and their significance
4) Understand different types of Turbo codes
5) Understand space-time codes and their significance.

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

CORE ELECTIVE – II

(R17A0434) SENSORS AND ACTUATORS

COURSE OBJECTIVES:

1) To study the principles of different sensors and Transducers
2) To understand different types of Thermal sensors and their significance
3) To study different types of Radiation Sensors
4) To study different types of Smart Sensors and their significance.
5) To study different types of Actuators and their significance.

UNIT – I: Sensors / Transducers: Principles, Classification, Parameters, Characteristics, Environmental Parameters (EP), Characterization. Mechanical and Electromechanical Sensors: Introduction, Resistive Potentiometer, Strain Gauge, Resistance Strain Gauge, Semiconductor Strain Gauges, Inductive Sensors- Sensitivity and Linearity of the Sensor, Types- Capacitive Sensors, Electrostatic Transducer, Force/Stress Sensors using Quartz Resonators, Ultrasonic Sensors.

UNIT – II : Thermal Sensors: Introduction, Gas thermometric Sensors, Thermal Expansion Type Thermometric Sensors, Acoustic Temperature Sensor, Dielectric Constant and Refractive Index Thermo-sensors, Helium Low Temperature Thermometer, Nuclear Thermometer, Magnetic Thermometer, Resistance Change Type Thermometric Sensors, Thermo-EMF Sensors, Junction Semiconductor Types, Thermal Radiation Sensors, Quartz Crystal Thermo-electric Sensors, NQR Thermometry, Spectroscopic Thermometry, Noise Thermometry, Heat Flux Sensors. Magnetic Sensors: Introduction, Sensors and the Principles Behind, Magneto-resistive Sensors, Anisotropic Magneto-resistive Sensing, Semiconductor Magneto-resistors, Hall Effect and Sensors, Inductance and Eddy Current Sensors, Angular/Rotary Movement Transducers, Synchros, Synchro resolvers, Eddy Current Sensors, Electromagnetic Flowmeter, Switching Magnetic Sensors, SQUID Sensors.

UNIT – III: Radiation Sensors: Introduction – Basic Characteristics – Types of Photo sensistors /Photo detectors– X-ray and Nuclear Radiation Sensors– Fiber Optic Sensors. Electro Analytical Sensors: Introduction – The Electrochemical Cell – The Cell Potential – Standard Hydrogen Electrode (SHE) – Liquid Junction and Other Potentials – Polarization – Concentration Polarization-– Reference Electrodes – Sensor Electrodes – Electro ceramics in Gas Media .

UNIT – IV: Smart Sensors: Introduction, Primary Sensors, Excitation, Amplification, Filters, Converters, Compensation, Information Coding/Processing, Data Communication, Standards for Smart Sensor Interface, the Automation. Sensors Applications: Introduction, On-board Automobile Sensors (Automotive Sensors), Home Appliance Sensors, Aerospace Sensors, Sensors for Manufacturing, Sensors for environmental Monitoring.

UNIT – V : Actuators: Pneumatic and Hydraulic Actuation Systems- Actuation systems, Pneumatic and hydraulic systems, Directional Control valves, Pressure control valves, Cylinders, Servo and proportional control valves, Process control valves, Rotary actuators, Mechanical Actuation Systems Types of motion, Kinematic chains, Cams, Gears, Ratchet and pawl, Belt and chain drives, Bearings, Mechanical aspects of motor selection, Electrical Actuation Systems, Electrical systems, Mechanical switches, Solid-state switches, Solenoids, D.C. Motors, A.C. Motors, Stepper motors.

TEXT BOOKS:

1) D. Patranabis, “Sensors and Transducers”, PHI Learning Private Limited.
2) W. Bolton, “Mechatronics”, Pearson Education Limited.

REFERENCE BOOKS:

1) Patranabis, “Sensors and Actuators”, 2nd Edition, PHI, 2013.

COURSE OBJECTIVES:

1) To study the principles of different sensors and Transducers
2) To understand different types of Thermal sensors and their significance
3) To study different types of Radiation Sensors
4) To study different types of Smart Sensors and their significance.
5) To study different types of Actuators and their significance.

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(R17A0486) MICROPROCESSORS AND MICROCONTROLLERS LAB

Note: - Minimum of 12 experiments has to be conducted

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 Addressing Modes).
2. Program for sorting an array for 8086.
3. Program for searching for a number or character in a string for 8086.
4. Program for string manipulations for 8086.
5. Program for digital clock design using 8086.
6. Interfacing ADC and DAC to 8086.
7. Parallel communication between two microprocessors using 8255.
8. Serial communication between two microprocessor kits using 8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Programming using arithmetic, logical and bit manipulation instructions of 8051.
11. Program and verify Timer/ Counter in 8051.
12. Program and verify Interrupt handling in 8051
13. UART Operation in 8051.
14. Communication between 8051 kit and PC.
15. Interfacing LCD to 8051.
16. Interfacing Matrix/ Keyboard to 8051.
17. Data Transfer from Peripheral to Memory through DMA controller 8237/8257.

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L	T/P/D	C
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(R17A0487) DIGITAL SIGNAL PROCESSING LAB

Note:

1. Minimum of 12 experiments has to be conducted.
2. The programs shall be implemented in software (Using MATLAB / Lab view / C programming/ Equivalent) and hardware (Using TI / Analog devices / Motorola / Equivalent DSP processors).

List of Experiments:

1. To find DFT / IDFT of given DT signal
2. Program to obtain Linear Convolution of two finite length sequences
3. Program for computing Auto-correlation.
4. To find frequency response of a given system (in Transfer Function/ Differential equation form).
5. Implementation of FFT of given sequence
6. Determination of power spectrum of a given signal(s).
7. Implementation of LP FIR filter for given sequence
8. Implementation of HP FIR filter for given sequence
9. Implementation of LP IIR filter for given sequence
10. Implementation of HP IIR filter for given sequence
11. Generation of sinusoidal signal through filtering
12. Generation of DTMF signals
13. Implementation of Decimation Process
14. Implementation of Interpolation Process
15. Implementation of I/D sampling rate converters
16. Audio application such as to plot a time and frequency display of microphone plus a cosine using DSP. Read a .wav file and match with their respective spectrograms.
17. Impulse response of first order and second order systems.

OPEN ELECTIVES III

OPEN ELECTIVE III		
S.NO	**SUBJECT CODE**	**SUBJECT**
1	**R17A0454**	**ROBOTICS & AUTOMATION**
2	**R17A0455**	**EMBEDDED SYSTEMS**
3	**R17A0520**	**WEB TECHNOLOGIES**
4	**R17A0553**	**DATA STRUCTURES**
5	**R17A0354**	**NANO TECHNOLOGY**
6	**R17A0355**	**TOTAL QUALITY MANAGEMENT**

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3	-/-/-	3

OPEN ELECTIVE III
(R17A0454) ROBOTICS & AUTOMATION

COURSE OBJECTIVES:

1. This introductory course is valuable for students who wish to learn about robotics through a study of industrial robot systems analysis and design.
2. This course is suited to students from engineering and science backgrounds that wish to broaden their knowledge through working on a subject that integrates multi-disciplinary technologies.

UNIT – I

Introduction & Basic Definitions: History pf robots-robot anatomy, Coordinate Systems, Human arm Characteristics, Cartesian, Cylindrical, Polar, coordinate frames, mapping transform.

UNIT – II

Kinematics – Inverse Kinematics: Kinematics, Mechanical structure and notations, description of links and joints, Denavit Hatenberg notation, manipulator transformation matrix, examples inverse kinematics.

UNIT – III

Differential Motion – Statics – Dynamic Modeling: Velocity Propagation along links, manipulator Jacobian – Jacobian singularities – Lagrange Euler formulation Newton Euler formulation basics of trajectory planning.

UNIT – IV

Robot Systems : Actuators Sensors and Vision: Hydraulic and Electrical Systems Including Pumps, valves, solenoids, cylinders, stepper motors, Encoders and AC Motors Range and use of sensors, Micro switches, Resistance Transducers, Piezo-electric, Infrared and Lasers Applications of Sensors : Reed Switches, Ultrasonic, Barcode Readers and RFID – Fundamentals of Robotic vision.

UNIT – V

Robots and Applications: Industrial Applications – Processing applications – Assembly applications, Inspection applications, Non Industrial applications.

TEXTBOOKS

1. Robotics and Control: R.K. Mittal and I.J. Nagarath, TMH 2003.
2. Introduction to Robotics – P.J. Mckerrow, ISBN: 0201182408

REFERENCES

1. Robotics – K.S. Fu, R.C. Gonzalez and C.S.G. Lee, 2008, TMH.
2. Introduction to Robotics – S. Nikv, 2001, Prentice Hall,
3. Mechatronics and Robotics: Design & Applications – A. Mutanbara, 1999, CRC Press.

COURSE OUTCOMES:

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

1. Describe the various elements that make an industrial robot system
2. Discuss various applications of industrial robot systems
3. Analyze robot manipulators in terms of their kinematics, kinetics, and control

4. Model robot manipulators and analyze their performance, through running simulations using
   a MATLAB-based Robot Toolbox
5. Select an appropriate robotic system for a given application and discuss the limitations of such a system
6. Program and control an industrial robot system that performs a specific task.

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	3	-/-/-	3

OPEN ELECTIVE III
(R17A0455) EMBEDDED SYSTEMS

COURSE OBJECTIVES:

For embedded systems, the course will enable the students to:

1) To understand the basics of microprocessors and microcontrollers architecture and its functionalities
2) Understand the core of an embedded system
3) To learn the design process of embedded system applications.
4) To understands the RTOS and inter-process communication.

