VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

(Permanently Affiliated to JNTUH, Approved by AICTE, New Delhi and Accredited by NBA)

Shamshabad – 501 218, Hyderabad

BACHELOR OF TECHNOLOGY
ELECTRONICS AND COMMUNICATION ENGINEERING

ACADEMIC REGULATIONS, COURSE STRUCTURE AND SYLLABI
UNDER AUTONOMOUS STATUS
FOR THE BATCHES ADMITTED FROM THE ACADEMIC YEAR 2011 - 12

B.Tech. Regular Four Year Degree Programme
(For the batches admitted from the academic year 2011–12)
&
B.Tech. (Lateral Entry Scheme)
(For the batches admitted from the academic year 2012 - 13)

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

PRELIMINARY DEFINITIONS AND NOMENCLATURES

- "Autonomous Institute / College" means an institute / college designated as autonomous institute / college by the Jawaharlal Nehru Technological University, Hyderabad (JNTUH), as per the JNTUH Autonomous College Statutes, 2011.
- "Academic Autonomy" means freedom to a College in all aspects of conducting its academic programs, granted by the University for promoting excellence.
- "Commission" means University Grants Commission.
- "AICTE" means All India Council for Technical Education.
- "University" the Jawaharlal Nehru Technological University, Hyderabad.
- "College" means Vardhaman College of Engineering, Hyderabad unless indicated otherwise by the context.
- "Program" means:
  Bachelor of Technology (B.Tech) degree program
  UG Degree Program: B.Tech
- "Branch" means specialization in a program like B.Tech degree program in Civil Engineering, B.Tech degree program in Computer Science and Engineering etc.
- "Course" or "Subject" means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester. For example, ABS11T01: Mathematics - I, ACS11T02: Data Structures through C, etc.
- T – Tutorial, P – Practical, D – Drawing, L - Theory, C - Credits

FOREWORD

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

Vardhaman College of Engineering is proud to win the credence of all the above bodies monitoring the quality in education and has gladly accepted the responsibility of sustaining, if not improving upon the standards and ethics for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several expertise solicited from academics, industry and research, in accordance with the vision and mission of the college to order to produce a quality engineering graduate to the society.

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

PRINCIPAL

VARDHAMAN COLLEGE OF ENGINEERING

(Autonomous)

(Permanent Affiliation with JNTUH, Approved by AICTE, New Delhi and Accredited by NBA)

ACADEMIC REGULATIONS

B.Tech. Regular Four Year Degree Programme
(for the batches admitted from the academic year 2011 - 12)
&
B.Tech. (Lateral Entry Scheme)
(for the batches admitted from the academic year 2012 - 13)

For pursuing four year undergraduate Bachelor Degree programme of study in Engineering (B.Tech) offered by Vardhaman College of Engineering under Autonomous status and herein after referred to as VCE:

1. APPLICABILITY

All the rules specified herein, approved by the Academic Council, will be in force and applicable to students admitted from the academic year 2011-2012 onwards. Any reference to "College" in these rules and regulations stands for Vardhaman College of Engineering.

2. EXTENT

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

3. ADMISSION

3.1. Admission into first year of four year B.Tech degree programme of study in engineering:

3.1.1. Eligibility:
A candidate seeking admission into the first year of four year B.Tech degree programme should have

(i) Passed either Intermediate Public Examination (I.P.E) conducted by the Board of Intermediate Education, Andhra Pradesh, with Mathematics, Physics and Chemistry as optional subjects or any equivalent examination recognized by Board of Intermediate Education, Andhra Pradesh or a Diploma in Engineering in the relevant branch conducted by the Board of Technical Education, Andhra Pradesh or equivalent Diploma recognized by Board of Technical Education for admission as per the guidelines of APSCHE.

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

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

(a) Category A seats are filled by the Convener, EAMCET.

(b) Category B seats are filled by the Management.

3.2. Admission into the second year of four year B.Tech degree programme in engineering

3.2.1. Eligibility:
A candidate seeking admission under lateral entry into the III semester B.Tech degree Programme should have passed the qualifying exam (B.Sc. Mathematics & Diploma holders), based on the rank secured by the candidate at Engineering Common Entrance Test ECET (FDH) in accordance with the instructions received from the Convener, ECET and Government of Andhra Pradesh.

3.2.2. Admission Procedure:
Admissions are made into the III semester of four year B.Tech degree programme through Convener, ECET (FDH) against the sanctioned strength in each programme of study as lateral entry students.

4. PROGRAMS OFFERED

Vardhaman College of Engineering, an autonomous college affiliated to JNTUH, offers the following B.Tech programmes of study leading to the award of B.Tech degree under the autonomous scheme.

1) B.Tech (Aeronautical Engineering)
2) B.Tech (Civil Engineering)
3) B.Tech (Computer Science & Engineering)
4) B.Tech (Electrical & Electronics Engineering)
5) B.Tech (Electronics & Communication Engineering)
6) B.Tech (Information Technology)
7) B.Tech (Mechanical Engineering)

5. DURATION OF THE PROGRAMS

5.1 Normal Duration

5.1.1 B.Tech degree program extends over a period of four academic years leading to the Degree of Bachelor of Technology (B.Tech) of the Jawaharlal Nehru Technology University, Hyderabad.

5.1.2 For students admitted under lateral entry scheme, B.Tech degree program extends over a period of three academic years leading to the Degree of Bachelor of Technology (B.Tech) of the Jawaharlal Nehru Technology University, Hyderabad.

5.2 Maximum Duration

5.2.1 The maximum period within which a student must complete a full-time academic program is 8 years for B.Tech. If a student fails to complete the academic program within the maximum duration as specified above, he / she will be required to withdraw from the program.

5.2.2 For students admitted under lateral entry scheme in B.Tech degree program, the maximum period within which a student must complete a full-time academic program is 6 years. If a student fails to complete the academic program within the maximum duration as specified above, he / she will be required to withdraw from the program.

5.2.3 The period is reckoned from the academic year in which the student is admitted first time in to the degree programme.

6. SEMESTER STRUCTURE

The College shall follow semester pattern. An academic year shall consist of a first semester and a second semester and the summer term follows in sequence. Each semester shall be of 23 weeks duration and this period includes time for course work, examination preparation, and conduct of examinations. Each semester shall have a minimum of 90 working days. The academic calendar is shown in Table 1 is declared at the start of the semester.

The first and second semesters shall have the duration to accommodate a minimum of 17 instructional weeks per semester.

Table 1: Academic Calendar

FIRST SEMESTER (23 weeks)	I Spell Instruction Period	: 9 weeks	19 weeks
	I Mid Examinations	: 1 week	
	II Spell Instruction Period	: 8 weeks	
	II Mid Examinations	: 1 Week	
	Preparation & Practical Examinations		2 weeks
	External Examinations		2 weeks
Semester Break			2 weeks
SECOND SEMESTER (23 weeks)	I Spell Instruction Period	: 9 weeks	19 weeks
	I Mid Examinations	: 1 week	
	II Spell Instruction Period	: 8 weeks	
	II Mid Examinations	: 1 Week	
	Preparation & Practical Examinations		2 weeks
	External Examinations		2 weeks
Summer Vacation			4 weeks

7. COURSE STRUCTURE

Every programme of study shall be designed to have 42 - 45 theory courses and 14 - 16 laboratory courses.

The Programme of instruction consists of:

(i) A general core programme comprising Basic Sciences, Mathematics, Basic Engineering, Humanities, Social Sciences and Management.

(ii) An Engineering Core programme imparting to the student the fundamentals of engineering in the branch concerned.

(iii) An elective programme enabling the students to take up a group of departmental and interdepartmental courses of interest to him / her.

In addition, a student has to carry out a mini project, project work, technical seminar and comprehensive viva.

Every course of the B Tech programme will be placed in one of the ten groups of courses with minimum credits as listed in the Table 2.
Note: All components prescribed in the curriculum of any programme of study shall be conducted and evaluated.

Contact Periods: Depending on the complexity and volume of the course the number of contact periods per week will be assigned.

Table 2: Group of Courses

S. NO	GROUP OF COURSES	CATEGORY	MINIMUM CREDITS
1	Humanities, Social Sciences and Management	HS	18
2	Basic Sciences	BS	30
3	Basic Engineering	BE	26
4	Core Engineering	CE	114
5	Professional Elective	PE	12
6	Inter Departmental Elective	IE	04
7	Mini Project	MP	02
8	Technical Seminar	TS	02
9	Comprehensive Viva	CV	02
10	Project Work	PW	10
TOTAL			**220**

8. CREDIT BASED SYSTEM

All the academic programs under autonomy are based on credit system. Credits are assigned based on the following norms:

8.1. The duration of each semester will normally be 23 weeks with 6 days a week (the second and fourth Saturdays will be observed as holidays in a month). A working day shall have 6 periods each of 60 minutes duration.

Each course is normally assigned a certain number of credits as follows:

- 1 credit per lecture / tutorial period per week.
- 2 credits for three (or more) period hours of practicals.
- 2 credits for mini project.
- 2 credits for technical seminar with 6 periods per week.
- 2 credits for comprehensive viva examination.
- 10 credits for project work with 12 periods per week.

8.2. The four year curriculum of any B.Tech programme of study shall have total of 220 credits. The exact requirements of credits for each course will be as recommended by the Board of Studies concerned and approved by the Academic Council.

In the case of lateral entry students, B.Tech programme for III, IV, V, VI VII and VIII semesters of study shall have a total 168 credits.

8.3. For courses like mini project / project work / technical seminar / comprehensive viva, where formal contact hours are not specified, credits are assigned based on the complexity of the work to be carried out.

9. METHOD OF EVALUATION

The performance of a student in each semester shall be evaluated subject-wise with a maximum of 100 marks each for theory and 75 marks for practical / computer aided engineering drawing lab. In addition, mini-project, technical seminar, comprehensive viva and project work shall be evaluated for 50, 50, 50 and 200 marks respectively.

9.1 **THEORY**

For all lecture based theory courses, the evaluation shall be for 25 marks through internal evaluation and 75 marks through external end semester examination of three hours duration.

9.1.1. Internal evaluation

The 25 internal marks are divided as shown in Table 3:

Table 3: Internal marks distribution

Subjective Type Test	20 marks
Assignment / Tutorial	05 marks

For theory subjects, during the semester there shall be 2 midterm examinations. Each midterm examination consists of subjective test. The subjective test is for 20 marks, with duration of 2 hours. Subjective test of each semester shall contain 5 one mark compulsory questions in part-A and part-B contains 5 questions, the student has to answer 3 questions, each carrying 5 marks.

First midterm examination shall be conducted for the first two and half units of syllabus and second midterm examination shall be conducted for the remaining portion.

The internal marks shall be computed as the average of the two internal evaluations, of two subjective tests.

Five marks are earmarked for assignments. There shall be two assignments in every theory course. Marks shall be awarded considering the average of two assignments in each course.

9.1.2. External Evaluation

The question paper shall be set externally and valued both internally and externally. The external end semester examination question paper in theory subjects will be for a maximum of 75 marks to be answered in three hours duration. There shall be two questions of descriptive type from each unit with internal choice. Each question carries 15 marks. Each theory course shall consist of five units of syllabus.

9.2 **PRACTICALS**

Practicals shall be evaluated for 75 marks, out of which 50 marks are for external examination and 25 marks are for internal evaluation. The 25 internal marks are distributed as 15 marks for day-to-day work and 10 marks for internal examination. The external end - examination shall be conducted by the teacher concerned and an external examiner from outside the college.

12 out of 14 to 16 experiments / exercises recommended are to be completed in a semester.

9.3. For Engineering Drawing, Advanced Engineering Drawing and Machine Drawing the distribution shall be 25 marks for internal evaluation (15 marks for day-to-day work and 10 marks for internal tests) and 75 marks for end examination. There shall be two internal evaluations in a semester and the average of the two internal evaluations is considered for the award of marks for internal marks.

9.4. The Computer Aided Engineering Drawing Lab, Computer Aided Aircraft Engineering Drawing Lab wherever offered is to be treated as a practical subject. Evaluation method adopted for practical subjects shall be followed here as well.

9.3 Mini Project

The mini project in an industry shall be carried out during the summer break for a minimum of 4 weeks after the VI Semester and completed before the start of the VII semester. A report has to be submitted for assessment to an internal evaluation committee comprising Head of the Department or his / her nominee and two faculty of the department including the project supervisor for 50 marks. A minimum of 40% of maximum marks shall be obtained to earn the corresponding credits. The mini project and its report shall be evaluated in VIII semester.

9.4 Technical Seminar

The seminar shall have two components, one chosen by the student from the course-work without repetition and approved by the faculty supervisor. The other component is suggested by the supervisor and can be a reproduction of the concept in any standard research paper or an extension of concept from earlier course work. A hard copy of the information on seminar topic in the form of a report is to be submitted for evaluation

along with presentation. The presentation of the seminar topics shall be made before an internal evaluation committee comprising the Head of the Department or his/her nominee, seminar supervisor and a senior faculty of the department. The two components of the seminar are distributed between two halves of the semester and are evaluated for 50 marks each. The average of the two components shall be taken as the final score. A minimum of 40% of maximum marks shall be obtained to earn the corresponding credits.

9.5 Comprehensive Viva

The comprehensive Viva will be conducted by a committee comprising Head of the Department or his/her nominee, two senior faculty of the respective department and an external examiner from outside the college. This is aimed at assessing the student's understanding of various subjects studied during the entire program of 4 years. The comprehensive viva shall be evaluated for 50 marks at the end of VIII semester. A minimum of 40% of maximum marks shall be obtained to earn the corresponding credits.

9.6 Project Work

The project work shall be evaluated for 200 marks out of which 50 marks for internal evaluation and 150 marks for end-semester evaluation. The project work shall be spread over in VII semester and in VIII semester. The project work shall be somewhat innovative in nature, exploring the research bent of mind of the student. A project batch shall comprise of not more than four students.

At the end of VII semester, students should submit synopsis summarizing the work done in VII semester. The project is expected to be completed by the end of VIII semester.

In VIII semester a mid-course review is conducted by Head of the Department and the project supervisor on the progress for 25 marks. On completion of the project a second evaluation is conducted for award of internal marks of another 25 marks before the report is submitted making the total internal marks 50. The end semester examination shall be based on the report submitted and a viva-voce exam for 150 marks by committee comprising of the Head of the Department, project supervisor and an external examiner. A minimum of 40% of maximum marks shall be obtained to earn the corresponding credits.

10. ATTENDANCE REQUIREMENTS TO APPEAR FOR THE SEMESTER-END EXAMINATION

10.1. A student shall be eligible to appear for semester-end examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects in a semester.

10.2. Condonation of shortage of attendance in aggregate upto 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee.

10.3. Shortage of attendance below 65% in aggregate shall in no case be condoned.

10.4. The shortage of attendance shall not be condoned more than twice during the entire course.

10.5. Students whose shortage of attendance is not condoned in any semester are not eligible to take their semester-end examination of that class and their registration shall stand cancelled.

10.6. A student will not be promoted to the next semester unless he satisfies the attendance requirements of the current semester. The student may seek readmission for the semester when offered next. He will not be allowed to register for the subjects of the semester while he is in detention. A student detained due to shortage of attendance, will have to repeat that semester when offered next.

10.7. A stipulated fee shall be payable towards condonation of shortage of attendance to the College.

10.8. Attendance may also be condoned as per the recommendations of academic council for those who participate in prestigious sports, co-curricular and extra-curricular activities provided as per the Govt. of AP norms in vogue.

11. EVALUATION

Following procedure governs the evaluation.

11.1. Marks for components evaluated internally by the faculty should be submitted to the Controller of Examinations one week before the commencement of the semester-end examinations. The marks for the internal evaluation components will be added to the external evaluation marks secured in the semester-end examinations, to arrive at total marks for any subject in that semester.

