# RAJEEV GANDHI MEMORIAL
# COLLEGE OF ENGINEERING AND TECHNOLOGY

**AUTONOMOUS**

NANDYAL-518501, KURNOOL DIST., A.P., INDIA

# ELECTRONICS AND COMMUNICATION ENGINEERING

**ESTD: 1995**

Applicable for students admitted into B.Tech (Regular) from 2010-11
&
B.Tech (Lateral Entry Scheme) from 2011-12

## REGULATIONS, COURSE STRUCTURE & DETAILED SYLLABUS

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGG. & TECH., NANDYAL-518 501

**AUTONOMOUS**

**ELECTRONICS AND COMMUNICATION ENGINEERING**

NANDYAL-518501, KURNOOL DIST., A.P., INDIA

(Affiliated to J.N.T.U.A, Anantapur)

## ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABUS

B.Tech (Regular) from 2010-11 and B.Tech (Lateral Entry Scheme) from 2011-12

For pursuing four year under graduate Bachelor Degree Programme of study in Engineering (B.Tech), Two year Master (post graduate) Degree of study in Engineering (M.Tech),Two year Master (post graduate) degree of study in Business Administration (MBA),Three year Master (post graduate) Degree of study in Computer Applications (MCA) offered by Rajeev Gandhi Memorial College of Engineering and Technology, Nandyal - 518501 under Autonomous status and herein referred to as RGMCET(Autonomous):

All the rules specified herein approved by the Academic Council will be in force and applicable to students admitted from the Academic Year 2010-11 onwards. Any reference to "Institute" or "College" in these rules and regulations stands for Rajeev Gandhi Memorial College of Engineering and Technology (Autonomous).

All the rules and regulations, specified here after shall be read as a whole for the purpose of interpretation as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. As per the requirements of statutory bodies, the Principal, Rajeev Gandhi Memorial College of Engineering and Technology shall be the Chairman, Academic Council.

The candidate seeking admission into the first year of study of four year B.Tech degree Programme should have

i) Passed either Intermediate Public Examination (IPE) conducted by the Board of Intermediate Education, Andhra Pradesh with Mathematics, Physics and Chemistry as optional subjects (or any equivalent examination certified by Board of Intermediate Examinations) or a Diploma in Engineering in the relevant branch conducted by the Board of Technical Education, Andhra Pradesh (or any equivalent certified by State Board of Technical Education) for admission.

ii) Secured a rank in the EAMCET examination conducted by A.P. State Council for Higher Education (APSCHE) for allotment of a seat by the Convener, EAMCET, for admission.

***Admission Procedure:***

As per the norms of A.P. State Council of Higher Education (APSCHE), Government of Andhra Pradesh, admissions are made to the first year of Four year B.Tech. Degree programme as follows:-

a) As per the norms of Government of Andhra Pradesh, A-Category (based on the rank obtained in EAMCET) seats will be filled by the Convener, EAMCET.

b) As per the norms of Government of Andhra Pradesh, B-Category seats will be filled by the management.

**Admission to the Second year of Four year B.Tech Degree Programme in Engineering:**

i) Candidates qualified in ECET and admitted by the Convener, ECET, in such cases for admission, when needed permission from the statutory bodies are to be obtained.

ii) 10% of the sanctioned strength in each programme of study (of RGMCET) shall be filled by the Convener, ECET as lateral entry.

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGG. & TECH., NANDYAL-518 501

**AUTONOMOUS**

**ELECTRONICS AND COMMUNICATION ENGINEERING**

## *List of Programmes offered*

1) B.Tech – Regular ( & Lateral Entry)
2) M.Tech – Regular
3) MBA – Regular
4) MCA – Regular

## 1. Academic Regulations for 2010 B.Tech (Regular)

(Effective for the students admitted into the I year from the Academic Year 2010-2011)

The B.Tech Degree will be conferred by the Jawaharlal Nehru Technological University, Anantapur, to students who are admitted to the program and fulfil all the requirements for the award of the Degree as specified below.

### *1.0 Award of B.Tech. Degree*

The student will be declared eligible for the award of the B. Tech. degree if he fulfils the following academic regulations:

1.1) Pursued a course of study for not less than prescribed course work duration and not more than double the prescribed course work duration.

1.2) Registered for 240 credits and secured 232 credits with compulsory subjects as listed in Table-1 below.

**Table 1: Compulsory Subjects**

| S.No | Subject Particulars |
|---|---|
| 1. | All the first year subjects |
| 2. | All practical subjects |
| 3. | All audit courses/soft skills/open electives |
| 4. | Mini project |
| 5. | Seminar |
| 6 | Comprehensive viva voce |
| 7. | Project work |

### *2.0 Forfeit of seat*

Students, who fail to fulfil all the academic requirements for the award of the degree within **eight academic years** from the year of their admission, shall forfeit their seat 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

1. Civil Engineering.
2. Computer Science and Engineering.
3. Electrical and Electronics Engineering.
4. Electronics and Communication Engineering.
5. Electronics and Instrumentation Engineering.
6. Information Technology.
7. Mechanical Engineering.

and any other course as approved by the authorities of the University from time to time.

**Table 2: Credits**

| | I Year | | | | Semester | | | |
|---|---|---|---|---|---|---|---|---|
| | Periods /Week | Credits | Internal Marks | External Marks | Periods /Week | Credits | Internal Marks | External Marks |
| Theory | 02 | 04 | 30 | 70 | 04 | 04 | 30 | 70 |
| | 03 | 05 | 30 | 70 | | | | |
| | 03+1* | 05 | | | | | | |
| | 03+1* | 06 | | | | | | |
| Practical | 03 | 03 | 25 | 50 | 03 | 02 | 25 | 50 |
| Practical / Drawing | 03+1* | 02 | | | 06 | 04 | | |
| | 06 | 06 | 30 | 70 | | | 30 | 70 |
| Open Electives/Audit courses /Soft skills courses | 03 | | | | | 02** | 100 | |
| Mini Project | | | | | | 02 | | 50 |
| Seminar | | | | | | 02 | 50 | |
| Comprehensive Viva-voce | | | | | | 04 | | 50 |
| Project | - | - | | | | 12 | 50 | 100 |

**[*Tutorial,**

****Open Electives/Audit courses/Soft skills course credits will not be considered for the award of division. However all these courses have to be cleared through Internal evaluation by scoring minimum of 40%.The credits obtained in these courses will be taken in to account for award of degree.]**

## *4.0 Distribution and Weightage of Marks*

4.1 The performance of the student in each semester / I year shall be evaluated subject – wise with a maximum of 100 marks for theory and 75 marks for practical subject. In addition, mini-project, comprehensive viva, seminar shall be evaluated for 50 marks each and the project work shall be evaluated for 150 marks.

4.2 For theory subjects the distribution shall be 30 marks for Internal Evaluation (25 marks for internal test and 05 marks for assignments) and 70 marks for the End-Examination.

4.3 For the semester system, during the semester there shall be 2 tests for theory subjects. In each Internal test there shall be one compulsory (short answers) question and 3 descriptive questions. The duration of internal test will be for 2 hrs. First test to be conducted in 1 – 3 units and second test to be conducted in 4 - 6 units of each subject. For awarding of 25 Internal marks the performance of the student in two Internal examinations conducted one in the middle of the semester and the other towards the end of the semester giving a weightage of 0.75 for the better score and 0.25 for the other score will be considered. There shall be two assignments (problem based) in each semester for award of 05 marks so that Internal component (marks) will be 30 marks (25 marks for Internal test+05 marks for assignments).

4.4 For the I year class which shall be on yearly basis, there shall be 3 tests. For awarding of 25 Internal marks the performance of the student in three Internal examinations conducted as per the schedule giving a weightage of 0.5 for the best score, 0.25 for better score and 0.25 for the other score will be considered. The distribution of syllabus for the conduct of Internal tests in the first year shall be as follows:

**Table 3: Units for Internal Tests**

| I Year | | Semester | |
|---|---|---|---|
| **2 Units** | **First Internal test.** | **3 Units** | **First Internal test.** |
| **3 Units** | **Second Internal test.** | **3 Units** | **Second Internal test.** |
| **3 Units** | **Third Internal test.** | | |

In a year there shall be at least three assignments and in each semester there shall be two assignments for the award of 5 marks.

4.5 In the case of open electives/Audit courses and soft skills subjects two Internal examinations shall be conducted one in the middle of the semester and the other at end of the semester for 70 marks and the marks scored by the student in these exams with a weightage of 0.75 for better score and 0.25 for the other score will be awarded as Internal marks for 70. The remaining 30 marks are based on the average marks scored in two assignments.

4.6 No makeup test for Internal examination or assignments will be conducted in any subject or practical. The student, who is absent for any test shall be deemed to have scored zero in that test.

## *5.0 Question Paper Pattern:*

5.1 Each Internal Test question paper shall contain 5 questions, of which the First question is compulsory and three questions are to be answered from the remaining four. Compulsory question carries 10 marks (It contains 5 questions of two marks - no choice in first question). The remaining 3 questions carry 5 marks each.

5.2 The End Examination question paper will have 7 questions and students have to write 5 questions. However, the first question is compulsory and it consists of 7 short answer questions, each carrying 2 marks. The next 4 questions are to be answered from the remaining 6 questions and each carries 14 marks.

5.3 For practical subjects there shall be a continuous evaluation during the semester for 25 Internal marks and 50 End Examination marks. Of the 25 marks for Internal, 20 marks shall be awarded for day-to-day work and 5 marks to be awarded by conducting an Internal laboratory test. The End Examination shall be conducted by the teacher concerned and an external Examiner from other institutions.

5.4 For the subject having design and /or drawing, (such as Engineering Graphics, Machine Drawing etc ) and estimation, the distribution shall be 30 marks for Internal evaluation (15 marks for day-to-day work and 5 marks for Internal tests and 10 marks for assignments) and 70 marks for End Examination.

There shall be two Internal tests in a Semester and the best of the two shall be considered for the award of marks for Internal tests. However in the I year class, there shall be three Internal tests and the average of best two will be taken into consideration for award of Internal marks.

5.5 The Engineering Drawing Practice Lab, wherever offered is to be treated as a theory subject. Evaluation method adopted for theory subjects shall be followed here as well.

5.6 There shall be mini-Project, in collaboration with an industry (wherever possible) of their specialization, to be taken up during the vacation(data collection, components etc) after III year II Semester examination and implementation/simulation shall be carried out in IV first semester during lab classes. Implementation or construction of mini project will be treated as laboratory. However, the mini project and its report shall be evaluated in IV year I Semester. The mini project shall be submitted in report form and should be presented before the committee, which shall be evaluated for 50 marks. The committee consists of an external Examiner, Head of the Department, the supervisor of mini project and a senior faculty member of the Department. There shall be 25 Internal marks for mini project which will be awarded based on the performance and involvement of the student during mini project period.

5.7 There shall be a 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 over the topic, and submit to the Department, which shall be evaluated by the Departmental committee consisting of Head of the Department, seminar supervisor and a senior faculty member of the department. The seminar report shall be evaluated for 50 marks. There shall be no external examination for seminar.

5.8 There shall be a comprehensive viva voce examination at the end of IV year II semester for 50 marks which shall be conducted by HOD, senior faculty and external Examiner from other institute.

5.9 The project topic should be approved by Internal Department Committee (IDC). Out of total 150 marks for the project work, 50 marks shall be for Internal Evaluation and 100 marks for the End Semester Examination. The evaluation of project work shall be conducted at the end of the IV year II semester. The project viva voce examination will be conducted by committee consists of an external Examiner from other institute, Head of the Department and the supervisor of the project. The Internal evaluation for 50 marks shall be on the basis of two seminars given by each student on the topic of the project. The Internal evaluation of the project work for 50 marks shall be conducted by committee consists of head of the Department or his nominee, senior faculty member and the supervisor of project.

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## TABLE4: DISTRIBUTION OF WEIGHTAGES FOR EXAMINATION AND EVALUATION:

| S.No | Nature of subject | Marks | Type of examination and mode of assessment | | Scheme of Examination |
|---|---|---|---|---|---|
| 1 | Theory | 70 | End Examination (External evaluation) | | End Examination in theory subjects will be for 70 marks. |
| | | 30 | 25 | Internal examinations (Internal evaluation) | These 25 marks are awarded to the students based on the performance in three(yearly) or two(semester) Internal examinations with a weightage of 0.5 for best score, 0.25 for better score, 0.25 for other score (yearly) and 0.75 for better score and 0.25 for the other score(semester) respectively. |
| | | | 05 | Assignments (Internal evaluation) | Average of two assignments each of 05 marks |
| 2 | practical | 50 | End lab examination (External evaluation) | | This End Examination in practical subjects will be for a maximum of 50 marks. |
| | | 25 | 20 | Internal evaluation | Day-to-day performance in lab experiments and record |
| | | | 05 | Internal evaluation | Internal lab examination at the end of year/semester |
| 3 | Mini Project | 50 | End Examination (External evaluation) | | This End Examination in miniproject will be for a maximum of 50 marks. |
| | | 25 | Internal evaluation | | Day-to-day performance in executing mini project. |
| 4 | Seminar | 50 | Internal evaluation | | Based on the performance in two seminars during semester |
| 5 | Comprehensive Viva | 50 | External evaluation | | This end viva voce examinations in all the subjects for 50 marks |
| 6 | Project work | 100 | External evaluation | | This end viva voce in project work for 100 marks |
| | | 50 | Internal evaluation | | These 50 marks are awarded based on the performance of the student which includes attendance and regularity |
| 7 | Open electives/ Audit courses/ softskills | 70 | Internal evaluation | | These 70 marks are awarded to the students based on the performance of two Internal examinations with a weightage of 0.75 for better score and 0.25 for the other score |
| | | 30 | Internal evaluation | | Based on the two assignments |

### *6.0 Attendance Requirements:*

6.1 The student shall be eligible to appear for End Examinations of the semester/ year if he acquires a minimum of 75% of attendance in aggregate of all the subjects of that semester/year.

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

6.3 The student will not be promoted to the next semester unless he satisfies the attendance requirement of the present semester / year, as applicable. They may seek re-admission for that semester / year when offered next.

6.4 **Shortage of Attendance below 65% in aggregate shall in NO case be condoned.**

6.5 Students whose shortage of attendance is not condoned in any semester / year are not eligible to take their End Examination of that class and their registration shall stand cancelled.

6.6 The stipulated fee shall be payable towards Condonation of shortage of attendance.

### *7.0 Minimum Academic Requirements:*

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

7.1 The student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical or design or drawing subject or project if he secures not less than 35% of marks in the End Examination and he has to score minimum of 40% marks from Internal and external exam marks put together to clear the subject.

7.2 The student shall be promoted from II to III year only if he fulfils the academic requirement of securing 40 out of 80 credits from one regular and one supplementary examinations of I year, and one regular examinations of II year I semester irrespective of whether the candidate takes the examination or not.

7.3 The student shall be promoted from third year to fourth year only if he fulfils the academic requirements of securing total 72 out of 144 credits from the following examinations, whether the candidate takes the examinations or not.

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

7.4 The student shall register and put up minimum attendance in all 240 credits and earn the 232 credits. Marks obtained in the best 220 credits (excluding the credits obtained in audit courses/soft skills and open electives) shall be considered for the calculation of percentage of marks.

7.5 Students who fail to earn 232 credits as indicated in the course structure including compulsory subjects as indicated in Table-1 within eight academic years from the year of their admission shall forfeit their seat in B.Tech course and their admission shall stand cancelled.

**Table 5: Promotion rules**

| Promotion from | Total credits to register | Total credits to be earned for promotion |
|---|---|---|
| II year to III year | 80 | 40 |
| III year to IV year | 144 | 72 |

## *8.0 Course pattern:*

8.1 The entire course of study is of four academic years. The first year shall be on yearly pattern and the second, third and fourth years shall be on semester pattern.

8.2 The student is eligible to appear for the End Examination in a subject, but absent at it or has failed in the End Examination may appear for that subject at the supplementary examination.

**Table: 6 Course pattern**

| Year | Semester | No.of Subjects | No.of Audit subjects | Number of Labs | Total credits | |
|---|---|---|---|---|---|---|
| First year | | O7 {ENG-4,EP-5,EC-5,M1-5, MM/EM-5,CDS-6,ED-6} | 00 | 04 | 1X4=04<br>4X5=20<br>2X6=12<br>4X3=12 | 48 |
| Second year | First | 06 | 01 | 03 | 6X4=24<br>1X2=02<br>3x2=06 | 32 |
| | Second | 06 | 01 | 03 | 6X4=24<br>1X2=02<br>3x2=06 | 32 |
| Third year | First | 06 | 01 | 03 | 6X4=24<br>1X2=02<br>3x2=06 | 32 |
| | Second | 06 | 01 | 03 | 6X4=24<br>1X2=02<br>3x2=06 | 32 |
| Fourth year | First | 06 | 01 | 02<br>Mini project | 6X4=24<br>1X2=02<br>3x2=06 | 32 |
| | Second | 03 | 01 | Seminar<br>Comprehensive Viva<br>Project Viva | 3x4 =12<br>1X2=02<br>1X2=02<br>1X4=04<br>1X12=12 | 32 |
| | | | | | **GRAND TOTAL** | **240** |

## *9.0 Award of Class:*

After the student has satisfied the requirements prescribed for the completion of the programme and is eligible for the award of B.Tech. Degree he shall be placed in one of the following four classes:

**Table 7: Award of Division**

| Class Awarded | % of marks to be secured | |
|---|---|---|
| First Class with Distinction | 70% and above | From the aggregate marks secured for the best 220 Credits excluding audit courses/ open elective/soft skills credits. |
| First Class | Below 70% but not less than 60% | |
| Second Class | Below 60% but not less than 50% | |
| Pass Class | Below 50% but not less than 40% | |

(The marks in Internal evaluation and End Examination shall be shown separately in the marks memorandum)

### *10.0 Supplementary Examinations:*

Apart from the regular End Examinations the institute may also schedule and conduct supplementary examinations for all subjects for the benefit of students with backlogs. Such students writing supplementary examinations as supplementary candidates may have to write more than one examination per day.

### *11.0 Transcripts:*

After successful completion of prerequisite credits for the award of degree a Transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued if required after the payment of requisite fee and also as per norms in vogue.

### *12.0 Rules of Discipline:*

12.2 Any attempt by any student to influence the teachers, Examiners, faculty and staff of controller of Examination for undue favours in the exams, and bribing them either for marks or attendance will be treated as malpractice cases and the student can be debarred from the college.

12.3 When the student absents himself, he is treated as to have appeared and obtained zero marks in that subject(s) and grading is done accordingly.

12.4 When the performance of the student in any subject(s) is cancelled as a punishment for indiscipline, he is awarded zero marks in that subject(s).

12.4.1 When the student's answer book is confiscated for any kind of attempted or suspected malpractice the decision of the Examiner is final.

### *13.0 Minimum Instruction Days:*

The minimum instruction days for each semester / I year shall be 95/180 clear instruction days excluding the days allotted for tests/examinations and preparation holidays declared if any.

### *14.0 Amendment of Regulations:*

The college may, from time to time, revise, amend or change the regulations, scheme of examinations and syllabi. However the academic regulations of any student will be same throughout the course of study in which the student has been admitted.

### *15.0 Transfers*

There shall be no branch transfers after the completion of admission process.

### *16.0 General:*

16.2 The Academic Regulation should be read as a whole for the purpose of any interpretation.

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

16.4 The Institute may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the Institute.

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

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## ACADEMIC REGULATIONS FOR B.TECH (LATERAL ENTRY SCHEME)

(Effective for the students getting admitted into II year from the Academic Year 2011-2012 on wards)

**1.0** The Students have to acquire 184 credits out of 192 from II to IV year of B.Tech. Program (Regular) for the award of the degree.

**2.0** Students, who fail to fulfil the requirement for the award of the degree in 6 consecutive academic years from the year of admission, shall forfeit their seat.

**3.0** The same attendance regulations are to be adopted as that of B.Tech. (Regular).

**4.0 Promotion Rule:**

The student shall be promoted from third year to fourth year only if he fulfils the academic requirements of 48 out of 96 credits from the examinations.

a) Two regular and one supplementary examinations of II year I semester.

b) One regular and one supplementary examinations of II year II semester.

c) One regular examination of III year I semester.

**5.0 Award of Class:**

After the student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B.Tech. Degree he shall be placed in one of the following four classes: The marks obtained in the best 172 credits will be considered for the calculation of percentage and award of class.

**Table 1: Award of Division**

| Class Awarded | % of marks to be secured | From the aggregate marks secured for best 172 Credits. (i.e. II year to IV year) excluding audit/open electives/soft skills |
|---|---|---|
| First Class with Distinction | 70% and above | |
| First Class | Below 70% but not less than 60% | |
| Second Class | Below 60% but not less than 50% | |
| Pass Class | Below 50% but not less than 40% | |

(The marks in Internal evaluation and End Examination shall be shown separately in the marks memorandum)

**6.0 All other regulations as applicable for B. Tech. Four-year degree course (Regular) will hold good for B.Tech. (Lateral Entry Scheme)**

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COURSE STRUCTURE

(Common to Branches: ECE, EEE, EIE, CSE & IT)

# I B.Tech

| Code | Subject | Scheme of instruction periods/week | | Credits | Scheme of Examination | | |
|---|---|---|---|---|---|---|---|
| | | Theory | Practical | | Internal Marks | External Marks | Total Marks |
| **Theory** | | | | | | | |
| A0001101 | English | 3+1* | - | 4 | 30 | 70 | 100 |
| A0002101 | Engineering Physics | 3+1* | - | 5 | 30 | 70 | 100 |
| A0003101 | Engineering Chemistry | 3+1* | - | 5 | 30 | 70 | 100 |
| A0004101 | Mathematics – I | 3+1* | - | 5 | 30 | 70 | 100 |
| A0005101 | Mathematical Methods | 3+1* | - | 5 | 30 | 70 | 100 |
| A0501101 | C Programming and Data Structures | 3+1* | - | 6 | 30 | 70 | 100 |
| A0301101 | Engineering Drawing | 3+1* | - | 6 | 30 | 70 | 100 |
| **Practical** | | | | | | | |
| A0591101 | C Programming and Data Structures Lab | - | 3 | 3 | 25 | 50 | 75 |
| A0391101 | Engineering and IT Workshop | - | 3 | 3 | 25 | 50 | 75 |
| A0091101 | Engineering Physics Lab and Engineering Chemistry Lab | - | 3 | 3 | 25 | 50 | 75 |
| A0092101 | English Language Communication Skills Lab | - | 3 | 3 | 25 | 50 | 75 |
| | **Total** | **28** | **12** | **48** | **310** | **690** | **1000** |

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## ELECTRONICS AND COMMUNICATION ENGINEERING

## COURSE STRUCTURE

## II B.TECH, I-SEMESTER

| Subject Code | Subject | Hours/ Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Tutorial | Lab | | Internal | External | Total |
| A0008103 | Mathematics – III | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0010103 | Environmental Studies | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0401103 | Electronic Devices and Circuits | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0402103 | Signals and Systems | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0403103 | Network Analysis and Synthesis | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0404103 | Probability Theory and Stochastic Processes | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0007103 | Aptitude Arithmetic Reasoning and Comprehension (Audit Course) | 3 | - | - | 2 | 30 | 70 (Internal Evaluation) | 100 |
| A0491103 | Electronic Devices and Circuits Lab | - | - | 3 | 2 | 25 | 50 | 75 |
| A0492103 | Signals and Systems Simulation Lab | - | - | 3 | 2 | 25 | 50 | 75 |
| A0493103 | Network Analysis Laboratory | - | - | 3 | 2 | 25 | 50 | 75 |
| | ***Contact Periods / Week*** | **21** | **6** | **9** | **32** | **285** | **640** | **925** |

## II B.TECH, II-SEMESTER

| Subject Code | Subject | Hours/ Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Tutorial | Lab | | Internal | External | Total |
| A0207104 | Control Systems | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0209104 | Electrical Technology | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0405103 | EM Waves and Transmission Lines | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0407104 | Electronic Circuit Analysis | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0408104 | Pulse and Digital Circuits | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0409104 | Switching Theory and Logic Design | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0009103 | Corporate Management Skills (Audit Course) | 3 | - | - | 2 | 30 | 70 (Internal Evaluation) | 100 |
| A0494104 | Electronic Circuit Analysis Lab | - | - | 3 | 2 | 25 | 50 | 75 |
| A0495104 | Pulse and Digital Circuits Lab | - | - | 3 | 2 | 25 | 50 | 75 |
| A0297104 | Electrical Technology Lab | - | - | 3 | 2 | 25 | 50 | 75 |
| | ***Contact Periods / Week*** | **21** | **6** | **9** | **32** | **285** | **640** | **925** |

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## ELECTRONICS AND COMMUNICATION ENGINEERING

## COURSE STRUCTURE

## III B.TECH, I-SEMESTER

| Subject Code | Subject | Hours/ Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Tutorial | Lab | | Internal | External | Total |
| A0410105 | Analog Communications | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0013105 | Managerial Economics and Financial Accounting | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0440105 | Antennas and Wave Propagation | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0441105 | Analog IC Applications | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0506104 | Object Oriented Programming | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0413105 | Microprocessors & Microcontrollers | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0414105 | Embedded 'C' (Audit Course) | 3 | - | | 2 | 30 | 70 (Internal Evaluation) | 100 |
| A0497105 | Analog IC Applications & Analog Communications Lab | - | - | 3 | 2 | 25 | 50 | 75 |
| A0498105 | Microprocessors and Microcontrollers Lab Using Embedded 'C' . | - | - | 3 | 2 | 25 | 50 | 75 |
| A0594104 | Object Oriented Programming Lab | - | - | 3 | 2 | 25 | 50 | 75 |
| Contact Periods / Week | | **21** | **6** | **9** | **32** | **285** | **640** | **925** |

## III B.TECH, II-SEMESTER

| Subject Code | Subject | Hours/ Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Tutorial | Lab | | Internal | External | Total |
| A0417106 | Digital Signal Processing | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0012105 | Management Science | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0505104 | Computer Organization | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0418106 | Microwave Engineering | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0416105 | Digital IC Applications Through VHDL | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0419106 | Digital Communications | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0420106 | Verilog (Audit Course) | 3 | - | - | 2 | 30 | 70 (Internal Evaluation) | 100 |
| A0093105 | Professional Communication and Soft Skills Lab | - | - | 3 | 2 | 25 | 50 | 75 |
| A0482106 | Digital Communications Lab | - | - | 3 | 2 | 25 | 50 | 75 |
| A0481105 | Digital IC Applications Using VHDL & Verilog Lab | - | - | 3 | 2 | 25 | 50 | 75 |
| | *Contact Periods / Week* | 21 | 6 | 9 | 32 | 285 | 640 | 925 |

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGG. & TECH., NANDYAL-518 501

**AUTONOMOUS**

**ELECTRONICS AND COMMUNICATION ENGINEERING**

## COURSE STRUCTURE

## IV B.TECH, I-SEMESTER

| Subject Code | Subject | Hours/ Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Tutorial | Lab | | Internal | External | Total |
| A0423107 | Micro Electronics and VLSI Design | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0424107 | Electronic Measurements And Instrumentation | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0425107 | Optical Communications | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0426107 | Digital Image Processing | 3 | 1 | - | 4 | 30 | 70 | 100 |
| | Elective-I | 3 | 1 | - | 4 | 30 | 70 | 100 |
| | Elective-II | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0432107 | Matlab Tools (Audit Course) | 3 | - | | 2 | 30 | 70 (Internal Evaluation) | 100 |
| A0483107 | Digital Signal & Image Processing Lab | - | - | 3 | 2 | 25 | 50 | 75 |
| A0484107 | Microwave & Optical Communications Lab | - | - | 3 | 2 | 25 | 50 | 75 |
| A0485107 | Industry Oriented Mini Project | - | - | 3 | 2 | 25 | 50 | 75 |
| | ***Contact Periods / Week*** | **21** | **6** | **9** | **32** | **285** | **640** | **925** |

## IV B.TECH, II-SEMESTER

| Subject Code | Subject | Hours/ Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Tutorial | Lab | | Internal | External | Total |
| A0433108 | Radar Systems | 3 | 1 | - | 4 | 30 | 70 | 100 |
| | Elective-III | 3 | 1 | - | 4 | 30 | 70 | 100 |
| | Elective-IV | 3 | 1 | - | 4 | 30 | 70 | 100 |
| A0439108 | Microwind & Lab View (Audit Course) | 3 | - | - | 2 | 30 | 70 (Internal Evaluation) | 100 |
| A0486108 | Project | - | - | - | 12 | 50 | 100 | 150 |
| A0487108 | Seminar | - | - | - | 2 | 50 | - | 50 |
| A0488108 | Comprehensive Viva | - | - | - | 4 | - | 50 | 50 |
| | ***Contact Periods / Week*** | 12 | 3 | - | 32 | 220 | 430 | 650 |

**AUTONOMOUS**

**ELECTRONICS AND COMMUNICATION ENGINEERING**

## ELECTIVES

| SUBJECT CODE | ELECTIVES |
|---|---|
| **ELECTIVE-I** | |
| A0427107 | Cellular and Mobile Communications |
| A0428107 | Satellite Communications |
| A0429107 | Spread Spectrum Communications |
| **ELECTIVE-II** | |
| A0430107 | Fundamentals of Operating Systems |
| A0322106 | Operation Research. |
| A0431107 | Optimization Techniques. |
| **ELECTIVE-III** | |
| A0511105 | Computer Networks |
| A0434108 | DSP Processors Architectures and Applications |
| A0435108 | Mixed Signal Design |
| **ELECTIVE-IV** | |
| A0436108 | Wireless Communications and Networks. |
| A0437108 | FPGA Architecture and Applications. |
| A0438108 | Statistical Signal Processing. |

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**ELECTRONICS AND COMMUNICATION ENGINEERING**

I B.TECH. (REGULAR, 2010-11)

(Common to all Branches)

For Branches: E.C.E, E.E.E, E.I.E, C.S.E, I.T, M.E, C.E.

| T | C |
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| 3+1* | 4 |

## (A0001101) ENGLISH

**1. INTRODUCTION :**

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

The teacher should focus on the skills of reading, writing, listening and speaking while using the prescribed text and exercises. The classes should be interactive. The students should be encouraged to participate in the classroom proceedings and also to write short paragraphs and essays. The main aim is to encourage two way communications in place of the one-sided lecture.