UNIT-I:INTRODUCTION TO MICROPROCESSORS AND MICROCONTROLLERS: 8086 Microprocessor: Architecture of 8086, Register Organization, Programming Model, Memory Segmentation, Signal descriptions of 8086, Addressing modes, Instruction Set.

8051 Microcontroller: 8051 Architecture, I/O Ports, Memory Organization, Instruction set of 8051, memory interfacing to 8051.

UNIT-II: INTRODUCTION TO EMBEDDED SYSTEMS:

History of embedded systems, Classification of embedded systems based on generation and complexity, Purpose of embedded systems, Applications of embedded systems, and characteristics of embedded systems, Operational and Non-operational attributes of embedded systems.

UNIT-III: 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. External communication interfaces: RS232, WIFI.

UNIT-IV: 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; Device drivers, How to choose an RTOS.

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. Introduction to Embedded Systems - shibu k v, Mc Graw Hill Education.

REFERENCE BOOKS:

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandi, TMH, 2nd Edition 2006
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

1) The student will learn the internal organization of popular 8086/8051 microprocessors/microcontrollers.
2) Understand and design the Embedded systems
3) Understand Embedded Firmware design approaches
4) Learn the basics of RTOS

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OPEN ELECTIVE III
(R17A0520) WEB TECHNOLOGIES

COURSE OBJECTIVES:

1) Giving the students the insights of the Internet programming and how to design and implement complete applications over the web.
2) It covers the notions of Web servers and Web Application Servers, Design Methodologies with concentration on Object-Oriented concepts, Client-Side
3) Programming, Server-Side Programming, Active Server Pages, Database Connectivity to web applications, Adding Dynamic content to web applications,
4) Programming Common Gateway Interfaces, Programming the User Interface for the web applications.

UNIT I:

Web Basics and Overview: Introduction to Internet, World Wide Web, Web Browsers, URL, MIME, HTTP, Web Programmers Tool box.

HTML Common tags: List, Tables, images, forms, frames, Cascading Style Sheets (CSS) & its Types. Introduction to Java Script, Declaring variables, functions, Event handlers (onclick, onsubmit, etc.,) and Form Validation.

UNIT II:

Introduction to XML: Document type definition, XML Schemas, Presenting XML , Introduction to XHTML, Using XML Processors: DOM and SAX.

PHP: Declaring Variables, Data types, Operators, Control structures, Functions.

UNIT III:

Web Servers and Servlets: Introduction to Servlets, Lifecycle of a Servlet, JSDK, Deploying Servlet, The Servlet API, The javax. Servlet Package, Reading Servlet parameters, Reading Initialization parameters. The javax.servlet HTTP package, Handling Http Request & Responses, Cookies and Session Tracking.

UNIT IV:

Database Access: Database Programming using JDBC, JDBC drivers, Studying Javax.sql.* package, Connecting to database in PHP, Execute Simple Queries, Accessing a Database from a Servlet. Introduction to struts frame works.

UNIT V:

JSP Application Development: The Anatomy of a JSP Page, JSP Processing. JSP Application Design and JSP Environment, JSP Declarations, Directives, Expressions, Scripting Elements, implicit objects. **Java Beans:** Introduction to Beans, Deploying java Beans in a JSP page.

TEXT BOOKS:

1. Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech (UNITs 1, 2)
2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES By Marty Hall and Larry Brown Pearson (UNITs 3, 4, 5)

REFERENCE BOOKS:

1. Programming world wide web-Sebesta, Pearson Education, 2007.
2. Internet and World Wide Web – How to program by Dietel and Nieto PHI/ Pearson Education Asia.
3. Jakarta Struts Cookbook, Bill Siggelkow, S P D O' Reilly for chap 8.
4. March's beginning JAVA JDK 5, Murach, SPD
5. An Introduction to WEB Design and Programming – Wang-Thomson
6. PHP: The Complete Reference Steven Holzner Tata McGraw-Hill.

COURSE OUTCOMES:

1) Understand the insights of the Internet programming and how to design and implement complete applications over the web.
2) Understands the notions of Web servers and Web Application Servers, Design Methodologies with concentration on Object-Oriented concepts, Client-Side
3) Understand Programming, Server-Side Programming, Active Server Pages, Database Connectivity to web applications, Adding Dynamic content to web applications,
4) Understand Programming Common Gateway Interfaces, Programming the User Interface for the web applications.

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OPEN ELECTIVE III
(R17A0553) DATA STRUCTURES

COURSE OBJECTIVES:

1) Exploring basic data structures such as stacks and queues.
2) Introduces a variety of data structures such as hash tables, search trees, heaps, graphs.
3) 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.

TEXTBOOKS

1. Fundamentals of data structures in C, 2 nd edition, 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.

REFERENCES

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:

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

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OPEN ELECTIVE III

(R15A0354) NANO TECHNOLOGY

COURSE OBJECTIVES:

1) To learn about basis of Nano Materials.
2) In this course we focus on synthetic aspects for the design of nanostructured materials.
3) 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.
4) 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.
5) 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.

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:

1) Will familiarize about the science of Nano Technology.
2) Will demonstrate the preparation of Nano Technology.
3) Will develop knowledge in characteristic Nano Technology & Nano Materials.

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	3	-/-/-	3

OPEN ELECTIVE III
(R17A0355) TOTAL QUALITY MANAGEMENT

COURSE OBJECTIVES:

1) To facilitate the understanding of Quality Management principles and process.
2) 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

ISO9000: 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 BOOK:

- Total Quality Management / Joel E. Ross/Taylor and Franscis Limited
- Total Quality Management/P. N. Mukherjee/PHI

REFERENCE BOOKS:

- Beyond TQM / Robert L.Flood
- Total quality management by Paneer Selvam
- Statistical Quality Control / E.L. Grant.
- Total Quality Management:A Practical Approach/H. Lal
- Quality Management/Kanishka Bedi/Oxford University Press/2011
- Total Engineering Quality Management/Sunil Sharma/Macmillan

COURSE OUTCOMES:

1) The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.
2) 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.

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(R17A0420) VLSI DESIGN

COURSE OBJECTIVES

1. To understand MOS transistor fabrication processes.
2. To understand basic circuit concepts
3. To have an exposure to the design rules to be followed for drawing the layout of circuits
4. Design of building blocks using different approaches.
5. To have a knowledge of the testing processes of CMOS circuits.

UNIT I

Introduction: Brief Introduction to IC technology MOS, PMOS, NMOS, CMOS & BiCMOS Technologies

Basic Electrical Properties of MOS and BiCMOS Circuits: I_{DS} - V_{DS} relationships, MOS transistor Threshold Voltage-V_T, figure of merit-ω_0 ,Transconductance-g_m, g_{ds} ; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

UNIT II

VLSI Circuit Design Processes: VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, Lambda(λ)-based design rules for wires, contacts and Transistors, Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling.

UNIT III

Gate level Design: Logic gates and other complex gates, Switch logic, Alternate gate circuits.

Basic Circuit Concepts: Sheet Resistance R_s and its concepts to MOS, Area Capacitances calculations, Inverter Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out.

UNIT IV

Subsystem Design: Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Counters.

VLSI Design styles: Full-custom, Standard Cells, Gate-arrays, FPGAs, CPLDs and Design Approach for Full-custom and Semi-custom devices, parameters influencing low power design.

UNIT V

CMOS Testing: CMOS Testing, Need for Testing, Test Principles, Design Strategies for Test, Chip Level and Board Level Test Techniques**.**

TEXT BOOKS:

1. Essentials of VLSI Circuits and Systems, Kamran Eshraghian, Eshraghian Dougles, A. Pucknell,
2005, PHI.
2. Modern VLSI Design – Wayne Wolf, 3 Ed., 1997, Pearson Education.
3.CMOS VLSI Design-A Circuits and Systems Perspective, Neil H.E Weste, David Harris, Ayan Banerjee, 3rd Edn, Pearson, 2009.

REFERENCE BOOKS:

1. Introduction to VLSI Systems: A Logic, Circuit and System Perspective – Ming-BO Lin, CRC Press, 2011.
2. Principals of CMOS VLSI Design – N.H.E Weste, K. Eshraghian, 2 Ed., Addison Wesley.
3. VLSI Design-K.Lal Kishore,V.S.V.Prabhakar,I.K.International,1997.
4. Introduction to VLSI Design-Mead & Convey,BS Publications,2010.
5. CMOS Logic Circuit Design-John P.Uyemura, Springer, 2007.

COURSE OUTCOMES

1. Acquire quality knowledge about the fabrication process of IC using MOS Transistor
2. Draw the layout of any logic circuits which helps to understand and estimate parasitic of any logic circuit
3. Provide design concepts required to design building blocks of data path using gates.
4. Design simple logic circuits using PLA, PAL, FPGA and CPLD
5. Understand different types of faults that can occur in a system and learn the concept of testing and adding extra hardware to improve the testability of the system.

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(R17A0421) MICROWAVE ENGINEERING

COURSE OBJECTIVES

1. To analyze micro-wave circuits incorporating hollow, dielectric and planar waveguides, transmission lines, filters and other passive components, active devices.
2. To Use S-parameter terminology to describe circuits.
3. To explain how microwave devices and circuits are characterized in terms of their "S" Parameters.
4. To give students an understanding of microwave transmission lines.
5. To Use microwave components such as isolators, Couplers, Circulators, Tees, Gyrators etc..
6. To give students an understanding of basic microwave devices (both amplifiers and oscillators).
7. To expose the students to the basic methods of microwave measurements.