11.2. Performance in all the courses is tabulated course-wise and will be scrutinized by the Examination Committee and moderation is applied if needed, based on the recommendations of moderation committee and course-wise marks lists are finalized.

11.3. Student-wise tabulation is done and student-wise memorandum of marks is generated which is issued to the student.

12. PERSONAL VERIFICATION

Students shall be permitted for personal verification of the semester-end examination answer scripts within a stipulated period after payment of prescribed fee.

13. SUPPLEMENTARY EXAMINATION

Supplementary examinations for the odd semester shall be conducted with the regular examinations of even semester and vice versa, for those who appeared and failed in regular examinations. Such of the candidates writing supplementary examinations may have to write more than one examination per day.

14. ACADEMIC REQUIREMENTS FOR PROMOTION / COMPLETION OF REGULAR B.TECH PROGRAMME OF STUDY

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

FOR STUDENTS ADMITTED INTO B.TECH. (REGULAR) PROGRAMME

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

ii. In case of mini project, technical seminar and comprehensive viva a student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each of them if he/she secures not less than 40% of marks.

iii. In case of project work, a student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted if he/she secures not less than 40% of marks on the aggregate in the internal evaluation and external end-evaluation taken together.

iv. A student shall be promoted from IV semester to V semester of programme of study only if he fulfils the academic requirement of securing 40 credits from the examinations held up to end of III semester including supplementary examinations.

v. A student shall be promoted from VI semester to VII semester of programme of study only if he fulfils the academic requirements of securing 68 credits out of which all 52 from I and II semesters shell be completed, from the examinations held up to V semester including supplementary examinations.

vi. A student shall register for all the 220 credits and earn all the 220 credits. Marks obtained in all the 220 credits shall be considered for the award of the class based on aggregate of marks.

vii. A student who fails to earn 220 credits as indicated in the course structure within **eight** academic years from the year of their admission shall forfeit their seat in B.Tech programme and their admission stands cancelled.

viii. Students who are detained for want of attendance (or) who have not fulfilled academic requirements (or) who have failed after having undergone the course in earlier regulations (or) have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same (or) equivalent subjects as and when subjects are offered, and pursue the remaining course work with the academic regulations of the batch into which such students are readmitted. However, all such readmitted students shall earn all the credits of subjects they have pursued for completion of the course.

FOR LATERAL ENTRY STUDENTS (BATCHES ADMITTED FROM 2012–2013)

i. A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the semester-end examination

and a minimum of 40% of marks in the sum total of the internal evaluation and semester-end examination taken together.

ii. In case of mini project, technical seminar and comprehensive viva a student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each of them if he/she secures not less than 40% of marks.

iii. In case of project work, a student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted if he/she secures not less than 40% of marks on the aggregate in the internal evaluation and external end-evaluation taken together.

iv. A student shall be promoted from VI semester to VII semester only if he fulfils the academic requirements of securing 42 credits from the examinations held up to V semester including supplementary examinations.

v. A student shall register for all 168 credits and earn all the 168 credits. Marks obtained in all 168 credits shall be considered for the award of the class based on aggregate of marks.

vi. A student who fails to earn 168 credits as indicated in the course structure within **six** academic years from the year of their admission shall forfeit their seat in B.Tech programme and their admission stands cancelled.

vii. Students who are detained for want of attendance (or) who have not fulfilled academic requirements (or) who have failed after having undergone the course in earlier regulations (or) have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same (or) equivalent subjects as and when subjects are offered, and pursue the remaining course work with the academic regulations of the batch into which such students are readmitted. However, all such readmitted students shall earn all the credits of subjects they have pursued for completion of the course.

15. TRANSITORY REGULATIONS

Students who are detained for want of attendance (or) who have not fulfilled academic requirements (or) who have failed after having undergone the course in earlier regulations (or) have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same (or) equivalent subjects as and when subjects are offered, and pursue the remaining course work with the academic regulations of the batch into which such students are readmitted. A regular student has to satisfy all the eligibility requirements within the maximum stipulated period of eight years, and a lateral entry student within six years, for the award of B.Tech Degree.

16. TRANSCRIPTS

After successful completion of the entire programme of study, a transcript containing performance of all academic years will be issued as a final record. Transcripts will also be issued, if required, after payment of requisite fee. Partial transcript will also be issued upto any point of study to a student on request, after payment of requisite fee.

17. AWARD OF DEGREE

The degree will be conferred and awarded by Jawaharlal Nehru Technological University, Hyderabad on the recommendations of the Chairman, Academic Council.

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

- Registered and successfully completed all the components prescribed in the programme of study to which he is admitted.
- Successfully acquired the minimum required credits as specified in the curriculum corresponding to the branch of study within the stipulated time.
- Obtained not less than 40% of marks (minimum requirement for declaring as passed).
- Has no dues to the college, hostel, and library etc. and to any other amenities provided by the College.
- No disciplinary action is pending against him.

17.2. AWARD OF CLASS

Declaration of Class is based on percentage of marks to be secured.

After a student has satisfied the requirement 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 Shown in Table 4:

Table 4: Declaration of Class is based on percentage of marks to be secured

Class Awarded	% of marks to be secured	
First Class with Distinction	70% and above	From the aggregate marks secured for the 220 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%	
Fail	Below 40%	

Sometimes, it is necessary to provide equivalence of percentages and/or *Class* awarded with *Grade Point Average (GPA).* This shall be done by prescribing certain specific thresholds in averages for *Distinction, First Class and Second Class,* as in Table 5.

Table 5: Percentage Equivalence of *Grade Points* (For a 10-Point Scale)

Grade Point	Percentage of Marks / Class
4.75	40 (Pass Class)
5.25	45
5.75	50 (Second Class)
6.25	55
6.75	60 *(First Class)*
7.25	65
7.75	70 *(First Class with Distinction)*
8.25	75

18. ADDITIONAL ACADEMIC REGULATIONS

i. Courses like projects / mini projects / seminars can be repeated only by re-registering for all the components in that semester.

ii. When a student is absent for any examination (internal or external) he is treated as to have obtained absent in that component (course) and aggregate of marks is done accordingly.

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

19. REGISTRATION

Each student has to compulsorily register for course work at the beginning of each semester as per the schedule mentioned in the Academic Calendar. It is absolutely compulsory for the student to register for courses in time.

20. TERMINATION FROM THE PROGRAM

The admission of a student to the program may be terminated and the student is asked to leave the college in the following circumstances:

i. The student fails to satisfy the requirements of the program within the maximum period stipulated for that program.

11. The student fails to satisfy the norms of discipline specified by the institute from time to time.

21. CURRICULUM

21.1 For each program being offered by the Institute, a Board of Studies (BOS) is constituted in accordance with AICTE / UGC / JNTUH statutes.

21.2. The BOS for a program is completely responsible for designing the curriculum once in three years for that program.

22. WITH-HOLDING OF RESULTS

If the candidate has not paid any dues to the college / if any case of indiscipline / malpractice is pending against him, the results of the candidate will be withheld. The issue of the degree is liable to be withheld in such cases.

23. GRIEVANCES REDRESSAL COMMITTEE

"Grievance and Redressal Committee" (General) constituted by the principal shall deal with all grievances pertaining to the academic / administrative / disciplinary matters. The composition of the complaints cum redressal committee shall be:

Headed by Senior Faculty member
Heads of all departments
A senior lady staff member from each department (if available)

The committee constituted shall submit a report to the principal of the college, the penalty to be imposed. The Principal upon receipt of the report from the committee shall, after giving an opportunity of being heard to the person complained against, submit the case with the committee's recommendation to the Governing Body of the college. The Governing Body shall confirm with or without modification the penalty recommended after duly following the prescribed procedure.

24. MALPRACTICE PREVENTION COMMITTEE

A malpractice prevention committee shall be constituted to examine and punish the students who does malpractice / behaves indiscipline in examinations. The committee shall consist of:

Principal.
Subject expert of which the subject belongs to.
Head of the department of which the student belongs to.
The invigilator concerned.
In-charge Examination branch of the college.

The committee constituted shall conduct the meeting on the same day of examination or latest by next working day to the incidence and punish the student as per the guidelines prescribed by the J N T University, Hyderabad from time to time.

Any action on the part of candidate at the examination like trying to get undue advantage in the performance at examinations or trying to help another, or derive the same through unfair means is punishable according to the provisions contained hereunder. The involvement of the Staff, who are in charge of conducting examinations, valuing examination papers and preparing / keeping records of documents relating to the examinations in such acts (inclusive of providing incorrect or misleading information) that infringe upon the course of natural justice to one and all concerned at the examination shall be viewed seriously and recommended for award of appropriate punishment after thorough enquiry.

25. AMENDMENTS TO REGULATIONS

The Academic Council of Vardhaman College of Engineering reserves the right to revise, amend, or change the regulations, scheme of examinations, and / or syllabi or any other policy relevant to the needs of the society or industrial requirements etc., without prior notice.

26. STUDENTS' FEEDBACK

It is necessary for the Colleges to obtain feedback from students on their course work and various academic activities conducted. For this purpose, suitable feedback forms shall be devised by the College and the feedback obtained from the students regularly in confidence, by administering the feedback form in print or on-line in electronic form.

The feedback received from the students shall be discussed at various levels of decision making at the College and the changes/ improvements, if any, suggested shall be given due consideration for implementation.

27. GRADUATION DAY

The College shall have its own annual *Graduation Day* for the award of Degrees to students completing the prescribed academic requirements in each case, in consultation with the University and by following the provisions in the Statute.

The College shall institute Prizes and Awards to meritorious students, for being given away annually at the *Graduation Day.* This will greatly encourage the students to strive for excellence in their academic work.

28. AWARD OF A RANK UNDER AUTONOMOUS SCHEME

28.1. Merit Rank will be declared only for those students who have been directly admitted in VCE under Autonomous Regulations and complete the entire course in VCE only within the minimum possible prescribed time limit, i.e., 4 years for B.Tech, 3 years for B.Tech under lateral entry scheme.

28.2. A student shall be eligible for a merit rank at the time of award of degree in each branch of Bachelor of Technology, provided the student has passed all subjects prescribed for the particular degree program in first attempt only.

28.3. Academic performance will be the sole criteria for awarding the merit rank and will be based only on performance of the student from the first to the eighth semester of the course.

28.4. The number of Merit Ranks to be announced for any course / program / branch / specialisation will be as follows:

- **3** (Three) Merit Ranks if the AICTE sanctioned intake is less than or up to 60.
- **4** (Four) Merit Ranks if the AICTE sanctioned intake is greater than 60.
- **5** (Five) Merit Ranks if the AICTE sanctioned intake is greater than 120.

28.5. Award of prizes, scholarships, or any other Honours shall be based on the rank secured by a candidate, consistent with the guidelines of the Donor, wherever applicable.

29. CONDUCT AND DISCIPLINE

29.1 Each student shall conduct himself / herself in a manner befitting his / her association with VCE.

29.2 He / she is expected not to indulge in any activity, which is likely to bring disrepute to the college.

29.3 He / she should show due respect and courtesy to the teachers, administrators, officers and employees of the college and maintain cordial relationships with fellow students.

29.4 Lack of courtesy and decorum unbecoming of a student (both inside and outside the college), wilful damage or removal of Institute's property or belongings of fellow students, disturbing others in their studies, adoption of unfair means during examinations, breach of rules and regulations of the Institute, noisy and unruly behaviour and similar other undesirable activities shall constitute violation of code of conduct for the student.

29.5 **Ragging in any form is strictly prohibited and is considered a serious offence. It will lead to the expulsion of the offender from the college.**

29.6 Violation of code of conduct shall invite disciplinary action which may include punishment such as reprimand, disciplinary probation, debarring from the examination, withdrawal of placement services, withholding of grades / degrees, cancellation of registration, etc., and even expulsion from the college.

29.7 Principal, based on the reports of the warden of Institute hostel, can reprimand, impose fine or take any other suitable measures against an inmate who violates either the code of conduct or rules and regulations pertaining to college hostel.

29.8 A student may be denied the award of degree / certificate even though he / she has satisfactorily completed all the academic requirements if the student is found guilty of offences warranting such an action.

29.9 Attendance is not given to the student during the suspension period.

30. OTHER ISSUES

The quality and standard of engineering professionals are closely linked with the level of the technical education system. As it is now recognized that these features are essential to develop the intellectual skills and knowledge of these professionals for being able to contribute to the society through productive and satisfying careers as *innovators, decision makers and/or leaders* in the global economy of the 21st century, it becomes necessary that certain improvements are introduced at different stages of their education system. These include:

a. Selective admission of students to a programme, so that merit and aptitude for the chosen technical branch or specialization are given due consideration.

b. Faculty recruitment and orientation, so that qualified teachers trained in good teaching methods, technical leadership and students' motivation are available.

c. Instructional/Laboratory facilities and related physical infrastructure, so that they are adequate and are at the contemporary level.

d. Access to good library resources and Information & Communication Technology **(ICT)** facilities, to develop the student's *mind* effectively.

These requirements make it necessary for the College to introduce improvements like:

a. Teaching-learning process on modern lines, to provide *Add-On* Courses for *audit*/credit in a number of peripheral areas useful for students' self development.

b. Life-long learning opportunities for faculty, students and alumni, to facilitate their dynamic interaction with the society, industries and the world of work.

c. Generous use of ICT and other modern technologies in everyday activities.

31. GENERAL

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

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

COURSE STRUCTURE

B. TECH - ELECTRONICS AND COMMUNICATION ENGINEERING

REGULATIONS: VCE-R11

I SEMESTER

Code	Subject	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A1008	Technical English	HS	4	-	-	4	25	75	100
A1001	Mathematics – I	BS	3	1	-	4	25	75	100
A1004	Environmental Science	BS	4	-	-	4	25	75	100
A1501	Computer Programming	BE	4	-	-	4	25	75	100
A1201	Basic Electrical Engineering	BE	3	1	-	4	25	75	100
A1009	English Language Communication Skills Lab	HS	-	-	3	2	25	50	75
A1502	Computer Programming Lab	BE	-	-	3	2	25	50	75
A1305	Computer Aided Engineering Drawing Lab	BE	-	2	3	2	25	50	75
TOTAL			**18**	**04**	**09**	**26**	**200**	**525**	**725**

II SEMESTER

Code	Subject	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A1007	Mathematics – II	BS	3	1	-	4	25	75	100
A1002	Engineering Physics	BS	4	-	-	4	25	75	100
A1003	Engineering Chemistry	BS	4	-	-	4	25	75	100
A1006	Computational Techniques	BS	3	1	-	4	25	75	100
A1503	Data Structures through C	BE	4	-	-	4	25	75	100
A1010	Engineering Physics and Engineering Chemistry Lab	BS	-	-	3	2	25	50	75
A1504	Data Structures through C Lab	BE	-	-	3	2	25	50	75
A1601	PC Software Lab	BE	-	2	3	2	25	50	75
TOTAL			**18**	**04**	**09**	**26**	**200**	**525**	**725**

III SEMESTER

Code	Subject	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A1011	Mathematics – III	BS	3	1	-	4	25	75	100
A1401	Electronic Devices	BE	3	1	-	4	25	75	100
A1402	Signals and Systems	CE	3	1	-	4	25	75	100
A1403	Probability Theory and Stochastic Processes	CE	4	-	-	4	25	75	100
A1404	Digital Logic Design	CE	4	-	-	4	25	75	100
A1206	Principles of Electrical Engineering	CE	4	-	-	4	25	75	100
A1406	Electronic Devices Lab	BE	-	-	3	2	25	50	75
A1208	Electrical Engineering Lab	CE	-	-	3	2	25	50	75
TOTAL			**21**	**03**	**06**	**28**	**200**	**550**	**750**