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

**2. OBJECTIVES:**

a) To improve the language proficiency of the students in English with an emphasis on LSRW skills.

b) To equip the students to study academic subjects with greater facility through theoretical and practical components of the syllabus.

c) To develop study skills as well as communication skills in formal and informal situations.

**3. SYLLABUS:**

**Listening Skills:**

**Objectives**

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

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

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

**Speaking Skills:**

**Objectives**

1. To make students aware of the role of ability to speak fluent English and its contribution to their success.
2. To enable students to express themselves fluently and appropriately in social and professional contexts.

- Oral practice
- Role play – Individual/Group activities

(Using exercises from all units of the prescribed text)

- Describing objects/situations/people
- 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 to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.

- Skimming the text
- Identifying the topic sentence
- Understanding discourse features
- Understanding the gist of an argument
- Inferring lexical and contextual meaning
- Recognizing coherence/sequencing of sentences

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

**Writing Skills:**

**Objectives**

1. To develop an awareness in the students the skill to write exact and formal writing.
2. To equip them with the components of different forms of writing.

- Writing sentences
- Paragraph writing
- Narration / description
- Formal and informal letter writing
- Use of appropriate vocabulary
- Coherence and cohesiveness
- Note Making
- Editing a passage

**4. TEXTBOOKS PRESCRIBED:**

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into **Eight Units**, are prescribed:

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

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

**UNIT -I**

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

b) Mokshagundam Visvesaraya from **INSPIRING LIVES**

**UNIT -II**

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

b) Mother Teresa from **INSPIRING LIVES.**

**UNIT -III**

a) The Connoisseur from **ENJOYING EVERYDAY ENGLISH**.

b) Dr. Amartya Kumar Sen from **INSPIRING LIVES.**

**UNIT -IV**

a) The Cuddalore Experience from **ENJOYING EVERYDAY ENGLISH**.

b) Gertrude Elion from **INSPIRING LIVES.**

**UNIT -V**

a) Bubbling Well Road from **ENJOYING EVERYDAY ENGLISH**.

b) Vishwanathan Anand from **INSPIRING LIVES.**

**UNIT-VI**

a) Odds against Us from **ENJOYING EVERYDAY ENGLISH**.

b) Charlie Chaplin from **INSPIRING LIVES.**

**UNIT – VII**

a) Exercises on Reading and Writing Skills, Reading Comprehension, Letter writing,Report writing

**UNIT – VIII**

Exercises on Remedial Grammar covering Common errors in English, Subject-Verb agreement, Use of Articles and Prepositions, Active/Passive Voice, Reported speech, Tenses Vocabulary development covering Synonyms & Antonyms, one-word substitutes, prefixes & suffixes, Idioms & phrases, words often confused.

**Evaluation**: The question paper shall contain two parts, Part A containing questions from Units I- VI and Part B containing questions from units VII & VIII. The student is required to answer five full questions choosing at least one from Part B.

**REFERENCES:**

1. Technical Communication , Principle and Practice, Meenakshi Raman and Sangita Sharma, OUP, 2009
2. Essential Grammar in Use, (with CD) 3rd edn, Cambridge University Press, 2009.
3. Resumes and Interviews, M.Ashraf Rizvi, Tata - Mcgraw Hill, 2009.
4. Everyday Dialogues in English by Robert J. Dixson, Prentice-Hall of India Ltd., 2006.
5. Communication Skills for Technical Students, T.M.Farhathullah, Orient Blackswan, 2008.
6. Developing Communication Skills, 2nd edn. by Krishna Mohan & Meera Banerji , Macmillan, 2009.
7. English for Technical Communication, Vol. 1 & 2, by K. R. Lakshmi Narayanan, Sci tech. Publications.
8. Basic Communication Skills for Technology, Andrea J Ruthurford, Pearson Education, Asia.
9. Longman Dictionary of Contemporary English with DVD, Pearson Longman.

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**AUTONOMOUS**

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(Common to all Branches)

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| T | C |
|---|---|
| 3+1* | 5 |

## (A0002101) ENGINEERING PHYSICS

**UNIT I OPTICS:**

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

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

**UNIT III PRINCIPLES OF QUANTUM MECHANICS & ELECTRON THEORY:**

Waves and Particles - de- Broglie's hypothesis - Heisenberg's uncertainity principle - Schroedinger's one dimensional wave equation (Time Independent) - Particle in a one dimensional potential box - Energy levels - Fermi-Dirac distribution and effect of Temperature(qualitative treatment only) - Scattering - Source of electrical resistance - Kronig-Penney model (qualitative treatment only) - energy bands - metals, semi conductors & insulators.

**UNIT IV SEMICONDUCTORS:**

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

**UNIT V MAGNETIC PROPERTIES:**

Introduction - Origin of magnetic moment - Classification of magnetic materials - Dia, Para , Ferro, anti-Ferro and Ferri magnetism - Hysteresis - Soft and hard magnetic materials - Magnetic bubbles memory.

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

**UNIT VI SUPERCONDUCTIVITY:**

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

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

**UNIT VII FIBER OPTICS:**

- Principle of optical fiber - Acceptance angle and Acceptance cone - Numerical aperture - Types of Optical fibers and refractive index profiles - Optical fiber communication systems - Application of optical fibers.

**UNIT VIII NANOMATERIALS:**

Introduction - Basic principles of nano materials - Fabrication of nano materials - ball milling - plasma arching - Chemical vapour deposition method - sol-gel methods - properties of nano materials - carbon nano tubes - properties and applications of carbon nano tubes - Applications of nano materials.

**TEXT BOOKS:**

1. Engineering Physics by V. Rajendran & K.Thyagarajan, Tata McGraw-Hill Publishing Co. Ltd.
2. Engineering Physics by M.R.Srinivasan New Age Publications.
3. Engineering Physics by M.N.Avadhanulu, S.Chand Publications, New Delhi.

**REFERENCES:**

1. Physics Volume 2, by Halliday, Resnick and Krane; John Wiley India.
2. Solid State Physics by C.Kittel, Wiley India.
3. Engineering Physics by Mittal, I.K.International.
4. Introduction to Nanoscience & Nano Technology by K.K Chattopadhya A.N. Banarjee , Prentice – Hall of India Pvt. Ltd.

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| T | C |
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| 3+1* | 5 |

## (A0003101) ENGINEERING CHEMISTRY

**UNIT I**

**Water:** Sources of Water, Types of impurities in Water, Hardness of Water - Temporary and Permanent hardness, Units, Estimation of hardness by EDTA Method, Analysis of Water - Dissolved Oxygen, Disadvantages of Hard Water, Problems on hardness of water, Methods of Treatment of Water for Domestic Purpose - Sterilisation: Chlorination, Ozonisation.

**Water for Industrial purpose**: Water for Steam Making, Boiler Troubles - Carry Over (Priming and Foaming), Boiler Corrosion, Scales and Sludges, Caustic Embrittlement, Water Treatment - Internal Treatment - Colloidal, Phosphate, Calgon, Carbonate, Sodium aluminates Conditioning of Water. External Treatment - Ion- Exchange Process; Demineralization of Brakish Water - Reverse Osmosis.

**UNIT II**

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

**UNIT III**

**Polymers:** Polymerization Reactions - Basic concepts, Types of Polymerization - Addition and Condensation Polymerization, Plastics - Thermosetting and Thermoplastics, Composition, Properties and Engineering Uses of the Following: Teflon, Bakelite, Nylon, Rubber - Processing of Natural Rubber and Compounding, Elastomers - Buna S, Buna N, Polyurethane Rubber; Silicone Rubber, Conducting Polymers, Synthesis and applications of Polyacetylene and Poly aniline Liquid Crystals definition, properties, suitable examples and Engineering Applications.

**UNIT IV**

**Chemistry of nano materials:** Nano materials definition, properties and applications.

**Explosives and Propellants**: Explosives, Classification, precautions during storage, blasting fuses, important explosives, Rocket propellants, classification of propellants**.**

**Lubricants :** Principles and function of lubricants - Classification and properties of lubricants - Viscosity, flash and fire points, cloud and pour points, aniline point, Neutralization Number and Mechanical Strength.

**UNIT V**

**Electro Chemistry:** Conductance - Equivalent Conductance - Molecular Conductance, Conductometric Titrations - Applications of Conductivity Measurements.

**Electrochemical Cells:** Measurement of EMF, Standard electrode potential, concentration cells, batteries (Ni–Cd cell), Lithium batteries, Fuel cell: hydrogen oxygen fuel cell and methanol fuel cell

**Insulators** – Definition, Properties and Characteristics of Insulating Materials, Engineering Applications.

**UNIT VI:**

Phase rule: Definition, Terms involved in Phase Rule and Phase rule equation. Phase diagrams - one component system (water system), two component system (lead- silver system) Eutectics, heat treatment based on iron-carbon phase diagram, hardening, annealing.

**UNIT VII:**

**Fuels and Combustion:** Definition and Classification of fuels, Solid, liquid & gaseous fuels, Characteristics of a good fuel, Metallurgical Coke - Characteristics & Manufacture (Otto-Halfmann),

Petroleum - Refining - Synthetic Petrol, Calorific Value & its determination (Bomb Calorimeter - Junker's Gas Calorimeter). Combustion: Flue gas analysis by Orsat's apparatus.

**UNIT VIII:**

**Building Materials:**

Cement: composition of Portland cement, analysis, setting & hardening of cement (reactions).

**Refractories:** Definition, Classification With Examples; Criteria of a Good Refractory Material; Causes for the failure of a Refractory Material.

**TEXT BOOKS**

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

**REFERENCE**

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

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(Common to all Branches)

For Branches: E.C.E, E.E.E, E.I.E, C.S.E, I.T, M.E, C.E.

| T | C |
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| 3+1* | 5 |

## (A0004101) MATHEMATICS – I

**UNIT I**

Differential equations of first order and first degree - Exact, linear and Bernoulli equations. Applications to Newton's law of cooling, law of natural growth and decay, orthogonal trajectories.

**UNIT II**

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

**UNIT III**

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

**UNIT IV**

Raidus of Curvature - Curve tracing - Cartesian, polar and parametric curves. Applications of integration to lengths, volume and surface area of solids of revolution in Cartesian and polar coordinates

**UNIT V**

Multiple integral: Double and triple integrals - Change of Variables - Change of order of integration.

**UNIT VI**

Laplace transform of standard functions -Inverse transform - First shifting Theorem, Transforms of derivatives and integrals - Unit step function - Second shifting theorem - Dirac's delta function - Convolution theorem - Laplace transform of Periodic function.

**UNIT VII**

Differentiation and integration of Laplace transform - Application of Laplace transforms to ordinary differential equations of first and second order.

**UNIT VIII**

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

**TEXT BOOKS**


1. A Text Book of Engineering Mathematics, Vol – 1, T.K.V. Iyengar, B. Krishna Gandhi and Others S. Chand & Company.
2. A Text Book of Engineering Mathematics, C. Sankaraiah, V.G.S. Book Links.
3. A Text Book of Engineering Mathematics-1,E. Rukmangadachari, E. Keshava Reddy, Pearson Education.


**REFERENCES**


1. A Text Book of Engineering Mathematics, B.V. Ramana, Tata Mc Graw Hill.
2. A Text Book of Engineering Mathematics, Thomson Book Collection.
3. A Text Book of Advanced Engineering Mathematics – A Computer Approach, N.Bail, M.Goyal & C.Watkins.
4. Engineering Mathematics, Sarveswara Rao Koneru, Universities Press.

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| T | C |
|---|---|
| 3+1* | 5 |

## (A0302101) MATHEMATICAL METHODS

**UNIT I**

**Matrices:** Elementary row transformations – Rank – Echelon form, normal form – Solution of Linear System of Homogenous and Non Homogeneous equations – Direct Methods – Gauss Elimination, Gauss Jordan methods.

Eigen Values, Eigen vectors – Properties. Cayley – Hamilton Theorem – Inverse and powers of a matrix by Cayley–Hamilton theorem – Diagonolization of matrix. Calculation of powers of matrix.

**UNIT II**

Real matrices – Symmetric, Skew – Symmetric, orthogonal matrices Linear Transformation – Orthogonal Transformation. Complex matrices: Hermitian, Skew-Hermitian and Unitary matrices – Eigen values and Eigen vectors and their properties. Quadratic forms – Reduction of quadratic form to canonical form and their nature.

**UNIT III**

Solution of Algebraic and Transcendental Equations: Introduction – The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method.

**Interpolation:** Introduction – Finite differences – Forward Differences – backward Differences –Newton's forward and backward difference formulae for interpolation – Lagrange's Interpolation formula.

**UNIT IV**

Curve fitting: Fitting a straight line – Second degree curve – Exponential curve-Power curve by method of least squares. Numerical Differentiation and Integration – Trapezoidal rule – Simpson's 1/3 Rule – Simpson's 3/8 Rule.

**UNIT V**

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Runge-Kutta Methods – Milne's Predictor-Corrector Method.

**UNIT VI**

Fourier Series: Determination of Fourier coefficients – Fourier series of Even and odd functions – Fourier series in an arbitrary interval – Even and odd periodic continuation – Half-range Fourier sine and cosine expansions. Fourier integral theorem (statement only) – Fourier sine and cosine integrals, Fourier transform – Fourier sine and cosine transforms – Properties – Inverse transforms – Finite Fourier transforms.

**UNIT VII**

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Method of separation of variables – Solutions of one dimensional wave equation, heat equation and two-dimensional Laplace equation under initial and boundary conditions.

**UNIT – VIII**

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

**TEXT BOOKS:**


1. Mathematical Methods, T.K.V. Iyengar, B. Krishna Gandhi and Others, S. Chand & Company.
2. Mathematical Methods, C. Sankaraiah, V.G.S. Book Links.
3. Mathematical Methods, G. Shanker Rao, E. Keshava Reddy, I. K. International Publishing House Pvt. Ltd.


**REFERENCES:**


1. Numerical Methods for Scientific and Engineering Computation , M.K. Jain, S.R.K. Iyengar & R.K. Jain, New Age international Publishers.
2. Mathematical Methods – Pal – Oxford.
3. Introduction to Numerical Analysis – S.S. Sastry Printice Hall of India.
4. Mathematical Methods, S.K.V.S. Sri Ramachary, M. Bhujanga Rao, P.B. Bhaskar Rao & P.S. Subramanyam, BS Publications.

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| T | C |
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| 3+1* | 6 |

## (A0501101) C PROGRAMMING AND DATA STRUCTURES

**UNIT I**

Overview of Computers and Programming - Electronic Computers then and Now, Computer Hardware, Computer Software, Algorithm, Flowcharts, Software Development Method, Applying the Software Development Method.

**UNIT II**

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

**UNIT III**

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

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

**UNIT IV**

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

Strings - String Basics, String Library Functions, Longer Strings, String Comparison, Arrays of Pointers, Character operations, String-To-Number and Number-To- String Conversions, Pointers and Strings.

**UNIT V**

Structure and Union – Introduction, Features of Structures. Declaration and Initialization of Structures, Structure within Structure, Array of Structures, Pointer to Structure, Structure and Functions, typedef, Bit Fields, Enumerated Data Type, Union, Union of Structures.

**UNIT VI**

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

**UNIT VII**

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

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

**UNIT VIII**

Searching and Sorting - Exchange (Bubble) Sort, Selection Sort, Quick Sort, Insertion Sort, Merge Sort. Searching- Linear and Binary Search Methods.

**TEXT BOOKS :**

1. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education
2. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.

**REFERENCES :**

1. Programming in C – Stephen G. Kochan, III Edition, Pearson Eductaion.
2. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press**.**
3. C and Data Structures, a snapshot oriented treatise with live engineering examples, Dr.N.B.Venkateswarlu, Dr. E.V.Prasad, S. Chand**.**
4. C and Data Structures, E.Balaguruswamy, Tata Mc Graw Hill**.**
5. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI, Eighth Edition.

**AUTONOMOUS**

**ELECTRONICS AND COMMUNICATION ENGINEERING**

I B.TECH. (REGULAR, 2010-11)

(Common to all Branches)

For Branches: E.C.E, E.E.E, E.I.E, C.S.E, I.T, M.E, C.E.

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## (A0301101) ENGINEERING DRAWING

**UNIT – I**

INTRODUCTION TO ENGINEERING DRAWING: Principles of Engineering Graphics and their Significance – Drawing Instruments and their Use – Conventions in Drawing – Lettering – BIS Conventions.

Curves used in Engineering Practice:

a) Conic Sections including the Rectangular Hyperbola – General method only.

b) Cycloid, Epicycloids and Hypocycloid

c) Involutes.

d) Helices

**UNIT – II**

PROJECTION OF POINTS AND LINES: Principles of Orthographic Projection – Conventions – First and Third Angle Projections. Projections of Points, Lines inclined to one or both planes, Problems on projections, Finding True lengths & traces only.

**UNIT – III**

PROJECTIONS OF PLANES: Projections of regular Plane surfaces, Projection of lines and planes using auxiliary planes.

**UNIT – IV**

PROJECTIONS OF SOLIDS: Projections of Regular Solids inclined to one or both planes – Auxiliary Views.

**UNIT – V**

SECTIONS & DEVELOPMENTS OF SOLIDS: Section Planes and Sectional views of Right Regular Solids– Prism, Cylinder, Pyramid and Cone – True shapes of sections.

Development of Surfaces of Right Regular Solids – Prisms, Cylinder, Pyramid, Cone and their Sectional parts.

**UNIT – VI**

ISOMETRIC & ORTHOGRAPHIC PROJECTIONS: Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids - Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts.

Conversion of Isometric Views to Orthographic Views - Conventions.

**UNIT – VII**

INTERPENETRATION OF RIGHT REGULAR SOLIDS: Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone, Square Prism Vs Square Prism.

**UNIT – VIII**

PERSPECTIVE PROJECTIONS: Perspective View: Plane Figures and Simple Solids,Vanishing Point Methods (General Method only).

**TEXT BOOKS:**

1. Engineering Drawing, N.D. Bhat / Charotar
2. Engineering Drawing, Johle /Tata McGraw-Hill
3. Engineering Drawing, Shah and Rana, 2/e Pearson education

**REFERENCES:**

1. Engineering Drawing and Graphics, Venugopal/ New age
2. Engineering Drawing, B.V.R. Guptha, J.K. Publishesrs
3. Engineering Drawing, K.L. Narayana, P. Khanniah, Scitech Pub
4. Engineering Drawing, Venkata Reddy, B.S.Publishers.

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**ELECTRONICS AND COMMUNICATION ENGINEERING**

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# (A0591101) C PROGRAMMING AND DATA STRUCTURES LAB

**Objectives:**

- To make the student learn a programming language.
- To teach the student to write programs in C to solve the problems.
- To introduce the student to simple linear data structures such as lists, stacks, queues.

**Recommended Systems/Software Requirements:**

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

**Exercise l**

a) Write a C program to find the sum of individual digits of a positive integer.
b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

**Exercise 2**

a) Write a C program to calculate the following Sum:

Sum=$1-x^2/2! +x^4/4!-x^6/6!+x^8/8!-x^{10}/10!$

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

**Exercise 3**

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

i) Find the factorial of a given integer.
ii) To find the GCD (greatest common divisor) of two given integers.
iii) To solve Towers of Hanoi problem.

**Exercise 4**

a) The total distance travelled by vehicle in 't' seconds is given by distance $S = ut+1/2at^2$ where 'u' and 'a' are the initial velocity (m/sec.) and acceleration ($m/sec^2$) respectively. Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.
b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

**Exercise 5**

a) Write a C program to find both the largest and smallest number in a list of integers.
b) Write a C program that uses functions to perform the following:
i) Addition of Two Matrices
ii) Multiplication of Two Matrices

**Exercise 6**

a) Write a C program that uses functions to perform the following operations:
i) To insert a sub-string in to a given main string from a given position.
ii) To delete n Characters from a given position in a given string.
b) Write a C program to determine if the given string is a palindrome or not

**Exercise 7**

a) Write a C program that displays the position or index in the string S where the string T begins, or –1 if S doesn't contain T.
b) Write a C program to count the lines, words and characters in a given text.

**Exercise 8**

a) Write a C program to generate Pascal's triangle.
b) Write a C program to construct a pyramid of numbers.

**Exercise 9**

Write a C program to read in two numbers, x and n, and then compute the sum of the geometric progression:

$1+x+x^2+x^3+\ldots\ldots\ldots\ldots+x^n$

For example: if n is 3 and x is 5, then the program computes 1+5+25+125.

Print x, n, the sum

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

**Exercise 10**

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

**Exercise 11**

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

i) Reading a complex number
ii) Writing a complex number
iii) Addition of two complex numbers
iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

**Exercise 12**

a) Write a C program which copies one file to another.
b) Write a C program to reverse the first n characters in a file.

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

**Exercise 13**

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

**Exercise 14**

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

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

**Exercise 15**

Write C programs that implement stack (its operations) using

i) Arrays
ii) Pointers

**Exercise 16**

Write C programs that implement Queue (its operations) using

i) Arrays
ii) Pointers

**Exercise 17**

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

i) Converting infix expression into postfix expression
ii) Evaluating the postfix expression

**Exercise 18**

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

i) Bubble sort
ii) Selection sort

**Exercise 19**

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

i) Linear search
ii) Binary search

**Exercise 20**

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

**Exercise 21**

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

**Exercise 22**

Write C programs to implement the Lagrange interpolation and Newton - Gregory forward interpolation.

**Exercise 23**

Write C programs to implement the linear regression and polynomial regression algorithms.

**Exercise 24**

Write C programs to implement Trapezoidal and Simpson methods.

**REFERENCE BOOKS**

1. The Spirit of C, an introduction to modern programming, M.Cooper, Jaico Publishing House.
2. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.
3. Computer Basics and C Programming, V. Rajaraman, PHI Publications.
4. Programming in C and Data Structures, J.R.Hanly, Ashok.N.K.Kamthane and A.Ananda Rao, Pearson Education.

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**ELECTRONICS AND COMMUNICATION ENGINEERING**

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(Common to all Branches)

For Branches: E.C.E, E.E.E, E.I.E, C.S.E, I.T, M.E, C.E.

| P | C |
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## (A0391101) ENGINEERING AND IT WORKSHOP

### ENGINEERING WORKSHOP

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

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

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

### REFERENCE BOOKS:

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

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**ELECTRONICS AND COMMUNICATION ENGINEERING**

## IT WORKSHOP

**Objectives:**

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

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

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

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

**PC Hardware**

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

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

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

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

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

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

**OFFICE TOOLS**

**LaTeX and Word**

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

**Task 1: Using LaTeX and Word** to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

**EXCEL**

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

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

**LaTeX and MS/equivalent (FOSS) tool Power Point**

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

**Exercise 10 - Task 2 :** Second Exercise helps students in making their presentations interactive. Topic covered during this Exercise includes : Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts

**Internet & World Wide Web** **2 Exercises**

**Exercise 11 - Task 1**: **Orientation & Connectivity Boot Camp:** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

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

**Exercise 12 - Task 2**: **Search Engines & Netiquette:** Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated by the student to the satisfaction of instructors.