UNIT I:

Waveguides & Resonators: Introduction, Microwave spectrum and bands, applications of Microwaves, Rectangular Waveguides-Solution of Wave Equation in Rectangular Coordinates, TE/TM mode analysis, Expressions for fields, Cutoff frequencies, filter characteristics, dominant and degenerate modes, sketches of TE and TM mode fields in the cross-section, Mode characteristics - Phase and Group velocities, wavelengths and impedance relations, Rectangular Waveguides – Power Transmission and Power Losses, Impossibility of TEM Modes, losses, Q-factor, Cavity resonators-introduction, Rectangular and cylindrical cavities, dominant modes and resonant frequencies, Q-factor and coupling coefficients, Illustrative Problems.

UNIT II:

Waveguide Components-I: Scattering Matrix - Significance, Formulation and properties, Wave guide multiport junctions - E plane and H plane Tees, Magic Tee, 2-hole Directional coupler, S Matrix calculations for E plane and H plane Tees, Magic Tee, Directional coupler, Coupling mechanisms - Probe, Loop, Aperture types, Wave guide discontinuities - Waveguide Windows, tuning screws and posts, Irises, Transitions, Twists, Bends, Corners and matched loads, Illustrative Problems.

Waveguide Components-II: Ferrites composition and characteristics, Faraday rotation, Ferrite components - Gyrator, Isolator, Circulator.

UNIT III:

Linear beam Tubes: Limitations and losses of conventional tubes at microwave frequencies, Classification of Microwave tubes, **O type tubes** - 2 cavity klystrons-structure, Reentrant cavities, velocity modulation process and Applegate diagram, bunching process and small signal theory Expressions for o/p power and efficiency, Reflex Klystrons-structure, Velocity Modulation, Applegate diagram, mathematical theory of bunching, power output, efficiency, oscillating modes and o/p characteristics, Effect of Repeller Voltage on Power o/p, Significance, types and characteristics of slow wave structures, structure of TWT and amplification process (qualitative treatment), Suppression of oscillations, Gain considerations.

UNIT IV:

Cross-field Tubes: Introduction, Cross field effects, Magnetrons-different types, cylindrical travelling wave magnetron-Hull cutoff and Hartree conditions, modes of resonance and PI-mode operation, separation of PI-mode, O/P characteristics.

Microwave Semiconductor Devices: Introduction to Microwave semiconductor devices, classification, applications, Transfer Electronic Devices, Gunn diode - principles, RWH theory, Characteristics, Basic modes of operation - Gunn oscillation modes, LSA Mode, Varactor diode, Parametric amplifier, Introduction to Avalanche Transit time devices (brief treatment only), Illustrative Problems.

UNIT V:

Microwave Measurements: Description of Microwave Bench – Different Blocks and their Features, Precautions; Waveguide Attenuators – Resistive Card, Rotary Vane types; Waveguide Phase Shifters – Dielectric, Rotary Vane types. Network Analyzer, Power Meter, Spectrum Analyzer, Microwave Power Measurement – Bolometer Method. Measurement of Attenuation, Frequency, VSWR, Cavity Q. Impedance Measurements.

TEXT BOOKS:

1. Microwave Devices and Circuits – Samuel Y. Liao, PHI, 3rd Edition,1994.
2. Microwave and Radar Engineering- M.Kulkarni, Umesh Publications,1998.

REFERENCES :

1. Foundations for Microwave Engineering – R.E. Collin, IEEE Press, John Wiley, 2nd Edition, 2002.
2. Microwave Circuits and Passive Devices – M.L. Sisodia and G.S.Raghuvanshi, Wiley Eastern Ltd., New Age International Publishers Ltd., 1995.
3. Microwave Engineering Passive Circuits – Peter A. Rizzi, PHI, 1999.
4. Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th ed., 1955.
5. Elements of Microwave Engineering – R. Chatterjee, Affiliated East-West Press Pvt. Ltd., New Delhi,1988.

COURSE OUTCOMES

1. Understand the significance of microwaves and microwave transmission lines
2. Analyze the characteristics of microwave tubes and compare them
3. Be able to list and explain the various microwave solid state devices
4. Can set up a microwave bench for measuring microwave parameters

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(R17A0422) CELLULAR & MOBILE COMMUNICATIONS

COURSE OBJECTIVES:

The course Objectives are

1. To provide the students with an understanding of the cellular concept frequency reuse, handoff strategies.
2. To enable the students to analyze and understand wireless and mobile cellular communication systems over stochastic fading channels .
3. To provide the students with an understanding of Co-channel and Non-Co channel Interference.
4. To give students an understanding of cell coverage for signal and traffic diversity techniques and mobile antennas.
5. To give the students an understanding of frequency management channel assignment and types of handoff.

UNIT I

CELLULAR SYSTEMS:

Limitations of Conventional System , Basic Cellular Mobile System ,First, second ,third and fourth Generation cellular wireless systems .Operation of Cellular System .Uniqueness of Mobile Radio Environment –Fading ,coherence bandwidth,Doppler Spread.

Fundamentals of cellular Radio System Design: concept of frequency reuse channels, Co-channel Interference, Co-channel Interference Reduction Factor, desired C/I from a normal case in a Omni directional Antenna system .Trunking and grade of service

UNIT II

CO-CHANNEL & NON CO-CHANNEL INTERFERENCE:

Measurement of Real Time Co-Channel Interference, design of Antenna system, Antenna parameters and their effects, diversity techniques: Space Diversity ,Polarization diversity, frequency diversity and time diversity.

Non-co channel interference-adjacent channel interference, Near End far end interference, effect on coverage and interference by power decrease, antenna height decrease

UNIT III

CELL COVERAGE FOR SIGNAL AND TRAFFIC:

Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, general formula for mobile propagation over water and flat open area, near and long distance propagation.

UNIT IV

CELL SITE AND MOBILE ANTENNAS:

Space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, Mobile Antennas.

Frequency Management And Channel Assignment : Numbering and grouping, setup access and paging channels ,channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells, non fixed channel assignment

UNIT V

HANDOFFS:

Handoff Initiation, types of handoff, delaying handoff, advantages of Handoff, power difference handoff, forced handoff, mobile assisted and soft handoff . Intersystem handoff.

TEXTBOOKS:

1. Mobile Cellular Telecommunications – W.C.Y. Lee, Tata McGraw Hill, 2rd Edn., 2006.
2. Wireless Communications - Theodore. S. Rapport, Pearson education, 2nd Edn., 2002.

REFERENCES:

1. Principles of Mobile Communications – Gordon L. Stuber, Springer International 2nd Edition, 2001.
2. Modern Wireless Communication –Simon Haykin Michael Moher, Persons Eduction,2005.
3. Wireless Communication theory and Techniques,Asrar U.H .Sheikh ,Springer,2004.

COURSE OUTCOMES:

1. The student will be able to understand impairments due to multipath fading channel
2. The student will be able to understand the fundamental techniques to overcome the different fading effects
3. The student will be able to understand co-channel and non co-channel interferences
4. The student will be able to familiar with cell coverage/signal and traffic, diversity techniques and mobile antennas
   The student will be able to understand the frequency management, channel assignment and types of handoffs

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(R17A05) COMPUTER NETWORKS

COURSE OBJECTIVES:

The students will be able to:

1. Build an understanding of the fundamental concepts of computer networking.
2. Familiarize the student with the basic taxonomy and terminology of the computer networking area.
3. Introduce the student to advanced networking concepts, preparing the student for entry Advanced Courses in computer networking.
4. Allow the student to gain expertise in some specific areas of networking such as the design and Maintenance of individual networks.

UNIT I:

Introduction: Introduction to networks, Internet, Protocols and Standards, The OSI model, Layers in OSI Model, TCP/IP Suite, Addressing, Analog & Digital Signals

Physical Layer: Physical Layer Introduction, Digital Transmission, multiplexing, Transmission media, Circuit switched networks, Datagram networks, Virtual circuit networks, Switch& telephone network

UNIT II:

Data link layer: Introduction, Block coding, Cyclic codes, checksum, Framing, Flow and error control, Noiseless & Noisy channels, HDLC, Point to point protocols

Media Access Sub Layer: Random Access, Controlled access, channelization, IEEE Standards

UNIT III:

Ethernet, Fast Ethernet, Giga bit Ethernet, wireless LANS, Connecting LANs, Backbone networks, Virtual LANs, Wireless WANs, SONET, frame relay, ATM

UNIT IV:

Network Layer: Logical addressing, internetworking, tunneling, address mapping, ICMP, IGMP, Forwarding, Unicast routing protocols, multicast routing protocols

UNIT V:

Transport Layer: Process to process delivery, TCP and UDP protocols, SCTP ,Data traffic , congestion, Congestion Control, QoS, integrated services, Differentiated services, QoS in Switched networks.

Application Layer: Domain name space, DNS in internet , Electronic Mail, FTP, WWW, HTTP, SNMP, Multi Media, Network Security

TEXT BOOKS:

1. Data Communications and Networking- Behrouz A Forouzan Fourth Edition TMH, 2006.
2. Computer Networks- Andrew S Tanenbaum, 4th Edition, Pearson Education

REFERENCE BOOKS:

1. An Engineering approach to computer Networks- S.Keshav, 2nd Edition, Pearson Education

2. Computer and communication Networks- Nader F Mir, Pearson Education
3. Data and Computer Communications, G.S.Hura and M. Singhal, CRC Press, Taylor and Francis Group.
4. Data Communications and Computer Networks,P.C.Gupta, PHI
5. Computer Networking : A top-down Approach Featuring the Internet, James F.Kurose, K.W.Rose, 3rd Edition, Pearson Education

COURSE OUTCOMES:

1. Have a good understanding of the OSI Reference Model and in particular have a good knowledge of Layers 1-3.
2. Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies
3. Specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocols
4. Have an understanding of the issues surrounding Mobile and Wireless Networks.
5. Have a working knowledge of datagram and internet socket programming.