B. TECH - ELECTRONICS AND COMMUNICATION ENGINEERING

REGULATIONS: VCE-R11

IV SEMESTER

Code	Subject	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A1013	Managerial Economics and Financial Analysis	HS	4	-	-	4	25	75	100
A1509	Computer Architecture and Organization	CE	4	-	-	4	25	75	100
A1212	Control Systems	CE	3	1	-	4	25	75	100
A1408	Electronic Circuit Analysis	CE	4	-	-	4	25	75	100
A1409	Pulse and Digital Circuits	CE	3	1	-	4	25	75	100
A1410	Electromagnetic Theory and Transmission Lines	CE	3	1	-	4	25	75	100
A1412	Electronic Circuit Analysis Lab	CE	-	-	3	2	25	50	75
A1413	Pulse and Digital Circuits Lab	CE	-	-	3	2	25	50	75
TOTAL			**21**	**03**	**06**	**28**	**200**	**550**	**750**

V SEMESTER

Code	Subject	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A1506	Object Oriented Programming through JAVA	CE	4	-	-	4	25	75	100
A1414	Electronic Measurements and Instrumentation	CE	4	-	-	4	25	75	100
A1415	Integrated Circuits Applications	CE	3	1	-	4	25	75	100
A1416	Digital Design through Verilog HDL	CE	4	-	-	4	25	75	100
A1417	Analog Communications	CE	3	1	-	4	25	75	100
A1418	Antennas and Wave Propagation	CE	3	1	-	4	25	75	100
A1420	Integrated Circuits Applications Lab	CE	-	-	3	2	25	50	75
A1421	Analog Communications Lab	CE	-	-	3	2	25	50	75
TOTAL			**21**	**03**	**06**	**28**	**200**	**550**	**750**

VI SEMESTER

Code	Subject	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A1512	Computer Networks	CE	4	-	-	4	25	75	100
A1423	Microprocessors and Interfacing	CE	3	1	-	4	25	75	100
A1424	Digital Communications	CE	3	1	-	4	25	75	100
A1425	Digital Signal Processing	CE	3	1	-	4	25	75	100
A1426	Microwave Engineering	CE	4	-	-	4	25	75	100
INTERDEPARTMENTAL ELECTIVE - I		HS	4	-	-	4	25	75	100
A1427	Microprocessors and Interfacing Lab	CE	-	-	3	2	25	50	75
A1428	Digital Signal Processing Lab	CE	-	-	3	2	25	50	75
TOTAL			**21**	**03**	**06**	**28**	**200**	**550**	**750**

B. TECH – ELECTRONICS AND COMMUNICATION ENGINEERING

REGULATIONS: VCE-R11

VII SEMESTER

Code	Subject	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A1015	Industrial Management and Psychology	HS	4	-	-	4	25	75	100
A1429	VLSI Design	CE	3	1	-	4	25	75	100
A1430	Embedded Systems	CE	3	1	-	4	25	75	100
A1431	Cellular and Mobile Communications	CE	4	-	-	4	25	75	100
INTERDEPARTMENTAL ELECTIVE - II		IE	4	-	-	4	25	75	100
PROFESSIONAL ELECTIVE - I		PE	4	-	-	4	25	75	100
A1438	Digital Communications and Microwave Engineering Lab	CE	-	-	3	2	25	50	75
A1439	VLSI Lab	CE	-	-	3	2	25	50	75
A1440	Project Work (Stage - I)	PW	-	2	-	-	-	-	-
TOTAL			**22**	**04**	**06**	**28**	**200**	**550**	**750**

VIII SEMESTER

Code	Subject	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal	External	Total
A1441	Satellite and Radar Communications	CE	3	1	-	4	25	75	100
PROFESSIONAL ELECTIVE - II		PE	3	1	-	4	25	75	100
PROFESSIONAL ELECTIVE – III		PE	3	1	-	4	25	75	100
A1454	Embedded Systems Lab	CE	-	-	6	2	25	50	75
A1455	Technical Seminar	TS	-	-	6	2	50	-	50
A1456	Comprehensive Viva	CV	-	-	-	2	-	75	75
A1457	Mini Project	MP	-	-	-	2	50	-	50
A1440	Project Work (Stage - II)	PW	-	-	12	8	50	150	200
TOTAL			**09**	**03**	**24**	**28**	**250**	**500**	**750**

B. TECH – ELECTRONICS AND COMMUNICATION ENGINEERING

REGULATIONS: VCE-R11

ELECTIVES	
INTERDEPARTMENTAL ELECTIVE - I	
Code	**Subject**
A1016	Human Values and Ethics
A1017	Human Resource Management
A1018	Entrepreneurship
A1019	Business Communication
A1020	Intellectual Property and Patent Rights
A1021	Project Planning and Management
INTERDEPARTMENTAL ELECTIVE - II	
A1508	Operating Systems
A1528	Advanced Computer Architecture
A1606	Network Security and Cryptography
A1228	Energy Management
A1331	Operations Research
A1725	Avionics
PROFESSIONAL ELECTIVE - I	
A1432	Telecommunication Switching Systems
A1433	Digital Image Processing
A1434	CPLD and FPGA Architectures and Applications
A1435	Real Time Operating Systems
A1436	Mobile Computing Technologies
A1437	Optical Communications
PROFESSIONAL ELECTIVE - II	
A1442	Wireless Communications and Networks
A1443	DSP Processors and Architectures
A1444	Low Power VLSI Design
A1344	Nanotechnology
A1445	Software Radio
A1446	Artificial Neural Networks and Fuzzy Logic
PROFESSIONAL ELECTIVE - III	
A1447	High Speed Networks
A1448	Speech Signal Processing
A1449	Design of Fault Tolerant Systems
A1450	Biomedical Instrumentation
A1451	RF Circuit Design
A1452	Optical Networks

SYLLABI FOR I SEMESTER

B. Tech. ECE I SEMESTER

TECHNICAL ENGLISH
(Common to ECE, CSE & IT)

Course Code: **A1008**

L	T	P	C
4	-	-	4

UNIT - I

1. ***Sir CV Raman: A Path breaker in the Saga of Indian Science*** from E*njoying Every Day English*
2. ***Mother Teresa*** from *Inspiring Speeches and Lives*

FOCUSING ON Word formation with prefixes and suffixes, synonyms and antonyms, noun phrases, infinitive and gerund, subject-verb agreement (concord), tenses, impersonal passive conditional sentences, adjectives and degrees of comparison, conjunctions and prepositions.

UNIT - II

1. ***The Connoisseur*** from E*njoying Every Day English*
2. ***Sam Pitroda*** from *Inspiring Speeches and Lives*

FOCUSING ON Word formation with prefixes and suffixes, synonyms and antonyms, noun phrases, infinitive and gerund, subject-verb agreement (concord), tenses, impersonal passive conditional sentences, adjectives and degrees of comparison, conjunctions and prepositions.

UNIT - III

1. ***Bubbling Well Road*** from E*njoying Every Day English*
2. ***I Have a Dream*** **- by Martin Luther King** from *Inspiring Speeches and Lives*

FOCUSING ON Word formation with prefixes and suffixes, synonyms and antonyms, noun phrases, infinitive and gerund, subject-verb agreement (concord), tenses, impersonal passive conditional sentences, adjectives and degrees of comparison, conjunctions and prepositions.

UNIT - IV

LETTERS, MEMOS AND E-MAIL: Letters, business letters, significance, structure and layout, principles, types and samples, claim letters, adjustment letters, sales letters, job application letters, memos, classification and purpose style, E-mails, E-mail etiquettes, sample E- mail messages, effectiveness and security.

UNIT - V

REPORTS: Objectives, characteristics of a report, types of reports, importance of reports, formats, rewriting structure of reports, writing the report, visual aids, revising, editing and proof reading, proof reading symbols.

TEXT BOOKS:

1. Ramakrishna Rao. A (2009), *Enjoying Every Day English,* Sangam Books, Hyderabad.
2. Yadava Raju. B and Muralikrishna. C (2009), *Inspiring Speeches and Lives,* Maruthi Publications, Guntur.
3. Meenakshi Raman, Sangeeta Sharma (2009), *Technical Communication,* Oxford University Press, New Delhi.

REFERENCE BOOKS:

1. Edgar Thorpe and Showick Thorpe (2008), Basic *Vocabulary for Competitive Examination,* Pearson Education, New Delhi, India.
2. Ashraf Rizvi M (2005), *Effective Technical Communication,* Tata Mc Graw Hill, New Delhi.
3. Raymond Murphy (2004), *Murphy's English Grammar with CD,* 3rd Edition, Cambridge University Press, USA.

B. Tech. ECE I SEMESTER

MATHEMATICS – I
(Common to all Branches)

Course Code: **A1001**

L	T	P	C
3	1	-	4

UNIT - I

DIFFERENTIAL EQUATIONS OF FIRST ORDER AND THEIR APPLICATIONS: Overview of differential equations, exact, linear and Bernoulli. Applications to Newton's law of cooling, law of natural growth and decay and orthogonal trajectories.

UNIT - II

HIGHER ORDER LINEAR DIFFERENTIAL EQUATIONS AND THEIR APPLICATIONS: Linear differential equations of second and higher order with constant coefficients, RHS term of the type $Q(x)= e^{ax}$, sinax, cosax, and x^n, $e^{ax}V(x)$, $x^nV(x)$, method of variation of parameters. Applications to electrical circuits, simple harmonic motion.

UNIT - III

FUNCTIONS OF SINGLE VARIABLE AND THEIR APPLICATIONS AND MULTIPLE INTEGRALS: Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, generalized mean value theorem (all theorems without proof), functions of several variables, functional dependence, Jacobian - maxima and minima of functions of two variables with and without constraints. Radius, centre and circle of curvature – evolutes and envelopes. Multiple integrals, double and triple integrals, change of order of integration, change of variables

UNIT - IV

LAPLACE TRANSFORMS: 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, periodic function, differentiation and integration of transforms, application of Laplace transforms to ordinary differential equations.

UNIT - V

VECTOR CALCULUS: Gradient, divergence, curl and their related properties, potential function, Laplacian and second order operators. Line integral, work done, surface integrals, flux of a vector valued function. Vector integrals theorems: Green's - Stoke's and Gauss's divergence theorems (statement & their verification).

TEXT BOOKS:

1. Grewal B.S (2007), *Higher Engineering Mathematics*, 40th Edition, Khanna Publishers, New Delhi.
2. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), *Engineering Mathematics Vol - I*, 10th Revised Edition, S. Chand & Company Limited, New Delhi.

REFERENCE BOOKS:

1. Jain R. K, Iyengar S. R. K (2008), *Advanced Engineering Mathematics,* 3rd edition, Narosa Publication House, New Delhi.
2. Shahanaz Bathul (2007), *Engineering Mathematics-I*, 3rd Edition, Right Publishers, Hyderabad.
3. Ramana B.V (2010), *Engineering Mathematics*, Tata McGraw Hill Publishing Co. Limited, New Delhi.

B. Tech. ECE I SEMESTER

ENVIRONMENTAL SCIENCE
(Common to ECE, CSE & IT)

Subject Code: **A1004**

L	T	P	C
4	-	-	4

UNIT - I

ENVIRONMENTAL SCIENCE INTRODUCTION AND NATURAL RESOURCES: *Introduction:* Multidisciplinary nature of environmental studies: definition, scope and importance, need for public awareness. *Natural Resources:* Renewable and non-renewable resources .Natural resources and associated problems. *Forest Resources:* Use and over - exploitation, deforestation, timber extraction, mining, dams and other effects on forest and tribal people. *Water Resources:* Use and over utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. *Mineral Resources:* Use and exploitation, environmental effects of extracting and using mineral resources. *Food Resources:* World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, Organic farming and Food miles. *Energy Resources:* Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, Case studies.
Land Resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT - II

ECOSYSTEM AND BIODIVERSITY: *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: forest ecosystem, grassland ecosystem, desert ecosystem, aquatic ecosystems (ponds, streams, lakes, rivers, oceans and estuaries). *Biodiversity and Its Conservation:* Introduction - definition: genetic, species and ecosystem diversity, value of biodiversity- consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, national and local levels. India as 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 - III

ENVIRONMENTAL POLLUTION, GLOBAL ENVIRONMENTAL ISSUES AND CONTROL MEASURES: *Environmental Pollution:* definition, cause, effects and control measures of air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution and 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. E-waste and plastic waste - recycling and reuse. *Social Issues and the Environment*: From unsustainable to sustainable development, urban problems related to energy. *Water Conservation*: Rain water harvesting, watershed management, resettlement and rehabilitation of people; its problems and concerns, case studies, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case Studies, wasteland reclamation.

UNIT - IV

GREEN ENVIRONMENTAL ISSUES: Introduction, Clean development mechanism, Carbon foot printing, Carbon credits, Carbon sequestration, Polluter pay principle. Green building, practices, approaches to green computing, Nanotechnology IS014000. Role of Information Technology in environment and human health, case studies.

UNIT - V

ENVIRONMENTAL ETHICS, ENVIRONMENTAL IMPACT ASSESMENT & ROLE OF NGOs: *Environmental Ethics:* 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. *Environmental Impact Assesment*: Conceptual facts of EIA, baseline date acquisition, planning and management of impact studies, operational aspects of EIA, methods for impact identification, prediction of impacts(air, water, noise, soil, biological and socio-economics), environmental management plan, role of NGOs in creating awareness among people regarding environmental issues.

TEXT BOOKS:

1. Benny Joseph (2005), *Environmental Studies*, Tata McGraw Hill Publishing Company Limited, New Delhi.
2. Erach Bharucha (2005), *Textbook of Environmental Studies for Undergraduate Courses*, Universities Press, Hyderabad.

REFERENCE BOOKS:

1. Anji Reddy. M (2007), Textbook of Environmental Sciences and Technology, BS Publications, Hyderabad.
2. Rajagopalan. R (2009), Environmental Studies, Oxford University Press, New Delhi.
3. Anubha Kaushik (2006), Perspectives in Environmental Science, 3rd Edition, New age international, New Delhi.

B. Tech. ECE I SEMESTER

COMPUTER PROGRAMMING
(Common to ECE, CSE, IT & EEE)

Course Code: **A1501**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION TO COMPUTERS: Introduction to computers, computer systems, computing environments, computer languages, creating and running programmes, software development method, algorithms, pseudo code, flow charts, applying the software development method.

INTRODUCTION TO C LANGUAGE: Basic structures of C language, C tokens, data types and sizes, declaration of variables, assigning values

OPERATORS AND EXPRESSIONS: Statements, arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bitwise operators, type conversions, expressions and evaluation, input and output statements, sample programs.

UNIT - II

CONTROL STATEMENTS: If and switch statements, while, do while and for statements, sample programs.

FUNCTIONS: Defining and accessing, passing arguments, function prototypes, library functions, static functions, user defined functions, recursive functions, variables and storage classes, scope rules, block structure, header files, C preprocessor, example C programs.

ARRAYS: Defining and processing, one dimensional and two dimensional arrays, initialization, passing arrays to a function, multi dimensional arrays, command line arguments.

UNIT - III

STRINGS: Defining and operations on strings, string variables declaration, reading, writing. Basics of functions, parameter passing, string handling functions.

POINTERS: Basic Concepts, pointer to pointer, passing pointers to a function, operations on pointers, pointer arithmetic, pointers and arrays, arrays of pointers, function pointers, dynamic memory allocation.

UNIT - IV

STRUCTURES AND UNIONS: Structure definition, initializing, assigning values, passing of structures as arguments, arrays of structures, pointers to structures, self reference to structures, unions, typedef, bit fields, sample programs.

UNIT - V

CONSOLE AND FILE I/O: File, types of files, file vs. console, file structure, file attributes, file operations, standard I/O, formatted I/O, sample programs.