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

**REFERENCES:**

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

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## (A0091101) ENGINEERING PHYSICS & ENGINEERING CHEMISTRY LAB

### *ENGINEERING PHYSICS LAB*

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

| S.No | Name of the Experiment |
|---|---|
| 1. | Determination of wavelength of given source – spectrometer – normal incidence method |
| 2. | Dispersive power of the prism – Spectrometer |
| 3. | Determination of wavelength of a laser source - Diffraction Grating |
| 4. | Determination of particle size by using a laser source |
| 5. | Determination of thickness of a thin wire using parallel fringes |
| 6. | Newton's Rings |
| 7. | Magnetic field along the axis of a current carrying coil – Stewart and Gee's method |
| 8. | Numerical aperture of an optical fiber |
| 9. | Hall Effect |
| 10. | B – H Curve |
| 11. | Energy gap of a material of p-n junction |
| 12. | Determination of rigidity modulus of a wire material – Torsional pendulum |
| 13. | Determination of dielectric constant |
| 14. | Verification of laws of stretched string – Sonometer |
| 15. | Melde's experiment – Transverse & Longitudinal modes |

Equipment required:

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

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## *ENGINEERING CHEMISTRY LAB*

| S.No | Name of the Experiment |
|---|---|
| 1) | Preparation of Standard Potassium Dichromate and Estimation of Ferrous Iron |
| 2) | Preparation of Standard Potassium Dichromate and Estimation of Copper, by Iodometry |
| 3) | Preparation of Standard EDTA solution and Estimation of Hardness of Water |
| 4) | Preparation of Standard EDTA and Estimation of Copper |
| 5) | Determination of Manganese in Steel and Iron in Cement |
| 6) | Determination of strength of the given Hydrochloric acid against standard sodium hydroxide solution by Conducto metric titration |
| 7) | Determination of viscosity of the oils through Redwood viscometer |
| 8) | Determination of calorific value of fuel using Bomb calorimeter |
| 9) | Estimation of dissolved oxygen |
| 10) | Determination of Eutectic Temperature of binary system (Urea – Benzoic Acid) |

**BOOKS:**

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

**Equipment Required:**

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

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**ELECTRONICS AND COMMUNICATION ENGINEERING**

I B.TECH. (REGULAR, 2010-11)

(Common to all Branches)

For Branches: E.C.E, E.E.E, E.I.E, C.S.E, I.T, M.E, C.E.

| P | C |
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| 3 | 3 |

## (A0092101) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

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

**Objectives:**

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

**SYLLABUS:**

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

- ♣ Introduction to the Sounds of English - Vowels, Diphthongs & Consonants.
- ♣ Introduction to Stress and Intonation.
- ♣ Situational Dialogues (giving directions etc.)
- ♣ Speaking on the mobiles and telephone conversation.
- ♣ Role Play.
- ♣ Oral Presentations- Prepared and Extempore.
- ♣ 'Just A Minute' Sessions (JAM).
- ♣ Describing Objects / Situations / People.
- ♣ Information Transfer.
- ♣ Debate

**Minimum Requirement:**

**The English Language Lab shall have two parts:**

i) **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.

ii) **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo –audio & video system and camcorder etc.

**System Requirement (Hardware component):**

*Computer network with Lan with minimum 60 multimedia systems with the following specifications:*

- ♣ P – IV Processor
- ♣ Speed – 2.8 GHZ
- ♣ RAM – 512 MB Minimum
- ♣ Hard Disk – 80 GB
- ♣ Headphones of High quality

**PRESCRIBED SOFTWARE: GLOBARENA**

**Suggested Software:**

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

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

**DISTRIBUTION AND WEIGHTAGE OF MARKS**

***English Language Laboratory Practical Paper:***

- The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
- For the Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional 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 same institution.

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**ELECTRONICS AND COMMUNICATION ENGINEERING**

**II B.Tech, I-Sem (ECE)** **T C**
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## (A0008103) MATHEMATICS – III

**(Common to ECE, EEE, EIE)**

OBJECTIVES:

- Beta And Gamma functions are used to solve some special integrals that are not able to by using general methods.
- The use of the concept complex analysis is to find the solution of the equations which does not have solution in real plane.
- The concept of complex analysis is widely used in space study, aero system, potential functions, fluid mechanics etc

**OUTCOMES:**

- Students will able to use Beta And Gamma functions to solve some special integrals that are not able to by using general methods.
- Students will able to use of the concept complex analysis is to find the solution of the equations which does not have solution in real plane.
- Students will able to use the concept of complex analysis is widely used in space study, aero system, potential functions, fluid mechanics etc.

**UNIT - I**

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

Elementary functions: Exponential, trigonometric, hyperbolic functions and their properties-General power $Z^c$ (c is complex), principal value.

**UNIT-II**

Complex integration: Line integral-evaluation along a path by indefinite integration-Cauchy's integral theorem-Cauchy's integral formula-Generalized integral formula.

**UNIT-III**

Complex power series: Radius of convergence-Expansion in Taylor's series, Maclaurin's series and Laurent series. Singular point-Isolated singular point-pole of order m-essential singularity.

**UNIT-IV**

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) $\int_0^{2\pi} f(\cos\theta, \sin\theta)\,d\theta$

c) $\int_{-\infty}^{\infty} e^{imx} f(x)\,dx$ d) integrals by indentation.

**UNIT-V**

Argument principle–Rouche's Theorem–determination of number of zeros of complex polynomials-Maximum Modulus principle-Fundamental theorem of Algebra, Liouville's Theorem.

**UNIT-VI**

Con formal mapping: Transformation by $e^z$, ln z ,$z^2$, $z^n$ (n positive integer)sin z,cosz, z + a/z, Translation, rotation, inversion and bilinear transformation–fixed -points-cross ratio-properties-invariance of circles and cross ratio–determination of bilinear transformation mapping 3 given point

**TEXT BOOKS:**

1) A Text book of Engineering Mathematics, Vol – III by T.K.V. Iyengar, B. Krishna Gandhi and others, S. Chand and company.
2) Higher Engineering Mathematics by B.S.Grewal, Khanna Publishers.
3) Engineering Mathematics by B.V. Ramana, Tata McGraw Hill.

**REFERENCES:**

1) Advanced Engineering Mathematics by Erwin Kreyszig - Wiley Publications.
2) Engineering Mathematics – III A by Dr.M.K. Venkat araman – The National Publishing co.
3) A text book of Engineering Mathematics by N.P.Bali, Iyengar – Lakshmi Publications (Pvt ltd)

**AUTONOMOUS**

**ELECTRONICS AND COMMUNICATION ENGINEERING**

II B.Tech, I-Sem (ECE) T C
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## (A0010103) ENVIRONMENTAL STUDIES

**(Common to ECE, EIE, CSE & IT)**

**OBJECTIVES:**

- To enhance the public awareness on natural resources.
- To understand biodiversity and its conservation.
- To understand Nuclear hazards and social issues.

**OUTCOMES:**

- Able to enhance the public awareness on natural resources.
- Able to avoid environmental pollutions and nuclear hazards.

**UNIT-I**

**INTRODUCTION OF ENVIRONMENTAL STUDIES-NATURAL RESOURCES**: Definition, The Global environment and its segments; Structure and composition of atmosphere, hydrosphere, lithosphere and biosphere Scope and Importance of Environmental Studies – Need for Public Awareness. Renewable and non-renewable resources – Natural resources and associated problems – Forest resources: Introduction –deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources :Introduction– Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Introduction, environmental effects of extracting and using mineral resources, case studies. Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. - Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

**UNIT – II**

**ECOSYSTEMS:** Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem:

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

**UNIT – III**

**BIODIVERSITY AND ITS CONSERVATION**: Introduction - Definition: genetic, species and ecosystem diversity. - Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a mega diversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts. - Endangered and endemic species of India - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

**UNIT – IV**

**ENVIRONMENTAL POLLUTION:** Definition, Cause, effects and control measures of:
Air Pollution.

a) Water pollution.
b) Soil pollution.
c) Marine pollution.
d) Noise pollution.
e) Thermal pollution.

**NUCLEAR HAZARDS**

**SOLID WASTE MANAGEMENT**: Causes, effects and control measures of urban and industrial wastes. - Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.

**UNIT–V**

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

**UNIT–VI**

**HUMAN POPULATION AND THE ENVIRONMENT**: Population growth, variation among nations. Population explosion - Family Welfare Programme. -Environment and human health. -Human Rights. -Value Education. -HIV/AIDS. ,Infectious deseases,-Tuber colossi,cancer,Water Borne Deseases-Malaria,Diheria - Women and Child Welfare. - Role of information Technology in Environment and human health. -Case Studies.

**TEXT BOOK:**

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.
3. A Basic Course in environmental Studies by S.Deswal and A.Deswal ,Dhanpat Rai & Co.

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## (A0401103) ELECTRONIC DEVICES AND CIRCUITS

**(Common to ECE, EEE, EIE & CSE)**

**OBJECTIVES:**

- To understand basic semiconductor devices construction and characteristics.
- To learn the design, working operation and analysis of Transistors and FETs..
- To understand the working operation of BJT and FET Amplifiers.

**OUTCOMES:**

- Students are able to understand basic semiconductor devices construction and characteristics.
- Students are able to learn the design, working operation and analysis of Transistors and FETs.
- Students are able to learn the design, working operation of BJT and FET Amplifiers

**UNIT- I: SEMICONDUCTOR DIODE CHARACTERISTICS:** PN junction Diode equation, VI characteristics of p-n diode, Static and Dynamic Resistances, Temperature dependence of VI characteristic, Diode equivalent circuits, Diode capacitances, Breakdown Mechanisms in Semi Conductor Diodes, Zener diode characteristics, Principle of operation and Characteristics of Tunnel Diode with the help of energy band diagrams, Varactar Diode, Schottky Barrier Diode, Thermistor.

**UNIT- II: RECTIFIERS, FILTERS AND REGULATORS:** PN junction as a Rectifier, Half wave rectifier, ripple factor, full wave rectifier, Bridge rectifier, Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L- □section filter, Π- section filter, comparison of various filter circuits□ in terms of ripple factors, Simple circuit of a regulator using Zener diode.

**UNIT- III: BJT TRANSISTORS:** Operation of BJT, Transistor as an amplifier, Junction transistor, Detailed study of currents in a transistor, Input and Output characteristics of transistor in CB, CE, and CC configurations, Relation between Alpha, Beta and Gamma.BJT specification, Transistor as an Amplifier, Principle of operation and characteristics of SCR.

**UNIT-IV: TRANSISTOR BIASING AND STABILISATION :** DC and AC Load lines, Operating point, Importance of Biasing, Fixed bias, Collector to Base, Voltage Divider bias, Bias stability, Stabilization factors, ($S$, $S'$, $S''$), Compensation techniques, (Compensation against variation in $V_{BE}$, $I_{co}$,) Thermal run away, Thermal stability in CE configuration.

**UNIT- V: FET TRANSISTORS**: operation and characteristics, Pinch-Off voltage, Small signal model of JFET, MOSFET characteristics (Enhancement and depletion mode), Symbols of MOSFET, Comparison of Transistors (BJT, FET, and MOSFET). Principle of operation and characteristics of UJT.

**UNIT-VI: BJT AND FET AMPLIFIERS:** Small signal low frequency transistor amplifier circuits, h-parameter representation of a transistor, Analysis of single stage transistor amplifier (CE, CB, and CC) using h-parameters: voltage gain, current gain, Input impedance and Output impedance. Comparison of transistor configurations in terms of $A_I$ , $R_i$ , $A_v$ , $R_o$, Small signal model of JFET, Analysis of single stage FET amplifier (CS, CG, and CD) using h-parameters

**TEXT BOOKS :**

1. Electronic Devices and Circuits – J.Millman, C.C.Halkias, and Satyabratha Jit Tata McGraw Hill, 2nd Ed., 2007.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, 9th Edition, 2006.
3. Electronic Devices and Circuits- David A. Bell, 5th Edition, 2008, Oxford University Press.

**REFERENCES :**

1. Electronic Devices and Circuits – T.F. Bogart Jr., J.S.Beasley and G.Rico, Pearson Education, 6th edition, 2004.
2. Principles of Electronic Circuits – S.G.Burns and P.R.Bond, Galgotia Publications, 2nd Edn.., 1998.
3. Microelectronics – Millman and Grabel, Tata McGraw Hill, 1988.
4. Electronic Devices and Circuits – Dr. K. Lal Kishore, B.S. Publications, 2nd Edition, 2005.
5. Electronic Devices and Circuits- Prof GS N Raju I K International Publishing House Pvt. Ltd 2006.

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## (A0402103) SIGNALS AND SYSTEMS

**(Common to ECE, EIE & EEE)**

OBJECTIVES:

- To help the students to mathematically analyze different types of signals and their associated systems.
- To make the students to mathematically analyze different types of Fourier series representation of different signals
- To make the students to mathematically analyze the Fourier transform, Laplace transforms Z–transform representation of different signals
- To make the students to mathematically analyze the transmission of signals through linear systems
- To analyze the Concepts of convolution and correlation of different signals
- To understand the concept of sampling.

**OUTCOMES:**

- Understand the concept of a frequency domain representation of a signal and basic concepts of bandwidth.
- Be able to compute the Fourier transform of common signals.
- Understand system response concepts in discrete time.
- Understand discrete-time frequency response.
- Be aware of issues related to sampling
- Have a basic understanding of the use of the FFT for analysis.
- Demonstrate ability to move between time domain and frequency domain (frequency response).
- Demonstrate understanding of signal space concepts, in particular Fourier series.

**UNIT-I**

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

**UNIT-II**

**REPRESENTATION OF SIGNALS USING FOURIER SERIES AND FOURIER TRANSFORMS:** Representation of Fourier series, Continuous time periodic signals, properties of Fourier series, Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Complex Fourier spectrum, Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Fourier transform of periodic signals, properties of Fourier transforms, Fourier transforms involving impulse function and unit step function.

**UNIT-III**

**SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS:** Linear system, impulse response, Impulse response of a linear system, Linear time invariant (LTI) system, Linear time variant (LTV) system, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, system bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and physical realization-The poly wiener criterion relationship between bandwidth and rise time.

**UNIT-IV**

**CONVOLUTION AND CORRELATION OF SIGNALS:** Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Convolution property of Fourier transforms. Cross correlation and auto correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Properties of convolution, 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, Partial fraction expansion, Inverse Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of L.T's relation between L.T's, and F.T. of a signal.

**UNIT-VI**

**SAMPLING THEOREM AND Z-TRANSFORM:** Representation of continuous time signals by its sample - Sampling theorem – Reconstruction of a Signal from its samples, aliasing – discrete time processing of continuous time signals, sampling of discretetime signals. Fundamental difference between continuous and discrete time signals, discrete time signal representation using complex exponential and sinusoidal components, Concept of Z- Transform of a discrete sequence. Distinction between Laplace, Fourier and Z transforms. Region of convergence in Z-Transform, constraints on ROC for various classes of signals, Inverse Z-transform, properties of Z-transforms.

**TEXT BOOKS:**

1. Signals, Systems & Communications - B.P. Lathi, BS Publications, 2003.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.

**REFERENCES:**

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.
5. Signals and Systems- S.C Goyal, Technical Publication

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## (A0403103) NETWORK ANALYSIS AND SYNTHESIS

**OBJECTIVES:**

- To understand various electrical circuit concepts..
- To understand the Network Topology & coupled circuits.
- To learn and analyze network theorem.
- To learn the synthesis of various networks.

**OUTCOMES:**

- Students become skilled in analysing various electrical circuits.
- Students can analyze various Network Topologies & coupled circuits.

**UNIT-I**

**INTRODUCTION TO ELECTRICAL CIRCUITS:** Circuit concept-R-L-C-parameters-voltage and current sources-independent and dependent sources-source transformation-voltage-current relationship for passive elements (for different input signals-square, ramp, saw tooth, triangular), R.M.S., Average values and form factor for different periodic wave forms, Kirchoff's laws-network reduction techniques-Series, parallel, series parallel, Star-to-delta, delta-to-star transformation.

**UNIT-II**

**NETWORK TOPOLOGY & COUPLED CIRCUITS:** Graph-Tree, Basic cut-set and Tie-set matrices for planar network–loop and nodal methods of networks with dependent & independent voltage and current sources-nodal analysis, mesh analysis, super node and super mesh for D.C.Excitations-duality & dual networks, Dot convention-coefficient of coupling-analysis of coupled circuits, Concept of self and mutual inductance.

**UNIT-III**

**RESONANCE, STEADY STATE AND TRANSIENT ANALYSIS:** Steady state analysis of i.e Parallel RL, RC, RLC & its power and power factor calculations, Resonance-Series, Parallel circuits, Concept of bandwidth and Q-factor, Transient Response of RL, RC Series, RLC Circuits for DC excitations, Initial Conditions, Solution using Differential Equations approach and Laplace Transform method (First and Second Order circuits).

**UNIT-IV**

**NETWORK THEOREMS:** Superposition, Thevenin's, Norton's Theorems. Maximum Power Transfer Theorem, Reciprocity Theorem, Compensation Theorem, Milliman's Theorem for DC and Sinusoidal excitations.

**UNIT-V**

**TWO PORT NETWORKS AND NETWORK FUNCTIONS:** Two port network parameters, Different types, Conversion of one to another, Reciprocity and symmetric conditions, Interconnection of two port networks in series, parallel and cascaded configurations, Image, Iterative impedance, Illustrative problems, Network functions, Terminal and terminal pairs, Driving point immittances, Transfer functions, Poles and zeros, Restrictions on pole and zero locations in S-plane, Time domain behavior from the pole and zero plot, procedure for finding network functions for general two terminal pair networks.

**UNIT-VI**

**SYNTHESIS OF NETWORKS:** Hurwirtz polynomial and its test, Burnes positive realness, Driving point immittances of positive real functions, Properties, Necessary and sufficient conditions for positive real functions and its applications, Properties of driving point impedance functions, Driving point synthesis, Synthesis of LC, RL, RC networks foster forms, cauer forms of networks.

**TEXT BOOKS:**

1. Engineering Circuits Analysis by William Hayt and Jack E.Kemmerly, McGraw Hill, 6th Edition.
2. Network Analysis by A.Sudhakar and Shyam Mohan, TATA McGraw Hill, 4th edition.
3. Network analysis by Umesh Sinha, Satya Prakasan publishers.
4. Electric Circuits by J.Edminister and M.Nahvi-Schuam Series, TATA McGraw Hill.

**REFERENCES:**

1. Network Analysis by M.E.Van Valkenberg, Pearson Education.
2. Electric Circuits by N.Srinivasulu, Reem Publications.
3. Network Analysis by N.C.Jagan and C.Lakshmi Narayana, B.S.Publications.

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## (A0404103) PROBABILITY THEORY AND STOCHASTIC PROCESSES

**OBJECTIVES:**

- To understand the Basic Concepts of Set Theory and Probability Theory
- To understand the concept of a Random Variables
- To understand some important operations that may be performed on a Random variable
- To understand the concept of Multiple Random Variables.
- To understand the operations that may be performed on Multiple Random variables.
- To understand the concept of Random Process and types of Random Processes.
- To understand the Temporal and Spectral characteristics of Random Processes.
- To understand the Temporal and Spectral characteristics of response of Linear System with random input.

**OUTCOMES:**

- This course use assigned readings, Lectures, and homework to enable the students to apply probability and stochastic processes and the mathematical techniques relating to random processes in the areas of signal processing, detection, estimation, and communication.
- Able to understand the Principles of random signals

**UNIT I**

**PROBABILITY:** Probability introduced through Sets and Relative Frequency: Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Mathematical Model of Experiments, Probability as a Relative Frequency, Joint Probability, Conditional Probability, Total Probability, Bayes' Theorem, Independent Events.

**UNIT II**

**THE RANDOM VARIABLE :** Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete and Continuous, Mixed Random Variable, Distribution and Density functions, Properties, Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh, Conditional Distribution, Methods of defining Conditioning Event, Conditional Density, Properties.

**UNIT III**

**OPERATION ON ONE RANDOM VARIABLE – EXPECTATION** : Introduction, Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Chebychev's Inequality, Characteristic Function, Moment Generating Function, Transformations of a Random Variable: Monotonic Transformations for a Continuous Random Variable, Nonmonotonic Transformations of Continuous Random Variable, Transformation of a Discrete Random Variable.

**UNIT IV**

**MULTIPLE RANDOM VARIABLES** : Vector Random Variables, Joint Distribution Function, Properties of Joint Distribution, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Conditional Distribution and Density – Interval conditioning, Statistical Independence, Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem.

**OPERATIONS ON MULTIPLE RANDOM VARIABLES:** Expected Value of a Function of Random Variables: Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case, Properties, Transformations of Multiple Random Variables, and Linear Transformations of Gaussian Random Variables.

**UNIT V**

**RANDOM PROCESSES – TEMPORAL CHARACTERISTICS:** The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, concept of Stationarity and Statistical Independence. First-Order Stationary Processes, Second- Order and Wide-Sense Stationarity, (N-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, Gaussian Random Processes, Poisson Random Process.

**UNIT VI**

**RANDOM PROCESSES – SPECTRAL CHARACTERISTICS:** The Power Density Spectrum and its Properties, Relationship between Power Spectrum and Autocorrelation Function, The Cross-Power Density Spectrum and its Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function.

**Linear Systems with Random Inputs:** Fundamentals of Linear System, Random Signal Response of Linear Systems– Convolution, Mean and Mean-squared Value of System Response, autocorrelation Function of Response, Cross-Correlation Functions of Input and Output, and Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Density Spectrums of Input and output.

**TEXT BOOKS:**

1. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, TMH, 4th Edition, 2001.
2. Probability, Random Variables and Stochastic Processes – Athanasios Papoulis and S. Unnikrishna Pillai, PHI, 4th Edition, 2002.

**REFERENCES:**

1. Communication Systems Analog & Digital – R.P. Singh and S.D. Sapre, TMH, 1995.
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. Signals, Systems & Communications - B.P. Lathi, B.S. Publications, 2003.

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**3 2**

## (A0007103) APTITUDE ARITHMETIC REASONING AND COMPREHENSION

**(Common to ECE, EEE & EIE)**

**OBJECTIVES:**

- To make the students ready to the recruitment drives.
- To raise the confidence of the students to face the written test of any Company.
- To train the students regarding employability skills.

**OUTCOMES:**

- Students becomes well trained for recruitment drives.
- Student become well trained to face the written test of any company.
- Students become well trained in employability skills

**UNIT I**

Numbers, Number Systems Simple Equations, Ratio, Proportion, Variation Quadratic Equations, Progressions Percentages.

**UNIT II**

Profit, Loss, Partnerships Averages, Mixtures & Allegations, Simple Interest, Compound Interest, Time and Work-Pipes, indices, surds, inequalities ,Cisterns Time and Distance Geometry and Menstruation.

**UNIT III**

Permutations & Combinations and Probability Data Interpretation & Data Sufficiency.

**UNIT IV**

Number & Letter Series, Analogies, Coding Decoding, Odd Man Out Blood Relations.

**UNIT V**

Direction Sense, Symbols and Notations Deductions & Connectives Clocks, Calendars Analytical

**UNIT VI**

Reasoning (Distribution+ Binary Logic + Puzzles) Cubes, Venn Diagrams Analytical Puzzles (Linear + Circular +Selections + Sequencing + Routes & Networks + Comparisons) and Non Verbal Reasoning

**REFERENCES:**

1. R.S.Agarwal " Quantitative Techniques" S.Chand Series
2. Shankuntala Devi " Techniques of Reasoning" S.Chand Series

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# (A0491103) ELECTRONIC DEVICES AND CIRCUITS LAB

**(Common to ECE, EEE, CSE & EIE)**

**OBJECTIVES:**

This Lab provides the students to get an electrical model for various semiconducter devices. Students can find and plot V_I characteristics of all semiconductor devices. Student learns the practical applications of the devices. They can learn and implement the concept of the feedback and frequency respo nse of the small signal amplifier

**OUTCOMES:**

Students able to learn electrical model for various semiconductor devices and learns the practical applications of the semiconductor devices

**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.
2. Identification, Specifications and Testing of Active Devices, Diodes, BJTs, Low power JFETs, MOSFETs, Power Transistors, LEDs, LCDs, SCR, UJT. Study and operation of
    - Multi-meters (Analog and Digital)
    - Function Generator
    - Regulated Power Supplies.
3. Study and Operation of CRO.

**(For Laboratory examination – Minimum of 10 experiments)**

1. Generating the Lissajious patterns and finding unknown frequency.
2. PN Junction diode characteristics.
3. Zener diode characteristics and Zener as a Regulator.
4. Transistor CB characteristics (Input and Output).
5. Transistor CE characteristics (Input and Output).
6. Rectifier without filters (Full wave & Half wave).
7. Rectifier with filters (Full wave & Half wave).
8. FET characteristics.
9. MOSFET characteristics.
10. SCR characteristics.
11. UJT characteristics.
12. Series and shunt regulators using transistors.

**Equipment required for Laboratories:**

| | | |
|---|---|---|
| 1. | Regulated Power supplies (RPS) | - 0-30v |
| 2. | CROs | - 0-20M Hz. |
| 3. | Function Generators | - 0-1 M Hz. |
| 4. | Multimeters | |
| 5. | Decade Resistance Boxes/Rheostats | |
| 6. | Decade Capacitance Boxes | |
| 7. | Micro Ammeters (Analog or Digital) | - 0-20 µA, 0-50µA, 0-100µA, 0-200µA |
| 8. | Voltmeters (Analog or Digital) | - 0-50V, 0-100V, 0-250V |
| 9. | Electronic Components | - Resistors, Capacitors, BJTs, LCDs, SCRs, UJTs, FETs, LEDs, MOSFETs,Diodes (Ge & Si type), Transistors (npn & pnp type) |

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## (A0492103) SIGNALS AND SYSTEMS SIMULATION LAB

**(Common to ECE, EIE & EEE)**

**OBJECTIVES:**

The main objective of the Lab is to give the introduction about all signals with the help of their charecteristics using matlab. This lab also deals with signal processing operation to understand various systems and simulate them using Matlab.

**OUTCOMES:**

Students can perform various signal processing operation on Matlab.

1. Basic operations on Matrices.
2. Generation of various signals and sequences (Periodic and aperiodic). Such as unit impulse, unit step, square, saw tooth, triangular, sinusoidal, ramp, sinc function.
3. Operation on signals and sequences such as addition, multiplication, scaling, shifting, folding, computation of energy and average power.
4. Finding the even and odd parts of signal or sequence and real imaginary parts of signals.
5. Convolution between signals and sequences.
6. Autocorrelation and cross correlation between signals and sequences.
7. Verification of linearity and time invariance properties of a given continuous/discrete system.
8. Computation of unit sample, unit step and sinusoidal responses of the given LTI system and verifying its physical realizability and stability properties.
9. Gibbs phenomenon.
10. Finding the Fourier transform of a given signal and plotting its magnitude and phase spectrum.
11. Waveform synthesis using Laplace Transform.
12. Locating zeros and poles and plotting the pole-zero maps in S-plane and Z-plane for the given transform functions.
13. Generation of Gaussian noise (real and complex), computation of its mean, M.S.Values and its skew, kurtosis and PSD, probability distribution function.
14. Sampling theorem verification.
15. Removal of noise by auto correlation/cross correlation in a given signal corrupted by noise.
16. Impulse response of a raised cosine filter.
17. Verification of Weiner-Khinchine relations.
18. Checking a Random process for stationary in wide sense.

**Using Licensed MATLAB of version 7.0 and above**

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## (A0493103) NETWORK ANALYSIS LABORATORY

**OBJECTIVES:**

- To understand various electrical circuit concepts..
- To understand the Network Topology & coupled circuits.
- To learn and analyze network theorem practically.
- To learn the synthesis of various networks.

**OUTCOMES:**

- Students become skilled in analysing various electrical circuits.
- Students can analyze various Network Topologies & coupled circuits and networks.

**PART-A**

1. Determine the total current for the Series and parallel resistive circuits using Pspice.
2. Calculate node voltages and branch currents for the given circuits.
3. For the series and parallel circuits determine the total impedance, phase angle, voltage across the parallel branches for the AC circuits.
4. Using Pspice determine the frequency at which the circuits resonance, also fine the voltage across the inductor, capacitor and Q factor of the given circuits.
5. Using Pspice calculates the effective inductance of the series and parallel coupled circuits.
6. Using Pspice find the complete expression the circuit when the switch is closed at t=0.
7. A series RLC circuits comprising R=10 Ω, L=0.5 H and C=1 μf is excited by a constant voltage source of 100 volts using Pspice obtain the expression for current.
8. Using Pspice find the Z, Y, transmission parameters for the given circuits.

**PART-B**

9. Verification of superposition & Reciprocity theorems.
10. Verification of maximum power transfer theorem. Verification on DC, Verification on AC with resistive and reactive loads.
11. Experimental determination of Thevenin's and Norton's equivalent circuits and verification by direct test.
12. Determination of two port network parameters – Z, Y parameters of the given network.