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CORE ELECTIVE – III

(R17A0423) SATELLITE COMMUNICATIONS

OBJECTIVES

1. To prepare the student to excel in basic knowledge of satellite communication principles.
2. To provide students with solid foundation in orbital mechanics and launches for the satellite communication
3. To train the students with the basic knowledge of link design of satellite with a design examples.
4. To provide the better understanding of multiple access systems and earth station technology.
5. To prepare the students with knowledge in satellite navigation and GPS and satellite packet communication

UNIT -I:

Communication Satellite: Orbit and Description: A Brief history of satellite Communication, satellite Frequency Bands, Satellite Systems, Applications, Orbital Period and Velocity, effects of orbital Inclination, Azimuth and Elevation, Coverage angle and slant Range, Eclipse, Orbital Perturbations, Placement of a Satellite in a Geo-Stationary orbit.

UNIT -II:

Satellite Sub-Systems: Attitude and Orbit Control system, TT&C subsystem, Attitude Control subsystem, Power systems, Communication subsystems, Satellite Antenna Equipment.

Satellite Link: Basic Transmission Theory, System Noise Temperature and G/T ratio, Basic Link Analysis, Interference Analysis, Design of satellite Links for a specified C/N, (With and without frequency Re-use), Link Budget.

UNIT -III:

Propagation Effects:Introduction, Atmospheric Absorption, Cloud Attenuation, Tropospheric and Ionospeheric Scintillation and Low angle fading, Rain induced attenuation, rain induced cross polarization interference. Multiple Access:Frequency Division Multiple Access (FDMA) -Intermodulation, Calculation of C/N, Time Division Multiple Access (TDMA) -Frame Structure, Burst Structure, Satellite switched TDMA, On-board Processing, Demand Assignment Multiple Access (DAMA) –Types of Demand Assignment, Characteristics, CDMA Spread Spectrum Transmission and Reception.

UNIT -IV:

Earth Station Technology:Transmitters, Receivers, Antennas, Tracking Systems, Terrestrial Interface, Power Test Methods, Lower Orbit Considerations.Satellite Navigation and Global Positioning Systems:Radio and Satellite Navigation, GPS Position Location Principles, GPS Receivers, GPS C/A Code Accuracy, Differential GPS.

UNIT -V:

Satellite Packet Communications:Message Transmission by FDMA: M/G/1 Queue, Message Transmission by TDMA, PURE ALOHA-Satellite Packet Switching, Slotted Aloha, Packet Reservation, Tree Algorithm.

TEXT BOOKS:

1.Satellite Communications –Timothy Pratt, Charles Bostian, Jeremy Allnutt, 2ndEdition, 2003, John Wiley & Sons.
2.Satellite Communications Engineering –Wilbur, L. Pritchand, Robert A. Nelson and Heuri G. Suyderhoud, 2ndEd., Pearson Publications.
3.Digital Satellite Communications-Tri.T.Ha, 2ndEdition, 1990, Mc.Graw Hill.

REFERENCE BOOKS:

1.Satellite Communications-Dennis Roddy, 2ndEdition, 1996, McGraw Hill.
2.Satellite Communications: Design Principles –M. Richcharia, 2ndEd., BSP, 2003.
3.Digital Satellite Communications –Tri. T. Ha, 2ndEd., MGH, 1990.
4.Fundamentals of Satellite Communications –K. N. Raja Rao, PHI, 2004.

OUTCOMES

1. Student will understand the historical background, basic concepts and frequency allocations for satellite communications
2. Students will demonstrate the orbital mechanics, launch vehicles and launchers
3. Student will demonstrate the design of satellite links for specified C/N with system design examples
4. Students will be able to visualize satellites sub systems like telemetry, tracking, command and monitoring power systems etc.,
5. Students will understand the various multiple access systems for satellite communication systems and satellite packet communications.

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CORE ELECTIVE – III

(R17A0424) EMBEDDED SYSTEMS DESIGN

COURSE OBJECTIVES:

For embedded systems, the course will enable the students to:

1. Understand the basics of an embedded system.
2. Program an embedded system.
3. To learn the design process of embedded system applications.
4. To understands the RTOS and inter-process communication.
5. To understand different communication interfaces.

UNIT-I 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, design example.

UNIT-II TYPICAL EMBEDDED SYSTEM

Core of the embedded system-general purpose and domain specific processors, ASICs, PLDs, COTs; Memory-ROM, RAM, memory according to the type of interface, memory shadowing, memory selection for embedded systems; Sensors, actuators and other components-sensors, actuators, seven segment LED, relay, piezo buzzer, push button switch, reset circuit, brownout protection circuit, oscillator circuit real time clock, watch dog timer.

UNIT-III 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; Programming in embedded c.

UNIT-IV 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; task communication-shared memory, message passing.

UNIT-V COMMUNICATION INTERFACE

Onboard communication interfaces-I2C, SPI, UART, 1 wire interface, parallel interface; External communication interfaces-RS232 and RS485,USB, infrared, Bluetooth, wi-Fi, zigbee, GPRS; Automotive networks and sensor networks.

TEXT BOOKS:

1. Computers as Components –Wayne Wolf, Morgan Kaufmann (second edition).
2. Introduction to Embedded Systems - shibu k v, Mc Graw Hill Education.

REFERENCE BOOKS:

1. Embedded System Design -frank vahid, tony grivargis, john Wiley.
2. Embedded Systems- An integrated approach - Lyla b das, Pearson education 2012.
3. Embedded Systems – Raj kamal, TMH
4. An embedded Software Primer, David e Simon, Pearson education

COURSE OUTCOMES

Upon completion of this course, the students will be able to:

1. Understand and design the embedded systems
2. Learn the basics of OS and RTOS
3. Understand types of memory and interfacing to external world
4. Understand embedded firmware design approaches

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CORE ELECTIVE – III

(R17A0425) DESIGN OF FAULT TOLERANCE SYSTEMS

COURSE OBJECTIVES:

1. To create understanding of the fundamental concepts of fault-tolerance
2. To learn basic techniques for achieving fault-tolerance in electronics, communication and software systems
3. To develop skills in modeling and evaluating fault-tolerant architectures in terms of reliability, availability and safety
4. To gain knowledge in sources of faults and means for their prevention and forecasting
5. To understand merits and limitations of fault-tolerant design

UNIT – I: FAULT TOLERANT DESIGN

Basic Concepts: Reliability Concepts, Failure & Faults, Reliability and Failure rate, Relation between Reliability and Meantime between failure, Maintainability and Availability, Reliability of series, Parallel and Parallel-Series combinational circuits

Fault Tolerant Design : Basic Concepts – Static, dynamic, Hybrid Triple Modular Redundant System, Self purging redundancy, SIFT out redundancy (SMR), 5 MR Re-Configuration techniques, Use of Error Correcting codes, Time redundancy and software redundancy

UNIT – II: SELF CHECKING CIRCUITS & FAIL SAFE DESIGN

Self Checking circuits: Basic concepts of self checking circuits, Design of Totally self checking checker, checkers using m out of n codes, Berger code, Low cost residue code

Fail Safe Design: Strongly fault secure circuits, fail safe design of sequential circuits using partition theory and Berger code

UNIT – III: ATPG FUNDAMENTALS & DESIGN FOR TESTABILITY FOR COMBINATIONAL CIRCUITS

Introduction to ATPG, ATPG Process – Testability and Fault analysis methods – Fault masking, Transition delay fault, Path delay

Design for Testability for Combinational Circuits: Basic concepts of Testability, Controllability and Observability, The Reed Muller's expansion technique, OR-AND-OR Design, Use of control and Syndrome Testable Designs

UNIT – IV :SCAN ARCHITECTURES & TECHNIQUES

Introduction to Scan Based testing, Functional testing, The Scan effective Circuit, The MUX-D Style Scan flip-flops, The Scan shift register, Scan cell operation

Scan Test Sequencing, Scan test timing, Partial Scan, Multiple Scan Chains, Scan based Design rules (LSSD), At-speed scan testing and Architecture, multiple clock and scan domain operation, critical paths for at speed scan test

UNIT – V: BUILT IN SELF TEST (BIST)

BIST concepts, Test Pattern generation for BIST exhaustive testing, Pseudo random testing, pseudo exhaustive testing, constant weight patterns, Generic offline BIST architectures, Memory Test architecture, BILBO

TEXT BOOKS:

1. Fault Tolerant & Fault Testable Hardware Design – Parag K. Lala, 1984, PHI.
2. Design for Test for Digital IC's and Embedded Core Systems – Alfred L. Crouch, 2008, Pearson Education.

REFERENCE BOOKS:

1. Digital Systems Testing and testable Design – Miron Abramovici, Melvin A. Breuer and Arthur D. Friedman, Jaico Books
2. Essentials of Electronic Testing - Bushnell & Vishwani D.Agarwal, Springers.