TEXT BOOKS:

1. B. A. Fouruzan and R. F. Gilberg (2006), *Computer Science: A structured programming approach using C,* 3rd edition, Thomson Publications, New Delhi.
2. Yashawanth Kanethkar (2008), *Let us C*, 8th edition, Jones & Bartlett Publishers, India.

REFERENCE BOOKS:

1. Herbert Schildt (2000), *C: The Complete Reference*, 4th Edition, New Delhi, Osborne Mc Graw Hill.
2. B. W. Kerninghan, Dennis M. Ritche (1988), *The C Programming Language*, 2nd edition, Prentice Hall Software Series, India.
3. Stephen G.Kochan (2004), *Programming in C*, 3rd Edition, Pearson Education Private Limited.

B. Tech. ECE I SEMESTER

BASIC ELECTRICAL ENGINEERING
(Common to ECE & EEE)

Course Code: **A1201**

L	T	P	C
3	1	-	4

UNIT - I

INTRODUCTION TO ELECTRICAL CIRCUITS: Concept of Circuit, R-L-C parameters, voltage and current sources, Independent and dependent sources, source transformation, voltage - current relationship for passive elements, Kirchhoff's laws, network reduction techniques, series, parallel and compound circuits.

UNIT - II

ANALYSIS OF ELCTRICAL CIRCUITS: mesh analysis: mesh equations by inspection method, super mesh analysis, nodal analysis: nodal equations by inspection method, supernode analysis, star-to-delta or delta-to-star transformation.

UNIT - III

SINGLE PHASE AC CIRCUITS: R.M.S, average values and form factor for different periodic wave forms, steady state analysis of R, L and C (in series, parallel and series parallel combinations) with sinusoidal excitation, concept of reactance, impedance, susceptance and admittance phase and phase difference.

POWER AND POWER FACTOR: Concept of power factor, real and reactive powers, J notation, complex and polar forms of representation, complex power. Resonance for series and parallel circuits, concept of band width and Q factor.

UNIT - IV

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

UNIT - V

NETWORK TOPOLOGY: Definitions, graph, tree, basic tieset and basic cutset matrices for planar networks duality & dual networks.

NETWORK PARAMETERS: Two port network parameters, Z, Y, ABCD and hybrid parameters and their relations.

TEXT BOOKS:

1. William H. Hayt, Jack E. Kemmerly, Steven M. Durbin (2006), *Engineering Circuits Analysis*, 7th Edition, Mc Graw Hill, New Delhi.
2. A. Chakrabarthy (2005), *Circuit Theory*, 4th Edition, Dhanpat Rai & Sons Publications, New Delhi.

REFERENCE BOOKS:

1. Van Valkenburg, M. E. (1974), *Network Analysis*, 3rd Edition, Prentice Hall of India, New Delhi.
2. Wadhwa C. L (2009), *Electric Circuits Analysis,* New Age International Publications, New Delhi.
3. A. Sudhakar, Shyammohan S. Palli (2003), *Electrical Circuits*, 2nd Edition, Tata Mc Graw Hill, New Delhi.
4. Joseph Edminister (2001), *Electric Circuits*, 6th Edition Schaum's Outlines, Tata Mc Graw Hill, New Delhi.

B. Tech. ECE I SEMESTER

ENGLISH LANGUAGE COMMUNICATION SKILLS LAB
(Common to ECE, CSE & IT)

Course Code: **A1009**

L	T	P	C
-	-	3	2

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

SYLLABUS:

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

1. Introduction to phonetics
2. Sounds of English- vowels, diphthongs & consonants
3. Introduction to stress and intonation
4. Oral presentations- prepared
5. Oral Presentations- Extempore
6. Situational dialogues / role play
7. 'Just A Minute' sessions (JAM)
8. Information transfer
9. Telephoning skills
10. Describing objects, situations and people
11. Giving directions
12. Listening for specific information
13. Listening to record telephone conversations
14. Debate

SUGGESTED SOFTWARE:

- Cambridge advanced learners' English dictionary with cd.
- The Rosetta stone English library.
- Clarity pronunciation power – part I.
- Oxford advanced learner's compass, 7th Edition.
- Learning to speak English - 4 CDs.
- Vocabulary in use, Michael McCarthy, felicity o'den, Cambridge.
- Murphy's English grammar, Cambridge with CD.

REFERENCE BOOKS:

1. Suresh Kumar. E. & Sreehari P.A (2007), *Handbook for English Language Laboratories,* Cambridge University Press India Pvt. Ltd, New Delhi.
2. Mandal S. K (2006), *Effective Communication & Public Speaking*, Jaico Publishing House, New Delhi.
3. Grant Taylor (2004), *English Conversation Practice,* Tata McGraw Hill, New Delhi.
4. Balasubramanian .T (2000), *A text book of English Phonetics for Indian Student, Mac* Millan Publishers, India.
5. Kamalesh Sadanand, Susheela Punitha (2008), *Spoken English: A foundation Course: Parts 1 & 2,* New Delhi, Orient Longman Pvt. Ltd.

B. Tech. ECE I SEMESTER

COMPUTER PROGRAMMING LAB
(Common to ECE, CSE, IT & EEE)

Course Code: **A1502**

L	T	P	C
-	-	3	2

LIST OF EXPERIMENTS:

1. To write C programs for the following:
   a) 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 to generate the first n terms of the Fibonacci sequence.

2. a) To write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user
   b) To write a C program to calculate the following sum:
   Sum=1+x2/2!+X4/4! ————— upto given 'n' terms.
   c) To write a C program to find the roots of a quadratic equation.

3. To write C programs that uses both recursive and non-recursive functions
   a) To find the factorial of a given number.
   b) To find the GCD (greatest common divisor) of two given integers.
   c) To solve Towers of Hanoi problem.

4. The total distance traveled by vehicle in 't' seconds is given by distance=ut+1/2at2 where 'u' and 'a are the initial velocity (m/sec) and acceleration (m/sec2). Write a C program to find the distance traveled at regular intervals of time given 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'.

5. Using switch-case statement, write a C program that takes two operands and one operator from the user, performs the operation and then prints the answer. (consider operators +, -, *, and %).

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

7. Write a C program that uses functions to perform the following
   a. Addition of Two Matrices
   b. Multiplication of Two Matrices

8. Write a C program that uses functions to perform the following operations
   a. To insert a sub-string in to given main string from a given position
   b. To delete n characters from a given position in given string.

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

10. a) Write a C program that displays the position or index in the string S where the string T begins, or -1 if S does not contain T.
    b) Write a C program to count the lines, words and characters in a given text.

11. To write a C program
    a) To generate Pascal's triangle
    b) To construct a pyramid of numbers

12. To write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression 1+x+x2+x3+…xn
    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 nest pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too.

13. To write a C program
    a) To find the 2's compliments of a binary number.
    b) To convert a Roman numeral to its decimal equivalent

14. To write a C program that uses functions to perform the following operations
    a. Reading a complex number
    b. Writing a complex number
    c. Addition of 2 complex numbers
    d. Multiplication of 2 complex numbers
    (Note: represent complex number using a structure)

15. To write a C program
    a) To copy the contents from one file to another.
    b) To reverse the first n characters in a file.
    (Note: the file name and n are specified on the command line)
    c) To fine the no. of characters, no. of words, no. of lines in a given file.

REFERENCE BOOKS:

1. Pradip Dey, Ghosh Manas (2009), *Programming in C,* Oxford University Press, USA.
2. E. Balaguruswamy (2009), *C and Data Structures,* 5th Edition, TMH publications, India.
3. M.K. Jain, S.R.K. Iyengar & R.K. Jain (2007), *Numerical Methods for Scientific and Engineering Computation,* 5th edition, New Age International Publishers, New Delhi.
4. Aitkinson, Han (2006), *Elementary Numerical Analysis*, 3rd Edition, John Wiley & Sons (Asia) Private Ltd., India.

B. Tech. ECE I SEMESTER

COMPUTER AIDED ENGINEERING DRAWING LAB

Course Code: **A1305**

L	T	P	C
-	2	3	2

UNIT - I

INTRODUCTION: Introduction to computer aided drafting, auto CAD commands, theory of projection, elements of projection, planes of projection, methods of projection.

ORTHOGRAPHIC PROJECTION: Lines used in general engineering drawing, types of surfaces, invisible lines, precedence of lines, selection of views, principles of multi view drawing, steps to draw orthographic views, orthographic projection of different objects.

UNIT - II

PROJECTION OF POINTS AND STRAIGHT LINES: Projection of points, various positions of straight lines w.r.t. reference planes, skew line, traces of line, projection of straight lines and traces.

UNIT - III

PROJECTION OF PLANES: Types of planes, projection of planes, traces of planes.

UNIT - IV

PROJECTION OF SOLIDS: Divisions of solids, polyhedra, solids of revolution, projection of solids in simple position, projection of solids with axis inclined to one reference plane and parallel to other.

UNIT - V

ISOMETRIC PROJECTIONS: Divisions of pictorial projection, divisions of axenometric projection, theory of isometric projection, isometric drawing, non-isometric drawing, isometric drawing from orthographic views for simple objects.

TEXT BOOKS:

1. D. M. Kulkarni, A. P. Rastogi, and A. K. Sarkar (2009), *Engineering Graphics with AutoCAD*, PHI Learning Private Limited, New Delhi.
2. Arshad Noor Siddiquee, Zahid Akhtar Khan, Mukhtar Ahmad (2006), *Engineering Drawing with a Primer on Autocad,* 2nd Edition, Prentice Hall, India.
3. Jolhe, Dhananjay (2006), *Engineering Drawing: With an Introduction to CAD*, Tata Mc Graw Hill, India.

REFERENCE BOOKS:

1. N. D. Bhatt, V. M. Panchal (2005), *Engineering Drawing***,** 48th Edition, Charotar Publishing House, Gujarat.
2. K. R. Gopalakrishna (2005), *Engineering Graphics*, 32nd Edition, Subash Publishers, Bangalore.

SYLLABI FOR II SEMESTER

B. Tech. ECE II SEMESTER

MATHEMATICS - II
(Common to all Branches)

Course Code: **A1007**

L	T	P	C
3	1	-	4

UNIT - I

SOLUTION FOR LINEAR SYSTEMS AND EIGEN VALUES & EIGEN VECTORS: *Matrices and linear systems of equations*: Elementary row transformations - rank - echelon form, normal form, solution of linear systems, direct methods**.** Eigen values, Eigen vectors - properties. Cayley-Hamilton theorem (without proof) - inverse and powers of a matrix by Cayley-Hamilton theorem, diagonlization of matrix, calculation of powers of a matrix, modal and spectral matrices.

UNIT - II

LINEAR TRANSFORMATIONS: Real matrices, symmetric, skew symmetric, orthogonal, linear transformation, orthogonal transformation. *Complex matrices*: Hermitian, Skew Hermitian and unitary, Eigen values and Eigen vectors of complex matrices and their properties. Quadratic forms- reduction of quadratic form to canonical form -rank - positive, negative definite - semi definite - index - signature.

UNIT - III

PARTIAL DIFFERENTIAL EQUATIONS: Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions - solutions of first order linear (Lagrange) equation and nonlinear (standard type) equations. Method of separation of variables for second order equations -two dimensional wave equation.

UNIT - IV

FOURIER SERIES: Determination of Fourier coefficients, Fourier series, 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, Fourier sine and cosine integral.

UNIT - V

FOURIER TRANSFORMS AND Z - TRANSFORMS: Fourier transform, Fourier sine and cosine transforms, properties, inverse transforms, finite Fourier transforms. Z-transforms, inverse Z-transforms, properties, Damping rule, Shifting rule, initial and final value theorems, Convolution theorem, Solution of difference equations by Z-transforms.

TEXT BOOKS:

1. Grewal B. S (2007), *Higher Engineering Mathematics*, 40th edition, Khanna Publishers, New Delhi.
2. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), *Mathematical Methods*, 10th revised edition, S. Chand & Company Limited, New Delhi.

REFERENCE BOOKS:

1. Shahanaz Bathul (2007), *Mathematical Methods*, 3rd edition, Right Publishers, Hyderabad.
2. Jain R. K., Iyengar S. R. K (2008), *Advanced Engineering Mathematics,* 3rd edition, Narosa Publication House, New Delhi.
3. Dass H. K ,Rajnish Verma Er (2007), *Higher Engineering Mathematics*, First Edition, S. Chand & Company Limited, New Delhi.

B. Tech. ECE II SEMESTER

ENGINEERING PHYSICS
(Common to ECE, CSE & IT)

Course Code: **A1002**

L	T	P	C
4	-	-	4

UNIT - I

BONDING IN SOLIDS: Ionic bond, Covalent bond, Metallic bond, Hydrogen bond, Vander-Waal's bond, calculation of cohesive energy.

CRYSTALLOGRAPHY AND CRYSTAL STRUCTURES: Space lattice, Unit cell lattice parameters, Crystal systems, Bravais lattices, Atomic radius, co-ordination number and packing factor of SC, BCC, FCC, diamond and HCP structures, structures of NaCl, ZnS, CsCl.

UNIT - II

CRYSTAL PLANES & X-RAY DIFFRACTION: Miller indices, Crystal planes and directions, Inter planar spacing of orthogonal crystal systems, Basic principles of X-ray diffraction, Bragg's law, Laue method, Powder method, applications of X- ray diffraction.

NANOTECHNOLOGY: Origin of Nanotechnology, Nano scale, surface to volume ratio, bottom-up fabrication: Sol-gel, precipitation, Combustion methods; Top-down fabrication: Chemical vapour deposition, physical vapour deposition, pulsed laser vapour deposition methods and applications.

UNIT - III

PRINCIPLES OF QUANTUM MECHANICS: Waves and particles, De Broglie hypothesis , matter waves, Davisson and Germer's experiment, g. P. Thomson experiment, Schrödinger's time independent wave equation, physical significance of the wave function - particle in one dimensional potential box.

BAND THEORY OF SOLIDS: Electron in a periodic potential, Bloch theorem, Kronig-penny model(qualitative treatment), origin of energy band formation in solids, classification of materials into conductors, semi conductors & insulators, concept of effective mass of an electron.

UNIT - IV

DIELECTRIC PROPERTIES: Electric dipole moment, dielectric constant, polarization, electric susceptibility internal fields in solids, Clausius - Mossotti equation and its derivation, Piezo-electricity and Ferro- electricity.

MAGNETIC PROPERTIES: Origin of magnetic moment, classification of magnetic materials on the basis of magnetic moment, domain theory of Ferro magnetism, hysteresis curve, soft and hard magnetic materials.

SUPERCONDUCTIVITY: Introduction to superconductivity, Meissner effect, BCS theory, applications of superconductors.

UNIT- V

LASERS: Characteristics of lasers, spontaneous and stimulated emission of radiation, meta-stable state, population inversion, lasing action, Einstein's coefficients, ruby laser, Helium-neon laser, semiconductor diode laser, applications of lasers.

FIBER OPTICS: Principle of optical fiber, acceptance angle, numerical aperture, types of optical fibers, attenuation of signal in optical fibers, application of optical fibers.

TEXT BOOKS:

1. S. O. Pillai, Sivakami (2009), *Engineering Physics,* 2nd edition, New Age International (P) Ltd, Delhi.

REFERENCE BOOKS:

1. C. Kittel (2009), *Introduction to Solid State Physics*, 8th edition, Wiley Eastern Publications, India.
2. A. J. Dekker (1999), *Solid State Physics*, Macmillan India Ltd, Chennai.
3. M. Ratner, D. Ratner (2003), *Nanotechnology*, Pearson Edition, India.
4. P. Sarah (2008), *Lasers & Optical Fiber communications*, IK International (P) Ltd, New Delhi.