Note: Total ten experiments has to be conducted. Choosing 6 from Part-A & all in Part-B.

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**ELECTRONICS AND COMMUNICATION ENGINEERING**

**II B.Tech, II-Sem (ECE)** **T C**
**3+1* 4**

# (A0207104) CONTROL SYSTEMS

**(Common to ECE, EIE & EEE)**

**OBJECTIVES:**

- Be prepared to apply mathematics, established scientific and engineering knowledge, for the development and implementation of a broad range of electronic systems
- Be knowledgeable about current technologies and be prepared to adapt to technology advances and ensure professional growth through an appreciation for lifelong learning.
- Basic skill in methods of design and analysis across a broad range of electrical and computer engineering areas

**OUTCOMES:**

- An ability to apply knowledge of mathematics (like differential equations), and engineering.
- Ability to analyze and design closed loop control systems and open loop control systems and transfer function representation of the control system.
- Ability to analyze the all test signal responses for different ordered control systems.
- Ability to analyze the time response and frequency response by using different plots.
- Ability to analyze the stability in time/frequency domain by using different plots.

**UNIT I: INTRODUCTION**: Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Examples-Types of feedback control systems.
Mathematical modelling of Electrical & Mechanical (Translational & rotational) systems – Differential equations, Electrical analogous (F-V, F-I) of mechanical system-Use of Laplace transforms in control systems-Transfer function: Concepts, features-Transfer functions of above systems.

**UNIT II: BLOCK DIAGRAM & SIGNAL FLOW GRAPH REPRESENTATION:** Block diagram representation of electrical systems and reduction techniques-Signal flow graphs and reduction using mason's gain formula-Transfer function of DC servomotor, AC servomotor.

**UNIT-III: TIME RESPONSE ANALYSIS**: Definition & classification of time response-Standard test signals-Type & order of a system-Transient response of first order and second order systems for step input-Transient response specifications-Steady state response-Steady sate errors and error constants-Effects of PD, PI & PID controllers.

**UNIT IV: STABILITY ANALYSIS IN S-DOMAIN**: The concept of stability – Routh's stability criterion, special, special cases, advantages and limitations.
Root locus technique: The root locus concept, construction of root loci-Effects of adding poles and zero's to G(s) H(s) on the root loci.

**UNIT V: FREQUENCY RESPONSE ANALYSIS**: Introduction – Steady state response to sinusoidal input (frequency response) – Bode diagrams – Phase margin and gain margin – Stability analysis from bode plots – Determination of transfer function from Bode diagram.

**UNIT VI: POLAR AND NYQUIST PLOTS:** Polar plots – Nyquist plots – Stability analysis.

**TEXT BOOKS:**

1) Control systems – U.A. Bakshi & V.U.Bakshi, Technical publications, Pune.
2) Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International (P) Limited, 2nd edition.

**REFERENCES:**

1) Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., edition 1998.
2) Automatic Control Systems by B. C. Kuo, John wiley and son's, 2003.
3) Control Systems Engg. by NISE 3rd Edition – John wiley.

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# (A0209104) ELECTRICAL TECHNOLOGY

**(Common to ECE & EIE)**

**OBJECTIVES:**

- To learn about AC and DC machines and their working principle, construction, characteristics, operation, testing and application.
- To learn about the principle of measuring devices and construction of PMMC,MI meters

**OUTCOMES:**

- Student can able to testing the machines like load test, finding the efficiencies and regulation of open circuit and short circuit characteristics.
- Student can able to know the characteristics of open circuit and short circuit characteristics.

**UNIT –I**

**DC MACHINES:** Principle of operation of DC machine, EMF Equation, Types of Generators, magnetization and load Characteristics of DC Generators.-Numerical problems

DC Motor- Types of DC Motors- Characteristics of DC Motors- 3point starters for dc shunt motor-losses and efficiency-Swinburne's test, load test-speed control of DC shunt motor-Numerical problems.

**UNIT –II**

**TRANSFORMERS:** Principle of operation of Transformer-constructional features- Phasor Diagram on no load and load – equivalent circuit-losses, efficiency and regulation of a transformer, OC & SC tests on transformer-Numerical problems

**UNIT –III**

**THREE PHASE INDUCTION MOTOR:** Principle of operation of 3-phase Induction motor-slip ring and squirrel cage motors- slip torque characteristics-efficiency calculation-starting methods-speed control of induction motor- Numerical problems

**UNIT –IV**

**SINGLE PHASE INDUCTION MOTOR:** Principle of operation of 1-phase Induction motor- constructional features-shaded pole motors-capacitor motor-split phase motors-equivalent circuit

**UNIT –V**

**ALTERNATORS:** Constructional features- Principle of operation-types-EMF equation- distribution and coil span factors- pre determination of regulation by synchronous impedance method – OC & SC test- Numerical problems

**UNIT –VI**

**SPECIAL MACHINES:** Construction and principle of operation of DC, AC Servomotors- AC tachometers-Stepper Motors(variable reluctance, permanent magnet and hybrid types)- Synchros- Switched reluctance motor- universal motor- Applications.

**TEXT BOOKS:**

1. Principle of Electrical Engineering by V.K.Mehta, Rohith Mehta, S.Chand publications.
2. Generalized Theory of Electrical Machines by P.S.Bimbra, Khanna publication
3. Electrical Technology-volume II – B L Theraja- S. Chand.

**REFERENCE BOOKS**:

1. Electrical Machinery- J B Guptha- katsonbooks .
2. Electrical Machines – I J Nagrath and D P Kothari- PHI Publications.

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## (A0405103) EM WAVES AND TRANSMISSION LINES

**OBJECTIVES:**

- To provide the basic skills required to understand, develop, and design various engineering applications involving electromagnetic fields.
- To lay the foundations of electromagnetism and its practice in modern communications such as wireless, guided wave principles such as fiber optics and electronic electromagnetic structures including those on the sub-micron scale.
- To provide basic laboratory exposure to electromagnetic principles and applications

**OUTCOMES:**

- Knowledge of basic wave propagation: To be able to discuss and deduce equations to describe wave propagation, to relate wave velocity and time delay, and to be able to formulate potential concepts to relate wave properties and their excitation. And should be able to specify the "constitutive relationships" for fields and understand why they are required.
- Have the ability to apply complex phasors (Fourier) to fields for sinusoidal waves.
- To have acquired knowledge of transmission lines for pulsed and sinusoidal steady state excitation; to have an understanding of wave interference and resonance on transmission lines; to be able to quantitatively deduce capacitive and inductive responses to pulsed excitation.
- To have acquired techniques for the measurement of basic transmission line parameters, such as the reflection coefficient, standing wave ratio, and impedance. Understanding of the Smith chart, its application to matching, and experimental verification.
- Have an ability to determine and describe static and dynamic electric and magnetic fields for technologically important structures: the coil, charge distributions, the dipole, the coaxial cable, dielectric and conducting spheres immersed in electric fields, and the depletion region of a p-n junction. Knowledge of, physical interpretation, and ability to apply Maxwell's equations to determine field waves, potential waves, energy and charge conservation conditions.
- Experimental measurement of voltages induced by time varying magnetic flux. Flux determination**.** A knowledge of and experimental measurement of the influence of boundaries on waves. Thus, knowledge of and the application of boundary conditions for fields, Brewster's angle to eliminate reflections and polarize radiation, total reflection from a boundary, evanescent fields, and some knowledge of their application to modern optics.
- Basic concept of the guiding of electromagnetic waves by constructive multiple reflections from conductors and dielectrics. Have some knowledge of cut-off, dispersion, and why no dispersive TEM waves in ideal coaxial lines and fibers are so useful. Some ability to use numerical techniques such as Mat lab and perhaps finite elements to solve and visualize electromagnetic.

**UNIT I**

**Review of Coordinate Systems, Vector Calculus:**

**Static Electric Fields :** 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 Two Equations for Electrostatic Fields, Energy Density, Continuity Equation, Poisson's and Laplace's Equations, Related Problems.

**UNIT II**

**Static Magnetic Fields:** Biot-Savart Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Ampere's Force Law, Related Problems.

**UNIT III**

**Time Varying EM Fields:** Faraday's Law of induction, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements. Conditions at a Boundary Surface : Dielectric-Dielectric and Dielectric-Conductor Interfaces, Poynting Theorem, Related Problems.

**UNIT IV**

**EM Wave Propagation :** Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, Relations Between E & H. Sinusoidal Variations. Wave Propagtion in Lossless and Conducting Media. Conductors & Dielectrics – Characterization, Wave Propagation in Good Conductors and Good Dielectrics. Polarization. Related Problems

**UNIT V**

**Guided Waves :** Parallel Plane Waveguides Introduction, Transverse Electric waves(TE), Transverse Magnetic waves(TM), TEM Modes – Concepts, expressions and Analysis, Cut-off Frequencies, Velocities, Wavelengths, Related Problems.

**UNIT VI**

**Transmission Lines :** Types, Equivalent Electrical circuits, Transmission Line Equations, Primary & Secondary Constants, Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line, Distortion – Distortionless and minimum attenuation condition, Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR. UHF Lines as Circuit Elements; λ/4, λ /2, λ /8 Lines. Related Problems.

**TEXT BOOKS:**

1. Elements of Electromagnetics – Matthew N.O. Sadiku, Oxford Univ. Press, 3rd ed., 2001.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd Edition, 2000.
3. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, TMH, 7th ed., 2006.
4. Electromagnetic Field Theory and Transmission Lines – G.S.N. Raju, Pearson Edn. Pte. Ltd., 2005.
5. Transmission Lines and Networks – Umesh Sinha, Satya Prakashan (Tech. India Publications), New Delhi, 2001.

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## (A0407104) ELECTRONIC CIRCUIT ANALYSIS

**(COMMON TO ECE & EIE)**

**OBJECTIVES:**

- Analysis of junction transistor and multistage amplifiers.
- Help students make transition from analysis of electronic circuits to design of electronic circuits. Equip students with a number of specific.
- Techniques that speed up design and analysis. Teach students a structured approach to the design problem.
- To understand the Analysis of transistor at high frequencies.
- Describe the various classes of their efficiencies power amplifiers
- To understand the concept of designing of tuned amplifier.
- The student will construct and analyze voltage regulator circuits.
- To understand the circuit configuration and the principle operation of converters, including diode rectifiers, controlled AC-DC converters and DC choppers

**OUTCOMES:**

- The ability to analyze and design single and multistage amplifiers at low, mid and high frequencies.
- Designing and analyzing the transistor at high frequencies.
- Determine the efficiencies of power amplifiers.
- Determine Frequency response and design of tuned amplifiers.
- Ability to design different types of regulators like switching and IC regulators

**UNIT-1**

**MULTI STAGE AMPLIFIERS:** Review of Small Signal Analysis of Transistors, Millers Theorem, Different Coupling Methods used in Amplifiers-RC, Direct, Transformer coupled Amplifiers. Analysis of Cascaded RC Coupled amplifiers. High Input Resistance Transistor Circuits. Cascode Transistor Configuration, CE-CC Amplifiers. Two Stage RC Coupled JFET amplifier (in Common Source (CS) configuration), Difference Amplifier

**UNIT-2**

**HIGH FREQUENCY TRANSISTOR CIRCUTS:** Transistor at High Frequencies, Hybrid-□π Common Emitter Transistor Model, Determination of Hybrid- π Parameters, Variation of Hybrid Parameters with |IC|, |VCE| and Temperature. The Hybrid-π CE Short Circuit Current Gain, CE Current Gain with Resistance Load, Gain Band width product, Design of High frequency Amplifier. Frequency Effects, Amplifier Analysis.

**UNIT-3**

**FEEDBACK AMPLIFIERS:** Concept of feedback, Classification of feedback amplifiers, General characteristics of negative feedback amplifiers, Effect of Feedback on Amplifier characteristics, Voltage series, voltage shunt, current series, and current shunt feedback amplifiers with discrete components and their analysis,

**UNIT-4**

**OSCILLATORS:** Condition for Oscillations. RC and LC type Phase Shift oscillators. Hartley and Colpitts oscillators, Wein bridge oscillator, Crystal oscillators, Frequency and amplitude stability of Oscillators.

**UNIT-5**

**LARGE SIGNAL AMPLIFIERS:** Importance of Power Amplifiers, Types of Power amplifiers, Class A Power Amplifier, Maximum Efficiency of Class A Amplifier, Transformer Coupled Audio Amplifier, Types of Distortions in amplifiers, Push Pull Amplifier (Class A, Class B), Complimentary Symmetry , Phase Inverters, Class D Operation, Class S Operation, Heat Sinks.

**UNIT-6**

**TUNED AMPLIFIERS:** Introduction, Q-Factor, Small Signal Tuned Capacitive Coupled, Tapped Single Tuned Capacitance Coupled Amplifier, Single Tuned Transformer Coupled Amplifier, Effect of Double Tuned CE Amplifier, Application of Tuned Amplifiers. Synchronous Tuning, Stagger Tuning, Stability of Tuned Amplifiers.

**TEXT BOOKS :**

1. Integrated Electronics – J. Millman and C.C. Halkias, Mc Graw-Hill, 1972.
2. Electronic Devices and Circuits, Theodore F. Bogart Jr., J.S. Beasley and G. Rico, Pearson Edition, 6th Edition, 2004.

**REFERENCES :**

1. Electronic Devices and Circuits Theory – Robert L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall,9th Edition,2006.
2. Micro Electronic Circuits – Sedra A.S. and K.C. Smith, Oxford University Press, 5th ed.
3. Micro Electronic Circuits: Analysis and Design – M.H. Rashid, Thomson PWS Publ., 1999.
4. Principles of Electronic Circuits – S.G.Burns and P.R.Bond, Galgotia Publications, 2nd Edn.., 1998.
5. Electronic Circuit Analysis and Design – Donald A. Neaman, Mc Graw Hill.
6. Electronic Circuit Analysis – K. Lal Kishore, BS Publications, 2004.

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## (A0408104) PULSE AND DIGITAL CIRCUITS

**(Common to ECE & EIE)**

**OBJECTIVES:**

- This course describes active and passive devices, and circuit configurations used for the generation and processing of pulse, digital and switching waveforms. These non-sinusoidal signals find extensive applications in such fields as computers, control systems, counting and timing systems, data processing systems, digital instrumentation, pulse communications, radar telemetry, television and in many areas of experimental research.
- This course presents a thorough study of the following basic circuits and techniques: Transmission networks like differentiator and integrator. These include how pulse type signals are transmitted, shaped or amplified by linear circuits. Clippers, Comparators, Clampers, the transistor as switch, switching timings, different multi-vibrators and time-base generators.
- This course presents Synchronization and synchronization with frequency division, sampling gates, basic logic gates and logic families

**OUTCOMES:**

- To learn about Different types of non-sinusoidal signals.
- To learn about How to generate and processing of non-sinusoidal signals.
- To learn about Limiting and storage circuits and their applications.
- To learn about Different synchronization techniques, basics of different sampling gates and their uses.
- To learn about Basics of digital logic families.

**UNIT I: LINEAR WAVE SHAPING:** High-pass, Low-pass RC circuits, their response for sinusoidal, step, pulse, square and ramp inputs. RC network as differentiator and integrator, attenuators, its applications in CRO probe, RL and RLC circuits and their response for step input.

**UNIT II: NON-LINEAR WAVE SHAPING :** Diode clippers, Transistor clippers, clipping at two independent levels, Transfer characteristics of clippers, Emitter coupled clipper, Comparators, applications of voltage comparators, clamping operation, Different clamping Circuits, Clamping circuit theorem.

**UNIT III: MULTI VIBRATOR CIRCUITS:** Diode as a switch, Piecewise linear diode characteristics, Diode Switching times, Transistor as a switch, Designing of transistor switch, Transistor-switching times, Analysis and design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger circuit using BJT.

**UNIT IV: TIME BASE GENERATORS :** General features of a time base signal, methods of generating time base waveform, Miller and Bootstrap time base generators – basic principles, Transistor miller time base generator, Transistor Bootstrap time base generator.

**UNIT V: SAMPLING GATES AND SYNCHRONIZATION:** Basic operating principles of sampling gates. Pulse Synchronization of relaxation devices.

**UNIT VI: REALIZATION OF LOGIC GATES USING DIODES & TRANSISTORS:** AND, OR & NOT gates using Diodes and Transistors, DCTL, RTL, DTL, TTL and CMOS Logic Families, and comparison between the logic families.

**TEXT BOOKS:**

1. Pulse, Digital and Switching Waveforms – Jacob Millman and Herbert 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.
4. Pulse and Digital Electronics – G.K.Mithal

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**ELECTRONICS AND COMMUNICATION ENGINEERING**

**II B.Tech, II-Sem (ECE)** **T C**
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## (A0409104) SWITCHING THEORY AND LOGIC DESIGN

**(Common to ECE & EIE)**

**OBJECTIVES:**

- Understand the different number system, its conversions and binary arithmetic.
- Know the fundamentals of Boolean algebra and theorems, Karnaugh maps including the minimization of logic functions to SOP or POS form.
- Analysis of logic circuits and optimization techniques to minimize gate count, signals, IC count, or time delay.
- To strengthen the principles of logic design and use of simple memory devices, flip-flops, and sequential circuits.
- To fortify the documentation standards for logic designs, standard sequential devices, including counters and registers.
- To understand the logic design of programmable devices, including PLDs, RAMS, and ROMS including its sequencing and control.

**OUTCOMES:**

- Ability to differentiate between analog and digital representations.
- Ability to convert a number from one number system to its equivalent in of the other number system.
- Cite the advantages of the octal and hexa decimal number systems and to understand the difference between BCD and straight binary.
- Ability to Perform the three basic logic operations and construct the truth tables for the different types of gates. And Implement logic circuits using basic AND, OR and NOT gates.
- Ability to Use De-Morgan's theorem to simplify logic expressions and describe the concept of active LOW and active HIGH logic signals and Use Boolean algebra and K-map as tool to simplify and design logic circuits and Design simple logic circuits without the help of truth tables.
- Ability to Construct and analyze the operation of flip-flop and Troubleshoot various types of flip-flop circuits.

**UNIT-I**

**NUMBER SYSTEMS, CODES AND BOOLEAN ALGEBRA:** Philosophy of number systems – complement representation of Negative numbers, Binary arithmetic, Binary codes, Error Detecting &Error Correcting codes, Hamming codes. Fundamental postulates of Boolean algebra, Basic theorems and properties.

**UNIT-II**

**SWITCHING FUNCTIONS AND IT'S MINIMIZATION:** Switching functions, Canonical and standard forms, Algebraic simplification Digital Logic Gates, properties of XOR gates, Universal Gates ,Multilevel NAND/NOR realizations. K-map method, Prime Implicants, Don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime - Implicant chart, simplification rules.

**UNIT-III**

**COMBINATIONAL LOGIC DESIGN:** Design using conventional logic Gates, Encoder, Decoder, Multiplexer, De-Multiplexer, MUX realization of Switching functions ,Parity bit generator, Code-converters, Hazards and Hazards free realization.

**UNIT-IV**

**PROGRAMABLE LOGIC DEVICES, THRESHOLD LOGIC:** Basic PLD's-ROM, PROM, PLA, PAL Realization of switching function using PLD's. Capabilities and limitations of Threshold gate, Synthesis of Threshold functions, Multigate synthesis.

**UNIT-V**

**SEQUENTIAL CIRCUITS:** Classification of sequential circuits, Basic Flip-Flops, Excitation and Characteristic Tables. Steps in Synchronous Sequential circuit design. Design of modulo-N counters, Ring and Johnson counters, Universal shift register, Serial Binary adder, Sequence Detector. FSM-capabilities and Limitations, Mealy and Moore models, Minimization of completely specified and incompletely specified Sequential Machines.

**UNIT-VI**

**ALGOROTHIMIC STATE MACHINES:** Salient features of the ASM chart, simple examples, System design using data path and control subsystems, Control Implementations, Examples of Weighing Machine and Binary multiplier.

**TEXTBOOKS:**

1. Switching & Finite Automata theory- Zvi Kohavi, TMH,2nd Edition.
2. Digital Design-Morries Mano, PHI, 3rd Edition,2006.
3. Switching Theory and Logic design-A. Anand Kumar,2008.

**REFERENCES:**

1. An Engineering Approach to Digital Design-Fletcher, PHI.
2. Fundamentals of Logic Design-Charles H.Roth.5th Edition, 2004, Thomson publications.
3. Digital Logic Applications and Design-John M.Yarbrough, 2006, Thomson Publications.

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## (A0009103) CORPORATE MANAGEMENT SKILLS

**(AUDIT COURSE)**

**(Common to ECE, EEE & EIE)**

**OBJECTIVES:**

- To improve the communication skills of the students.
- To raise the confidence of the students with respect to the inter-personal communication.
- To make them to habituate to the Team culture and Team Work.
- To ensure the students to take up the challenges of Group Discussion and Personal Interview.
- To improve the overall personality of the students.

**OUTCOMES:**

- Able to improve the communication skills.
- Able to obtain the confidence of students with respect to the inter-personal communication.
- Able to cultivate the Team culture and Team Work.
- Able to take the challenges of Group Discussion and Personal Interview.

**UNIT I**

**Concept of Communication** – Significance, Scope and functions of Business Communication – Process and dimensions of communication – Essentials of good communication – Channels of communication – Formal, informal communication – Upward, Downward, Horizontal communication – Grapevine Phenomenon.

**UNIT II**

**Types of communication**: **Verbal – Oral Communication:** Advantages and limitations of oral communication, written communication – Characteristics, significance, advantages & Limitations of written communication.

**UNIT III**

**Non verbal Communication:** Sign language – Body language – Kinesics – Proxemics – Time language and Hap tics: Touch language.

**UNIT IV**

**Interpersonal communication** – Interpersonal communication – Communication models: Exchange theory – Johari window – Transactional analysis, Communication styles.

**UNIT V**

**Managing Motivation** to Influence Interpersonal communication – Inter-personal perception – Role of emotion in inter personal communication.

**UNIT VI**

**Barriers to communication**: Types of barriers – Technological – Socio-Psychological barriers – Overcoming barriers. Listening – Types of listening – Tips for effective listening..

**REFERENCES:**


1. Business Communication, Meenakshi Raman, Oxford University Press.
2. Business Communication, Raymond V.Lesikar, Neeraja Pandit et al.,TMH
3. English for Business Communication, Dr.T.M Farhatulla, Prism books Pvt. Ltd.
4. Business Communications,Hudson,5/e,Jaico Publications
5. Business communication for managers, Penrose, Raspbery, Myers, Cengage
6. The Skills of Communication, Bills Scot, Gower publishing company Limited, London.
7. Effective Communication, Harward Business School, Harward Business Review No.1214.
8. Essentials of Business Communication, Rajendra Pal, JS.Korlahhi, S.Chand

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# (A0494104) ELECTRONIC CIRCUIT ANALYSIS LAB

**(Common to ECE & EIE)**

## OBJECTIVES

- Help students make transition from analysis of electronic circuits to design of electronic circuits.
- To understand the Analysis of transistor at high frequencies.
- To understand the concept of designing of tuned amplifier.
- The student will construct and analyze voltage regulator circuits.
- To understand the circuit configuration and the principle operation of converters, including diode rectifiers, controlled AC-DC converters and DC choppers

## OUTCOMES:

- The ability to analyze and design single and multistage amplifiers at low, mid and high frequencies.
- Designing and analyzing the transistor at high frequencies.
- Determine the efficiencies of power amplifiers.
- Determine Frequency response and design of tuned amplifiers.
- Able to Analyze all the circuits using simulation software and Hardware.

**I) Design and Simulation in Simulation Laboratory using Multisim OR Pspice OR Equivalent Simulation Software.**

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

**II) Testing in the Hardware Laboratory**

A) Any Three circuits simulated in Simulation laboratory

B) Any Three of the following

1. Class A Power Amplifier (with transformer load)
2. Class B Power Amplifier
3. Single Tuned Voltage Amplifier
4. RC Phase Shift Oscillator
5. Wien Bridge Oscillator
6. Crystal Oscillator

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## (A0495104) PULSE AND DIGITAL CIRCUITS LAB

**(Common to ECE & EIE)**

**OBJECTIVES:**

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

**OUTCOMES:**

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

### Minimum Ten experiments to be conducted:

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers.
3. Non Linear wave shaping – Clampers.
4. Transistor as a switch.
5. Study of Logic Gates & Some applications.
6. Study of Flip-Flops & some applications.
7. Sampling Gates.
8. Astable Multivibrator.
9. Monostable Multivibrator.
10. Bistable Multivibrator.
11. Schmitt Trigger.
12. UJT Relaxation Oscillator.
13. Bootstrap sweep circuit.

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## (A0297104) ELECTRICAL TECHNOLOGY LAB

**(Common to ECE & EIE)**

**OBJECTIVES:**

- To learn about AC and DC machines and their working principle, construction, characteristics, operation, testing and application.
- To learn about the principle of measuring devices and construction of PMMC,MI meters

**OUTCOMES:**

- Student can able to testing the machines like load test, finding the efficiencies and regulation of open circuit and short circuit characteristics.
- Student can able to know the characteristics of open circuit and short circuit characteristics.

1. OCC test on dc generator.
2. Load Test on DC shunt motor.
3. Load test on DC series motor.
4. Swinburne's test on DC Shunt motor.
5. Speed control of DC Shunt motor by Armature control method.
6. Speed control of DC Shunt motor by Field control method.
7. OC & SC test on 1 phase Transformer (Efficiency)
8. OC & SC test on of 1 phase Transformer (regulation)
9. Load test on 3-phase Induction motor
10. Equivalent circuit of Single phase Induction motor.
11. Regulation of Alternator by using Synchronous Impedance methods.
12. Characteristics of Synchro.

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**III B.Tech, I-Sem (ECE)** **T C**
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## (A0410105) ANALOG COMMUNICATIONS

**OBJECTIVES:**

- To develop a fundamental understanding of the communication systems.
- Signal modulation techniques will be emphasized.
- Different types of analog techniques (amplitude modulation, frequency modulation) and the basics of Digital Communications (sampling, PAM, PWM, PPM) will be considered.
- Modulation techniques will be analyzed both on the basis of spectral characteristics and performance in random noise.
- Examples of practical communication systems will be presented.

**OUTCOMES:**

- Ability to design Analog communication systems to meet desired needs.
- Ability to evaluate fundamental communication system parameters, such as bandwidth, power, signal to quantization noise ration, and data rate.
- Apply knowledge of mathematics, science and engineering in the design of analog communication circuits and systems.
- Design and conduct experiments for testing analog communication circuits and systems.
- Design analog communication circuits and systems to meet predefined specifications.
- Identify, formulate and solve analog communication circuits and systems problems.

**UNIT I**

**INTRODUCTION TO COMMUNICATION SYSTEMS**: Communication process, Elements of Communication Systems; Modulation: Need for Modulation, Forms of Modulation: AM, FM, PM, Advantages, Disadvantages and Applications.

**UNIT II**

**AMPLITUDE MODULATION AND DEMODULATION**: Introduction, Mathematical Representation of AM, Modulation Factors, Percentage of Modulation, Power Relationships, Virtues and Limitations of AM.
DSB AM: Analog Message Conventions, AM Signals and Spectra, DSB signals and spectra.
SSB AM: SSB Signals and Spectra, SSB generation, VSB Generation, Demodulation of AM, Square law detector.