COURSE OUTCOMES:

On completion of this course, it is expected that the student will be able to:

1. Understand the fundamental concepts of fault-tolerance
2. Learn basic techniques for achieving fault-tolerance in electronics, communication and software systems
3. Develop skills in modeling and evaluating fault-tolerant architectures in terms of reliability, availability and safety
4. Gain knowledge in sources of faults and means for their prevention and forecasting
5. Understand merits and limitations of fault-tolerant design

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CORE ELECTIVE - IV

(R17A0426) DIGITAL IMAGE PROCESSING

Course Objectives:

The course objectives are:

1. Provide the student with the fundamentals of digital image processing
2. Give the students a taste of the applications of the theories taught in the subject. This will be achieved through the project and some selected lab sessions.
3. Introduce the students to some advanced topics in digital image processing.
4. Give the students a useful skill base that would allow them to carry out further study should they be interested and to work in the field.

UNIT I

Digital image fundamentals & Image Transforms:- Digital Image fundamentals, Sampling and quantization, Relationship between pixels.

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

UNIT II

Image enhancement (spatial domain) : Introduction, Image Enhancement in Spatial Domain, Enhancement Through Point Operation, Types of Point Operation, Histogram Manipulation, Linear and non linear gray level Transformation, local or neighborhood operation, median filter,spatial domain high-pass filtering.

Image enhancement (Frequency domain): Filtering in Frequency Domain, Obtaining Frequency Domain Filters from Spatial Filters, Generating Filters Directly in the Frequency Domain, Low Pass(smoothing) and High Pass (sharpening) filters in Frequency Domain

UNIT III

Image Restoration: Degradation Mode, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration

UNIT IV

Image segmentation: Detection of discontinuities. Edge linking and boundary detection, Thresholding, Region oriented segmentation

Morphological Image Processing : Dilation and Erosion, Dilation, Structuring Element Decomposition, Erosion, Combining Dilation and Erosion, Opening and Closing, The Hit or Miss Transformation.

UNIT V

Image Compression:

Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Huffman and Arithmetic Coding, Error Free Compression, Lossy Compression, Lossy and Laooless Predictive Coding, Transform Based Compression, JPEG 2000 Standards.

TEXT BOOKS:

1. Digital Image Processing- Rafeal C.Gonzalez, Richard E.Woods, 3rd Edition, Pearson, 2008
2. Digital Image Processing- S Jayaraman, S. Essakkirajan, T. Veerakumar-TMH,2010

REFERENCE BOOKS:

1 Digital Image Processing and analysis-human and computer visionapplication with using CVIP Tools – Scotte Umbaugh,2nd Ed, CRC Press,2011
2. Introduction to Digital Image Processing with Matlab, Alasdair McAndrew, Thomson Course Technology
3.Fundamentals of Digital Image Processing-A.K. Jain, PHI,1989
4.Digital Image Processing and computer Vision-Somka, Halavac,Boyle-Cengage learning (Indian edition)2008,
5. Digital Image Processing using Matlab, Rafeal C.Gonzalez, Richard E.Woods, Steven L. Eddins, Pearson Education.
6. Introduction to Image Processing & Analysis-John C.Russ, J. Christian Russ, CRC Press,2010
7. Digital Image Processing with MATLAB & Labview-Vipula Singh Elsevier

Course Outcomes:

1. Upon Successfully completing the course, the student should:
2. Have an appreciation of the fundamentals of Digital Image Processing including the topics of filtering,transforms and morphology, and image analysis and compession
3. Be able to implement basic image processing algorithums in MATLAB.
4. Have the skill base necessary to further explore advance d topics of Digital Image Processing.
5. Be in a position to make a positive professional contribution in the field of Digital Image Processing.
6. At the end of the course the student should have a clear impression of the breadth and practical scope of Digital Image Processing and have arrived at a level of understanding that is the foundation for most of the work currently underway in this field.

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CORE ELECTIVE – IV

(R17A0427) SPEECH PROCESSING

COURSE OBJECTIVES:

1. Focus on the fundamentals of digital speech processing and their application to coding, synthesis and recognition.
2. Emphasize on how digital signal processing techniques can be applied in problems related to speech communication.
3. Provide an overview of the way in which digital speech processing is being applied in present day applications.

UNIT – I

FUNDAMENTALS OF DIGITAL SPEECH PROCESSING

Anatomy & Physiology of Speech Organs, The process of Speech Production, The Acoustic Theory of Speech Production, Loss less tube models, Digital Speech Processing, Digital models for speech signals.

UNIT – II

TIME DOMAIN MODELS FOR SPEECH PROCESSING

Introduction- Window considerations, Short time energy and average magnitude Short time average zero crossing rate ,Speech vs. silence discrimination using energy and zero crossing, Pitch period estimation using a parallel processing approach, The short time autocorrelation function, The short time average magnitude difference function, Pitch period estimation using the autocorrelation function.

UNIT – III

LINEAR PREDICTIVE CODING (LPC) ANALYSIS

Basic principles of Linear Predictive Analysis: The Autocorrelation Method, The Covariance Method, Solution of LPC Equations: Cholesky Decomposition Solution for Covariance Method, Durbin's Recursive Solution for the Auto Correlation Equations, Comparison between the Methods of Solution of the LPC Analysis Equations, Applications of LPC Parameters: Pitch Detection using LPC Parameters, Formant Analysis using LPC Parameters.

UNIT – IV

SPEECH ENHANCEMENT

Nature of interfering sounds, Speech enhancement techniques: Single Microphone Approach: spectral substraction, Wiener filter, Multi microphone Approach, Spectral restoration: MMSE-STSA, MMSE-LSA.

UNIT – V

SPEECH & SPEAKER RECOGNITION

Speech recognition

Basic pattern recognition approaches, parametric representation of speech, evaluating the similarity of speech patterns, Accommodating both spectral and temporal variability, Speech Recognition Systems: Isolated Digit Recognition System, Continuous digit Recognition System

Speaker recognition

Recognition techniques, Features that distinguish speakers, Speaker Recognition Systems: Speaker Verification System, Speaker Identification System.

TEXT BOOKS:

1. Digital processing of speech signals - L.R Rabiner and S.W.Schafer. Pearson Education.
2. Speech Communications: Human & Machine - Douglas O'Shaughnessy, 2nd ed., IEEE Press.
3. Fundamental of speech recognition: L.R Rabinar, Biing-Hwang Jung, Pearson Education.

REFERENCES:

1. Discrete Time Speech Signal Processing: principles and Practice - Thomas F. Quateri 1 ed., PE.
2. Speech & Audio Signal Processing- Ben Gold & Nelson Morgan, 1 ed., Wiley.
3. Speech and Language Processing, Jurafsky, Pearson Education.
4. Voice and Speech Processing, Thomas Parsons, McGraw Hill Series
5. Signal Processing of Speech, Owens F.J., Macmillan New Electronics

COURSE OUTCOMES

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

1. Understand the fundamentals of digital speech processing and their application to coding, synthesis and recognition.
2. Emphasize on how digital signal processing techniques can be applied in problems related to speech communication.
3. Provide an overview of the way in which digital speech processing is being applied in present day applications.

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CORE ELECTIVE – IV

(R17A0428) MULTIMEDIA AND SIGNAL CODING

COURSE OBJECTIVES:

1. To provide an introduction to the fundamental principles and techniques in Multimedia Signal coding and compression.
2. To give an overview of current multimedia standards and technologies.
3. To provide techniques related to computer and multimedia networks.
4. To provide knowledge related to Multimedia Network Communications and Applications.

UNIT-I:

Introduction to Multimedia: Multimedia, World Wide Web, Overview of Multimedia Tools, Multimedia Authoring, Graphics/ Image Data Types, and File Formats.

Color in Image and Video: Color Science – Image Formation, Camera Systems, Gamma Correction, Color Matching Functions, CIE Chromaticity Diagram, Color Monitor Specifications, Out-of-Gamut Colors, White Point Correction, XYZ to RGB Transform, Transform with Gamma Correction, L*A*B* Color Model. Color Models in Images – RGB Color Model for CRT Displays, Subtractive Color: CMY Color Model, Transformation from RGB to CMY, Under Color Removal: CMYK System, Printer Gamuts, Color Models in Video – Video Color Transforms, YUV Color Model, YIQ Color Model, Ycbcr Color Model.

UNIT-II:

Video Concepts: Types of Video Signals, Analog Video, Digital Video.

Audio Concepts: Digitization of Sound, Quantization and Transmission of Audio.

UNIT-III:

Compression Algorithms:

Lossless Compression Algorithms: Run Length Coding, Variable Length Coding, Arithmetic Coding, Lossless JPEG, Image Compression. **Lossy Image Compression Algorithms:** Transform Coding: KLT And DCT Coding, Wavelet Based Coding. **Image Compression Standards:** JPEG and JPEG2000.

UNIT-IV:

Video Compression Techniques: Introduction to Video Compression, Video Compression Based on Motion Compensation, Search for Motion Vectors, H.261- Intra-Frame and InterFrame Coding, Quantization, Encoder and Decoder, Overview of MPEG1 and MPEG2.

UNIT-V:

Audio Compression Techniques: ADPCM in Speech Coding, G.726 ADPCM, Vocoders – Phase Insensitivity, Channel Vocoder, Formant Vocoder, Linear Predictive Coding, CELP, Hybrid Excitation Vocoders, MPEG Audio – MPEG Layers, MPEG Audio Strategy, MPEG Audio Compression Algorithms, MPEG-2 AAC, MPEG-4 Audio.