B. Tech. ECE II SEMESTER

ENGINEERING CHEMISTRY
(Common to ECE, CSE & IT)

Course Code: **A1003**

L	T	P	C
4	-	-	4

UNIT - I

ELECTROCHEMISTRY AND BATTERIES: Concept of Electrochemistry, Conductance Electrolyte in solution, Conductance specific, Equivalent and molar conductance, Ionic Mobilities, Kolrausch's law & applications. *EMF:* Galvanic cells, Nernst equation, Galvanic series, Numerical problems.

BATTERIES: Primary and secondary cells, Lead-acid cell, NI-CD cell, Lithium cells. Applications of batteries, *Fuel cells:* Hydrogen – Oxygen fuel cells, advantages of fuel cells.

UNIT - II

WATER: Introduction, *Hardness:* causes, expression of hardness units, types of hardness, estimation of temporary and permanent hardness of water, numerical problems. Softening of water internal and external treatment, Zeolite, ion exchange process and numerical problems, reverse osmosis, electro dialysis.

UNIT - III

POLYMERS: Types of polymerization, *Plastics:* Thermoplastic resins & thermo set resins. Compounding & fabrication of plastics, preparation, properties, engineering applications of: polyethylene, PVC, PS, Teflon, Nylon. *Rubber:* vulcanization. *Elastomers:* Buna-s, Buna-n, Thiokol rubbers, fibers polyester, applications.

SURFACE CHEMISTRY: Solid surfaces, types of adsorption, Longmuir adsorption isotherm, application adsorption, classification of colloids, electrical & optical properties of colloids, applications of colloids in industry. *Nano materials*: Introduction, preparation and applications of nano materials.

UNIT - IV

ENERGY SOURCES: Fuels, classification, conventional fuels (solid, liquid, gaseous) solid fuels, coal analysis proximate and ultimate analysis and their significance liquid fuels, primary petroleum, refining of petroleum. *Gaseous Fuels:* natural gas, analysis of flue gas by Orsat's method combustion, problems.

UNIT - V

PHASE RULE: Definitions, phase, component, degree of freedom and phase rule equation. Phase diagrams, one component system: Water system. Two component system: Lead silver system.

MATERIAL CHEMISTRY: *Cement:* Composition of Portland cement, manufacture of Port land cement. *Lubricants:* Criteria of a good lubricant. *Refractories:* Classification, characteristics of good refractory. *Insulators & conductors:* Classification of insulators, characteristics of thermal & electrical insulators and applications of superconductors.

TEXT BOOKS:

1. Dara S. S., Mukkanti (2006), *Engineering Chemistry,* S. Chand & Company Limited, New Delhi.

REFERENCE BOOKS:

1. Jain. P. C. and Monica Jain (2008), *Engineering Chemistry,* Dhanpat Rai Publishing Company, New Delhi.
2. Mishra. K. N., Mani R.P. and Rama Devi. B (2009), *Chemistry of Engineering Materials,* Cengage learning.
3. Kuriacase J. C and Rajaram. J (2004), *Engineering Chemistry,* Tata Mc Graw Hill Co., New Delhi.

B. Tech. ECE II SEMESTER

COMPUTATIONAL TECHNIQUES

Course Code: **A1006**

L	T	P	C
3	1	-	4

UNIT - I

ROOTS OF NON-LINEAR EQUATIONS AND SOLUTIONS OF LINEAR EQUATIONS: Bisection method – method of false position - iteration method – newton-raphson method. Ill conditioned systems – jacobi iterative method – gauss seidel method – convergence of iterative methods.

UNIT - II

INTERPOLATION: Introduction – errors in polynomial interpolation – finite differences – forward differences - backward differences – symbolic relations and separation of symbols – difference equations – difference of a polynomial – newton's formulae for interpolation – interpolation with unequally spaced points - lagrange's interpolation formula.

UNIT - III

NUMERICAL DIFFERENTIATION & INTEGRATION AND CURVE FITTING: Numerical differentiation – trapezoidal rule - simpson's 1/3 rule – simpson's 3/8 rule. Linear, non-linear and curvilinear curve fitting – multiple linear regressions.

UNIT - IV

NUMERICAL SOLUTIONS OF INITIAL VALUE PROBLEMS IN ORDINARY DIFFERENTIAL EQUATIONS: Solution by taylor's series method – picard's method of successive approximation – euler's method and modified euler's method – runge - kutta methods. Predictor – corrector methods - adam's bashforth method.

UNIT - V

SOLUTIONS OF PARTIAL DIFFERENTIAL EQUATIONS: Classification of partial differential equation – finite difference methods for elliptic equations – laplace equations – liebmann's iterative methods – parabola equations – solution of one dimensional heat equation.

TEXT BOOKS:

1. Iyengar T. K. V., Krishna Gandhi B. & Others (2011), *Numerical Methods*, First Edition, New Delhi, S. Chand & Co. Ltd.
2. Grewal B. S (2007), *Higher Engineering Mathematics*, 40th Edition, New Delhi, Khanna Publishers.

REFERNCE BOOKS:

1. Sastry S. S (2005), *Introductory Methods of Numerical Analysis*, 4th Edition, New Delhi, PHI Learning Pvt. Ltd.
2. Jain M. K. and Iyengar S. R. K (2007), *Numerical Methods for Scientific and Engineering Computation*, 5th Edition, New Delhi, New Age International Publishers.
3. Balaguruswamy. E (1999), *Numerical Methods*, New Delhi, Tata McGraw Hill Publishing Company Limited.

B. Tech. ECE II SEMESTER

DATA STRUCTURES THROUGH C
(Common to ECE, CSE, IT & EEE)

Course Code: **A1503**

L	T	P	C
4	-	-	4

UNIT - I

RECURSION AND LINEAR SEARCH: Preliminaries of algorithm, algorithm analysis and complexity. Recursion definition, design methodology and implementation of recursive algorithms, linear and binary recursion, recursive algorithms for factorial function, GCD computation, Fibonacci sequence, Towers of Hanoi, tail recursion. List searches using linear search, binary search, Fibonacci search, analyzing search algorithms.

UNIT - II

SORTING TECHNIQUES: Basic concepts, Sorting by: Insertion (insertion sort), Selection (heap sort), Exchange (bubble sort, quick sort), Distribution (radix sort) and Merging (merge sort) algorithms.

UNIT - III

STACKS: Basic stack operations, representation of a stack using arrays, *Stack Applications*: Reversing list, factorial calculation, in-fix- to postfix transformation, evaluating arithmetic expressions.

QUEUES: Basic queues operations, representation of a queue using array, implementation of Queue operations using Stack, applications of Queues-Round Robin Algorithm, Enqueue, Dequeue, Circular queues, Priority queues.

UNIT - IV

LINKED LISTS: Introduction, single linked list, representation of a linked list in memory, operations on a single linked list, merging two single linked lists into one list, reversing a single linked list, applications of single linked list to represent polynomial expressions and sparse matrix manipulation, advantages and disadvantages of single linked list, circular linked list, double linked list.

UNIT - V

TREES: Basic tree concepts, *Binary Trees:* Properties, representation of binary trees using arrays and linked lists, operations on a binary tree, binary tree traversals, creation of binary tree from in-order and pre (post) order traversals, tree travels using stack, threaded binary trees.

GRAPHS: Basic concepts, *Representations of Graphs:* Using Linked list and adjacency matrix, graph algorithms, graph traversals (BFS & DFS)

TEXT BOOKS:

1. Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan (2008), *Fundamentals of Data Structure in C*, 2nd Edition, University Press, India.
2. Richard F. Gilberg, Behrouz A. Forouzan (2005), *Data Structures: A Pseudo code approach with C*, 2nd Edition, Thomson, India.

REFERENCE BOOKS:

1. Seymour, Lipschutz (2005), *Data Structures*, Schaum's Outlines Series, Tata McGraw-Hill, India.
2. Debasis, Samanta (2009), *Classic Data Structures*, 2nd Edition, Prentice Hall of India, India.
3. G. A. V. Pai (2008), *Data Structures and Algorithms: Concepts, Techniques and Applications*, Tata McGraw-Hill Education, India.
4. A. M. Tanenbaum, Y. Langsam, M. J. Augustein (1991), *Data Structures using C*, Prentice Hall of India, New Delhi, India.

B. Tech. ECE II SEMESTER

ENGINEERING PHYSICS AND ENGINEERING CHEMISTRY LAB
(Common to ECE, CSE & IT)

Course Code: **A1010**

L	T	P	C
-	-	3	2

PHYSICS LAB:

1. Study of I-V characteristics of an LED.
2. Determination of numerical aperture - optical Fibers.
3. Determination of time constant – R-C circuit.
4. Determination of energy gap of a given semiconductor material.
5. Determination of rigidity modulus of the material of a given wire– torsional pendulum.
6. Determination of frequency of vibrating tuning fork – melde's experiment.
7. Determination of wavelength and angular divergence of given laser source.
8. Determination of frequency of AC supply – Sonometer.
9. Determination of dispersive power of the material of the given prism – spectrometer.
10. Study of variation of magnetic field along a circular current carrying conductor – Stewart & Gee apparatus.

CHEMISTRY LAB:

1. **TITRIMETRY:** Estimation of hardness of water by EDTA method (or) Estimation of calcium in limestone by permanganometry.

2. **MINERAL ANALYSIS:** Determination of percentage of copper in brass

INSTRUMENTAL METHODS:

3. **COLORIMETRY:** Determination of ferrous ion in cement by colorimetric method (Or) Estimation of copper by colorimetric method.

4. **CONDUCTOMETRY:** Conductometric titration of strong acid vs strong base (or) Conductometric titration of mixture of acids vs strong base.

5. **POTENTIOMETRY:** Titration of strong acid vs strong base by potentiometry (or) Titration of weak acid vs strong base by potentiometry.

PHYSICAL PROPERTIES:

6. Determination of viscosity of sample oil by redwood/ ostwald's viscometer.

7. Determination surface tension of lubricants.

8. **IDENTIFICATION AND PREPARATIONS:** preparation of organic compounds: aspirin (or) benzimidazole.

KINETICS:

9. To determine the rate constant of hydrolysis of methyl acetate catalysed by an acid and also the energy of Activation (or) to study the kinetics of reaction between $K_2S_2O_8$ and KI.

10. **DEMONSTRATION EXPERIMENTS (ANY ONE OF THE FOLLOWING)**:
    a. Preparation of thiokol rubber
    b. Adsorption on charcoal

B. Tech. ECE II SEMESTER

DATA STRUCTURES THROUGH C LAB
(Common to ECE, CSE, IT & EEE)

Course Code: **A1504**

L	T	P	C
-	-	3	2

Exercise 1:
Write recursive programme which computes the n^{th} Fibonacci number, for appropriate values of n.

Exercise 2:
Write recursive programme for the following
a) Write recursive C programme for calculation of Factorial of an integer
b) Write recursive C programme for calculation of GCD (n, m)
c) Write recursive C programme for Towers of Hanoi : N disks are to be transferred from peg S to peg D with Peg I as the intermediate peg.

Exercise 3:
a) Write C programs that use both recursive and non recursive functions to perform linear search for a Key value in a given list.
b) Write C programs that use both recursive and non recursive functions to perform binary search for a Key value in a given list.
c) Write C programs that use both recursive and non recursive functions to perform Fibonacci search for a Key value in a given list.

Exercise 4:
a) Write C programs that implement Bubble sort, to sort a given list of integers in ascending order
b) Write C programs that implement Quick sort, to sort a given list of integers in ascending order
c) Write C programs that implement Insertion sort, to sort a given list of integers in ascending order

Exercise 5:
a) Write C programs that implement heap sort, to sort a given list of integers in ascending order
b) Write C programs that implement radix sort, to sort a given list of integers in ascending order
c) Write C programs that implement merge sort, to sort a given list of integers in ascending order

Exercise 6:
a) Write C programs that implement stack (its operations) using arrays
b) Write C programs that implement stack (its operations) using Linked list

Exercise 7:
a) Write a C program that uses Stack operations to Convert infix expression into postfix expression
a) Write C programs that implement Queue (its operations) using arrays.
b) Write C programs that implement Queue (its operations) using linked lists

Exercise 8:
a) Write a C program that uses functions to create a singly linked list
b) Write a C program that uses functions to perform insertion operation on a singly linked list
c) Write a C program that uses functions to perform deletion operation on a singly linked list

Exercise 9:
a) Adding two large integers which are represented in linked list fashion.
b) Write a C programme to reverse elements of a single linked list.
c) Write a C programme to store a polynomial expression in memory using linked list
d) Write a C programme to representation the given Sparse matrix using arrays.
e) Write a C programme to representation the given sparse matrix using linked list

Exercise10:
a) Write a C program to create a Binary Tree of integers
b) Write a recursive C program, for traversing a binary tree in preorder, inorder and postorder.
c) Write a non recursive C program, for traversing a binary tree in preorder, inorder and postorder.
d) Program to check balance property of a tree.

B. Tech. ECE II SEMESTER

PC SOFTWARE LAB
(II Semester: Common to

Course Code: **AI601**

L	T	P	C
-	2	3	2

LIST OF EXPERIMENTS:

1. PC Hardware:

Task 1 and 2 - Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor based on your observation:

1. Check and measure various supply voltages of PC.
2. Make comparative study of motherboards.
3. Observe and study various cables, connections and parts used in computer communication.
4. Study various cards used in a system viz. display card, LAN card etc.
5. Study on floppy disk drive.
6. Study on hard disk.
7. To remove, study and replace CD ROM drive.
8. To study monitor, its circuitry and various presents and some elementary fault detection.
9. To study printer assembly and elementary fault detection of DMP and laser printers.
10. To observe various cables and connectors used in networking.
11. To study parts of keyboard and mouse.
12. To assemble a PC.
13. Troubleshooting exercises related to various components of computer like monitor, drives, memory and printers etc.
14. Study on operating systems: Microsoft Windows, Linux and Macintosh

Task 3 - Several mini tasks would be that covers Basic commands in Linux and Basic system administration in Linux which includes: Basic Linux commands in bash, Create hard and symbolic links, Text processing, Using wildcards

2. Net Working:

Task 4 and 5 - Importance of Networking:

1. Communication and Transmission Devices such as Modems, hubs, switches, routers , gateways, twisted pair cables, optic fiber, radio wave communication
2. Associated software Communication modes

Features of Networking, Communication Protocols
Topology: Ring, Star, Bus, etc
Types of Networks: Local Area, Metropolitan Area, Wide Area Networking
Wireless Network: Wide Area Networking, Value added Networking

Network Administration:

1. Holding & protecting Supervisor password
2. Protecting access to sensitive files
3. Allocation of user login, password and access rights
4. Control on unauthorised user activities
5. Day to day management of user requirements
6. Vigilance over unauthorised programs, failed attempts to access
7. Steps to prevent hacking & wiretapping
8. Password control
9. Maintenance of Audit trail logs
10. Physical control on access to servers & console

3. Internet & World Wide Web:

Task 6 - 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.

Task 7 - Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Task 8 - 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 to the instructors.

Task 9 - 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 antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

4. MICROSOFT OFFICE/ Equivalent (FOSS) tools

MS/equivalent (FOSS) tool Word

Task 10 and 11 – Word Orientation: Word– Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word, 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 and Word, Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check , Track Changes , Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs, Forms, Text Fields, Inserting objects, Mail Merge in Word.

MS/equivalent (FOSS) tool Excel

Task 12 and 13 - Excel Orientation : Excel –Accessing, overview of toolbars, saving excel files, Using help and resources, Gridlines, Format Cells, Summation, auto fill, Formatting Text, Cell Referencing, Formulae in excel – average, standard deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting, Pivot Tables, Interactive Buttons, Importing Data, Data Protection, Data Validation

MS/equivalent (FOSS) tool Power Point

Task 14 and 15 - PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts, Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides, Auto content wizard, Slide Transition, Custom Animation, Auto Rehearsing.