**UNIT III**

**FREQUENCY, PHASE MODULATION AND DEMODULATION**: FM: Introduction, Mathematical Representation of FM, Modulation Index, Deviation Sensitivity, Deviation Ratio, Bandwidth of FM (Carson's rule), Narrow band FM, Wide band FM, Voltage and Power for FM, Pre-emphasis and De-emphasis, Illustrative Problems.

PM: Introduction, Narrow Band PM, Phase Modulation and Indirect FM; FM demodulators, Slope detector, Balanced slope discriminators, Phase difference discriminators, Ratio detector, PLL Detectors, Distortion and Transmission estimates.

**UNIT IV**

**TRANSMITTERS AND RECEIVERS:** AM Transmitters: Balanced Modulator, Square Law Modulator, and Product Modulator.
**Receivers**: Super Heterodyne Receiver, Double Conversion Receiver and Independent Sideband Receiver.FM Transmitters: Direct FM and VCO's, Mixer, Divider, Multiplier. Receivers: Local Oscillator, Slope Detector, Phase Locked Loop, Introduction to IC 565 applications, FM demodulator.

**UNIT V**

**NOISE IN ANALOG COMMUNICATION SYSTEMS:** Introduction, Noise in Baseband Systems, System Model and Parameter, SNR at the output of a Base band System.
Noise in AM systems: System model and parameter, Noise in DSB and SSB Systems.

Noise in Angle modulation Systems: Output SNR in Angle Modulation, Threshold effects in Angle Modulation Systems.

Improvement of SNR using Pre-emphasis and De-emphasis, Comparison of Continuous Wave Modulation.

**UNIT VI**

**PULSE MODULATION TECHNIQUES**: Definition, Types: PAM, PWM, PPM, Sampling, Nyquist rate, Flat top sampling, Generation and Detection of PAM, PWM, PPM.

**TEXT BOOKS:**

1. A.Bruce Carlson, & Paul B. Crilly, "Communication Systems – An Introduction to Signals & Noise in Electrical Communication", McGraw-Hill International Edition, 5th Edition, 2010.
2. "Electronic Communications systems" Modulation and Transmission-Robert Schoenbeck, UBS Publications, New Delhi.

**REFERENCES:**

1. Simon Haykin, "Communication Systems", Wiley-India edition, 3rd edition, 2010
2. Sham Shanmugam, "Digital and Analog Communication Systems", Wiley-India edition, 2006.
3. B.P. Lathi, & Zhi Ding, "Modern Digital & Analog Communication Systems", Oxford University Press, International 4th edition, 2010.
4. Linear Integrated Circuits – D. Roy Chowdhury, New Age International (p) Ltd, 2nd Edition, 2003.

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## (A0013105) MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTING

**OBJECTIVES**

- To understand the principles of and techniques of managerial economics.
- To understand the business organizations.
- To understand the financial accounting and analysis.
- To understand maintain a particular product at the lowest cost while meeting the specifications of the customer

**OUTCOMES:**

- Students will able to analyze the demand in the present market.
- Students will able to how to precise the production cost.
- Students will able to know the price output decisions are made in markets.
- Students will able to maintain the books by using the financial accounting

**UNIT I: INTRODUCTION TO MANAGERIAL ECONOMICS**: Definition, Nature and Scope of Managerial Economics–Demand Analysis: Demand Determinants, Law of Demand and its exceptions.

**UNIT II: ELASTICITY OF DEMAND**: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting).

**UNIT III: BUSINESS & NEW ECONOMIC ENVIRONMENT**: Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Changing Business Environment in Post-liberalization scenario.

**UNIT IV: CAPITAL AND CAPITAL BUDGETING**: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance.
Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

**UNIT V: INTRODUCTION TO FINANCIAL ACCOUNTING**: Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

**UNIT VI: FINANCIAL ANALYSIS THROUGH RATIOS**: Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt- Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS).

**TEXT BOOKS:**

1. Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH, 2005.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2003.

**REFERENCES:**

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 4th Ed.
3. Suma Damodaran, Managerial Economics, Oxford University Press.
4. Lipsey & Chrystel, Economics, Oxford University Press.
5. S. A. Siddiqui & A. S. Siddiqui, Managerial Economics & Financial Analysis, New age International Space Publications.
6. Domnick Salvatore: Managerial Economics In a Global Economy, 4th Edition, Thomson.
7. Narayanaswamy: Financial Accounting—A Managerial Perspective, PHI.
8. Raghunatha Reddy & Narasimhachary: Managerial Economics& Financial Analysis, Scitech.
9. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas.
10. Truet and Truet: Managerial Economics:Analysis, Problems and Cases, Wiley.
11. Dwivedi:Managerial Economics, 6th Ed., Vikas.

Codes/Tables: Present Value Tables need to be permitted into the examinations Hall.

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## (A0440105) ANTENNAS AND WAVE PROPAGATION

**OBJECTIVES:**

- Fundamentals of electromagnetic radiation: Maxwell's equations, potential functions, wave equation, retarded potential, short current element, near and far fields, Poynting's theorem.
- Introduction ,Design issues, Examples of typical antennas.
- Basic antenna parameters: radiated power, radiation resistance, radiation efficiency,
- Input impedance, radiation pattern, directivity and gain.
- Design of simple wire antennas: linear dipole, λ/2-dipole, folded dipole, monopoles.
- Design of antenna arrays: principle of pattern multiplication, broadside and end fire arrays, array synthesis, coupling effects and mutual impedance, parasitic elements, Yagi-Uda antenna.
- Understood the different bands of the frequency spectrum and how do they relate to each other when designing and building antennas.
- Design of aperture-type antennas: rectangular aperture, circular aperture, horn antenna, reflector antennas, microstrip patch antennas.
- Transmit-receive system: Friis transmission formula
- Radio-wave propagation: ground effects, reflections, diffraction, scattering, multipath propagation, fading.

**OUTCOMES:**

- Able to understand Fundamentals of electromagnetic radiation: Maxwell's equations, potential functions, wave equation, retarded potential, short current element, near and far fields, Poynting's theorem.
- Able to understand Design issues, Examples of typical antennas.
- Basic antenna parameters: radiated power, radiation resistance, radiation efficiency.
- Able to analyze Input impedance, radiation pattern, directivity and gain, linear dipole, λ/2-dipole, folded dipole, monopoles, principle of pattern multiplication, broadside and end fire.
- Understood the different bands of the frequency spectrum and how do they relate to each other when designing and building antennas.
- Able to Design of aperture-type antennas: rectangular aperture, circular aperture, horn antenna, reflector antennas, micro strip patch antennas.
- Transmit-receive system: Friis transmission formula.
- Radio-wave propagation: ground effects, reflections, diffraction, scattering, multipath propagation, fading

**UNIT I**

**ANTENNA FUNDAMENTALS**: Introduction, Radiation Mechanism – single wire, Two-wire, Current Distribution on a thin wire antenna of different lengths. Antenna Parameters - Radiation Patterns, Patterns in Principal Planes, Main Lobe and Side Lobes, Beam width, Beam Area, Radiation Intensity, Radiation resistance, Beam Efficiency, Directivity, Gain and Resolution, Antenna Apertures, Aperture Efficiency, Effective Height. Near-field and Far-field regions.

**UNIT II**

**BASIC ANTENNA ELEMENTS**: Retarded Potentials (Vector and Scalar Descriptions), Hertzian Dipole, Half-wave Dipole, Quarter-wave Monopole; Current Distribution, Evaluation of Field Components, Expression for Radiated Power and antenna parameters for Alternating Current-carrying Element, Half-wave Dipole and Quarter-wave Monopole; Small Loop Antenna, Comparison between Loop Antenna and Dipole, Illustrative problems.

**UNIT III**

**ANTENNA ARRAYS**: Introduction to Antenna Arrays, Purpose of antenna arrays; N-element Uniform Linear Arrays – Broadside Arrays (BSA), End-fire Arrays (EFA), Derivation of their characteristics, EFA with Increased Directivity, Comparison of BSA and EFA. Principle of Pattern Multiplication, Binomial Arrays; Effects of Uniform and Non-Uniform Amplitude Distributions. Related Problems.

**UNIT IV**

**HF, VHF ANTENNAS**: Classification of antennas based on different characteristics. HF,VHF Antennas: V-antennas, Rhombic Antennas and Design Relations, Helical Antennas– Significance, Geometry, basic properties; Design considerations, Modes of Helical antennas- Axial Mode and Normal Mode. Yagi - Uda Antenna Arrays, Folded Dipoles & their characteristics.

**UNIT V**

**UHF AND MICRO-WAVE FREQUENCY ANTENNAS**: Reflector Antennas: Flat Sheet and Corner Reflectors; Paraboloidal Reflectors– Geometry, Characteristics, Types of feeds. Cassegrain feed system. Horn Antennas – Types, Optimum Horns, Design Characteristics of Pyramidal Horns; Lens Antennas – Geometry, Features, Types- Non-metallic & Metallic lens and Zoning, Patch and slot Antennas. Applications of all antennas,

Antenna Measurements - Introduction, Co-Ordinate System, Patterns to be measured, Pattern Measurement arrangement, Directivity and Gain Measurements (Comparison, Absolute and 3-Antenna Methods).

**UNIT VI**

**WAVE PROPAGATION**: Introduction-Frequency ranges and modes of propagations.Ground Wave Propagation– Characteristics, Parameters, Wave Tilt, Flat and Spherical Earth Considerations and Roughness Calculations.

Sky Wave Propagation – Formation of Ionospheric Layers and their Characteristics, Mechanism of Reflection and Refraction, Critical Frequency, MUF & Skip Distance –Optimum Frequency, LUHF, Virtual Height, Ionospheric Abnormalities, Ionospheric Absorption. Space wave propagation - Introduction, field strength variation with distance and height, effect of earth's curvature, M-curves and Duct propagation, scattering phenomena, fading path loss calculations.

**TEXT BOOKS**

1. Antennas and Wave Propagation- John D. Krauss and Ronald J. Marhefka and Ahmad S. Khan, 3rd Edition, TMH, New Delhi.
2. Antenna Theory - C.A. Balanis, John Wiley & Sons, 2nd ed., 2001.

**REFERENCE**

1. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd Edition, 2000.
2. Antennas and Wave Propagation - GSN Raju, Pearson Education India, 2009.
3. Antennas and Wave Propagation – K.D. Prasad, Satya Prakashan, Tech India Publications, New Delhi, 2001.
4. Transmission and Propagation – E.V.D. Glazier and H.R.L. Lamont, The Services Text Book of Radio, vol. 5, Standard Publishers Distributors, Delhi.
5. Antennas and Wave Propagation by V.Soundararajan, SCITECH Publications.

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## (A0441105) ANALOG IC APPLICATIONS

**OBJECTIVES:**

- Design of OPAMPS, Classification of OPAMPs.
- To study and design various linear applications of OPAMPs.
- To study and design various non linear applications of OPAMPs.
- Design of Analog filters.
- Design of Timers and Phase Locked Loops.
- Design of D/A AND A/D converters.

**OUTCOMES:**

- Able to design OPAMPS and analyze different OPAMP circuits.
- Able to analyze and design various linear applications of OPAMPs.
- Able to analyze and design various non linear applications of OPAMPs.
- Able to analyze and design o Analog filters, Timers and Phase Locked Loops. And D/A AND A/D converters using OPAMP.

**UNIT-I**

**INTRODUCTION TO OP**-AMPS: Integrated circuits-types, classification, package types and temperature ranges, power supplies, OP-Amp Block diagram, Differential amplifier circuit configurations, Characteristics of OP-Amps, ideal and practical OP-Amp specifications, DC and AC characteristics, 741 OP-Amp and its features, OP-Amp parameters, input and output offset voltages and currents, slew rate, CMRR, PSRR.

**UNIT-II**

**LINEAR APPLICATIONS OF OP-AMPS**: Inverting and non-inverting amplifier, integrator and differentiator, difference amplifier, instrumentation amplifier, AC amplifier, Voltage to Current, Current to Voltage converters, Buffers.

**UNIT-III**

**NON LINEAR APPLICATIONS OF OP-AMPS:** Non-linear function generation, comparators, Multivibrators, Triangular and square wave generators, Log and antilog amplifiers, precision rectifiers, IC 723 voltage regulators.

**UNIT-IV**

**ANALOG FILTERS**: Introduction, Butterworth filters-first order, second order LPF, HPF filters. Band pass, Band reject and all pass filters.

**UNIT-V**

**TIMERS AND PHASE LOCKED LOOPS**: Introduction to 555 Timer, functional diagram, Monostable and Astable operations and applications, Schmitt Trigger, PLL-Introduction, Block schematic, principles and description of individual blocks, Introduction to IC 566, VCO applications and details.

**UNIT–VI**

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

**TEXT BOOKS:**

1. Op-Amps & Linear ICs - Ramakanth A. Gayakwad, 4th edition, PHI, 1987.
2. Linear Integrated Circuits – D. Roy Chowdhury, New Age International (p) Ltd, 2nd Edition, 2003.

**REFERENCES:**

1. Operational Amplifiers & Linear ICs by David A. Bell, 2nd edition, Oxford University Press, 2010.
2. Design with Operational Amplifiers & Analog Integrated Circuits - Sergio Franco, McGraw Hill, 1988.

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## (A0506104) OBJECT ORIENTED PROGRAMMING

**OBJECTIVES:**

- Describe the Windows event-driven programming model.
- Build simple JAVA applications according to the model.
- Write fluent JAVA code for creating classes.
- Use JAVA variables, data, expressions and arrays.
- Design and create forms, menus and controls.
- Write clear, elementary Java programs (applets and applications).
- Use a Java-enabled browser and/or the applet viewer to execute Java applets.
- Use the Java interpreter to run Java applications.
- Design and construct effective graphic user interfaces for application software.
- Use Java Beans, RMI to build complex business applications.

**OUTCOMES:**

- Understand the syntax and concepts of JAVA
- Write JAVA programs for processing data
- Write JAVA programs to interface with windows.
- Write JAVA programs that use data from flat files and databases.
- Develop programs with GUI features such as dialog boxes, menus etc.
- Write JAVA programs that form the GUI front-end for database applications.
- Write applications using distributed objects.
- A passing student shall demonstrate knowledge of GUI-based event-driven programming in a working.
- Program assignment utilizing Java GUI components, event listeners and event-handlers

**UNIT I**

Java Basics - History of Java, Java buzzwords, comments, data types, variables, constants, scope and life time of variables, operators, expressions, type conversion and casting, enumerated types, control flow- conditional statements, break and continue, simple java program, arrays.

OOP concepts, parameter passing, static fields and methods, access control, this, overloading methods and constructors, recursion, garbage collection, Strings, string functions.

**UNIT II**

Inheritance – Inheritance concept, Super and Sub classes, Member access rules, types of Inheritance, super uses, final classes and methods, casting, polymorphism- dynamic binding, method overriding, abstract classes and methods, the Object class and its methods.

Interfaces – Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interface.

**UNIT III**

Packages- Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

Files-streams, text Input/output, binary input/output, random access file operations, File management using File class, Using java.io.

Networking in Java – Introduction, Manipulating URLs, Ex. Client/Server Interaction with Stream Socket Connections, Connectionless Client/Server Interaction with Datagrams, Using java.net.

**UNIT IV**

Exception handling – benefits of exception handling, exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, rethrowing exceptions, built in exceptions, creating own exceptions.

Multithreading - Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, interthread communication, thread groups, daemon threads.

**UNIT V**

Event Handling - Events, Event sources, Event classes, Event Listeners, Relationship between Event sources and Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

**UNIT VI**

GUI Programming with Java - The AWT class hierarchy, Introduction to Swing, Swing vs. AWT,MVC architecture, Hierarchy for Swing components, Containers – Top-level containers – JFrame, JApplet, JWindow, JDialog, JPanel, A simple swing application, swing components- Jbutton, JToggleButton, JCheckBox, JRadioButton, JLabel, JTextField, JTextArea, JList, JComboBox, JMenu, capabilities –color control, Font control, Drawing lines, rectangles and ovals, Drawing arcs, Layout management - Layout manager types – border, grid, flow, box.

**TEXT BOOKS:**

1. Java; the complete reference, 7th editon, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, pearson eduction.

**REFERENCES:**

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley & sons.
2. An Introduction to OOP, second edition, T. Budd, Pearson education.
3. Introduction to Java programming 6th edition, Y. Daniel Liang, Pearson education.
4. An introduction to Java programming and object oriented application development, R.A. Johnson-Thomson.
5. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, seventh Edition, Pearson Education.
6. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education

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## ELECTRONICS AND COMMUNICATION ENGINEERING

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## (A0413105) MICROPROCESSORS & MICROCONTROLLERS

**OBJECTIVES:**

- To understand the architecture of 8086 MICROPROCESSOR**.**
- To learn various 8086 Instruction set and Assembler Directives.
- To become skilled in 8086 Assembly Language programming.
- To understand programmable peripheral devices and their Interfacing.
- To understand and learn 8051 microcontroller.
- To learn 8051 assembly Language programming

**OUTCOMES:**

- Becomes skilled in various 8086 Instruction set and Assembler Directives
- Able to write8086 Assembly Language programs.
- Able to understand programmable peripheral devices and their Interfacing.
- Able to write 8051 assembly Language programs.

**UNIT-I**

**8086 MICROPROCESSOR**: Evaluation of microprocessors. Overview of 8085. Register organization of 8086, architecture, signal description of 8086, physical memory organization, general bus operations, I/O addressing capability, special processor activities, 8086-Minimum mode and maximum mode of operation, Timing diagram.

**UNIT-II**

**8086 INSTRUCTION SET AND ASSEMBLER DIRECTIVES**: Addressing modes of 8086, Instruction set of 8086, Assembler Directives and operators

**UNIT-III**

**8086 ASSEMBLY LANGUAGE PROGRAMMING**: 8086 Assembly language programs involving logical, branch and call instructions, sorting, evaluation of arithmetic expressions, string manipulation.

**UNIT-IV**

**PROGRAMMABLE PERIPHERAL DEVICES AND THEIR INTERFACING**: Memory interfacing to 8086 (static RAM and EPROM). 8255 PPI-various modes of operation and interfacing to 8086. D/A and A/D converter interfacing, Stepper motor interfacing. Interrupt structure of 8086, Vector interrupt table. Interrupt service routines.8259 PIC architecture and interfacing cascading of interrupt controller and its importance.

**UNIT-V**

**8051 MICROCONTROLLER**: Architecture of 8051 microcontroller. Pin Diagram of 8051, and external memories, counters and timers, serial communication, interrupts.

**UNIT-VI**

**8051 ASSEMBLY LANGUAGE PROGRAMMING**: Instruction set of 8051, Addressing modes of 8051, Assembly Language Programming examples using 8051.

**TEXT BOOKS:**

1. Microprocessor Architecture, Programming and Applications with8085 By Ramesh S Gaonkar.
2. Advanced microprocessor and peripherals-A.K. Ray and K.M.Bhurchandi, 2nd edition, TMH, 2000.
3. 8051 microcontroller and embedded systems by mazidi and mazidi ,pearson education 2000.

**REFERENCES:**

1. Microprocessors Interfacing-Douglas V.Hall, Revised 2nd edition, 2007.
2. The 8088 and 8086 Microprocessors- Walter A. Triebel, Avtar Singh, PHI, 4th Edition, 2003.
3. 8051 Microcontroller-Internals, Instructions, Programming and Interfacing by Subrata Ghoshal, Pearson, 2010.

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## (A0414105) EMBEDDED 'C'

**(AUDIT COURSE)**

**OBJECTIVES:**

- To understand the fundamental concepts of Embedded systems.
- To learn the kernel of RTOS, architecture of ARM processor.
- To learn various syntax in embedded c
- To know various embedded Tools.

**OUTCOMES:**

- Learns the fundamental concepts of Embedded systems.
- Learns the kernel of RTOS, architecture of ARM processor
- Becomes skilled in embedded c programming.
- Becomes aware of various embedded Tools.

**UNIT I**

**INTRODUCTION TO EMBEDDED SYSTEMS**: Fundamentals of Embedded System- Definition, Purpose of Embedded System, real life examples of embedded systems, future of embedded systems, Core of Embedded systems, Classification of Embedded Systems- Small, Medium and Large Scale Embedded System, System On-Chip.

**UNIT II**

**REAL-TIME OPERATING SYSTEMS [RTOS]:** Types of operating systems - Real-Time Operating System-Definition, a brief evolutionary history, Types of Real time systems, Special Characteristics of Real-Time Systems,

**Kernel**: Overview, Architecture, Scheduling algorithms, Objects, Applications.

**UNIT III**

**ARM PROCESSOR:** Introduction to ARM processor – Its features, Architecture, Registers, Instruction set and Addressing Modes, Example programs.

**UNIT IV**

**EMBEDDED 'C'**: Introduction, Purpose of the Standard, Guiding Principles, Comparison with 'C'; General Rules- Line Width Braces Parentheses, Common Abbreviations;

Data Types: -Naming Conventions, Fixed-Width Integers and Signed Integers, Floating Point, Structures and Unions; Modules-Naming Conventions, Header Files, Source Files, File Templates, Procedures -Naming Conventions, Functions, Function-Like Macros, Tasks, Variables-Naming Conventions, Initialization, Variable Declarations; Expressions and Statements, If-Else Statements, Switch Statements Loops, Unconditional Jumps. Preprocessor directives, Modifiers, Command line Arguments.

**UNIT V**

**Embedded Tools**: Debugging Techniques, Compilers, Cross compilers,

**Keil**: Introduction, features, Development tools, Testing sample programs.

**UNIT VI**

**Design examples**: Traffic light, Digital Camera, Home Automation.

**TEXT BOOKS**

1. Real-Time Concepts for Embedded system-Qing Li, Caroline Yao.
2. Embedded system Architecture, Programming and Design-Raj Kamal, Second Edition, TMH Companies.
3. Embedded C coding Standard –Michael Barr from Neutrino.

**REFERENCE**

1. Embedded/ Real-Time Systems – KVKK Prasad, Dreamtech Press, 2005.
2. An Embedded Primer – David E. Simon, Pearson Edition,2005
3. Computer as Components, Principles of Embedded Computing System Design.– Wayne Wolf, 2nd Edition.

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## (A0497105) ANALOG IC APPLICATIONS & ANALOG COMMUNICATIONS LAB

**OBJECTIVES:**

- Design of OPAMPS Classification of OPAMPS.
- To study and design various linear applications of OPAMPs.
- To study and design various non linear applications of OPAMPs.
- Design of Analog filters.
- Design of Timers and Phase Locked Loops.
- Design of D/A AND A/D converters.
- Modulation techniques will be analyzed both on the basis of spectral characteristics and performance in random noise.
- Examples of practical communication systems will be presented.

**OUTCOMES:**

- Able to design OPAMPS and analyze different OPAMP circuits.
- Able to analyze and design various linear applications of OPAMPs.
- Able to analyze and design various non linear applications of OPAMPs.
- Able to analyze and design o Analog filters, Timers and Phase Locked Loops. And D/A AND A/D converters using OPAMP.
- Design and conduct experiments for testing analog communication circuits and systems.
- Design analog communication circuits and systems to meet predefined specifications.
- Identify, formulate and solve analog communication circuits and systems problems.

**Minimum Ten Experiments to be conducted (Five from each Part-A & B)**

**Part A (Analog IC Application Lab):**

1. OP AMP Applications – Adder, Subtractor, Comparator Circuits.
2. Active Filter Applications – LPF, HPF (first order).
3. Function Generator using OP AMPs.
4. IC 555 Timer –Astable multi vibrator.
5. IC 555 Timer Monostable multi vibrator.
6. IC 566 – VCO Applications.
7. Voltage Regulator using IC 723.
8. 4 bit DAC using OP AMP.

**Part B (Analog Communications Lab):**

1. Amplitude modulation and demodulation.
2. Frequency modulation and demodulation.
3. Characteristics of Mixer.
4. Pre-emphasis & de-emphasis.
5. Pulse amplitude modulation & demodulation.
6. Pulse width modulation & demodulation
7. Pulse position modulation & demodulation.
8. Radio receiver measurements – sensitivity selectivity and fidelity.

**Equipment required for Laboratories:**

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 M Hz.
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. IC Trainer Kits (Optional)
10. Bread Boards
11. Components-IC741, IC555, IC566, 7805, 7809,7912 and other essential Components.
12. Analog IC Tester

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## (A0498105) MICROPROCESSORS & MICROCONTROLLERS LAB USING EMBEDDED'C'

**OBJECTIVES:**

- To become skilled in 8086 Assembly Language programming.
- To understand programmable peripheral devices and their Interfacing.
- To understand and learn 8051 microcontroller.
- To learn 8051 assembly Language programming

**OUTCOMES:**

- Able to write8086 Assembly Language programs.
- Able to understand programmable peripheral devices and their Interfacing.
- Able to write 8051 assembly Language programs.

Minimum **Ten** Experiments to be conducted (**Five** from each section)

**I) 8086 Microprocessor Programs using TASM/8086 kit.**

1. Introduction to TASM Programming.
2. Arithmetic operation – Multi byte Addition and Subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation, ASCII – arithmetic operation.
3. Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
4. By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Length of the string, String comparison.

**Interfacing:**

1. 8259 – Interrupt Controller and its interfacing programs
2. 8255 – PPI and its interfacing programs (A /D, D/A, stepper motor,)
3. 7-Segment Display.

**II) Microcontroller 8051 Trainer kit Using Keil**

1. Introduction to Keil µvision
2. Arithmetic operation – Multi byte Addition and Subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation.
3. Logic operations – Shift and rotate.
4. Sorting- Ascending and descending order.

**Interfacing using 8051 Trainer kit:**

1. Key board Interfacing
2. Seven Segment display
3. Switch Interfacing
4. Relay Interfacing
5. UART

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## (A0594105) OBJECT ORIENTED PROGRAMMING LAB

**OBJECTIVES:**

- To make the student learn a object oriented way of solving problems.
- To teach the student to write programs in Java to solve the problems.

**OUTCOMES:**

- Able to learn object oriented way of solving problems.
- Able to write programs in Java to solve the problems.

**Recommended Systems/Software Requirements:**

a) Intel based desktop PC with minimum of 166 MHZ or faster processor with atleast 64 MB RAM and 100 MB free disk space.
b) JDK Kit. Recommended.

1) a) Write a Java program that prints all real solutions to the quadratic equation ax2 + bx+ c = 0. Read in a, b, c and use the quadratic formula. If the discriminant b2 -4ac is negative, display a message stating that there are no real solutions.
   b) Fibonacci sequence is defined by the following rule: The first two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it. Write a Java program that uses both recursive and non recursive functions to print the nth value in the Fibonacci sequence.
2) a) Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.
   b) Write a Java program to multiply two given matrices.
3) Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers (Use String Tokenizer class of java.util).
4) Write a Java program to find both the largest and smallest number in a list of integers.
5) Write a Java program to illustrate method overloading.
6) Write a Java program that implements the Sieve of Eratosthenes to find prime numbers.
7) Write a Java program to sort a list of names in ascending order.
8) Write a Java program to implement the matrix ADT using a class. The operations supported by this ADT are:
   a) Reading a matrix.
   b) Printing a matrix.
   c) Addition of matrices.
   d) Subtraction of matrices.
   e) Multiplication of matrices.
9) a) Write a Java Program to solve Towers of Hanoi problem.
   b) Write a Java Program that uses a recursive function to compute ncr. (Note: n and r values are given.)
10) Write a Java program to perform the following operations:
   a) Concatenation of two strings.
   b) Comparison of two strings.
11) Implement the complex number ADT in Java using a class. The complex ADT is used to represent complex numbers of the form c=a+ib, where a and b are real numbers. The operations supported by this ADT are:
   a) Reading a complex number.
   b) Subtraction of complex numbers.
   c) Writing a complex number.
   d) of complex numbers.
   e) Addition of Complex numbers.
   f) Division of complex numbers.
12) Write a Java program that makes frequency count of letters in a given text.
13) Write a Java program that uses functions to perform the following operations :
   a) Inserting a sub-string in to the given main string from a given position.
   b) Deleting n characters from a given position in a given string.