TEXT BOOKS:

1. Fundamentals of Multimedia – Ze- Nian Li, Mark S. Drew, PHI, 2010.
2. Multimedia Signals & Systems – Mrinal Kr. Mandal Springer International Edition 1st Edition, 2009.

REFERENCE BOOKS:

1. Multimedia Communication Systems – Techniques, Stds & Netwroks K.R. Rao, Zorans. Bojkoric, Dragorad A. Milovanovic, 1st Edition, 2002.
2. Fundamentals of Multimedia Ze- Nian Li, Mark S.Drew, Pearson Education (LPE), 1st Edition, 2009.
3. Multimedia Systems John F. Koegel Bufond Pearson Education (LPE), 1st Edition, 2003.
4. Digital Video Processing – A. Murat Tekalp, PHI, 1996.
5. Video Processing and Communications – Yaowang, Jorn Ostermann, Ya-QinZhang, Pearson, 2002.

COURSE OUTCOMES

1. Upon successfully completion of the course, the student should:
2. Understand the fundamentals behind the multimedia signal processing
3. Understand the fundamentals behind the multimedia compression
4. Understand the basic principles behind the existing multimedia compression and communication standards
5. Understand future multimedia technologies and apply the acquired knowledge to specific multimedia related problems and projects at work

6. Take advance courses in this area.

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(R17A0488) eCAD & VLSI LAB

Note: Minimum of 10 programs from Part –I and 4 programs from Part -II are to be conducted.

Design and implementation of the following CMOS digital/analog circuits using Cadence / Mentor Graphics / Synopsys / Equivalent CAD tools. The design shall include Gate-level design, Transistor-level design, Hierarchical design, Verilog HDL/VHDL design, Logic synthesis, Simulation and verification.

Part –I: VLSI Front End Design programs:

Programming can be done using any complier. Down load the programs on FPGA/CPLD boards and performance testing may be done using pattern generator (32 channels) and logic analyzer apart from verification by simulation with any of the front end tools.

1. HDL code to realize all the logic gates
2. Design and Simulation of adder, Serial Binary Adder, Multi Precession Adder, Carry Look Ahead Adder.
3. Design of 2-to-4 decoder
4. Design of 8-to-3 encoder (without and with parity)
5. Design of 8-to-1 multiplexer
6. Design of 4 bit binary to gray converter
7. Design of Multiplexer/ Demultiplexer, comparator
8. Design of Full adder using 3 modeling styles
9. Design of flip flops: SR, D, JK, T
10. Design of 4-bit binary, BCD counters (synchronous/ asynchronous reset) or any Sequence Counter
11. Design of a N- bit Register of Serial- in Serial –out, Serial in parallel out, Parallel in Serial out and Parallel in Parallel Out.
12. Design of Sequence Detector (Finite State Machine- Mealy and Moore Machines).
13. Design of 4- Bit Multiplier, Divider.
14. Design of ALU to Perform – ADD, SUB, AND-OR, 1's and 2's Compliment, Multiplication, and Division.

Part –II: VLSI Back End Design programs:

Design and implementation of the following CMOS digital/analog circuits using Cadence / Mentor Graphics / Synopsys / Equivalent CAD tools. The design shall include Gate-level design/Transistor-level design/Hierarchical design/Verilog HDL or VHDL design, Logic synthesis, Simulation and verification, Scaling of CMOS Inverter for different technologies, study of secondary effects (temperature, power supply and process corners), Circuit optimization with respect to area, performance and/or power, Layout, Extraction of parasitics and back annotation, modifications in circuit parameters and layout consumption, DC/transient analysis, Verification of layouts (DRC, LVS).

1. Introduction to layout design rules
2. Layout, physical verification, placement & route for complex design, static timing analysis, IR drop analysis and crosstalk analysis of the following:
    1. Basic logic gates
    2. CMOS inverter
    3. CMOS NOR/ NAND gates
    4. CMOS XOR and MUX gates
    5. CMOS 1-bit full adder
    6. Static / Dynamic logic circuit (register cell)
    7. Latch
    8. Pass transistor
3. Introduction to SPICE simulation of NMOS/CMOS circuit
4. SPICE Simulation of basic analog circuits: Inverter/Differential Amplifier
5. Analog Circuit simulation (AC analysis) of CS & CD Amplifier

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(R17A0489) MICROWAVE AND DIGITAL COMMUNICATIONS LAB

LIST OF EXPERIMENTS

Part – A (Any 6 Experiments) :

1. Characteristics of gunn diode
2. Characteristics of the reflex klystron tube
3. Attenuation measurement
4. Impedance measurement
5. Frequency measurement
6. Characteristics of multihole directional coupler
7. Determination of standing wave ratio and reflection coefficient
8. Measurement of waveguide parameters
9. Study of magic tee
10. Study of circulator

Part – B (Any 6 Experiments):

1. Time Division Multiplexing and Demultipluxing
2. Amplitude shift keying modulation & demodulation
3. Frequency shift keying modulation & demodulation
4. Phase shift keying modulation & demodulation
5. Differential phase shift keying modulation & demodulation
6. Pulse code modulation & demodulation
7. Differential pulse code modulation & demodulation
8. Delta modulation & demodulation

Equipment required for Microwave Laboratory:

1. Regulated Klystron Power Supply
2. VSWR Meter
3. Micro Ammeter - 0 – 500 µA
4. Multimeter
5. CRO
6. GUNN Power Supply, Pin Modulator
7. Reflex Klystron Tube
8. Crystal Diodes
9. Micro wave components (Attenuation)
10. Frequency Meter
11. Slotted line carriage
12. Probe detector
13. wave guide shorts
14. Directional Coupler
15. E, H, Magic Tee
16. Circulators, Isolator
17. Matched Loads

Equipment required for Digital Communications Lab:

1. TDM,ASK,FSK,PSK,PCM,DPCM,DPSK,DM Modulation & Demodulation Kits
2. Digital Storage Oscilloscopes, Coaxial Probes, Patch Cords

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CORE ELECTIVE – V

(R17A0429) RADAR SYSTEMS

COURSE OBJECTIVES

1. To learn Radar Fundamentals like Radar Equation, Operating frequencies & Applications.
2. To understand the basic concepts of different types of Radars for surveillance & Tracking.
3. To know the various types of tracking techniques involved.
4. To understand Radar Receivers, MTI filters, displays and antennas.

UNIT I

Basics of Radar: Introduction, Maximum Unambiguous Range, Radar Waveforms, Simple form of Radar Equation, Radar Block Diagram and Operation, Radar Frequencies and Applications, Prediction of Range Performance, Minimum Detectable Signal, Receiver Noise, Modified Radar Range Equation, Related Problems.

Radar Equation: SNR, Envelope Detector-False AlarmTime and Probability, Integration of Radar Pulses, Radar Cross Section of Targets (simple targets - sphere, cone-sphere), Transmitter Power, PRF and Range Ambiguities, System Losses (qualitative treatment), Related Problems.

UNIT-II

CW and Frequency Modulated Radar: Doppler Effect, CW Radar – Block Diagram, Isolation between Transmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth Requirements, Applications of CW radar, Related Problems.

FM-CW Radar: FM-CW Radar, Range and Doppler Measurement, Block Diagram and Characteristics (Approaching/ Receding Targets), FM-CW altimeter, Multiple Frequency CW Radar.

UNIT-III

MTI and Pulse Doppler Radar: Introduction, Principle, MTI Radar with - Power Amplifier Transmitter and Power Oscillator Transmitter, Delay Line Cancellers – Filter Characteristics, Blind Speeds, Double Cancellation, Staggered PRFs. Range Gated Doppler Filters. MTI Radar Parameters, Limitations to MTI Performance, MTI versus Pulse Doppler Radar.

Tracking Radar: Tracking with Radar, Sequential Lobing, Conical Scan, Monopulse Tracking Radar – Amplitude Comparison Monopulse (one- and two- coordinates), Angular Accuracy, Tracking in Range, Acquisition and Scanning Patterns, Comparison of Trackers.

UNIT-IV

Detection of Radar Signals in Noise: Introduction, Matched Filter Receiver – Response Characteristics and Derivation, Correlation Function and Cross-correlation Receiver, Efficiency of Non-matched Filters, Matched Filter with Non-white Noise.

UNIT-V

Radar Receivers: Noise Figure and Noise Temperature, Displays – types, Introduction to Phased Array Antennas –Basic Concepts, Radiation Pattern, Beam Steering and Beam Width changes, Applications, Advantages and Limitations.

Electronic Warfare: Introduction to ESM, ECM and ECCM systems.

TEXT BOOK:

1. Introduction to Radar Systems – Merrill I. Skolnik, TMH Special Indian Edition, 2nd Edition, Tata McGraw-Hill, 2007.

REFERENCES:

1. Introduction to Radar Systems – Merrill I. Skolnik, 3rd Edition Tata McGraw-Hill, 2001.
2. Radar: Principles, Technology, Applications-Byron Edde, Pearson Education, 2004.
3. Principles of Modern Radar: Basic Principles-Mark A. Richards, James A. Scheer, William A. Holm, Yesdee,2013.
4. 'Radar Hand Book ' Ed. By M.I Skolnik, 2nd Edition, Tata McGraw Hill.
5. 'Understanding Radar Systems' by Simon Kinsley and Shaun Quegan, Scitech Publishing, McGraw-Hill.