MS/equivalent (FOSS) tool Publisher

Task 16 - Using Templates, Layouts, Inserting text objects, Editing text objects, Inserting Tables, Working with menu objects, Inserting pages, Hyper linking, Renaming, deleting, modifying pages, Hosting website.

REFERENCE BOOKS:

1. Vikas Gupta (2008), Comdex *Hardware and Networking Course Kit*, DreamTech press, New Delhi, India.
2. Sumitabha Das (2008), *UNIX concepts and applications*, 4th Edition, Tata McGraw Hill, New Delhi, India.

SYLLABI FOR III SEMESTER

B. Tech. ECE III SEMESTER

MATHEMATICS - III
(Common to ECE & EEE)

Course Code: **A1011**

L	T	P	C
3	1	-	4

UNIT - I

SPECIAL FUNCTIONS: Gamma and Beta functions and their properties, evaluation of improper integrals. *Bessel's functions:* properties, recurrence relations, orthogonality of Bessel functions. *Legendre functions:* Legendre Polynomials, properties, recurrence relations, orthogonality of Legendre polynomials, Rodrigue's formula.

UNIT - II

FUNCTIONS OF A COMPLEX VARIABLE: Continuity, differentiability, analyticity and properties of analytic functions. Cauchy - Riemann equations in Cartesian and Polar co-ordinates, Harmonic and conjugate harmonic functions, Milne - Thomson method.

ELEMENTARY FUNCTIONS: Exponential, trigonometric, hyperbolic functions and their properties, general power of z^a (a is complex), Principal value.

UNIT - III

COMPLEX INTEGRATION: Line integral, evaluation of Line Integral along a path and by indefinite integration, Cauchy's integral theorem, Cauchy's integral formula and generalized Cauchy's integral formula.

COMPLEX POWER SERIES: Radius of convergence, expansion in Taylor's series, Maclaurin's series and Laurent's series. Zeros, singular points and poles of an analytic function.

UNIT - IV

CALCULUS OF RESIDUES: *Residue:* Evaluation of residues by formula and by Laurent's 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) Integration by indentation

UNIT - V

CONFORMAL MAPPING: Transformation by $z+\frac{1}{z}$, z^2, $z^n (n \in z^+)$, e^z, $\log z$, $\sin z$, $\cos z$.*Bilinear transformation*: Translation, rotation, inversion, fixed points, properties and invariance of cross ratio under bilinear transformation. Determination of bilinear transformation mapping three given points.

ELEMENTARY GRAPH THEORY: *Graphs*: Simple, Multiple, Regular, Complete, Bipartite and Planar Graphs. *Trees:* Introduction, Spanning Tree and Minimal Spanning Tree.

TEXT BOOKS:

1. Dr T. K. V Iyengar, Dr B. Krishna Gandhi & Others (2011), *Engineering Mathematics Volume - III*, 9th Revised Edition, S. Chand & Co. Ltd, New Delhi.
2. B. S. Grewal (2007), *Higher Engineering Mathematics*, 41st edition, Khanna Publishers, New Delhi.

REFERENCE BOOKS:

1. Shahnaz Bathul (2011), *Special Functions & Complex variables (Engineering Mathematics - III)*, Prentice Hall of India, New Delhi.
2. Ruel Churchill, James Brown (2010), *Complex Variables and Applications,* 7th edition, Tata McGraw Hill Publishing Co. Ltd, New Delhi.

B. Tech. ECE III SEMESTER

ELECTRONIC DEVICES
(Common to ECE & EEE)

Course Code: **A1401**

L	T	P	C
3	1	-	4

UNIT - I

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

CONDUCTION IN SEMICONDUCTORS: Electrons and holes in an Intrinsic semiconductor, conductivity of a semiconductor, carrier concentrations in an intrinsic semiconductor, donor and acceptor impurities, charge densities in a semiconductor, Fermi level in a semiconductor having impurities, diffusion, carrier lifetime, the continuity equation, the hall effect.

UNIT - II

SEMICONDUCTOR DIODE CHARACTERISTICS: Qualitative theory of the p-n Junction, the p-n junction as a diode, band structure of an open circuited p-n junction, the current components in a p-n diode, quantitative theory of the p-n diode currents, the volt ampere characteristics, the temperature dependence of V-I characteristics, diode resistance, ideal versus practical diodes, diode equivalent circuits, space charge or transition capacitance C_T, diffusion capacitance, breakdown mechanism in diode, Zener diode**,** V-I characteristics of Zener diode.

UNIT - III

DIODE APPLICATIONS: Introduction, load line analysis, series diode configurations, parallel and series-parallel configuration, half-wave rectification, full-wave rectification, general filter considerations, Inductive, Capacitive, LC and CLC filters, Zener diode as voltage regulator.

SPECIAL SEMICONDUCTOR DEVICES: Principle of operation, Characteristics and applications of Tunnel diode, Varactor diode, UJT, Photo Diode, LED, LCD, SCR.

UNIT - IV

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

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

UNIT - V

BJT BIASING: Need for biasing, Operating point, load line analysis, bias stabilization techniques: fixed bias, collector to base bias, self-bias, Stabilization against variations in I_{co}, V_{BE} and β for the self bias circuit, bias compensation techniques, thermal runaway and thermal stability.

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

TEXT BOOKS:

1. Jacob Milliman, Christos C .Halkias, Satyabrata Jit (2011), *Electronic Devices and Circuits*, 3rd edition, Tata McGraw Hill, New Delhi.
2. G. K. Mittal (1999), *Electronic Devices and Circuits*, 22nd edition, Khanna Publications, New Delhi.
3. Robert Boylestad, Lowis Nashelsky (1993), *Electronic Devices and Circuit Theory*, 5th edition, Prentice Hall of India, New Delhi, India.

REFERENCE BOOKS:

1. David. A. Bell (1986), *Electronic Devices and Circuits,* 4th edition, Prentice Hall of India, New Delhi.
2. S. Shalivahanan, N. Suresh Kumar, A. Vallavaraj (2007), *Electronic Devices and Circuits*, 3rd edition, McGraw Hill, New Delhi, India.
3. Theodore. F. Bogart Jr, Jeffrey S. Beasley, Guillermo Rico (2004), *Electronic Devices and Circuits*, 6th edition Pearson Education, India.

B. Tech. ECE III SEMESTER

SIGNALS AND SYSTEMS

Course Code: **A1402**

L	T	P	C
3	1	-	4

UNIT - I

CLASSIFICATION OF SIGNALS: Continuous time (CT) and Discrete time (DT) signals, elementary signals-Unit, Step, Impulse, ramp signals, singularity functions and operations on signals.

FOURIER SERIES: Analogy between vectors and signals, some examples of orthogonal functions, relationship between trigonometric Fourier series and exponential Fourier series, representation of periodic function by Fourier series over the entire interval, convergence of Fourier series, alternate form of trigonometric series, symmetry conditions, complex Fourier spectrum.

UNIT - II

FOURIER TRANSFORMS: Fourier transform(FT), Fourier transform of standard signals, Properties of continuous Fourier transforms, Fourier transforms involving impulse function, Fourier transform of periodic signals, Hilbert transform and its properties, pre-envelope and representation of band pass signal.

UNIT - III

SIGNAL TRANSMISSION THROUGH LTI SYSTEMS: Classification of systems, discrete time LTI systems, continuous time LTI systems, properties of LTI system, Impulse response of a linear system, filter characteristics of LTI system, distortion less transmission.

CONVOLUTION AND CORRELATION OF SIGNALS: System analysis by convolution, graphical interpretation of convolution, Ideal differentiator and Integrator, response of linear system to derivative or integral function, signal comparison, correlation and convolution, some properties of correlation function, correlation functions for non finite energy signals, detection of periodic signals in presence of noise by correlation.

UNIT - IV

LAPLACE TRANSFORMS: The Laplace transform (LT), The Region of convergence (ROC) for Laplace transforms, Properties of Laplace transforms, some Laplace transform pairs, analysis and characterization of LTI system using Laplace transform, Inverse Laplace transforms, Laplace transforms methods in circuit analysis, the transfer function.

UNIT - V

SAMPLING: Sampling of continuous time signals, sampling theorem, reconstruction of signal from its samples, the effect of under sampling- aliasing, practical aspects of sampling, discrete-time processing of continuous time signals.

Z - TRANSFORMS: The Z - Transform, The Region of Convergence (ROC) for Z - transform and its properties, properties of Z - transform, constraints on ROC for various classes of signals, transfer function, causality and stability, Inverse Z- transform using various methods.

TEXT BOOKS:

1. Oppenheim A. V, Willisky (2009), *Signals and Systems*, 2nd edition, Prentice Hall of India, India.
2. B. P. Lathi (2001), *Signals, Systems & Communications*, BS Publications, New Delhi.

REFERENCE BOOKS:

1. Simon Haykin, Van Veen (2007), *Signals & Systems*, 2nd edition, Wiley publications, India.
2. Hwei Piao Hsu, Schaums (2003), *Outline of Theory Problems of Signals and Systems*, McGraw Hill, India.
3. Charles L. Phillips, John M. Parr, Eve A. Riskin (2007), *Signals, Systems and Transforms*, Prentice Hall of India, New Delhi, India.

B. Tech. ECE III SEMESTER

PROBABILITY THEORY AND STOCHASTIC PROCESSES

Course Code: **A1403**

L	T	P	C
4	-	-	4

UNIT - I

PROBABILITY THEORY: Probability and axioms of probability, joint probability and conditional probability, total probability, Baye's theorem and Bernoulli's trials.

RANDOM VARIABLES: Definition of a random variable, classification of random variables, distribution and density functions- Gaussian, uniform, exponential, binomial, poisons, Rayleigh, conditional distribution and density functions.

OPERATIONS ON SINGLE RANDOM VARIABLE: Expectation, moments, variance and skew, Chebyshev inequality, Markov's inequality, Schwartz inequality, characteristic function, moment generating function, transformation of random variables.

UNIT - II

MULTIPLE RANDOM VARIABLES: Joint distribution function, properties of joint distribution, marginal distribution functions, joint density function, properties of joint density function, conditional distribution and density point conditioning, interval conditioning, statistical independence, sum of two random variables, sum of several random variables, central limit theorem (without proof).

OPERATIONS ON MULTIPLE RANDOM VARIABLES: Expected value of a function of random variable, 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, linear transformations of Gaussian random variables.

UNIT - III

RANDOM PROCESS - TEMPORAL CHARACTERISTICS: Random process concept, classification of random processes, distribution and density functions, concept of stationary and statistical independence. first-order stationary processes, second- order and wide-sense stationary, N^{th}-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.

UNIT - IV

RANDOM PROCESS-SPECTRAL CHARACTERISTICS: *Power spectrum:* properties, relationship between power spectrum and autocorrelation function, cross-power density spectrum, properties, relationship between cross-power spectrum and cross-correlation function.

UNIT - V

NOISE: Types of noise, Resistive noise, Shot noise, extra terrestrial noise, arbitrary noise sources, white noise, narrow band noise: In-phase and quadrature phase components and its properties, modeling of noise sources, average noise bandwidth, effective noise temperature, average noise figures.

TEXT BOOKS:

1. Peyton Z. Peebles (2009), *Probability Random variables and Random signal principles* 4^{th} edition, Tata McGraw Hill, New Delhi, India.
2. Athanasios Papoulis, Unni Krishna Pillai (2002), *Probability, Random variables and stochastic processes*, 4^{th} edition, Tata McGraw Hill, New Delhi, India.

REFERENCE BOOKS:

1. Henry Stark, John W. Woods (2009), *Probability and Random processes with applications to signal processing,* 3^{rd} edition, Pearson Education, India.
2. R. P. Singh, S. D. Sapre (2007), *Communication Systems Analog & Digita*l, 2^{nd} edition, Tata McGraw Hill, New Delhi, India.
3. Simon Haykin (2009), *Communication Systems*, 2^{nd} edition, John Wiley, India.

B. Tech. ECE III SEMESTER

DIGITAL LOGIC DESIGN
(Common to ECE, CSE & EEE)

Course Code: **A1404**

L	T	P	C
4	-	-	4

UNIT - I

DIGITAL SYSTEMS AND BINARY NUMBERS: Digital systems, binary numbers, number base conversions, octal and hexadecimal numbers, complements, signed binary numbers, binary codes, binary storage and registers, binary logic.

BOOLEAN ALGEBRA AND LOGIC GATES: Basic definitions, axiomatic definition of Boolean algebra, basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, other logic operations, digital logic gates.

UNIT - II

GATE LEVEL MINIMIZATION: The k-map method, four-variable map, five-variable map, product of sums simplification, don't-care conditions, NAND and NOR implementation, AND-OR-INVERT, OR-AND-INVERT implementations, exclusive - OR function, Variable entered mapping, the tabulation (Quine - Mccluskey) technique, determination and selection of Prime Implicants.

COMBINATIONAL LOGIC: Combinational circuits, analysis procedure, design procedure, binary adder, binary subtractor, decimal adder, binary multiplier, magnitude comparator, decoders, encoders, multiplexers.

UNIT - III

SYNCHRONOUS SEQUENTIAL LOGIC: Sequential circuits, latches, flip-flops, analysis of clocked sequential circuits, State reduction and assignment, design procedure.

REGISTERS AND COUNTERS: Registers, shift registers, ripple counters, synchronous counters, counters with unused states, ring counter, Johnson counter.

UNIT - IV

MEMORY AND PROGRAMMABLE LOGIC: Introduction**,** Random access memory, memory decoding, error detection and correction, read only memory, programmable logic array, programmable array logic, sequential programmable devices.

UNIT - V

ALGORTHMIC STATE MACHINES (ASM): Introduction, ASM chart, timing considerations, design with multiplexers.

ASYNCHRONOUS SEQUENTIAL LOGIC: Introduction, analysis procedure, circuits with latches, design procedure, reduction of state and flow tables, race-free state assignment hazards, design example.

TEXT BOOKS:

1. M. Morris Mano, Michael D. Ciletti (2008), *Digital Design*, 4th edition, Pearson Education Inc, India.

REFERENCE BOOKS:

1. Zvi. Kohavi (2004), *Switching and Finite Automata Theory*, Tata McGraw Hill, India.
2. C. V. S. Rao (2009), *Switching and Logic Design*, 3rd Edition, Pearson Education, India.
3. Donald D. Givone (2002), *Digital Principles and Design*, Tata McGraw Hill, India
4. Roth (2004), *Fundamentals of Logic Design*, 5th Edition, Thomson, India.

B. Tech. ECE III SEMESTER

PRINCIPLES OF ELECTRICAL ENGINEERING

Course Code: **A1206**

L	T	P	C
4	-	-	4

UNIT - I

NETWORK THEOREMS: Tellegen's, Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer and Millman's theorems for DC and AC excitations.

UNIT - II

D.C AND A.C TRANSIENT ANALYSIS*:* Transient response of R-L, R-C, R-L-C circuits (Series and parallel combinations) for DC and AC excitations – Initial conditions, solution using differential equation and Laplace transform method.

UNIT - III

D.C GENERATORS: Principle of operation of DC Machines, EMF equation, types of generators, magnetization and load characteristics of DC generators.

D.C. MOTORS: Types of DC motors, characteristics of DC motors, losses and efficiency, Swinburne's test, speed control of DC shunt motor, flux and armature voltage control methods.

UNIT - IV

TRANSFORMERS: Principle of operation of single phase transformer, types, constructional features, phasor diagram on no load and load, equivalent circuit, losses and efficiency of transformer and regulation, OC and SC tests, predetermination of efficiency and regulation.

UNIT - V

THREE PHASE INDUCTION MOTORS: Principle of operation of three phase induction motors, slip ring and squirrel cage motors, slip-torque characteristics, efficiency calculation, starting methods.