14) a) Write a Java program that checks whether a given string is a palindrome or not.
Ex: MADAM is a palindrome.
b) Write a Java program to make frequency count of words in a given text.
15) a) Write a Java program that reads a file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
b) Write a Java program that reads a file and displays the file on the screen, with a line number before each line.
c) Write a Java program that displays the number of characters, lines and words in a text file.
d) Write a Java program to change a specific character in a file.

Note: Filename, number of the byte in the file to be changed and the new character are specified on the command line.

16) Write a Java program that:
a) Implements stack ADT.
b) Converts infix expression into Postfix form
c) Evaluates the postfix expression.
17) a) Develop an applet in Java that displays a simple message.
b) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.
18) Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result.
19) Write a Java program for handling mouse events.
20) a) Write a Java program that creates three threads. First thread displays "Good Morning" every one second, the second thread displays "Hello" every two seconds and the third thread displays Welcome" every three seconds.
b) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.
21) Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.
22) Write a Java program that implements a simple client/server application. The client sends data to a server. The server receives the data, uses it to produce a result, and then sends the result back to the client. The client displays the result on the console. For ex: The data sent from the client is the radius of a circle, and the result produced by the server is the area of the circle. (Use java.net).
23) a) Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green. When a radio button is selected, the light is turned on, and only one light can be on at a time No light is on when the program starts.
b) Write a Java program that allows the user to draw lines, rectangles and ovals.
24) a) Write a Java program to create an abstract class named Shape that contains an empty method named number of Side ( ). Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes contains only the method number of Sides ( ) that shows the number of sides in the given geometrical figures.
b) Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Jtable component.

**TEXT BOOKS:**

1. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI
2. Introduction to Java programming, Sixth edition, Y.Daniel Liang, Pearson Education
3. Big Java, 2nd edition, Cay Horstmann, Wiley Student Edition, Wiley India Private Limited.

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## (A0417106) DIGITAL SIGNAL PROCESSING

**OBJECTIVES:**

- At the end of the course, the student should be able to:
- Program a DSP chip to filter signals using either assembly language or a C compiler for the chip. This filter could be a FIR or IIR filter. The student should understand how design algorithms for implementation.
- Understand how digital to analog (D/A) and analog to digital (A/D) converters operate on a signal and be able to model these operations mathematically.
- Use Z transforms and discrete time Fourier transforms to analyze a digital system.
- Design and understand simple finite impulse response filters
- Understand stability of FIR filters
- Quantization of different types of FIR filters (FIR)
- Choose the best filter effects and noise
- Pole-zero design of simple filters using real data
- Window method design structure for implementation

**OUTCOMES:**

- Ability to describe the Sampling Theorem and how this relates to Aliasing and Folding.
- Ability to determine if a system is a Linear Time-Invariant (LTI) System and Take the Z-transform of a LTI system.
- Ability to determine the frequency response of FIR and IIR filters.
- Ability to understand the relationship between poles, zeros, and stability and determine the spectrum of a signal using the DFT, FFT, and spectrogram.
- Ability to Design, analyze, and implement digital filters in Mat lab.

**UNIT-I**

**INTRODUCTION**: Review of Discrete time signals and sequences, Frequency domain representation of discrete time signals and systems.

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

**UNIT-II**

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

**UNIT-III**

**REALIZATION OF DIGITAL FILTERS**: Review of Z-transforms, applications of Z-Transforms, solution of difference equations of digital filters, block diagram representation of linear constant-coefficient difference equations, basic structures of IIR systems, basic structures of FIR systems, allpass filters, tuneable IIR filters, cascaded lattice realization of IIR & FIR filters.

**UNIT-IV**

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

**UNIT-V**

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

**UNIT-VI**

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

**TEXT BOOKS**:

1. Digital signal processing, principles, Algorithms and applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education/PHI, 4th ed., 2007.
2. Digital signal processing , A computer base approach- Sanjit K Mitra, Tata Mcgraw Hill, 3rd edition, 2009.
3. Discrete Time Signal Processing-A.V. Oppenheim and R.W. Schaffer, 2nd ed., PHI.

**REFERENCES:**

1. Digital signal processing: Andreas Antoniou, TATA McGraw Hill, 2006.
2. A Text book on Digital Signal processing – R S Kaler, M Kulkarni,, Umesh Gupta, I K International Publisthing House Pvt. Ltd.
3. Digital signal processing: M H Hayes, Schaum's outlines, TATA Mc-Graw Hill, 2007.

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## (A0012105) MANAGEMENT SCIENCE

**OBJECTIVES:**

- To know the concept of management, administration.
- To know the personnel management and human research management.
- To know and analyze the steps involved in the corporate planning process.
- To understand present effective production techniques.

**OUTCOMES:**

- Students will able to know how to design the plant layout and location.
- Students will able to know importance of human resource department in organization.
- Students will able to know how the SWOT analysis helps to generate alternative corporate strategies.
- Students will able by using the contemporary practices how to survive in competitive global market.

**UNIT-I: INTRODUCTION TO MANAGEMENT**: Concepts of Management – Nature, Importance and Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Mayo's Hawthorne Experiment, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation

**UNIT-II: BASIC ISSUES IN ORGANIZATION**: Designing Organic Structures of Organization (Line organization, Line and staff organization, Functional organization, Committee organization, Matrix organization, Virtual organization, Cellular organization, Team structure, Boundary less organization and Departmentation, Leadership Styles, Social responsibilities of Management

**UNIT-III: OPERATIONS MANAGEMENT**: Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Materials Management: Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records, Marketing: Functions of Marketing, Marketing Mix, Marketing Strategies based on Product Life Cycle., Channels of distribution.

**UNIT-IV: HUMAN RESOURCES MANAGEMENT**: Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs. PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.

**UNIT-V: PROJECT MANAGEMENT (PERT/CP**M): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

**UNIT-VI: WOMEN ENTREPRENEURSHIP**: Scope of Entrepreneurship among women- Promotional efforts supporting Women Entrepreneurs in India – Opportunities for women entrepreneurs – Challenges/Problems of Women Entrepreneurs – Successful cases of Women Entrepreneurs.

**TEXT BOOK:**

1. Aryasri: Management Science, TMH, New Delhi.

**REFERENCE BOOKS:**

1. Kotler Philip & Keller Kevin Lane: Marketing Mangement 12/e, PHI, 2007.
2. Koontz & Weihrich: Essentials of Management, 6/e, TMH, 2007.
3. Thomas N.Duening & John M.Ivancevich Management—Principles and Guidelines, Biztantra,2007.
4. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2007.
5. Memoria & S.V.Ganker, Personnel Management, Himalaya, 25/e, 2007.
6. Schermerhorn: Management, Wiley, 2007.
7. Parnell: Strategic Management, Biztantra, 2007.
8. L.S.Srinath: PERT/CPM,Affiliated East-West Press, 2007.

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## (A0505104) COMPUTER ORGANIZATION

**OBJECTIVES:**

- To understand the structure, function, characteristics and performance issues of computer systems.
- To understand the design of the various functional units of digital computers
- To understand I/O transfer mechanism, design of I/O circuit interfaces and example bus standards (like PCI, SCSI, USB)
- To understand the basic processing unit and how they are connected and how it generates control signals (using hardwired and micro programmed approaches)
- To understand the different types of memory and how they are related.
- To learn basics of Parallel Computing and Pipelining.

**OUTCOMES:**

- Students will learn about computer performance, computer design, and tradeoffs between cost and performance as well as between hardware and software.
- Students will formulate and solve problems, understand the performance requirements of systems.
- Students will learn to communicate effectively and learn to think creatively and critically, both independently and with others.
- Students will learn about all the detailed design issues and circuits of each unit.

**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, Error Detection codes.

**UNIT II: REGISTER TRANSFER LANGUAGE AND MICRO-OPERATIONS**: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit. Basic Computer Organization and Design: Instruction codes, Computer Registers, Computer instructions, Instruction cycle, Memory- reference instructions, Input – Output and Interrupt. Central Processing Unit: Stack organization, Instruction formats, Addressing modes, Data transfer and manipulation, Program control, Reduced Instruction set computer.

**UNIT III: MICRO PROGRAMMED CONTROL**: Control memory, Address sequencing, micro program example, design of control unit, hard wired control, Micro programmed control. Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations, Decimal Arithmetic unit.

**UNIT IV: THE MEMORY SYSTEM**: Basic concepts, semiconductor RAM memories, Read-only memories, Cache memories, performance considerations, Virtual memories, secondary storage, Introduction to RAID.

**UNIT-V: PIPELINE AND VECTOR PROCESSING**: Parallel processing, Arithmetic pipeline, Instruction Pipeline, RISC Pipeline, Vector processing, Array Processors.

**UNIT VI: MULTI PROCESSORS**: Characteristics of Multi Processors, Inter Connection Structures, Inter Processor Arbitration, Inter Processor Communication & Synchronization, Cache Coherence

**TEXT BOOKS:**

1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
2. Computer Systems Architecture – M. Moris Mano, IIIrd Edition, Pearson/PHI

**REFERENCES:**

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson
3. Fundamentals or Computer Organization and Design, - Sivaraama Dandamudi Springer Int. Edition.
4. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition Elsevier
5. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

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## (A0418106) MICROWAVE ENGINEERING

**OBJECTIVES:**

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

**OUTCOMES:**

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

**UNIT I**

**MICROWAVE TRANSMISSION LINES**: Introduction, Microwave Spectrum and Bands, Applications of Microwaves. Rectangular Waveguides – TE/TM mode analysis, Expressions for Fields, Characteristic Equation and Cut-off 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; Power Transmission and Power Losses in Rectangular Guide. Related Problems, Cavity Resonators– Introduction, Rectangular Cavities, Dominant Modes and Resonant Frequencies, Q factor and Coupling Coefficients. Related Problems

**UNIT II**

**WAVEGUIDE COMPONENTS AND APPLICATIONS**: Waveguide Multiport Junctions – E plane and H plane Tees, Magic Tee, Hybrid Ring; Directional Couplers – Two Hole type only. Scattering Matrix– Significance, Formulation and Properties. S Matrix Calculations for – Two port Junction, E plane and H plane Tees, Magic Tee, Directional Coupler, Ferrites - Composition and Characteristics, Faraday Rotation; Ferrite Components - Gyrator, Isolator, Circulator. Related Problems.

**UNIT III**

**MICROWAVE TUBES – I**: Limitations and Losses of conventional tubes at microwave frequencies. Microwave tubes – O type and M type classifications. O-type tubes : Two 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, Applegate Diagram and Principle of working, Mathematical Theory of Bunching, Power Output, Efficiency, Electronic Admittance; Oscillating Modes and o/p Characteristics, Electronic and Mechanical Tuning. Related Problems.

**UNIT IV**

**MICROWAVE TUBES-II:** HELIX TWTS: Significance, Types and Characteristics of Slow Wave Structures; Structure of TWT and Amplification Process (qualitative treatment), Suppression of Oscillations, Nature of the four Propagation Constants, Gain Considerations.

M-type Tubes: Introduction, Cross-field effects, Magnetrons – Different Types, 8-Cavity Cylindrical Travelling Wave Magnetron – Hull Cut-off and Hartree Conditions, Modes of Resonance and PI-Mode of Operation, Separation of PI-Mode, o/p characteristics.

**UNIT V**

**MICROWAVE SOLID STATE DEVICES**: Introduction, Classification, Applications. TEDs - Introduction, Gunn Diode – Principle, RWH Theory, Characteristics, Basic Modes of Operation, Oscillation Modes, Varactor diode, parametric amplifiers, Avalanche Transit Time Devices - Introduction, IMPATT and TRAPATT Diodes – Principle of Operation and Characteristics.

**UNIT VI**

**MICROWAVE MEASUREMENTS**: Description of Microwave Bench – Different Blocks and their Features, Precautions; 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 Principles – Herbert J. Reich, J.G. Skalnik, P.F. Ordung and H.L. Krauss, CBS Publishers and Distributors, New Delhi, 2004.

**REFERENCES :**

1. Elements of Microwave Engineering – R. Chatterjee, Affiliated East-West Press Pvt. Ltd., New Delhi, 1988.
2. Foundations for Microwave Engineering – R.E. Collin, IEEE Press, John Wiley, 2nd Edition, 2002.
3. Microwave Engineering by Pozar,
4. Microwave Engineering and its applications by O.P.Gandhi.
5. Microwave Circuits and Passive Devices – M.L. Sisodia and G.S.Raghuvanshi, Wiley Eastern Ltd., New Age International Publishers Ltd., 1995.
6. Microwave Engineering Passive Circuits – Peter A. Rizzi, PHI, 1999.
7. Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th ed., 1955.
8. Micro Wave and Radar Engineering – M. Kulkarni, Umesh Publications, 1998.

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## (A0416105) DIGITAL IC APPLICATIONS THROUGH VHDL

**OBJECTIVES:**

- To be able to use computer-aided design tools for development of complex digital logic circuits
- To be able to model, simulate, verify, analyze, and synthesize with hardware description languages
- To be able to design and prototype with standard cell technology and programmable logic
- To be able to design tests for digital logic circuits, and design for testability

**OUTCOMES:**

- Able to use computer-aided design tools for development of complex digital logic circuits.
- Able to model, simulate, verify, analyze, and synthesize with hardware description languages.
- Able to design and prototype with standard cell technology and programmable logic.
- Able to design tests for digital logic circuits, and design for testability.

**UNIT I**

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

**UNIT II**

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

**UNIT III**

**THE VHDL HARDWARE DESCRIPTION LANGUAGE**: Design flow, program structure, types and constants, functions and procedures, libraries and packages.

THE VHDL DESIGN ELEMENTS: Structural design elements, data flow design elements, behavioral design elements, and time dimension and simulation synthesis.

**UNIT IV**

**COMBINATIONAL LOGIC DESIGN**: Decoders, encoders, three state devices, multiplexers and demultiplexers, EX-OR gates and parity circuits, comparators, adders & subtractors, ALUs, VHDL modes for the above ICs.

**UNIT V**

**DESIGN EXAMPLES (USING VHDL):** Barrel shifter, comparators, floating-point encoder, dual parity encoder, designing with ROM.

**UNIT VI**

**SEQUENTIAL LOGIC DESIGN**: Latches and flip-flops, counters, shift register, and their VHDL models.

**TEXT BOOKS:**

1. Digital Design Principles & Practices – John F. Wakerly, PHI/ Pearson Education Asia, 3rd Ed., 2005.
2. Fundamentals of Digital Logic with VHDL Design – Stephen Brown and Zvonko Vramesic, McGraw Hill, 2nd Edition., 2005.

**REFERENCES:**

1. Digital System Design Using VHDL – Charles H. Roth Jr., PWS Publications, 2nd edition, 2008.
2. A VHDL Primer – J. Bhasker, Pearson Education/ PHI, 3rd Edition.

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## (A0419106) DIGITAL COMMUNICATIONS

**OBJECTIVES:**

- The students to be able to understand, analyze, and design fundamental digital communication systems.
- The course focuses on developing a thorough understanding of digital communication systems by using a series of specific examples and problems.
- Illustrate and require the student to understand analysis and design of modern digital communication systems.
- Specific examples include digital modulators, receivers, optimum detectors, phase locked loops, synchronization systems, and error correcting codes.

**OUTCOMES:**

- Students are able to analyze digital communication signals as vectors.
- Students understand the principles of maximum a posteriori and maximum likelihood detection.
- Students understand the basics of PAM, QAM, PSK, FSK, and MSK. They can analyze probability of error performance of such systems and are able to design digital communication systems based on these modulation techniques as block diagrams.
- Students understand and are able to analyze equalizers.
- Students understand and are able to analyze synchronization systems.
- Students understand the basics of information theory and error correcting codes.

**UNIT I: DIGITIZATION TECHNIQUES FOR ANALOG MESSAGES-I:** Introduction - Importance of Digitization Techniques, Elements of Pulse Code Modulation (PCM) - Generation and Reconstruction, Quantization and coding, Quantization error, PCM with Noise, Companding in PCM,

**UNIT II: DIGITIZATION TECHNIQUES FOR ANALOG MESSAGES-II:**
Delta modulation, Adaptive Delta Modulation, Differential PCM systems (DPCM),

**UNIT III: BASE BAND DIGITAL TRANSMISSION**: Digital Signals and Systems – Digital PAM Signals, Transmission Limitations, Power Spectra of Digital PAM, Noise and Errors – Binary Error Probabilities, Matched Filtering, Optimum filtering.

**UNIT IV: DIGITAL MODULATION TECHNIQUES**: Introduction, ASK, FSK, PSK, DPSK, QPSK, M–ary PSK Systems calculation of error probability of ASK, BPSK, BFSK, QPSK, Coherent AND Non-Coherent ASK (OOK (on-off keying)

**BAND PASS DIGITAL TRANSMISSION**: Introduction, Signal Space, Coherent Binary Systems – Optimum Binary Detection.

**UNIT V: INFORMATION THEORY**: Introduction, Information Measure and Encoding, Entropy and Information Rate, Coding for a Discrete Memory Less Channel, Binary Symmetric Channel, Discrete Channel Capacity, Coding for the Binary Symmetric Channels.

**UNIT VI: CHANNEL CODING**: Error Detection & Correction of Linear Block Codes Hamming Codes, Forward Error Correction (FEC) Systems, Automatic Retransmission Query (ARQ) Systems, Matrix Representation of Block Codes, Convolutional Codes, Syndrome calculation, M-ary modulation techniques.

**TEXT BOOKS:**

1. A. Bruce Carlson, & Paul B. Crilly, “Communication Systems – An Introduction to Signals & Noise in Electrical Communication”, McGraw-Hill International Edition, 5th Edition, 2010.
2. Sam Shanmugam, “Digital and Analog Communication Systems”, John Wiley, 2005

**REFERENCES:**

1. Digital communications - Simon Haykin, John Wiley, 2005
2. Herbert Taub & Donald L Schilling, “Principles of Communication Systems”, Tata McGraw-Hill, 3rd Edition, 2009.
3. Digital Communications – John Proakis, TMH, 1983. Communication Systems Analog & Digital – Singh & Sapre, TMH, 2004.

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## (A0420106) VERILOG

**(AUDIT COURSE)**

**OBJECTIVES:**

- To understand the basics of the Language and its conventions.
- To form an introduction to design through Verilog.
- To design various components like Flipflops, decoders and multiplexers using different modelling.
- To form an introduction to the system tasks and functions in Verilog and their use in typical environment.

**OUTCOMES:**

- Student understands the basics of the Language and its conventions.
- Student becomes skilled in design through Verilog.
- Able to design various components like Flipflops,decoders and multiplexers using different modelling.
- Able to form an introduction to the system tasks and functions in Verilog and their use in typical environment.

**UNIT I**

Verilog Hardware Description Language: Program structure, Logic system, Nets, Variables, Constant, Vectors, Operators, Arrays, Logical operators and expressions, Compiler directives.

**UNIT II**

Design elements-1: Structural design elements, Dataflow design elements.

**UNIT III**

Design elements-2: Behavioral design elements, Time dimension, Simulation.

**UNIT IV**

Combination circuit modelling: Decoders (74X138), Priority encoder (74X148), Multiplexers (74X151), Comparators (74X85).

**UNIT V**

Sequential circuit modelling: Flip Flops (74X74); Counters: Binary counters (74X163); Decade counters (74X160); Shift registers (74X194); Ring counter, Johnson counter.

**UNIT VI**

Design examples: Dual priority encoder, Floating point encoder.

**TEXT BOOKS:**

1. Digital Design Principles & Practices – John F. Wakerly, PHI/ Pearson Education Asia, 3rd Ed., 2005

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## (A0093105) PROFESSIONAL COMMUNICATION AND SOFT SKILLS LAB (PROS LAB)

**(Common to all Branches)**

**OBJECTIVE**

Keeping in mind the previous exposure of the student to English, this lab focuses on improving the student's proficiency in English at all levels. The lab intends to train students to use language effectively, to participate in group discussions, to help them face interviews, and sharpen public speaking skills and enhance the confidence of the student by exposing him/her to various situations and contexts which he/she would face in his/her career.

**OUTCOMES**

students use language effectively and able to participate in group discussions. Student can easily face interviews.

**INTRODUCTION**

The **Professional Communication and Soft Skills Lab** has been introduced at the III B. Tech level to navigate the students towards the appropriate career orientation. At this stage it is imperative for the student to prepare for the ever growing competition in the job market. In this scenario, the student needs to improve his/her Communication and soft skills in an effective manner to cope up the global trends.

## SYLLABUS

The following modules are prescribed for the Professional Communication and Soft Skills Lab.

**Week –I Professional Spirit**

- Motivation & Self Esteem - Questionnaire on self analysis
- Activity- G.D on Personal goals and career objectives
- Case Study – Profile of a successful person

**Week –II Concept of Communication -I**

- Principles – barriers - Strategies -Analysis through video clipping
- Activity- Elevator pitch (Tell me about yourself )
- Reading Comprehension- 1
- Case study : news reviews

**Week –III Concept of Communication -II**

- Non verbal communication – kinesics – paralinguistic elements - Analysis through video clipping
- Activity- Elevator pitch (Tell me about yourself)
- Vocabulary: idioms & phrases

**Week –IV Concept of Communication -III**

- Listening Skills – ROAR Technique – Chinese Pictograph
- Activity- Debate with analysis on Non verbal cues, Gestures & postures
- Reading Comprehension-2
- Case study : TV Interviews/ Movie

**Week –V Professional Communication -I**

- Group Discussion- Modalities, Process and evaluation
- Activity- Group Discussion
- Vocabulary – Foreign –Derived words

**Week –VI Professional Communication -II**

- Writing Skills –Letters, Emails & Resume Writing
- Activity- Letter writing and Resume Writing practice
- Reading Comprehension-3
- Analysis of Sample Letters / Memos/ Resume s

**Week –VII Job Skills I**

- HR Interview Strategies, Questions with analysis - Analysis through video clippings(Typical HR interviews)
- Vocabulary: Technical Jargon
- Activity- Group Discussion / Debate

**Week –VIII Job Skills II**

- Telephone Interview Strategies - On line interview Tips -Activity- Mock Interview
- Reading Comprehension-4

**Week –IX Job Skills III**

- Technical Presentation skills
- Activity- Group Discussion Practice

**Week –X Soft skills I**

- Reading Skills – SQR3 technique – Bloom's Taxonomy
- Technical Presentation Practice - PPTs

**Week –XI Soft skills II**

- Job Etiquettes
- Communication Project Reviews
- Activity- Group Discussion Practice

**Week –XII Soft skills III**

- Team communication
- Mock CAT/ GRE Test
- Activity -Mock Interview

**Minimum Requirements**

The English Language Lab shall have two parts:

The Computer aided Language lab for 60 students with 60 systems, one master console. LAN facility and English Language Skills Lab with movable Chairs and audio aids with a P.A system, a TV, A digital stereo-audio and video system, Camcorder etc.

**Prescribed software**: Department in-built data, K-Van Solutions and Globarena Ltd.

**BOOKS PRESCRIBED:**

1. Cornerstone: Developing Soft Skills by Robert M. Sherfield, Rhonda J. Montgomery and Patricia G. Moody, published by Pearson Education.
2. Resume's and Interviews by M.Ashraf Rizvi, Tata Mc Graw- Hill, 2008

**BOOKS SUGGESTED FOR REFERENCE:**

1. The ACE of Soft Skills by Gopal Ramesh and Mahadevan REamesh, Pearson Education, 2010
2. How to Do Well in GDs and Interviews by Dorling Kindersdley ( India ) Pvt. Ltd., Licencees of Pearson Education in South Asia.
3. Technical Writing by Sharon J.Gerson and Steven M.Gerson , published by Pearson Education
4. Professesional Presentations by Malcolm Goodale , published by Cambridge University Press.

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**ELECTRONICS AND COMMUNICATION ENGINEERING**

**III B.Tech, II-Sem (ECE)** **P C**
**3 2**

# (A0482106) DIGITAL COMMUNICATIONS LAB

**OBJECTIVES:**

- To study the various steps involved in generating and degenerating different pulse modulation techniques.
- To study various modulation process.
- To study the study the generation and demodulation of PSK,DPSK,FSK.

**OUTCOMES:**

- Able to analyze generating and degenerating different pulse modulation techniques.
- Able to perform various modulation process.
- Able to acquire practical knowledge on digital communications and its applications.

## Minimum of Ten experiments to be conducted (Five from each Part-A&B)

**PART-A**

1. Sampling Theorem – verification.
2. Time division multiplexing.
3. Pulse code modulation.
4. Differential pulse code modulation.
5. Delta modulation.
6. Frequency shift keying.
7. Differential phase shift keying.
8. QPSK modulation and demodulation.

**PART-B**

**Modeling of Digital Communications using MATLAB**

1. Sampling Theorem – verification.
2. Pulse code modulation.
3. Differential pulse code modulation.
4. Delta modulation.
5. Frequency shift keying.
6. Phase shift keying.
7. Differential phase shift keying.
8. QPSK modulation and demodulation.

**Equipment required for Laboratories:**

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 M Hz.
5. Multimeters
6. Lab Experimental kits for Digital Communication
7. Components
8. Radio Receiver/TV Receiver Demo kits or Trainees.

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**3 2**

## (A0481105) DIGITAL IC APPLICATIONS USING VHDL & VERILOG LAB

**OBJECTIVES:**

- To use computer-aided design tools for development of complex digital logic circuits
- To model, simulate, verify, analyze, and synthesize with hardware description languages
- To design and prototype with standard cell technology and programmable logic
- To design tests for digital logic circuits, and design for testability

**OUTCOMES:**

- Able to use computer-aided design tools for development of complex digital logic circuits.
- Able to model, simulate, verify, analyze, and synthesize with hardware description languages.
- Able to design and prototype with standard cell technology and programmable logic.
- Able to design tests for digital logic circuits, and design for testability.

Simulate the internal structure of the following Digital IC's using VHDL & VERILOG and verify the operations of the Digital IC's (Hardware) in the Laboratory

### Minimum Ten experiments to be conducted

1. Logic Gates- 74XX
2. Half Adder, Full Adder
3. Ripple Carry Adder
4. 3-8 Decoder -74138
5. 8-3 Encoder- 74X148
6. 8 x 1 Multiplexer -74X151
7. 4 bit Comparator-74X85
8. D Flip-Flop 74X74
9. Decade counter-74X160
10. Mod-Counters
11. Universal shift register -74X194
12. Ring counter
13. Johnson counter
14. RAM, ROM

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**ELECTRONICS AND COMMUNICATION ENGINEERING**

**IV B.Tech, I-Sem (ECE)** **T C**
**3+1* 4**

## (A0423107) MICRO ELECTRONICS AND VLSI DESIGN

**OBJECTIVES:**

- To understand VLSI circuit design processes.
- To understand basic circuit concepts and designing Arithmetic Building Blocks.
- To have an overview of Low power VLSI.

**OUTCOMES:**

- Able to understand VLSI circuit design processes.
- Able to understand basic circuit concepts and designing Arithmetic Building Blocks.
- Able to learn the concepts of Low power VLSI.