COURSE OUTCOMES

1. Demonstrate an understanding of the factors affecting the radar performance using Radar Range Equation.
2. Analyze the principle of FM-CW radar and apply it in FM-CW Altimeter.
3. Differentiate between a MTI Radar and a Pulse Doppler Radar based on their working principle.
4. Demonstrate an understanding of the importance of Matched Filter Receivers in Radars.
5. Familiarize with the different types of Radar Displays and their application in real time scenario

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CORE ELECTIVE – VII

(R17A0430) DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES

COURSE OBJECTIVES

1. To introduce architectural features of programmable DSP Processors of TI and Analog Devices.
2. To recall digital transform techniques.
3. To give practical examples of DSP Processor architectures for better understanding.
4. To develop the programming knowledge using Instruction set of DSP Processors.
5. To understand interfacing techniques to memory and I/O devices.

UNIT –I:

Introduction to Digital Signal Processing:

Introduction, A Digital signal-processing system, The sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), Linear time-invariant systems, Digital filters, Decimation and interpolation.

Computational Accuracy in DSP Implementations:

Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT –II:

Architectures for Programmable DSP Devices:

Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation UNIT, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT -III:

Programmable Digital Signal Processors:

Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline operation of TMS320C54XX Processors.

UNIT –IV:

Analog Devices Family of DSP Devices:

Analog Devices Family of DSP Devices – ALU and MAC block diagram, Shifter Instruction, Base Architecture of ADSP 2100, ADSP-2181 high performance Processor.

Introduction to Blackfin Processor - The Blackfin Processor, Introduction to Micro Signal Architecture, Overview of Hardware Processing Units and Register files, Address Arithmetic Unit, Control Unit, Bus Architecture and Memory, Basic Peripherals.

UNIT –V:

Interfacing Memory and I/O Peripherals to Programmable DSP Devices:

Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA).

TEXT BOOKS:

1. Digital Signal Processing – Avtar Singh and S. Srinivasan, Thomson Publications, 2004.
2. A Practical Approach to Digital Signal Processing - K Padmanabhan, R. Vijayarajeswaran, Ananthi. S, New Age International, 2006/2009
3. Embedded Signal Processing with the Micro Signal Architecture Publisher: Woon-Seng Gan, Sen M. Kuo, Wiley-IEEE Press, 2007

REFERENCE BOOKS:

1.Digital Signal Processors, Architecture, Programming and Applications – B. Venkataramani and M. Bhaskar, 2002, TMH.
2.Digital Signal Processing – Jonatham Stein, 2005, John Wiley.
3.DSP Processor Fundamentals, Architectures & Features – Lapsley et al. 2000, S. Chand & Co.
4.Digital Signal Processing Applications Using the ADSP-2100 Family by The Applications Engineering Staff of Analog Devices, DSP Division, Edited by Amy Mar, PHI
5.The Scientist and Engineer's Guide to Digital Signal Processing by Steven W. Smith, Ph.D., California Technical Publishing, ISBN 0-9660176-3-3, 1997 6.Embedded Media Processing by David J. Katz and Rick Gentile of Analog Devices, Newnes, ISBN 0750679123, 2005

COURSE OUTCOMES

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

1. To distinguish between the architectural features of general purpose processors and DSP processors
2. Understand the architectures of TMS 320C54XX and ADSP2100 DSP devices
3. Able to write assembly language programs using instruction set of TMS320C54XX
4. Can interface various devices to DSP Processors

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CORE ELECTIVE - V

(R17A0431) RF CIRCUIT DESIGN

COURSE OBJECTIVES:

The Course Objectives are:

1. To educate students fundamental RF circuit and system design skills.
2. To introduce students the basic transmission line theory, single and multiport networks, RF component modelling.
3. To offer students experience on designing matching and biasing networks & RF transistor amplifier design.

UNIT-I:

Introduction: Importance of RF Design-Dimensions and Units-Frequency Spectrum-RF Behavior of Passive Components: High Frequency Resistors, High Frequency Capacitors, High Frequency Inductors.-Chip Components and Circuit Board Considerations: Chip Resistors, Chip Capacitors, and Surface Mount Inductors

Review of Transmission Lines: Types of Transmission Lines-Equivalent Circuit representation-R, L, C, G parameters of Different Line configurations-Terminated Lossless Transmission Lines-Special Terminations: Short Circuit, Open Circuit and Quarter Wave Transmission Lines-Sourced and Loaded Transmission Lines: Power Considerations, Input Impedance Matching, Return Loss and Insertion Loss.

UNIT-II:

SingleandMulti-PortNetworks: TheSmithChart:ReflectionCoefficient,Normalized Impedance-Impedance Transformation: Standing wave Ratio, Special Transformation Conditions-Admittance Transformation-Parallel and Series RL & RC Connections-Basic Definitions of Single and Multi-Port Networks-Interconnecting Networks.

RF Filter Design: Scattering Parameters: Definition, Meaning, Chain Scattering Matrix, Conversion Between S-and Z-parameters, Signal Flow Chart Modeling, Generalization-Basic Resonator and Filter Configurations: Low Pass, High Pass, Band Pass and Band Stop type Filters-Filter Implementation using Unit Element and Kuroda's Identities Transformations-Coupled Filters.

UNIT-III:

Active RF Component Modelling: RF Diode Models: Nonlinear and Linear Models-Transistor Models: Large Signal and Small Signal BJT Models, Large Signal and Small Signal FET Models-Scattering Parameter, Device
Characterization.

UNIT-IV:

Matching and Biasing Networks: Impedance Matching Using Discrete Components: Two Component Matching Networks, Forbidden Regions, Frequency Response and Quality Factor, T and Pi Matching Networks-
Amplifier Classes of Operation and Biasing Networks: Classes of Operation and Efficiency of Amplifiers, Biasing Networks for BJT, Biasing Networks for FET.

UNIT-V:

RF Transistor Amplifier Design: Characteristics of Amplifiers-Amplifier Power Relations: RF Source, Transducer Power Gain, Additional Power Relations-Stability Considerations: Stability Circles, Unconditional Stability, And Stabilization Methods-Unilateral and Bilateral Design for Constant Gain-Noise Figure Circles-Constant VSWR Circles.

RF Oscillators and Mixers: Basic Oscillator Model: Negative Resistance Oscillator, Feedback Oscillator Design, Design steps, Quartz Oscillators-

Fixed Frequency High Frequency Oscillator -Basic Characteristics of

Mixers: Concepts, Frequency Domain Considerations, Single Ended Mixer Design, Single and Double Balanced Mixers.

TEXT BOOKS:

1. RF Circuit Design –Theory and Applications -Reinhold Ludwig, Pavel Bsetchko – Pearson Education India, 2000.
2. Radio Frequency and Microwave Communication Circuits –Analysis and Design - Devendra K.Misra –Wiley Student Edition –John Wiley & Sons, Inc.

REFERENCE BOOKS:

1. Radio Frequency and Microwave Electronics –Matthew M. Radmanesh –PEI.
2. RF Circuit Design –Christopher Bowick, Cheryl Aljuni and John Biyler,Elsevier Science, 2008.
3. Secrets of RF Circuit Design -Joseph J.Carr, TMH, 2000.
4. Design of RF and Microwave Amplifiersand Oscillators Peter L.D. Abrif, Artech House, 2000.
5. The Design of CMOS Radio Frequency Integrated Circuits -Thomas H.Lee, 2/e - Cambridge University Press, 2004.

COURSE OUTCOMES:

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

1. Explore fundamental RF circuit and system design skills.
2. Understand the basic transmission line theory, single and multiport networks, RF component modelling.
3. Design matching and biasing networks & RF transistor amplifiers.

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CORE ELECTIVE – VI

(R17A0432) WIRELESS COMMUNICATIONS AND NETWORKS

COURSE OBJECTIVES

1. To provide the students with the fundamental treatment about many practical and theoretical concepts that forms basic of wireless communication to equip the students with various kinds of wireless networks and its operations.
2. To prepare the students to understand the concept of frequency reuse and be able to apply it in the design of mobile cellular system
3. To prepare the students to understand various modulation schemes and multiple access techniques that are used in wireless communications
4. To provide an analytical perspective on the design and analysis the traditional and emerging wireless networks and to discuss the nature of and solution methods to the fundamental problems in the wireless networking
5. To train the students to understand the architecture and operation of various wireless WAN such as GSM, IS-95, GPRS and SMS
6. To train students to understand wireless LAN architectures and operations
7. To prepare students to understand the emerging technique OFDM and its importance in the wireless communications

UNIT -I

INTRODUCTION TO WIRELESS COMMUNICATION SYSTEMS: Evolution of mobile radio communications, examples of wireless communication systems-paging systems, cordless telephone systems, cellular telephone systems, comparison of common wireless communication systems, trends in cellular radio and personal communications. MODERN WIRELESS COMMUNICATION SYSTEMS: Second generation (2G) cellular networks, third generation (3G) wireless networks, wireless local loop (WLL) and LMDS, wireless local area networks (WLANs), Bluetooth and personal area networks (PANs).

UNIT –II:

Mobile Radio Propagation: Large-Scale Path Loss: Introduction to Radio Wave Propagation, Free Space Propagation Model, Relating Power to Electric Field, The Three Basic Propagation Mechanisms, Reflection-Reflection from Dielectrics, Brewster Angle, Reflection from prefect conductors, Ground Reflection (Two-Ray) Model, Diffraction-Fresnel Zone Geo metry, Knife-edge Diffraction Model, Multiple knife-edge Diffraction, Scattering, Outdoor Propagation Models-Longley-Ryce Model, Okumura Model, Hata Model, PCS Extension to Hata Model, Walfisch and Bertoni Model, Wideband PCS Microcell Model, Indoor Propagation Models-Partition losses (Same Floor), Partition losses between Floors, Log-distance path loss model, Ericsson Multiple Breakpoint Model, Attenuation Factor Model, Signal penetration into buildings, Ray Tracing and Site Specific Modeling.