SINGLE PHASE MOTORS: Principle of operation, Shaded pole motors, Capacitor motors, stepper motors characteristics.

TEXT BOOKS:

1. A. Sudhakar, Shyammohan S. Palli (2008), *Circuit and Networks,* Tata McGraw Hill, New Delhi, India.
2. B. L. Theraja, A. K. Theraja (2011), *A Text book of Electrical Technology (Volume-II)*, 4th edition, S. Chand Publications, New Delhi, India.

REFERENCE BOOKS:

1. Joseph A. Edminister (2002), *Schaums outline of Electrical Circuits*, 4th edition, McGraw Hill Publications, India.
2. J. B. Gupta (2006), *Theory and Performance of Electrical Machines*, S. K. Kataria & Sons, New Delhi.

B. Tech. ECE III SEMESTER

ELECTRONIC DEVICES LAB
(Common to ECE & EEE)

Course Code: **A1406**

L	T	P	C
-	-	3	2

LIST OF EXPERIMENTS:

PART - A: **ELECTRONIC WORKSHOP PRACTICE**

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Relays, Bread Boards, PCB's.

2. Identification, Specifications and Testing of Active Devices: Diodes, BJTs, JFETs, MOSFETs, Power Transistors, LED's, LCD's, SCR, UJT.

3. Study and operation of

    - Multimeters (Analog and Digital)
    - Function Generator
    - Regulated Power Supply (RPS)
    - CRO

4. Soldering Practice.

PART - B:

1. Forward and Reverse Bias Characteristics of PN junction diode.
2. Zener Diode Characteristics and Zener diode as voltage regulator.
3. Half wave rectifier with and without filters.
4. Full wave rectifier with and without filters.
5. Input & output characteristics of transistor in CB configuration.
6. Input & output characteristics of transistor in CE configuration.
7. Input & output characteristics of transistor in CC configuration
8. Drain and Transfer characteristics of JFET.
9. Voltage divider bias using BJT.
10. UJT characteristics.
11. SCR characteristics.

B. Tech. ECE III SEMESTER

ELECTRICAL ENGINEERING LAB

Course Code: **A1208**

L	T	P	C
-	-	3	2

LIST OF EXPERIMENTS:

PART - A: ELECTRICAL CIRCUITS

1. Verifications of KVL and KCL for series and parallel networks
2. Draw the frequency response of R-L-C Series and Parallel Resonance and estimate the Band-width and Resonant frequency
3. Determination of Z and Y Parameters for T and Π networks.
4. Determination of ABCD and h-Parameters for T and Π networks.
5. Verification of Thevenins and Norton's theorems.
6. Verification of Maximum Power Transfer theorem.
7. Verification of Super Position and Reciprocity theorems.

PART - B: ELECTRICAL MACHINES

1. Open circuit characteristics of D.C Shunt Generator and determine the Critical Field Resistance (R_c).
2. Brake test on D.C Shunt motor and draw the characteristics.
3. Predetermination of efficiency of given D.C Shunt machine working as Generator and Motor (Swinburne's Test).
4. Speed control of DC shunt Motor.
5. Open circuit and Short Circuit tests on Single Phase Transformer and determination of efficiency and regulation at given power factors and draw the equivalent circuit.
6. Load test on single phase Transformer. .
7. Break test on three phase induction motors.

Note: Any 12 of above experiments and from each part 6 experiments are to be conducted.

SYLLABI FOR IV SEMESTER

B. Tech. ECE IV SEMESTER

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Code: **A1013**

L	T	P	C
4	-	-	4

UNIT - I

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

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

UNIT - II

THEORY OF PRODUCTION AND COST ANALYSIS: Production Function, Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Production function, Laws of Returns, Internal and External Economies of Scale.

COST ANALYSIS: Cost concepts, Opportunity cost, fixed vs. variable costs, explicit costs vs. Implicit costs, Out of pocket costs vs. Imputed costs. Break Even Analysis (BEA), termination of Break Even Point (simple problems), Managerial Significance and limitations of BEA.

UNIT - III

INTRODUCTION TO MARKETS AND PRICING STRATEGIES: *Market structures*: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition.

PRICE DETERMINATION AND PRICE STATISTICS: Price-Output Determination in case of Perfect Competition and Monopoly, Pricing Strategies.

UNIT - IV

BUSINESS AND 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.

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).

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 (2005), *Managerial Economics and Financial Analysis,* 2nd edition, Tata McGraw Hill, New Delhi, India.
2. Varshney, Maheswari (2003), *Managerial Economics,* Sultan Chand, New Delhi, India.

REFERENCE BOOKS:

1. Ambrish Gupta (2004), *Financial Accounting for Management,* Pearson Education, New Delhi, India.
2. Domnick Salvatore (2011), *Managerial Economics in a Global Economy,* 7th edition, Oxford University Press, United States of America.
3. Narayanaswamy (2005), *Financial Accounting, A Managerial Perspective,* Prentice Hall of India private Ltd, New Delhi, India.

B. Tech. ECE IV SEMESTER

COMPUTER ARCHITECTURE AND ORGANIZATION
(Common to ECE, EEE, CSE &IT)

Course Code: **A1509**

L	T	P	C
4	-	-	4

UNIT - I

STRUCTURE OF COMPUTERS: Computer types, functional units, basic operational concepts, Von-Neumann architecture, bus structures, software, performance, multiprocessors and multicomputer, data representation, fixed and floating point and error detecting codes.

REGISTER TRANSFER 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.

UNIT - II

BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction codes, computer registers, computer instructions, instruction cycle, timing and control, 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 (RISC).

UNIT - III

MICRO-PROGRAMMED CONTROL: Control memory, address sequencing, micro-program example, design of control unit.

COMPUTER ARITHMETIC: Addition and subtraction, multiplication and division algorithms, floating-point arithmetic operation, decimal arithmetic unit, decimal arithmetic operations.

UNIT - IV

THE MEMORY SYSTEM: Basic concepts, semiconductor RAM types of read - only memory (ROM), cache memory, performance considerations, virtual memory, secondary storage, raid, direct memory access (DMA).

UNIT - V

MULTIPROCESSORS: Characteristics of multiprocessors, interconnection structures, interprocessor arbitration, interprocessor communication and synchronization, cache coherence, shared memory multiprocessors.

TEXT BOOKS:

1. M. Moris Mano (2006), *Computer System Architecture*, 3rd edition, Pearson/PHI, India.
2. Carl Hamacher, Zvonks Vranesic, SafeaZaky (2002), *Computer Organization*, 5th edition, McGraw Hill, New Delhi, India.

REFERENCE BOOKS:

1. William Stallings (2010), *Computer Organization and Architecture- designing for performance*, 8th edition, Prentice Hall, New Jersy.
2. Andrew S. Tanenbaum (2006), *Structured Computer Organization*, 5th edition, Pearson Education Inc, New Jersy.
3. Sivarama P. Dandamudi (2003), *Fundamentals of Computer Organization and Design*, Springer Int. Edition, USA.
   John P. Hayes (1998), *Computer Architecture and Organization*, 3rd edition, Tata McGraw Hill, New Delhi, India.

B. Tech. ECE IV SEMESTER

CONTROL SYSTEMS
(Common to EEE & ECE)

Course Code: **A1212**

L	T	P	C
3	1	-	4

UNIT - I

INTRODUCTION: Concepts of control systems-open loop and closed loop control systems and their differences, different examples of control systems, classification of control systems, feed-back characteristics, effects of feedback. mathematical models-differential equations, impulse response and transfer functions - translational and rotational mechanical systems, transfer function of DC servo motor, AC servo motor, synchro transmitter and receiver, block diagram representation of systems considering electrical systems as examples, block diagram algebra, representation by signal flow graph, reduction using Masons gain formula.

UNIT - II

TIME RESPONSE ANALYSIS: Standard test signals-time response of first order systems, characteristic equation of feedback control systems, transient response of second order systems - time domain specifications, steady state response, steady state errors and error constants, effects of proportional derivative, proportional integral systems.

STABILITY ANALYSIS IN TIME DOMAIN: The concept of stability, Routh's stability criterion, qualitative stability and conditional stability, limitations of Routh's stability, root locus techniques- root locus concept, construction of root loci, effects of adding poles and zeros to G(s) H(s) on the root loci.

UNIT - III

FREQUENCY RESPONSE ANALYSIS: Introduction, frequency domain specifications, Bode diagrams, determination of frequency domain specifications and transfer function from Bode diagram-phase margin and gain margin-stability, analysis from Bode plots.

STABILITY ANALYSIS IN FREQUENCY DOMAIN: Polar plots, Nyquist plots, stability analysis.

UNIT - IV

CLASSICAL CONTROL DESIGN TECHNIQUES: Compensation techniques - lag technique, lead technique, lead-lag controllers design in frequency domain, PID controllers.

UNIT - V

STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS: Concepts of state, state variables and state model, derivation of state models from block diagrams, diagonalization- solving the time invariant state equations- state transition matrix and its properties – concepts of controllability and observability.

TEXT BOOKS:

1. B. C. Kuo (2003), *Automatic Control Systems,* 8th edition, John Wiley and sons, India.
2. J. Nagrath, M. Gopal, *Control Systems Engineering*, 2nd edition, New Age International (P) Limited, New Delhi.

REFERENCE BOOKS:

1. Katsuhiko Ogata (1998), *Modern Control Engineering,* 3rd edition, Prentice Hall of India Pvt. Ltd., India.
2. Norman S. Nice (2011), *Control Systems Engineering,* 6th edition, John Wiley, India.
3. N. K. Sinha *(*1998), *Control Systems,* 3rd edition, New Age International (P) Limited Publishers, India.

B. Tech. ECE IV SEMESTER

ELECTRONIC CIRCUIT ANALYSIS

Course Code: **A1408**

L	T	P	C
4	-	-	4

UNIT - I

SINGLE STAGE AMPLIFIERS: Transistor as an amplifier, Classification of amplifiers, Transistor hybrid model, the h-parameters, analysis of a transistor amplifier circuit (CE, CB, CC) using h-parameters, simplified Common Emitter hybrid model, frequency response of amplifier.

JFET AMPLIFIERS: Small signal JFET model, common source amplifier, common drain amplifier, common gate amplifier.

UNIT - II

FEEDBACK AMPLIFIERS: Feedback concept and types, transfer gain with feedback, general characteristics of negative feedback amplifiers, effect of negative feedback on input and output resistances, method of analysis of feedback amplifiers, voltage series, current series, current shunt, and voltage shunt feedback amplifiers.

OSCILLATORS: Constituents of an oscillator, Barkhausen criterion, classification of oscillators, sine wave feedback oscillators of LC type-general form of oscillator circuit, Hartley oscillator, Colpitts oscillator, sine wave feedback oscillator of RC type- RC phase shift oscillator, Wein bridge oscillator, Crystal oscillator, frequency stability.

UNIT - III

MULTISTAGE AMPLIFIERS: Distortion in amplifiers, cascading transistor amplifiers, choice of transistor configuration in a cascade amplifier, band pass of cascaded stages, RC coupled amplifier, transformer coupled amplifier, CE-CC amplifier, Darlington connection, multistage amplifier using JFET.

TRANSISTOR AT HIGH FREQUENCIES: Hybrid-pi (π) common emitter transistor model, hybrid - π conductances and capacitances, validity of hybrid- π model, variation of hybrid – π parameters, Millers theorem and its dual, the CE short circuit current gain, current gain with resistive load, gain-bandwidth product, emitter follower at high frequencies.

UNIT - IV

LARGE SIGNAL AMPLIFIERS: Introduction, class A large signal amplifier, harmonic distortion, transformer coupled audio power amplifier, collector dissipation and conversion efficiency, push-pull amplifier, class B power amplifier, class B push pull amplifier without output transformer, push pull amplifiers using transistors having complementary symmetry, class AB push pull amplifier, thermal stability, heat sink.

UNIT - V

TUNED AMPLIFIERS: Introduction, classification of small signal tuned amplifiers, **s**ingle tuned capacitance coupled amplifier, tapped single tuned capacitance coupled amplifier, **s**ingle tuned inductively coupled amplifier, double tuned amplifier.

TEXT BOOKS:

1. Jacob Milliman, Christos C. Halkias, Chetan D. Parikh (2011), *Integrated Electronics-Analog and Digital Circuits and Systems,* 2nd edition, Tata McGraw Hill Education Private Limited, New Delhi.
2. G. K. Mithall (1998), *Electronic Devices and Circuits*, Khanna Publishers, New Delhi.

REFERENCE BOOKS:

1. Robert L. Boylestad, Louis Nashelsky (2006), *Electronic Devices and Circuits Theory*, 9th edition, Pearson/Prentice Hall, India.
2. Jacob Millman, Arvin Grabel (2003), *Microelectronics*, 2nd edition, Tata McGraw Hill, New Delhi.

B. Tech. ECE IV SEMESTER

PULSE AND DIGITAL CIRCUITS

Course Code: **A1409**

L	T	P	C
3	1	-	4

UNIT - I

LINEAR WAVE SHAPING: High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square, ramp and exponential inputs, high pass RC circuit as differentiator and low pass RC circuit as integrator, attenuators, RL and RLC circuits and their response for step input, ringing circuit.

UNIT - II

STEADY STATE SWITCHING CHARACTERISTICS OF DEVICES: Diode as a switch, diode switching times, temperature variation of saturation parameters, design of transistor as a switch, transistor-switching times, transistor in saturation.

NON-LINEAR WAVE SHAPING: Diode clippers, transistor clippers, clipping at two independent levels, emitter coupled clipper, comparators, applications of voltage comparators, clamping operation, clamping circuits using diode with different inputs, clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage.

UNIT - III

BISTABLE MULTIVIBRATORS: The stable state of a bistable multivibrator, design and analysis of fixed bias and self biased bistable multivibrator, emitter coupled bistable multivibrator, direct binary, and Schmitt trigger circuit using transistors.

MONOSTABLE AND ASTABLE MULTIVIBRATORS: Monostable multivibrator, design and analysis of collector coupled and emitter coupled monostable multivibrator, triggering of monostable multivibrator, astable multivibrator, collector coupled and emitter coupled astable multivibrator.

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, current time base generators, methods of linearity improvements.

SYNCHRONIZATION AND FREQUENCY DIVISION: Principles of Synchronization, Frequency division in sweep circuit, Astable relaxation circuits, monostable relaxation circuits, synchronization of a sweep circuit with symmetrical signals, sine wave frequency division with a sweep circuit

UNIT - V

SAMPLING GATES: Basic operating principles of sampling gates, Unidirectional diode gate, Bi-directional sampling gates using transistors, Reduction of pedestal in gate circuit, four diode sampling gate, an alternate form of four diode gate, six diode sampling gate, , Chopper Amplifier, Sampling Scope.

LOGIC FAMILIES: Realization of Logic Gates (OR, AND, NOT) Using Diodes & Transistors, DCTL, RTL, DTL, TTL, ECL, CML, CMOS logic family and comparison of logic families.

TEXT BOOKS:

1. Jacob Millman, Herbert Taub, Mothiki S. Prakash Rao (2008), *Pulse, Digital and Switching Waveforms*, 3rd edition, Tata McGraw Hill, New Delhi.

REFERENCE BOOKS:

1. David A. Bell (2002), *Solid state pulse circuits,* 4th edition, Prentice Hall of India, New Delhi, India.
2. A. Anand Kumar (2005), *Pulse and Digital Circuits*, Prentice Hall of India, India.
3. Mothiki S. Prakash Rao (2006), *Pulse and Digital Circuits*, Tata McGraw Hill, India.