**UNIT I**

**INTRODUCTION** : Introduction to IC Technology – MOS, PMOS, NMOS, CMOS technologies- Oxidation, Lithography, Diffusion, Ion implantation, Metallization, Encapsulation, Integrated Resistors and Capacitors.

**UNIT II**

**BASIC ELECTRICAL PROPERTIES**: Basic Electrical Properties of MOS Circuits: $I_{ds}$-$V_{ds}$ relationships, MOS transistor threshold Voltage, gm, gds; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

**UNIT III**

**VLSI CIRCUIT DESIGN PROCESSES**: MOS Layers, Stick Diagrams, Design Rules and Layout: Lambda based CMOS Design rules for wires, Contacts and Transistors Layout Diagrams for NMOS and CMOS Inverters and Gates.

**UNIT IV**

**BASIC CIRCUIT CONCEPTS**: Sheet Resistance $R_S$ and its concept to MOS, Area Capacitances of layers, standard unit of capacitance □□Cg, area capacitance calculations, The Delay unit, Inverter delays, estimation of CMOS inverter delay, Wiring Capacitances, Choice of layers.

**UNIT V**

**DESIGNING ARITHMETIC BUILDING BLOCKS**: Introduction; The Adders: Definition, The Full adder: Circuit design consideration, The Binary adder: Logic design consideration; The Multiplier: Definition, Partial product generation, Partial product accumulation, Final addition, Multiplier summary.

Introduction to FPGAs, CPLDs architectures and Standard Cells.

**UNIT VI**

**INTRODCTION TO LOW POWER VLSI**: Introduction, over view of power consumption, low power design through voltage scaling, estimation and optimization of switching activity.

**TEXTBOOKS:**

1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Dougles and A. Pucknell, PHI, 2005 Edition.
2. CMOS digital integrated circuits analysis and design by Sung-Mo Kand and Yusuf Leblebici, Tata McGraw Hill, 3rd edition.

**REFERENCES:**

1. Introduction to VLSI Circuits and Systems - John .P. Uyemura, JohnWiley, 2003.
2. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition, 1997.
3. VLSI Technology – S.M. SZE, 2nd Edition, TMH, 2003.
4. Principles of CMOS VLSI Design - Weste and Eshraghian, Pearson Education, 1999.
5. Digital Integrated Circuits – A design perspective, John M. Rabaey, Anantha Chandrakasan, Borivoje Nikolic Pearson Education, 2rd Edition.

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**ELECTRONICS AND COMMUNICATION ENGINEERING**

**IV B.Tech, I-Sem (ECE)** **T C**

**3+1* 4**

## (A0424107) ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

**OBJECTIVES:**

- In this subject, the student can able to read the basic characteristics and the errors associated with an instrument.
- Studies on various analyzers and signal generators and can analyze the frequency component of a wave generated and its distortion levels.
- Studies on the difference between the various parameters which are to be measured that are getting out from the different sensors.
- Studies on the basics of instrumentation and various signal measurements and can signal condition the circuit to the required level which are getting out from the sensor.

**OUTCOMES:**

- Student can able to do the various operation of measuring the physical parameters and using different instruments.
- Students can able the capability to design the circuit and can condition the circuit getting out from the sensors.
- Students can analyze which signal is getting out from the sensors & what type of instrument are to be used to measure that signal can be know well.
- The subject provides the students a clear in sight into the working level in measuring the signal and the instruments.

**UNIT I: ELECRICAL MEASUREMENTS**: Electrical standards: ampere, voltage, resistance, capacitance & inductance standards-Suspension Galvanometer-Torque & deflection of the galvanometer-PMMC mechanism-DC Ammeters-DC voltmeters-Voltmeter sensitivity-Series and Shunt type ohm meters-Multimeters-Alternating current indicating instruments: electrodynamometer, rectifier type-Thermo instruments-Electrodynamometers in power measurements-Watt hour meter-Power factor meter.

**UNIT II: BRIDGE MEASUREMENTS**: Resistance Measurement: Wheat stone bridge, Kelvin bridge- AC bridges: Condition for bridge balance- Inductance measurement: Maxwell Bridge, Hay Bridge- Capacitance measurement: Schering Bridge- Frequency measurement: Wein Bridge- Problems of shielding and grounding.

**UNIT III: ELECTRONIC MEASUREMENTS**: FET input electronic volt-ohm-ammeters- AC voltmeters: rectifier type, true RMS type- Digital voltmeters: Ramp, Dual slope integration & SAR types – Q meter- Vector impedance meter-Vector volt meter- RF power and voltage measurement.

**UNIT IV: OSCILLOSCOPES**: Oscilloscope block diagram- Vertical deflection system-Delay line-Horizontal deflection system-Vertical I/p and sweep generator signal synchronization-Oscilloscope probes: 1:1 probes, attenuator probes, active probes, current probes- Oscilloscope controls-Measurement of voltage, frequency, phase and pulse- Multi I/p oscilloscopes: dual beam, dual trace- Sampling oscilloscopes- Digital storage oscilloscopes.

**UNIT V: SIGNAL GENERATORS AND ANALYZERS**: Low-frequency signal generators- Function generators- Pulse generators- RF signal generators- Frequency synthesized signal generator- Heterodyne wave analyzer- Harmonic distortion analyzers- Spectrum analyzer (Basics only).

**UNIT VI: FREQUENCY & TIME MEASUREMENT**: Time & frequency standards - Frequency measurement - time base - Period measurement - Measurement errors.

**TEXT BOOKS:**

1. Modern Electronic Instrumentation and Measurement Techniques- Albert D. Helfrick, Willium D. Cooper- PHI-2002
2. Electronic Instrumentation and Measurements- David A. Bell-PHI-2nd edition-2003.

**REFERENCES:**

1. A course in Electrical and Electronic Mesurements and Instrumentation- A.K. Sawhney- Dhanpati Rai&CO-7th edition-2005
2. Electronic Instrumentation- H Kalsi- TMH-3rd edition
3. Electronic Measurements and Instrumentation- Oliver and Cage- TMH

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**ELECTRONICS AND COMMUNICATION ENGINEERING**

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**3+1* 4**

## (A0425107) OPTICAL COMMUNICATIONS

**OBJECTIVES:**

- The course gives an account of optical Communication starting with the basic of fiber optics.
- To give clear understanding of various components such as Optical fibers, Photo detectors, connectors, coupling devices and optical amplifiers Knowledge of various components used in optical networks
- Knowledge of modulation and demodulation techniques used in optical networks
- Knowledge about Various topologies used to construct an optical networks
- Knowledge about OTDM and OCDMA Techniques

**OUTCOMES:**

- Graduate will demonstrate the ability to design and conduct experiments, analyze and interpret data.
- Graduate will demonstrate the ability to design a system, component or process as per needs and specification.
- Initiate an expose the newcomers to exciting area of optical communication.
- Aware about SONET/SDH and its application.
- Graduate will develop confidence for self education and ability for life -long learning.

**UNIT I:** Overview of optical fiber communication - Historical development, The general system, advantages of optical fiber communications. Optical fiber wave guides- I ntroduction, Ray theory transmission, Total Internal Reflection, Acceptance angle, Numerical Aperture, Skew rays.

**UNIT II: Cylindrical fibers**- Modes, Vnumber, 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 III:** Signal distortion in optical fibers- Attenuation, Absorption, Scattering and Bending losses, Core and Cladding losses. Material dispersion, Wave-guide dispersion, Polarization mode dispersion, Intermodal dispersion. Pulse broadening

**UNIT IV: OPTICAL SOURCES AND DETECTORS**: 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. Optical detectors- Physical principles of PIN and APD, Detector response time, Temperature effect on Avalanche gain, Comparision of Photodetectors.

**UNIT V:** Optical fiber Connectors- Connector types, Single mode fiber connectors, Connector return loss. Fiber Splicing- Splicing techniques, Splicing single mode fibers. Fiber alignment and joint loss- Multimode fiber joints, single mode fiber joints,.

**UNIT VI:** 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. WDM, Necessity, Principles, Types of WDM, Measurement of Attenuation and Dispersion

**TEXT BOOKS:**

1. Optical Fiber Communications – Gerd Keiser, Mc Graw-Hill International edition, 3rd Edition, 2000.
2. Optical Fiber Communications – John M. Senior, PHI, 2nd Edition, 2002.

**RERFERENCES :**

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.

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**ELECTRONICS AND COMMUNICATION ENGINEERING**

**IV B.Tech, I-Sem (ECE)** **T C**
**3+1* 4**

## (A0426107) DIGITAL IMAGE PROCESSING

**OBJECTIVES:**

- To know the fundamentals of Image Processing
- To know sampling and reconstruction procedures.
- To know various transforms used in image Processing.
- To know about various techniques of image enhancement, reconstruction and image compression.
- To design image processing systems.

**OUTCOMES:**

- Develops ability to identify, formulate &solve problems involving images.
- Develops ability to design &conduct experiments, analyze &interpret image data.
- To design a software, Component or process as per needs &specifications.
- It will demonstrate the skills to use modern engineering tools, software's &equipment to analyze problems.
- Develop confidence for self education &ability for life-long learning.
- It will show the ability to participate &try to succeed in competitive Exams.

**UNIT I**

**DIGITAL IMAGE FUNDAMENTALS**: Introduction, Image sensing & acquisition, Concept of gray levels. Gray level to binary image conversion. Sampling and quantization. Relationship between pixels. Imaging Geometry.

**UNIT II**

**IMAGE TRANSFORMS**: 2-D FFT, Properties. Walsh transform, Hadamard Transform, Discrete cosine Transform, Haar transform, Slant transform, Hotelling transform.

**UNIT III**

**IMAGE ENHANCEMENT**: Enhancement in Spatial Domain: Point processing. Histogram processing. Spatial filtering. Enhancement in frequency domain: Image smoothing, Image sharpening, Basics of color image processing.

**UNIT IV**

**IMAGE RESTORATION**: Degradation model, Algebraic approach to restoration, Inverse filtering, Least mean square filters, Constrained Least Squares Restoration, Interactive Restoration.

**UNIT V**

**IMAGE SEGMENTATION**: Introduction, Detection of discontinuities. Edge linking and boundary detection, Thresholding, Region oriented segmentation.

**UNIT VI**

**IMAGE COMPRESSION**: Redundancies and their removal methods, Fidelity criteria, Image compression models, Source encoder and decoder, Error free compression, Lossy compression.

**TEXT BOOK :**

1. Digital Image processing – R.C. Gonzalez & R.E. Woods, Addison Wesley/ Pearson education,2nd Education, 2002.

**REFERENCES :**

1. Fundamentals of Digital Image processing – A.K.Jain , PHI.
2. Digital Image processing using MAT LAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Edition, PEA, 2004.
3. Digital Image Processing – William K. Pratt, John Wilely, 3rd Edition, 2004.
4. Fundamentals of Electronic Image Processing – Weeks Jr., SPIC/IEEE Series, PHI.
5. Digital image processing by S.Jayaraman, S.Esakkirajan & T.Veera Kumar, Tata McGraw Hill, 2010.

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**ELECTRONICS AND COMMUNICATION ENGINEERING**

**IV B.Tech, I-Sem (ECE)** **T C**

**3+1* 4**

# (A0427107) CELLULAR AND MOBILE COMMUNICATIONS

**ELECTIVE-I**

**OBJECTIVES:**

- To enable the student to synthesis and analyze wireless and mobile cellular communication systems over a stochastic fading channel.
- To provide the student with an understanding of advanced multiple access techniques.
- To provide the student with an understanding of diversity reception techniques.
- To give the student an understanding of digital cellular systems (GSM, CDMA One, GPRS, CDMA 2000, and W-CDMA).

**OUTCOMES:**

- Able to analyze and design wireless and mobile cellular systems.
- Ability to work in advanced research wireless and mobile cellular programs.
- Students will gain the skill to design a cellular system according to the Traffic load, mobile cellular system planning.
- It will demonstrate the skills to use modern engineering tools, software's equipment to analyze problems.

**UNIT I**

**INTRODUCTION TO CELLULAR MOBILE SYSTEMS**: Limitations of conventional mobile telephone systems ,A basic cellular system, Performance criteria, uniqueness of mobile radio environment, operation of cellular systems, Hexagonal shaped cells, Elements of mobile radio system design, General description of the problem, concept of frequency channels, Co-channel Interference Reduction Factor, desired C/I from a normal case in a omni directional Antenna system, Cell splitting,

**UNIT II**

**INTERFERENCE**: Introduction to Co-Channel Interference, real time Co-Channel interference, Co-Channel measurement, design of Antenna system, Antenna parameters and their effects, Non co channel interference. **Cell site and mobile antennas**: Omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, high gain antennas.

**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 antenna height gain, form of a point to point model.

**UNIT IV**

**FREQUENCY MANAGEMENT, CHANNEL ASSIGNMENT AND HANDOFF**: Numbering and grouping, setup access and paging channels channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells. Handoff :types of handoff, handoff initiation, delaying handoff, forced handoff, mobile assigned handoff. Intersystem handoff

**UNIT V**

**INTRODUCTION TO CELLULAR SYSTEMS**: Advantages of digital systems, Analogy to modulation schemes, Introduction to digital technology, ARQ techniques, Digital speech, Digital mobile telephony, practical multiple access schemes. Analog and Digital cellular systems.

**UNIT VI**

**DIGITAL CELLULAR SYSTEMS**: Global system for mobile(GSM), Gsm architecture, GSM Air specifications , Gsm channels, Speech processing in GSM,CDMA

**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. Wireless and Mobile Communications – Lee McGraw Hills, 3rd Edition, 2006.
2. Wireless Communication and Networking – Jon W. Mark and Weihua Zhqung, PHI, 2005.
3. Wireless Communication Technology – R. Blake, Thompson Asia Pvt. Ltd., 2004.

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**ELECTRONICS AND COMMUNICATION ENGINEERING**

**IV B.Tech, I-Sem (ECE)** **T C**
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## (A0428107) SATELLITE COMMUNICATIONS

**ELECTIVE-I**

**OBJECTIVES:**

- To introduce the principles of Satellite Communication systems.
- To introduce how a Satellite Communication system successfully transfers information from one earth station to another.
- To introduce the basic concepts of orbital mechanics and launchers.
- To introduce the basic concepts and designing of Satellite links..
- To introduce the basic concepts of earth station transmitter and receivers.
- To introduce the basic concepts of various multiple access techniques and GPS systems.

**OUTCOMES:**

- Students can determine the location of Satellite.
- Students can design satellite uplink and downlink.
- Students can design earth station transmitter, receiver and antenna systems.

**UNIT I**

**INTRODUCTION**: Basic Concepts of Satellite Communications, Frequency allocations for Satellite Services, Applications, Modulation Techniques used (Elementary treatment only)

ORBITAL MECHANICS AND LAUNCHERS: Orbital Mechanics, Look Angle determination, Orbital perturbations, Orbit determination, launches and launch vehicles, Orbital effects in communication systems performance.

**UNIT II**

**SATELLITE SUBSYSTEMS**: Attitude and orbit control system, telemetry, tracking, Command and monitoring, power systems, communication subsystems, Satellite antennas.

**UNIT III**

**SATELLITE LINK DESIGN**: Basic transmission theory, system noise temperature and G/T ratio, Design of down link, up link design, Design of satellite links for specified C/N.

**UNIT IV**

**MULTIPLE ACCESS**: Frequency division multiple access (FDMA): Intermodulation, Calculation of C/N with intermodulation. Time division Multiple Access (TDMA): Frame structure. Satellite Switched TDMA, Onboard processing, Demand Access Multiple Access (DAMA), Code Division Multiple access (CDMA), Spread spectrum transmission and reception.

**UNIT V**

**EARTH STATION TECHNOLOGY**: Introduction, Transmitters, Receivers, Antennas, Tracking systems, Terrestrial interface.

**LOW EARTH ORBIT AND NON-GEOSTATIONARY SATELLITE SYSTEMS**: Orbit considerations, coverage and frequency considerations.

**UNIT VI**

**SATELLITE NAVIGATION & THE GLOBAL POSITIONING SYSTEM**: Radio and Satellite Navigation, GPS Position Location principles, GPS Receivers and codes, Satellite Signal Acquisition, GPS Navigation Message, GPS Signal Levels, GPS Receiver operation, GPS C/A code accuracy, Differential GPS.

**TEXT BOOKS:**

1. Satellite Communications – Timothy Pratt, Charles Bostian and Jeremy Allnutt, WSE Wiley Publications, 2nd Edition, 2006.
2. Satellite Communications – Dennis Roddy, McGraw Hill, 3rd Edition, 2001.

**REFERENCES:**

1. Satellite Communications: Design Principles – M. Richharia, BS Publications, 2nd Edition, 2003.
2. Satellite Communication – Dr.D.C Agarwal, Khanna Publications, 5th Ed.
3. Fundamentals of Satellite Communications – K.N. Raja Rao, PHI, 2004
4. Satellite Communications Engineering – Wilbur L. Pritchard, Robert A Nelson and Henri G.Suyderhoud, 2nd Edition, Pearson Publications, 2003.

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**ELECTRONICS AND COMMUNICATION ENGINEERING**

**IV B.Tech, I-Sem (ECE)** **T C**
**3+1* 4**

## (A0429107) SPREAD SPECTRUM COMMUNICATIONS

**ELECTIVE-I**

**OBJECTIVES:**

- To understand the general concepts of spread spectrum
- To generate spread spectrum signals.
- To study various applications of spread spectrum.
- To learn the working operation of CDMA systems.

**OUTCOMES:**

- Students are able to understand the general concepts of spread spectrum.
- Students are familiar with the generation of generate spread spectrum signals.
- Students are familiar with various applications of spread spectrum and working operation of CDMA systems.

**UNIT-I**

**FUNDAMENTALS OF SPREAD SPECTRUM**: General concepts, Direct sequence (DS)), Pseudo noise (PN), Frequency hopping, Time hopping, Comparison of Modulation methods, Hybrid spread spectrum systems, Chirp spread spectrum, Baseband modulation techniques.

**UNIT-II**

**ANALYSIS OF AVOIDANCE-TYPE SPREAD SPECTRUM SYSTEMS**: Properties of PN sequences, Classes of periodic sequences, Properties of m sequences, Partial correlation, PN signal from PN sequences, Partial correlation of PN signals, The PN signal, De-spreading the PN signal, Interference rejection, Output signal to noise ratio, Anti-jam characteristics, Interception, Energy bandwidth efficiency.

**UNIT-III**

**ANALYSIS OF AVOIDANCE-TYPE SPREAD SPECTRUM SYSTEMS**: The frequency hopped signal, Interference rejection in a frequency hopping receiver, the time hopped signal.
GENERATION OF SPREAD SPECTRUM SIGNALS: Shift register sequence generators, discrete frequency synthesizers, SAW device PN generators, Charge coupled devices, Digital tapped delay lines.

**UNIT-IV**

**DETECTION OF SPREAD SPECTRUM SIGNALS-TRACKING**: Coherent direct sequence receiver, other method of carrier tracking, Delay lock loop analysis, Tau-Dither loop, Coherent carrier tracking, Non coherent frequency hop receiver.
**DETECTION OF SPREAD SPECTRUM SIGNALS-ACQUISITION**: Acquisition of spread spectrum signals, Acquisition cell by cell searching, Reduction of acquisition time, Acquisition with matched filters, Matched filters for PN sequences, Matched filters for frequency hopped signals, matched filters with acquisition-aiding waveform.

**UNIT-V**

**APPLICATION OF SPREAD SPECTRUM TO COMMUNICATIONS**: General capabilities of spread spectrum, Multiple access considerations, Energy and bandwidth efficiency in multi access, Selective calling and Identification, Anti-jam considerations, Error correction coding, Intercept consideration (AI), Miscellaneous considerations, Examples of spread spectrum system.

**UNIT-VI**

**CODE DIVISION MULTIPLE ACCESS DIGITAL CELLULAR SYSTEMS**: Introduction, Cellular radio concept, CDMA Digital cellular systems, Specific examples of CDMA digital cellular systems.

**TEXT BOOKS:**

1. George.R.Cooper and Clare D.McGillem, Modern Communications and Spread Spectrum, McGraw Hill.
2. Roger L.Peterson, Rodger E.Ziemer & David E.Ziemer & David E.Both, Introduction to spread spectrum communications, Prentice hall, 1995.

**REFERENCE BOOKS**:

1. Dr.Kamilo Feher, Wireless Digital Communications: Modulation & Spread Spectrum Applications, PHI, 1999.
2. Upena Datal, Wireless Communication, Oxford Higher Education, 2009.
3. Andrea Goldsmith, Wireless Communications, Cambridge University Press, 2005.

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## (A0430107) FUNDAMENTALS OF OPERATING SYSTEMS

**ELECTIVE-II**

**OBJECTIVES:**

- To understand the architecture & structure, services.
- To learn the principles of deadlock, Memory management.
- To learn the basics of UNIX and LINUX.

**OUTCOMES:**

- Able to understand the architecture & structure, services.
- Able to learn the principles of deadlock, Memory management.
- Able to learn Linux and UNIX kernel.

**UNIT I**

Operating Systems Overview: Software, OS- evolution, features, types, what Operating systems do, computer system architecture & structure, special purpose systems, operating system services and systems calls and their types, system boot.

Process overview & scheduling, inter-process communication, threads overview & multithreading models, process scheduling- overview, scheduling criteria & algorithms.

**UNIT II**

Memory Management**:** Swapping, contiguous memory allocation, paging, segmentation, virtual memory, demand paging, page-replacement algorithms.

**UNIT III**

Principles of deadlock: system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock.

**UNIT IV**

File system Interface**:** The concept of a file, Access Methods, Directory structure, File System implementation**:** File system structure, file system implementation, directory implementation, allocation methods, free-space management.

Mass-storage structure: overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, RAID structure.

**UNIT V**

Linux: History, design principles, kernel modules, process management, scheduling, memory management, file systems, input and output.

**UNIT VI**

UNIX: History, system calls, process management, memory management, input and output, file system and allocation methods.

**TEXT BOOKS:**

1. Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Eighth edition, John Wiley.
2. Operating Systems, A Concept based Approach-D.M.Dhamdhere, Second Edition, TMH.

**REFERENCES:**

1. OS incorporating UNIX and windows, 3rd edition BPB, Colin Ritche.
2. Operating Systems: Internals and Design Principles, Stallings, Sixth Edition–2009, Pearson Education.
3. Introduction to OS, PHI, NIIT.
4. Operating Systems, S.Haldar, A.A.Aravind, Pearson Education.
5. Principles of Operating Systems, B.L.Stuart, Cengage learning, India Edition.
6. Operating Systems, A.S.Godbole, Second Edition, TMH.
7. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
8. Operating Systems, G.Nutt, N.Chaki and S.Neogy, Third Edition, Pearson Education.
9. Operating Systems, R.Elmasri, A,G.Carrick and D.Levine, Mc Graw Hill.

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**ELECTRONICS AND COMMUNICATION ENGINEERING**

**IV B.Tech, I-Sem (ECE)** **T C**

**3+1* 4**

# (A0322106) OPERATION RESEARCH

**ELECTIVE-II**

**OBJECTIVES:**

- Improving management skills by applying management theories in a real life.
- Preparing a basic marketing plan.
- Understanding and interpreting financial statements.
- Applying cost accounting principles in decision makings.
- Applying economic principles in day to day business operations.
- Practicing an effective inventory control system for an organization.

**OUTCOMES:**

- Able to to understand various operation research models
- Able to solve transportation and sequencing problem.
- Able to solve deterministic models.
- Able to learn dynamic programming and simulation

**UNIT – I**

History of operations research-features of operations research-scientific method in Operations research-types of models-general methods for solving operations research models-Applications of Operations research.

**Linear Programming:** Introduction-structure of linear programming model- Formulation–Graphical solution – Simplex algorithm (maximization case and minimization case), Special cases-Duality.

**UNIT-II**

**Transportation:** Introduction-methods of finding initial solution-optimal solution-variations in transportation problem-maximization.

**Assignment problems**: Hungarian method of Assignment problem- variations of the assignment problem-Traveling salesman problem.

**Sequencing:** processing n jobs through two machines- processing n jobs through three machines- processing n jobs through m machines- Two jobs through m machines.

**UNIT-III**

**Replacement and maintenance models:** Introduction-types of failure-replacement of items whose efficiency deteriorates with time- replacement of items that fail completely-staffing problem.

**UNIT-IV**

**Theory of games:** Introduction-two person zero-sum games-pure strategies-mixed strategies-principles of dominance- solution methods of games without saddle point: Algebraic method- arithmetic method-graphical method-Linear programming method.

**Queuing theory:** introduction-characteristics of queuing system-probability distributions in queuing system-single server queuing models-multi server queuing models.

**UNIT-V**

**Inventory:** introduction-functional role of inventory-reasons for carrying inventory-inventory control models without shortages and with shortages-EOQ models with quantity discounts-instantaneous probabilistic demand without set-up cost.

**UNIT-VI**

**Dynamic programming:** introduction-Bellman's principle of optimality-dynamic programming under certainty- linear programming problem.

**TEXT BOOKS:**

1. Operations Research- theory and applications, second edition, J.K. Sharma/MacMillian publications.
2. Introduction to operations research, Hamdy A. Taha/PHI publications.

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## (A0431107) OPTIMIZATION TECHNIQUES

**ELECTIVE-II**

**OBJECTIVES:**

- To understand different classical Optimization Techniques.
- To understand and solve Linear Programming Standard form of a linear programming problem.
- To understand Unconstrained & Constrained Nonlinear Programming.

**OUTCOMES:**

- Able to understand and analyse classical Optimization Techniques.
- Able to understand and solve Linear Programming Standard form of a linear programming problem.
- Able to understand Unconstrained & Constrained Nonlinear Programming.

**UNIT – I**

Introduction and Classical Optimization Techniques: Statement of an Optimization problem – design vector – design constraints – constraint surface – objective function – objective function surfaces – classification of Optimization problems.

**UNIT – II**

Classical Optimization Techniques: Single variable Optimization – multi variable Optimization without constraints – necessary and sufficient conditions for minimum/maximum – multivariable Optimization with equality constraints.

Solution by method of Lagrange multipliers – multivariable Optimization with inequality constraints – Kuhn – Tucker conditions.

**UNIT – III**

Unconstrained Nonlinear Programming & Optimization Techniques: One – dimensional minimization methods: Classification, Fibonacci method and Quadratic interpolation method, Univariate method, Powell's method and steepest descent method.

**UNIT – IV**

Constrained Nonlinear Programming: Characteristics of a constrained problem, Classification, Basic approach of Penalty Function method; Basic approaches of Interior and Exterior penalty function methods. Introduction to convex Programming Problem.

**UNIT – V**

Modern Methods of Optimization: Introduction, Genetic algorithms, Simulated annealing, particle & warm optimization, ant colony optimization, fuzzy optimization, neural network based optimization.

**UNIT – VI**

**Multi-Objective Genetic Algorithms:** Pareto's analysis, Non-Dominated front, Multi objective genetic algorithms, Non-Dominated sorted genetic algorithms, convergence criterion, applications of multi-objective problems.

**TEXT BOOKS:**

1. "Engineering optimization: Theory and practice"-by S. S.Rao, New Age International (P) Limited, 4th edition, 1998.
2. "Introductory Operations Research" by H.S. Kasene & K.D. Kumar, Springer (India), Pvt .LTd.