UNIT –III:

Mobile Radio Propagation: Small –Scale Fading and MultipathSmall Scale Multipath propagation-Factors influencing small scale fading, Doppler shift, Impulse Response Model of a multipath channel-Relationship between Bandwidth and Received power, Small-Scale Multipath Measurements-Direct RF Pulse System, Spread Spectrum Sliding Correlator Channel Sounding, Frequency Domain Channels Sounding, Parameters of Mobile Multipath

Channels-Time Dispersion Parameters, Coherence Bandwidth, Doppler Spread and Coherence Time, Types of Small-Scale Fading-Fading effects Due to Multipath Time Delay Spread, Flat fading, Frequency selective fading, Fading effects Due to Doppler Spread-Fast fading, slow fading, Statistical Models for multipath Fading Channels-Clarke's model for flat fading, spectral shape due to Doppler spread in Clarke's model, Simulation of Clarke and Gans Fading Model, Level crossing and fading statistics, Two-ray Rayleigh Fading Model.

UNIT –IV

WI-FI AND THE IEEE 802.11 WIRELESS LAN STANDARD: IEEE 802 Architecture, IEEE 802.11 Architecture and Services, 802.11Medium Access Control, 802.11 Physical Layer, Other IEEE 802.11 Standards, Wi-Fi Protected Access.BLUETOOTH AND IEEE 802.15: Overview, radio specification, baseband specification, link manager specification, logical link control and adaptation protocol, IEEE 802.15.

UNIT -V

MOBILE DATA NETWORKS: Introduction, data oriented CDPD network, GPRS and higher data rates, short messaging service in GSM, mobile application protocols.WIRELESS ATM & HIPERLAN: Introduction, Wireless ATM, HIPERLAN, HIPERLAN-2.

TEXT BOOKS:

1.Theodore S. Rappaport (2002), Wireless Communications -Principles Practice,2nd edition, Prentice Hall of India, New Delhi.

2.William Stallings (2009), Wireless Communications and Networks,2nd edition, Pearson Education, India.

3.Kaveh PahLaven, Prashanth Krishna Murthy (2007), Principles of Wireless Networks -A Unified Approach, Pearson Education, India.

REFERENCE BOOKS:

1.Dr. Kamilo Feher (2003), Wireless Digital Communications,Prentice Hall of India, New Delhi.

2.Jochen Schiller (2009), Mobile Communications, 2nd edition, Pearson Education, India.

3.Andreas F. Molisch (2006), Wireless Communications, Wiley –India, New Delhi.

COURSE OUTCOMES

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

1. Understand the principles of wireless communications
2. Understand fundamentals of wireless networking
3. Understand cellular system design concepts
4. Analyze various multiple access schemes using wireless communication
5. Understand Wireless WANs and their performance analysis
6. Demonstrate wireless LAN and their specifications
7. Familiar with some of the existing and emerging wireless standards
8. Understand the concept of OFDM

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CORE ELECTIVE – VI

(R17A0561) NETWORK SECURITY AND CRYPTOGRAPHY

OBJECTIVES:

To make the students

1. To understand the principles of encryption algorithms, conventional and public key cryptography.

UNIT 1:

Introduction to security attacks - services and mechanism - introduction to cryptography - Conventional Encryption: Conventional encryption model - classical encryption techniques - substitution ciphers and transposition ciphers – cryptanalysis – stereography - stream and block ciphers - Modern Block Ciphers: Block ciphers principals - Shannon's theory of confusion and diffusion - fiestal structure - data encryption standard(DES) - strength of DES - differential and linear crypt analysis of DES - block cipher modes of operations - triple DES.

UNIT 2:

IDEA encryption and decryption - strength of IDEA - confidentiality using conventional encryption - traffic confidentiality - key distribution - random number generation - Introduction to graph - ring and field - prime and relative prime numbers - modular arithmetic - Fermat's and Euler's theorem - primality testing - Euclid's Algorithm - Chinese Remainder theorem - discrete algorithms.

UNIT 3:

Principles of public key crypto systems - RSA algorithm - security of RSA - key management – Diffle-Hellman key exchange algorithm - introductory idea of Elliptic curve cryptography - Elganel encryption - Message Authentication and Hash Function: Authentication requirements - authentication functions - message authentication code - hash functions - birthday attacks - security of hash functions and MACS.

UNIT 4:

MD5 message digest algorithm - Secure hash algorithm (SHA) Digital Signatures: Digital Signatures - authentication protocols - digital signature standards (DSS) - proof of digital signature algorithm - Authentication Applications: Kerberos and X.509 - directory authentication service - electronic mail security-pretty good privacy (PGP) - S/MIME.

UNIT 5:

IP Security: Architecture - Authentication header - Encapsulating security payloads - combining security associations - key management.

Web Security: Secure socket layer and transport layer security - secure electronic transaction (SET) - System Security: Intruders - Viruses and related threads - firewall design principals - trusted systems.

TEXT BOOKS:

1.William Stallings, "Cryptography and Network Security: Principals and Practice", Prentice Hall

2.Cryptography and Network Security: Atul Kahate, McGraw Hill

REFERENCE BOOKS:

1. Network Cryptography and Security: C K Shyamala, N Harini,Dr TR Padmanabhan.wiley india,1st Edition .
2. Network Cryptography and Security: Forouzan Mukhopadhyay,Mc Graw Hill.2nd Edition.
3. Information Security, Principles and Practice: Mark Stamp. Wiley India

OUTCOMES

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

1. Acquire an understanding of Network security and its changing character
2. Understand Conventional encryption and cryptography
3. Analyze issues related to network IP security
4. Identify and investigate web security requirements
5. Know the concept of SNMP and design principles of firewall

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B.Tech. ECE-II Sem	**L**	**T/P/D**	**C**
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CORE ELECTIVE – VI

(R17A0433) TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS

COURSE OBJECTIVES:

The following are the course objectives:

1. To learn Switching, Signaling and traffic in the context of Telecommunication network.
2. To expose through the evolution of switching systems from manual and electromechanical systems to stored-program-controlled digital systems
3. To study signaling, packet switching and networks

UNIT - I:

Switching Systems: Evolution of Telecommunications; Basics of a switching systems; Function of a switching system; Crossbar switching- Principal of crossbar switching; Crossbar switch configuration; Cross-Point technology; Crossbar exchange Organization; A General Trunking; Electronic switching; Digital switching systems.

Telecommunications Traffic: Introduction; The Unit Of Traffic; Congestion; Traffic Measurement; A mathematical model ; Lost-call Systems-Theory; Traffic Performance; Loss systems in Tandem; Use of Traffic tables; Queuing Systems-The Second Erlang Distributions; Probability of Delay; Finite Queue Capacity; Some Other Useful Results; Systems with a Single Server; Queues in Tandem; Delay Tables; Applications of Delay Formulae.

UNIT - II:

Switching Networks: Single Stage Networks; Grading-Principle Two Stage Networks; Three stage networks; Four stage Networks

Time Division Switching: Basic Time Division Space Switching; Basic Time Division Time Switching; Time Multiplexed Space Switching; Time Multiplexed Time Switching; Combination Switching; Three Stage Combination Switching.

Control of Switching Systems: Call Processing Functions-Sequence of Operations; Signal Exchanges; State Transition Diagrams; Common Control Reliability; Availability and Security; Stored Program Control.

UNIT - III:

Signaling: Introduction; Customer Line Signaling; Audio Frequency Junctions and Trunk Circuits; FDM Carrier Systems- Outband Signaling; Inband (VF) Signaling; PCM Signaling; Inter Register Signaling; Common Channel Signaling Principles-General Signaling Networks; CCITT Signaling System Number 6; CCITT Signaling System Number 7; The High Level Data Link Control Protocol; Signal Units; The Signaling Information Field.

UNIT - IV:

Packet Switching: Introduction; Statistical Multiplexing; Local Area and Wide Area Networks-Bus Networks; Ring Networks; Comparison of Bus and Ring Networks; Optical Fiber Networks; Large Scale Networks-General; Datagrams and Virtual Circuits; Routing; Flow Control; Standards; Frame Relay; Broadband Networks-General; The Asynchronous Transfer Mode; ATM Switches.

UNIT – V:

Networks: Introduction; Analog Networks; Integrated Digital Networks; Integrated Services Digital Networks; Cellular Radio Networks; Intelligent networks; Private Networks; Charging; Routing – General, Automatic Alternative Routing.

TEXT BOOKS :

1. J. E Flood, "Telecommunications Switching and Traffic Networks", Pearson Education, 2006
2. Tyagarajan Viswanathan, "Telecommunications Switching Systems and Networks", Prentice Hall of India Pvt. Ltd., 2006

REFERENCE BOOKS:

1. John C Bellamy, "Digital Telephony", John Wiley International Student Student Edition, 3rd Edition, 2000.
2. Behrouz A. Forouzan, "Data Communications and Networking," TMH, 2nd Edition, 2002.
3. Tomasi, "Introduction to Data Communication and Networking", Pearson Education, 1st Edition, 2007

COURSE OUTCOMES:

On completion of this course, it is expected that the student will be able to:

1. Understand the main concepts of telecommunication network Design
2. Analyse and evaluate fundamental telecommuinication traffic models.
3. Understand basic modem signaling system.
4. Solve traditional interconnection switching system design problems.
5. Understand the concept of packet switching