**REFERENCE BOOKS:**

1. "Optimization Methods in Operations Research and systems Analysis" – by K.V. Mital and C. Mohan, New Age International (P) Limited, Publishers, 3rd edition, 1996.
2. Operations Research – by Dr. S.D.Sharma.
3. "Operations Research: An Introduction" – by H.A. Taha, PHI Pvt. Ltd., 6th edition
4. Linear Programming – by G. Hadley.
5. Multi objective genetic algorithms-Kalyanmay Deb, PHI Publishers.
6. Genetic algorithms in search, optimization and machine learning-D.E.Gold Burg, Addition Wesley publishers.

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**3 2**

# (A0432107) MATLAB TOOLS

**(AUDIT COURSE)**

**OBJECTIVES:**

- To Understand general commands in Matlab.
- TO Learn Matlab Graphics.
- To Learn code composer studio and various debug tools.
- To learn image processing tool box, analyzing and enhancing of images

**OUTCOMES:**

- Student becomes skilled in writing Matlab programming .
- Student Learn Matlab Graphics, composer studio and various debug tools.
- Student learns image processing tool box, analyzing and enhancing of images

**UNIT I**

Introduction to MATLAB: Major components of MATLAB environment, Types of files, General commands, Constants and variables, Operators, Functions, Vectors and Matrices.

**UNIT II**

Polynomials and Input output statements: Different operations of on Polynomials, Characteristics of Polynomials, Derivative and integration of Polynomials, Polynomials with matrix arguments, Different input output statements, File input output functions.

**UNIT III**

MATLAB GRAPHICS: Introduction, Two dimensional plots, Multiple plots, Sub plots, Specialized two dimensional plots, Three dimensional plots.

**UNIT IV**

Code Composer Studio: Introduction, Target and host setup, Create and build a basic CCS project, Debug tools included with CCS, Applications of CCS.

**UNIT V**

Introduction to image processing tool box, Basic concepts, Read and display of an image, Image types, Conversion between image types, Conversion between image classes, Reading and writing of image data, displaying the images, Spatial transforms, Fourier transform, DCT.

**UNIT VI**

Analyzing and enhancing of images: Image analysis, Intensity adjustment, Histogram based operations, Image deblurring, Neighborhood operations.

**TEXT BOOKS:**

1. MATLAB & Its applications in Engineering by Raj Kumar Bansol, Ashok Kumar Goel & Monoj Kumar Sharma, Pearson, 3rd edition, 2011.
2. CCS development tools V3-I Lab manual.
3. Math works manual for Image processing tool box.

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**3 2**

# (A0483107) DIGITAL SIGNAL & IMAGE PROCESSING LAB

**OBJECTIVES:**

- To design real time DSP systems and real world applications.
- To implement DSP algorithms using both fixed and floating point processors.
- To generate the basis function of different transforms.
- To perform Image processing techniques.

**OUTCOMES:**

- Able to design real time DSP systems and real world applications.
- Able to implement DSP algorithms using both fixed and floating point processors.
- Able to perform various image processing applications

**I. DSP LAB (Any 6 of the following):**

1) Simulation of discrete time systems.
2) Verification of DTFT properties.
3) Stability test.
4) Effect of sampling in frequency and time domain.
5) Design of analog filters.
6) Realization of IIR and FIR transfer functions.
7) Design of IIR & FIR filters.
8) Design of tunable digital filters.
9) Multirate signal processing techniques: Decimation and interpolation.

II. **Image Processing LAB (Any 4 of the following)**:

1) Verification of image scaling properties.
2) To generate the basis function of different transforms.
3) Image enhancement using special domain and frequency domain techniques.
4) Image restoration using inverse and weiner filtering.
5) Edge detection using various operators.
6) Image compression techniques.

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**3 2**

# (A0484107) MICROWAVE & OPTICAL COMMUNICATIONS LAB

**OBJECTIVES:**

- To verify the characteristics of various microwave components using microwave test bench.
- Initiate an expose the newcomers to exciting area of optical communication

**OUTCOMES:**

- Students acquire applications and testing of microwave components.
- Students acquire knowledge on the various applications of optical fiber communications
- Students develop confidence for self education and ability for life -long learning.

**Minimum Ten Experiments to be conducted:**

**Part – A (Any 6 Experiments):**

1. Reflex Klystron Characteristics.
2. Gunn Diode Characteristics.
3. Attenuation Measurement.
4. Directional Coupler Characteristics.
5. Impedance Measurement.
6. Waveguide parameters measurement.
7. Scattering parameters of Directional Coupler.
8. Scattering parameters of Magic Tee.

**Part – B (Any 4 Experiments):**

1. Characterization of LED.
2. Characterization of Laser Diode.
3. Intensity modulation of Laser output through an optical fiber.
4. Measurement of Data rate for Digital Optical link.
5. Measurement of NA.
6. Measurement of losses for Analog Optical link.
7. Radiation Pattern Measurement of Antennas (at least two antennas).

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## (A0433108) RADAR SYSTEMS

**OBJECTIVES:**

- This course describes the understanding of the components of a radar system and their relationship to overall system performance
- To become familiar with design, operation, and applications of various types of radar systems
- To understand clutter and its effects of radar system performance and learn the principle of target track and various types of radar antennas.

**OUTCOMES:**

- To become familiar with fundamentals of radar.
- To gain in knowledge about the different types of radar and their operation.
- Need for signal detection in radar and various radar signal detection techniques.
- Will demonstrate the ability to design a system component or process as per needs & specifications.
- Will demonstrate the ability to identify, formulate & solve engineering problems.
- Will show the ability to participate and try to succeed in competitive examination

**UNIT I**

**INTRODUCTION TO RADAR**: Basic Radar, The Simple Form of the Radar Equation, Radar block Diagram, Radar Frequencies, Applications of Radar.

THE RADAR EQUATION: Introduction, detection of Signals in Noise, Receiver Noise and the Signal-to-Noise Ratio, Probability Density Functions, Probabilities of detection and False Alarm, Integration of radar Pulses, Radar Cross-section of Targets, Radar Cross-section Fluctuations, Transmitter Power, Pulse Repetition Frequency, Antenna Parameters, System Losses.

**UNIT II**

**CW AND FREQUENCY-MODULATED RADAR**: The Doppler Effect, CW Radar, Frequency-Modulated CW Radar, Air-Borne Doppler Navigation, Multiple –Frequency CW Radar.

**UNIT III**

**MTI AND PULSE DOPPLER RADAR**: Introduction to Doppler and MTI Radar, Delay-line Cancellers, Staggered Pulse-Repetition Frequencies, Doppler Filter Banks, Digital MTI Processing, Moving Target Detector, Limitations of MTI Performance, MTI from a moving Platform(AMTI), Pulse Doppler Radar.

**UNIT IV**

**TRACKING RADAR**: Tracking with Radar, Monopulse Tracking, Conical Scan and Sequential Lobing, Limitations of Tracking Accuracy, Low-Angle Tracking, Tracking in Range, Other Tracking Radar Topics, and Comparison of Trackers.

**UNIT V**

**RECEIVERS AND DETECTION OF RADAR SIGNALS IN NOISE**: The Radar Receiver, Noise Figure, Mixers, Low-Noise Front-Ends, Displays, Duplexers and Receiver Protectors; Matched-Filter Receiver, Correlation Detection, Detection Criteria, Detector Characteristics, Performance of Radar Operator, Automatic Detection, Constant-False-Alarm-Rate (CFAR) Receiver, ECMS & ECCMS.

**UNIT VI**

**INFORMATION FROM RADAR SIGNALS**: Introduction, Basic Radar measurements, , Theoretical accuracy of Radar measurements, Ambiguity diagram, Pulse compression, Target recognition.

**TEXT BOOKS:**

1. Introduction to Radar systems by Merrill I.Skolnik, Second edition, Tata McGraw Hill.
2. Introduction to Radar systems by Merrill I.Skolnik, Third edition, Tata McGraw Hill.

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# (A0511105) COMPUTER NETWORKS

**ELECTIVE-III**

**(Common to CSE & ECE)**

**OBJECTIVES:**

- An understanding of the overriding principles of computer networking, including protocol design, protocol layering, algorithm design, and performance evaluation.
- An understanding of computer networking theory, including principles embodied in the protocols designed for the application layer, transport layer, network layer, and link layer of a networking stack.
- An understanding of specific implemented protocols covering the application layer, transport layer, network layer, and link layer of the Internet (TCP/IP) stack.
- An understanding of security issues.

**OUTCOMES:**

- Students will learn to list and classify network services, protocols and architectures, explain why they are layered.
- Student will learn to explain key Internet applications and their protocols.
- Students will learn to explain security issues in computer networks.
- To master the terminology and concepts of the OSI reference model and the TCP-IP reference model.
- To master the concepts of protocols, network interfaces, and Design/performance issues in local area networks and wide area networks.
- To be familiar with wireless networking concepts.
- To be familiar with contemporary issues in networking technologies.
- To be familiar with network tools and network programming.

**UNIT I:** Introduction: Network Hardware, Network Software, References Models. The Physical Layer: Guided Transmission Media, Communication Satellites, The public Switched Telephone Network- The Local Loop: Modern ADSL, and wireless, Trunks and Multiplexing, Switching

**UNIT II:** The Data Link Layer: Data link Layer Design Issues, Elementary Data Link Protocols, Sliding Window Protocols.

**UNIT III:** The Medium Access Control Sublayer: Multiple Access protocols, Ethernet- Ethernet Cabling, Manchester Encoding, The Ethernet MAC Sublayer Protocol. The Binary Exponential Backoff Algorithm, Ethernet Performance, Switched Ethernet, Fast Ethernet. Wireless LANs- The 802.11 Protocol Stack, The 802.11 Physical Layer, The 802.11 MAC SubLayer Protocol, The 802.11 Frame Structure .

**UNIT IV:** The Network Layer: Network Layer Design Issues, Routing Algorithms(Shortest path, Flooding, Distance Vector, Link state and Hierarchical routing, Broad cast routing , Multicast routing), Congestion Control Algorithms, Internetworking.

**UNIT V:** The Transport Layer: The Transport Service, Elements of Transport Protocols, The Internet Transport Protocols: UDP, The Internet Transport Protocols: TCP.

**UNTI VI:** The Application Layer: DNS-The Domain Name System, Electronic Mail, The World Wide Web. Network Security: Cryptography, Symmetric-Key Algorithms, Public-Key Algorithms, Digital Signatures.

**TEXT BOOKS:**

1. Computer Networks, Andrew S. Tanenbaum, Fouth Edition, Pearson Education.

**REFERENCES:**


1. Computer Communications and Networking Technologies, Michael A. Gallo, William M. Hancock, Cengage Learning.
2. Computer Networks: Principles, Technologies and Protocols for Network Design, Natalia Olifer, Victor Olifer, Wiley India.
3. Data Communications and Networking, Behrouz A. Forouzan, Fourth Edition, Tata McGraw Hill.
4. Understanding Communications and Networks, Third Edition, W.A.Shay, Cengage Learning.
5. Computer and Communication Networks, Nader F. Mir, Pearson Education
6. Computer Networking: A Top-Down Approach Featuring the Internet, James F.Kurose, K.W.Ross, Third Edition, Pearson Education.
7. Data and Computer Communications, G.S.Hura and M.Singhal, CRC Press, Taylor and Francis Group.

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## (A0434108) DSP PROCESSORS ARCHITECTURE & APPLICATIONS

**ELECTIVE-III**

**OBJECTIVES:**

- To understand the concept of DSP Architecture & comparison of this with that of microprocessors.
- To understand addressing modes, instruction sets , pipelining and application programs in TMS320C54XX processor
- To understand the architectural issues of programmable DSP devices and their relationship to the algorithmic requirements, architectures of commercially popular programmable devices and the use of such devices for software development and system design
- To highlight the suitability of programmable DSP devices for various application areas and motivate to design systems around these devices.

**OUTCOMES:**

- To become familiar with fundamentals of DSP Processors & architectures.
- To gain in knowledge about the different types of processors and their operation.
- Will demonstrate the ability to design a system component or process as per needs & specifications.
- Will demonstrate the ability to identify, formulate & solve engineering problems.

**UNIT I: ARCHITECURE OF DSP PROCESSOR (TMS320C5X):** Introduction, Bus structure, Central Arithmetic Logic Unit(CALU),Auxiliary Register ALU (ARAU),Index Register(INDX),Auxiliary Register Compare Register(ARCR),Block Move Address Register(BMAR)Block Repeat Registers (RPTC, BRCR, PASR,PAER), Parallel Logic Unit(PLU),Memory- Mapped Registers, Program Controller, Some flag in the status registers

**UNIT II: 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 III: 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 IV: 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 V: IMPLEMENTATIONS OF BASIC DSP ALGORITHMS**: The Q-notation, FIR Filters, IIR Filters, Interpolation Filters, Decimation Filters,
IMPLEMENTATION OF FFT ALGORITHMS: An FFT Algorithm for DFT Computation, A Butterfly Computation, Overflow and scaling, Bit-Reversed index generation, An 8-Point FFT implementation on the TMS320C54XX, Computation of the signal spectrum.

**UNIT VI: Interfacing & APPLICATIONS OF PROGRAMMABLE DSP DEVICES**: DSP based Biotelemetry receiver, A speech processing system, An Image processing system, Memory interfacing, Synchronous serial interface, MCBSP, A CODEC interface circuit.

**TEXT BOOKS:**

1. Digital Signal Processing – Avtar Singh and S. Srinivasan, Thomson Publications, 2004.
2. Digital Signal Processors, Architecture, Programming and Applications – B. Venkata Ramani and M. Bhaskar, TMH, 2004.

**REFERENCES:**

1. Digital Signal Processing – Jonathan Stein, John Wiley, 2005.
2. DSP Processor Fundamentals, Architectures & Features – Lapsley et al. S. Chand & Co, 2000.

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# (A0435108) MIXED SIGNAL DESIGN

**ELECTIVE-III**

**OBJECTIVES:**

- To study and design various Active filters and Digital filters.
- To study and design analog and mixed signals through HDL .

**OUTCOMES:**

- Student can design various Active filters and Digital filters.
- Student can design analog and mixed signals through VHDL and VERILOG .

**UNIT I**

**ACTIVE FILTERS**: Active RC Filters for Monolithic Filter Design: First and Second Order Filter Realizations, Universal Active Filter (KHN),Self Tuned Filter, Programmable Filters.

**UNIT II**

**SWITCHED CAPACITOR FILTERS**: Switched Capacitor Resisters, Amplifiers, Comparators, Sample and Hold Circuits, Integrator Biquad.

**CONTINUOUS TIME FILTERS**: Introduction to Gm, C filters, Bipolar Transconductors, CMOS Transconductors using Triode Transistors, Active Transistors, Bi-CMOS Transconductors, MOSFET C Filters, Tuning Circuitry, Dynamic Range Performance.

**UNIT III**

DIGITAL FILTERS: Sampling, Decimation, Interpolation, Implementation of FIR and IIR Filters.

**UNIT IV**

**SIGMA DELTA CONVERTERS**: Over Sampled Converters, Over Sampling without Noise and With Noise, Implementation Imperfections, First Order Modulators, Decimal Filters, Second Order Filters, Sigma Delta DAC and ADCs.

**UNIT V**

**ANALOG AND MIXED SIGNAL EXTENSIONS TO VERILOG**: Introduction, Equation Construction, Solution, Waveform Filter Functions, Simulator, Control Analysis, Multi-Disciplinary Model.

**UNIT VI**

**ANALOG AND MIXED SIGNAL EXTENSIONS TO VHDL**: Introduction, Language Design Objectives, Theory of Differential Algebraic Equations, The 1076.1 Language, Tolerance Groups, Conservative Systems, Time and Simulation Cycle, A/D and D/A Interaction, Quiescent Point, Frequency Domain Modeling and Examples.

**TEXT BOOKS:**

1. David A. Johns, Ken Martin, “Analog Integrated Circuit Design”, John Wiley and Sons.
2. Benhard Razavi , “Data Converters”, Kluwer Publishers, 1999.
3. T Sividis Y.P, “Mixed Analog and Digital VLSI Devices and Technology,” McGraw Hill, 1996.

**REFERENCES:**

1. Antoniou, “Digital Filters Analysis and Design,” Tata McGraw Hill,1998.
2. Phillip Allen and Douglas Holm Berg, “CMOS Analog Circuit Design,” Oxford University Press, 2000.

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## (A0436108) WIRELESS COMMUNICATIONS AND NETWORKS

**ELECTIVE-IV**

**OBJECTIVES:**

- To emphasize the core principles of wireless communication systems.
- To make the students to analyze the networking in wireless communication.
- To make the student aware of the latest trends in wireless communications.
- To support student to solve the technical challenges in wireless communications and networks.

**OUTCOMES:**

- Acquires knowledge in the core principles of wireless communication systems.
- Able to analyze the networking in wireless communication.
- Acquires knowledge in the latest trends of wireless communications.
- Able to come out with the problem statement and solve the challenges in the system.

**UNIT-I**

**OVERVIEW OF WIRELESS COMMUNICATIONS**: History of Wireless Communications, Wireless vision, Technical issues, Current wireless systems-cellular telephone systems, cordless phones, wireless LANs, Wide area wireless data services, satellite networks, Zigbee, Bluetooth, ultra band radios.

**UNIT II**

**MOBILE RADIO PROPAGATION**: Large-Scale Path Loss, Introduction to Radio Wave Propagation, Free Space Propagation Model, Propagation Mechanisms, Reflection, Ground Reflection (Two-Ray) Model, Diffraction, Scattering.

Small-Scale Fading and Multipath, Impulse Response Model of a Multipath Channel, Small-Scale Multipath Measurements, Parameters of Mobile Multipath Channels,

**UNIT III**

**DIVERSITY TECHNIQUES**: Concept of diversity branches and signal paths- Combining methods- Selective diversity combining - Switched combining- maximal ratio combining- Equal gain combining

**UNIT IV**

**WIRELESS LAN TECHNOLOGY**: Infrared LANs, spread spectrum LANs, Narrow band Microwave LANs, IEEE 802 protocol Architecture, IEEE 802 architecture and services,802.11 medium access control,802.11 physical layer.

**UNIT V**

**MOBILE DATA NETWORKS**: Introduction, Data oriented CDPD network, GPRS and Higher data rates, SMS in GSM, Mobile Application Protocol, Bluetooth.

**UNIT VI**

**MULTIPLE ACESS**: TDMA, FDMA, CDMA, CDMA and spread spectrum , Multi carrier modulation, OFDM, Discrete implementation of OFDM..

**TEXT BOOKS:**

1) Wireless Communications by Andrea Goldsmith, Cambridge University press.
2) Wireless Communication, principles & practice" by T.S. Rappaport, PHI, 2001.
3) Wireless Communication and Networking by William Stalling, PHI, 2003.

**REFERENCES:**

1) Wireless Digital Communications-Kamilo Feher,PHI,1999.
2) Wireless Communication-Andrews F.Molisch,Wiley India,2006.
3) Principles of Wireless Networks-Kaveh Pah Lahen and P.Krishna Murtht, Pearson Education,2002

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**3+1* 4**

## (A0437108) FPGA ARCHITECTURE & APPLICATIONS

**ELECTIVE-IV**

**OBJECTIVES:**

- To learn the design and operation of various PLDs
- To understand the architecture and types of FPGA.
- To understand the design of FSM and realization of SM charts.
- To design various adders and multipliers.

**OUTCOMES:**

- Able to learn the design and operation of various PLDs.
- Able to understand the architecture and types of FPGA.
- Able to understand the design of FSM and realization of SM charts.
- Able to design various adders and multipliers

**UNIT I**

**PROGRAMMABLE LOGIC DEVICES**: ROM, PLA, PAL, PLD, FPGA, ALTERA CPLD's and Altera Flex 10K serie,CPLD.

**UNIT II**

**FPGA**: Xilinx logic cell array, CLB,I/O Block, Programmable interconnect, Technology mapping for FPGA: Library based, LUT based, MUX based technology mapping.

**UNIT III**

**TYPES OF FPGA:** Programmable Technology, Xilinx XC 3000,XC4000,Actel FPGA's, Altera FPGA's, AMD FPGA, Quick logic FPGA, Algotronix FPGA,FPGA Design flow.

**UNIT IV**

**FSM**: Finite State Machine, State Transition Table, State assignments for FPGA,s, Problem of the initial state assignment for one hot encoding.

**UNIT V**

**REALIZATION OF SM**: Derivation of SM charts, Realization of SM charts, Alternative realization of SM charts using microprogramming, Linked state machine, one hot state machine, Petri-nets for SM: Basic concepts, properties.

**UNIT VI**

**CASE STUDIES**: Case studies of parallel adder cell, Parallel Adder, Sequential Circuits, Decade Counters, Parallel Multiplier, Parallel Counters.

**TEXT BOOKS:**

1. Fundamentals of logic Design,5/e Charles H Roth. Jr
2. P.K. Chan & S. Mourad, Digital Design Using Field Programmable Gate Array, Prentice Hall(Pte),1994.
3. S. Brown, R. Francis, J. Rose, Z. Vransic Field Programmable Gate Array, Kluwer Pubin 1992.
4. J Old Field, R.Dorf, Field Programmable Gate Arrays, John Wiley & Sons, Newyork,1995.

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## (A0438108) STATISTICAL SIGNAL PROCESSING

**ELECTIVE-IV**

**OBJECTIVES:**

- To learn the special types of Random processors.
- To learn the various Signal Models and Characterization.
- To learn Spectral Estimation, Parametric and Non-Parametric Signal Modelling and Estimation.

**OUTCOMES:**

- Able to learn the special types of Random processors.
- Able to learn the various Signal Models and Characterization.
- Able to learn Spectral Estimation, Parametric and Non-Parametric Signal Modelling and Estimation.

**UNIT – I**

**Random Processes**: Definitions, Ensemble averages, Gaussian processes, stationary processes, the autocovariance and autocorrelation matrices, ergodicity, white noise, the power spectrum, **Filtering random processes, Spectral factorization**, **Special types of Random processes**: Autoregressive Moving Aaverage Processes, Autoregressive Processes, Moving Average Processes, Harmonic Processes.

**UNIT – II**

**Signal modelling**: Introduction, The least squares (direct) method, the pade approximation, **Prony's method:** Pole-zero modelling, Shanks' method, all-pole modelling, linear prediction, application: FIR least squares inverse filters, Iterative prefiltering, Finite data records: The autocorrelation method, The covariance method, Stochastic models: Autoregressive moving average models, autoregressive models, moving average models, application: power spectrum estimation.

**UNIT – III**

**The Levinson Recursion:** Introduction, The Levinson-Durbin recursion: Development of the recursion, the lattice filter, properties, the step-up and step-down recursions, the inverse levinson-durbin recursion, the schur recursion, the cholesky decomposition, the autocorrelation extension problem, inverting a toeplitz matrix, The Levinson recursion, the split levinson recursion.

**UNIT – IV**

**Lattice Filters:** Introduction, The FIR lattice filter, Split lattice filter, IIR Lattice filters: All-pole filter, other all –pole lattice structures, lattice filters having poles and zeros, Wiener Filtering: The FIR wiener filters: Filtering, Linear prediction, Noise cancellation, Lattice representation for the FIR wiener filter, The IIR Wiener filter: Noncausal IIR Wiener filter, The causal IIR wiener filter, Causal wiener filtering, Wiener deconvolution, Discrete Kalman filter.

**UNIT – V**

**Spectrum Estimation-I:** Introduction, Nonparametric methods: The Periodogram, Performance of the Periodogram, The modified Periodogram, Barlett's method: Periodogram averaging, Welch's method: Averaging modified Periodograms, Blackman-Tukey approach: Periodogram smoothing, Performance comparisons, Minimum variance spectrum estimation, The maximum entropy method.

**UNIT – VI**

**Spectrum Estimation-II:** Parametric methods**:** Autoregressive spectrum estimation, moving average spectrum estimation, autoregressive moving average spectrum estimation. Frequency estimation: Eigendecomposition of the autocorrelation matrix, Pisarenko Harmonic Decomposition, Music, other Eigenvector methods, Principal components spectrum estimation: Bartlett frequency estimation, Minimum variance estimation, autoregressive frequency estimation.

**TEXTBOOKS:**

1. Monsoon H. Hayes, Statistical Digital Signal Processing and Modeling, New York, USA: Wiley, 1996, ISBN-0-471-59431-8.
2. A.Papoulis, Probability, Random Variables and stochastic processes, 2nd Ed., McGraw Hill, 1983.

**REFERENCE BOOKS**:

1. Steven M. Kay, Fundamentals of Statistical Signal Processing: Estimation theory, Upper Saddle River, New Jersey, USA: Prentice-Hall, 1993.ISSBN-0-13-345711-7.
2. J. G. Proakis, C. M. Rader, F. Ling, C. L. Nikias, M. Moonen, I. K. Proudler, Algorithms for Statistical Signal Processing, 2002, ISBN 0-13-062219.

**AUTONOMOUS**

**ELECTRONICS AND COMMUNICATION ENGINEERING**

**IV B.Tech, II-Sem (ECE)** **T C**
**3 2**

## (A0439108) MICROWIND & LAB VIEW

**(AUDIT COURSE)**

**OBJECTIVES:**

- To understand the Techlogy and features of microwind.
- To learn the simulation and performance estimations at circuit level
- To learn the basics of labview.

**OUTCOMES:**

- Students understands the Techlogy and features of microwind.
- Students understands the simulation and performance estimations at circuit level
- Students learn the basics of labview.

**UNIT I**

**INTRODUCTION & FEATURES OF MICROWIND**: Nanometer Era, Technology scaling, Microwind design flow, DSCH, Nanoloamda, Virtuoso fab, Prothumb-transient analysis of voltage, current, transfer curve, eye diagram, parametric analysis, simulation on layout, Protutor, MEMsim, SOI, Design trends, Extractions, technology rule files.

**UNIT II**

**SIMULATION AND PERFORMANCE ESTIMATIONS AT CIRCUIT LEVEL**: Basic CMOS inverter-simulation, layout, power, delay, area and metrics calculations, Simulations of basic gates- and, or, xor, nand, 8 to 1 multiplexor, arithmetic circuits-full adder, 4-bit, 8-bit, 16-bit adders, comparator and sequential circuits – basic latch, RS latch, D latch at layout level.

**UNIT III**

**STUDY OF DIFFERENT PARAMETER VARIATIONS AT CIRCUIT LEVEL**: Study of variations of W/L ratio, threshold variations, Process, Voltage and temperature variations on the values of on current, off current, power dissipation, propagation delay and metrics of basic circuits.

**UNIT IV**

**BASICS OF LABVIEW**: Introduction, Components of LabVIEW, Owned and free labels, Tools and other pallets, Arranging Objects, Pop-Up menus, color coding, code debugging, context help.

**UNIT V**

**IMPLEMENTING A VI**: Front panel design, LabVIEW data types, For loop, while loop, timing a VI, case structures, iterative data transfer. Relating Data Arrays, Clusters, type definitions.

**UNIT VI**

**DATA ACQUISITION**: Introduction, classification of signals, guidelines, practical Vs Ideal interfacing, Measurement and Automation explorer, Use of Simple VI's, Use of DAQmx.

**TEXT BOOKS:**

1. Microwind lab user manual.
2. Sanjay Gupta & Joseph John, Virtual Instrumentation Using LabVIEW, TMH, New Delhi.
3. Jovitha Jerome, Virtual Instrumentation Using LabVIEW, PHI, New Delhi.
4. Gary Johnson, Richard Jennings, LabVIEW graphical programming, McGraw-Hill