B. Tech. ECE IV SEMESTER

ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

Course Code: **A1410**

L	T	P	C
3	1	-	4

UNIT - I

ELECTROSTATICS: Introduction to Co-ordinate Systems and Transformations, Coulomb's law, Electric field intensity, Field due to different charge distributions, Electric flux and Flux density, Gauss law and its applications, Electric potential, relation between electric field and potential, Maxwell's equations for electrostatic fields, energy density and illustrative problems. Convection and conduction currents, Continuity equation, relaxation time, poisons and Laplace equations, Capacitance – Parallel plate, coaxial, spherical capacitors, Illustrative problems.

UNIT - II

MAGNETO STATICS: Biot-Savarts law, Amperes circuital law and applications, Magnetic flux and magnetic flux density, Maxwell's equations for magneto static fields, magnetic Scalar and vector potentials, amperes force law, inductances and magnetic energy, illustrative problems.

UNIT - III

TIME VARYING FIELDS & MAXWELLS EQUATIONS: Faradays law, Inconsistency of Amperes law and displacement current density, Maxwell's equations in differential, integral and word statements.

BOUNDARY CONDITIONS: Conditions at a boundary surface: dielectric-dielectric and dielectric – conductor interfaces, illustrative problems.

UNIT - IV

EM WAVE CHARACTERISTICS: Wave motion in free space, perfect, Lossy dielectrics and good conductors, Poynting theorem, polarization, reflection and refraction of plane waves- normal and oblique incidence (perpendicular and parallel polarizations).

UNIT - V

TRANSMISSION LINES: Transmission line types, parameters, equations, Infinite line concepts, distortion, condition for distortion less, lossless and minimum attenuation, loadings, Input impedance relations of open and short circuited transmission lines, reflection coefficient and VSWR, Smith chart configuration and applications, Single stub and double stub matching, illustrative problems.

TEXT BOOKS:

1. Matthew N. O. Sadiku (2008), *Elements of Electromagnetics*, 4rd edition, Oxford University Press, New Delhi.
2. Umesh Sinha, Satya Prakashan (2001), *Transmission Lines & Networks*, Tech India Publications, India.

REFERENCE BOOKS:

1. William H. Hayt Jr. , John A. Buck (2006), *Engineering Electromagentics*, 7th edition, Tata McGraw Hill, India.
2. E. C. Jordan, K. G. Balmain(2000), *Electromagnetic Waves and Radiating Systems*, 2nd edition, Prentice Hall of India, New Delhi.
3. John. D. Kraus (2007), *Electromagnetics*, 6th edition, McGraw Hill, New Delhi.
4. Nanapeneni Narayana Rao(2006), *Elements of Engineering Electromagnetics*, 6th edition, Pearson Education, India.

B. Tech. ECE IV SEMESTER

ELECTRONIC CIRCUIT ANALYSIS LAB

Course Code: **A1412**

L	T	P	C
-	-	3	2

LIST OF EXPERIMENTS: (Minimum 12 Experiments to be conducted)

PART - A
DESIGN AND SIMULATION USING MULTISIM

1. Common Emitter Amplifier.
2. Voltage Series Feedback Amplifier.
3. Current Shunt Feedback Amplifier.
4. Two Stage RC Coupled Amplifier.
5. Cascade Amplifier.
6. Darlington Pair Configuration.
7. Class A Power Amplifier (Transformer less).
8. Class B Complementary Symmetry Push Pull Amplifier.

PART - B
TESTING IN THE HARDWARE LABORATORY:

a) Any Three circuits simulated in Simulation laboratory
b) Any Three of the following

1. Common Source Amplifier.
2. Hartley Oscillator.
3. Colpitt's Oscillator.
4. Class A Power Amplifier (with Transformer Load)
5. Class B Power Amplifier.
6. Single Tuned Voltage Amplifier.
7. RC Phase Shift Oscillator.
8. Wien Bridge Oscillator.

B. Tech. ECE IV SEMESTER

PULSE AND DIGITAL CIRCUITS LAB

Course Code: **A1413**

L	T	P	C
-	-	3	2

LIST OF EXPERIMENTS: (Minimum 12 Experiments to be conducted)

PART - A
Testing in the Hardware Laboratory: (Any 6 Experiments)

1. Linear wave shaping – High Pass RC circuits
2. Linear wave shaping – Low Pass RC circuits
3. Non Linear wave shaping – Clippers.
4. Non Linear wave shaping – Clampers
5. Bistable Multivibrator.
6. Schmitt Trigger.
7. Monostable Multivibrator.
8. Astable Multivibrator.
9. Study of Logic Gates & Some applications

PART - B
Design and Simulation in Simulation Laboratory using Multisim Software

A) Any three circuits from hardware laboratory
B) Any three of the following

1. Transistor as a switch.
2. Sampling Gates.
3. Bootstrap sweep circuit.
4. Miller Sweep circuit.
5. Study of Flip-Flops & some applications

SYLLABI FOR V SEMESTER

B. Tech. ECE V SEMESTER

OBJECT ORIENTED PROGRAMMING THROUGH JAVA
(Common to ECE & EEE)

Course Code: **A1506**

L	T	P	C
4	-	-	4

UNIT - I

OBJECT ORIENTED THINKING: Need for object oriented programming paradigm, a way of viewing world agents and Communities, messages, methods, responsibilities, Classes and Instances, Class Hierarchies-Inheritance ,Method Binding, Overriding and Exceptions.

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

UNIT - II

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

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

I / O STREAMS: Concepts of streams, stream classes- byte and character stream, reading console input and writing console output, File: introduction to file, reading and writing to a file.

UNIT - III

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

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

UNIT - IV

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

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

UNIT - V

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

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

TEXT BOOKS:

1. Herbert schildt (2010), *The complete reference*, 7th edition, Tata Mc graw Hill, New Delhi

REFERENCE BOOKS:

1. T. Budd (2009), *An Introduction to Object Oriented Programming*, 3rd edition, Pearson Education, India.
2. J. Nino, F. A. Hosch (2002), *An Introduction to programming and OO design using Java*, John Wiley & sons, New Jersey.
3. Y. Daniel Liang (2010), *I*ntroduction *to Java programming*, 7th edition, Pearson education, India.
4. R. A. Johnson (2009), *An introduction to Java programming and object oriented application development*, 1st edition, Course Technology, India.

B. Tech. ECE V SEMESTER

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Course Code: **A1414**

L	T	P	C
4	-	-	4

UNIT - I

CHARACTERSTICS OF INSTRUMENTS: performance characteristics of instruments, static and dynamic characteristics, errors in measurement, DC voltmeters- multirange, range extension, solid state and differential voltmeters, AC voltmeters- multi range, range extension, shunt, thermocouple type RF ammeter, ohmmeters series type, and shunt type, multimeter for voltage, current and resistance measurements, dual slope and successive approximation type DVM.

UNIT - II

CATHODE RAY OSCILLOSCOPE (CRO): Introduction to CRT, vertical amplifiers, horizontal deflection system, sweep, trigger pulse, delay line, simple CRO, triggered sweep CRO, dual beam CRO, measurement of frequency.

UNIT - III

OSCILLOSCOPES: Dual trace oscilloscope, sampling oscilloscope, analog storage oscilloscope, digital readout oscilloscope, digital storage oscilloscope, measurement of phase and frequency (lissajous patterns).

AC BRIDGES: Measurement of resistance wheat's stone bridge, kelvin's double bridge, measurement of inductance using maxwell's inductance bridge, anderson's bridge, hay's bridge, measurement of capacitance using schering bridge, , errors and precautions in using bridges, Q-meter.

UNIT - VI

TRANSDUCERS: Introduction, classification, strain gauges, LVDT, piezo electric transducers, OPAMP applications in measurement and transducer circuits, instrumentation amplifier, thermometers, thermocouples, thermistors, sensistors.

UNIT - V

MEASUREMENT OF NON - ELECTRICAL QUANTITIES: Measurement of Strain, displacement, force, pressure, vacuum, torque, vibration and acceleration, pH, sound, velocity, humidity, speed, analog and digital data acquisition systems, pc based data acquisition systems, interfacing and bus standards, programmable logic controllers and their industrial applications.

TEXTBOOKS:

1. K Sawhney (2007), *Electrical and Electronic Measurements and Instrumentation,* 18th edition, Dhapat Rai & Co, New Delhi.
2. A. D. Helfrick, W.D. Cooper (2002), *Modern Electronic Instrumentation and Measurement Techniques*, 5th edition, Prentice Hall of India, New Delhi.

REFERENCE BOOKS:

1. David A. Bell (2003), *Electronic Instrumentation & Measurements,* 2nd edition, Prentice Hall of India, New Delhi.
2. Robert A. Witte (2004), *Electronic Test Instruments, Analog and Digital Measurements,* 2nd edition, Pearson Education, India.

B .Tech. ECE V SEMESTER

INTEGRATED CIRCUITS APPLICATIONS
(Common to ECE & EEE)

Course Code: **A1415**

L	T	P	C
3	1	-	4

UNIT - I

INTEGRATED CIRCUITS AND OPERATIONAL AMPLIFIER: Introduction, Classification of IC's, IC chip size and circuit complexity, basic information of Op-Amp IC741 Op-Amp and its features, the ideal Operational amplifier, Op-Amp internal circuit, Op-Amp characteristics - DC and AC.

UNIT - II

LINEAR APPLICATIONS OF OP-AMP: Inverting and non-inverting amplifiers, adder, subtractor, Instrumentation amplifier, AC amplifier, V to I and I to V converters, Integrator and differentiator.

NON-LINEAR APPLICATIONS OF OP-AMP: Sample and Hold circuit, Log and Antilog amplifier, multiplier and divider, Comparators, Schmitt trigger, Multivibrators, Triangular and Square waveform generators, Oscillators.

UNIT - III

ACTIVE FILTERS: Introduction, Butterworth filters – 1st order, 2nd order low pass and high pass filters, band pass, band reject and allpass filters.

TIMER AND PHASE LOCKED LOOPS: Introduction to IC 555 timer, description of functional diagram, monostable and astable operations and applications, schmitt trigger, PLL - introduction, basic principle, phase detector/comparator, voltage controlled oscillator (IC 566), low pass filter, monolithic PLL and applications of PLL.

UNIT - IV

VOLTAGE REGULATOR: Introduction, Series Op-Amp regulator, IC Voltage Regulators, IC 723 general purpose regulators, Switching Regulator.

D to A AND A to D CONVERTERS: Introduction, basic DAC techniques - weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, A to D converters - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC, DAC and ADC Specifications.

UNIT - V

CMOS LOGIC: CMOS logic levels, MOS transistors, Basic CMOS Inverter, NAND and NOR gates, CMOS AND-OR-INVERT and OR-AND-INVERT gates, implementation of any function using cmos logic.

COMBINATIONAL CIRCUITS USING TTL *74XX* ICS: Study of logic gates using *74XX* ICs, Four-bit parallel adder(IC 7483), Comparator(IC 7485), Decoder(IC 74138, IC 74154), BCD-to-7-segment decoder(IC 7447), Encoder(IC 74147), Multiplexer(IC 74151), Demultiplexer (IC 74154).

SEQUNTIAL CIRCUITS USING TTL *74XX* ICS: Flip Flops (IC 7474, IC 7473), Shift Registers, Universal Shift Register(IC 74194), 4- bit asynchronous binary counter(IC 7493).

TEXT BOOKS:

1. D. Roy Choudhury, Shail B. Jain (2012), *Linear Integrated Circuit*, 4th edition, New Age International Pvt. Ltd., New Delhi, India.
2. Ramakant A. Gayakwad, (2012), *OP-AMP and Linear Integrated Circuits*, 4th edition, Prentice Hall / Pearson Education, New Delhi.
3. Floyd, Jain (2009), *Digital Fundamentals,* 8th edition, Pearson Education, New Delhi.

REFERENCE BOOKS:

1. Sergio Franco (1997), *Design with operational amplifiers and analog integrated circuits*, McGraw Hill, New Delhi.
2. Gray, Meyer (1995), *Analysis and Design of Analog Integrated Circuits*, Wiley International, New Delhi.
3. John F. Wakerly (2007), *Digital Design Principles and practices*, Prentice Hall / Pearson Education, New Delhi.

B .Tech. ECE V SEMESTER

DIGITAL DESIGN THROUGH VERILOG HDL

Course Code: **A1416**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION TO VLSI DESIGN: Introduction, conventional approach to digital design, VLSI design, ASIC design flow, Role of HDL.

INTRODUCTION TO VERILOG: Conventional Data flow, ASIC data flow, Verilog as HDL, Levels of Design Description, Concurrency, Simulation and Synthesis, Functional Verification, System Tasks, Programming Language Interface (PLI), Module, Simulation and Synthesis Tools, Test Benches.

LANGUAGE CONSTRUCTS AND CONVENTIONS: Introduction, Keywords, Identifiers, White Space Characters, Comments, Numbers, Strings, Logic Values, Strengths, Data Types, Scalars and Vectors, Parameters, Memory, Operators, System Tasks, Exercises.

UNIT - II

GATE LEVEL MODELING: Introduction, AND Gate Primitive, Module Structure, Other Gate Primitives, Illustrative Examples, Tri-State Gates, Array of Instances of Primitives, Additional Examples, Design of Flip-flops with Gate Primitives, Delays, Strengths and Contention Resolution, Net Types, Design of Basic Circuits, Exercises.

UNIT - III

BEHAVIORAL MODELING: Introduction, Operations and Assignments, Functional Bifurcation, Initial Construct, Always Construct, Examples, Assignments with Delays, Wait construct, Multiple Always Blocks, Designs at Behavioral Level, Blocking and Non blocking Assignments, The case statement, Simulation Flow, if and if-else constructs, assign-de assign construct, repeat construct, for loop, the disable construct, while loop, forever loop, parallel blocks, force-release construct, Event.

UNIT - IV

MODELING AT DATA FLOW LEVEL: Introduction, Continuous Assignment Structures, Delays and Continuous Assignments, Assignment to Vectors, Operators.

SWITCH LEVEL MODELING:. Introduction, Basic Transistor Switches, CMOS Switch, Bi-directional Gates, Time Delays with Switch Primitives, Instantiations with Strengths and Delays, Strength Contention with Tri reg Nets, Exercises.

UNIT - V

SYSTEM TASKS, FUNCTIONS, AND COMPILER DIRECTIVES: Introduction, Parameters, Path Delays, Module Parameters, System Tasks and Functions, File-Based Tasks and Functions, Compiler Directives, Hierarchical Access, General Observations, Exercises.

FUNCTIONS, TASKS, AND USER DEFINED PRIMITIVES: Introduction, Function, Tasks, User- Defined Primitives (UDP), FSM Design (Moore and Mealy Machines).

TEXT BOOKS:

1. T. R. Padmanabhan, B. Bala Tripura Sundari (2004), *Design through Verilog HDL*, Wiley & Sons Education, IEEE Press, USA.
2. J. Bhaskar (2003)*, A Verilog Primier,* 2nd edition*,* BS Publications, India.

REFERENCE BOOKS:

1. Stephen. Brown, Zvonko Vranesic (2005), *Fundamentals of Logic Design with Verilog,* Tata McGraw Hill, India.
2. Charles H. Roth (2004), *Digital Systems Design using VHDL,* Jr. Thomson Publications, India.
3. Michael D. Ciletti (2005), *Advanced Digital Design with Verilog HDL*, Prentice Hall of India, New Delhi.
4. Joseph Cavanagh (2012), *Verilog HDL- Digital Design and Modeling*, CRC press, India.

B .Tech. ECE V SEMESTER

ANALOG COMMUNICATIONS

Course Code: **A1417**

L	T	P	C
3	1	-	4

UNIT - I

AM MODULATION: Introduction to communication system, need for modulation, Amplitude modulation- time domain and frequency domain of AM signals-power relations in AM, generation of AM waves: square law modulator, Switching modulator, Detection of AM waves: Square law detector, Envelope detector.

DSBSC MODULATION: Time domain and frequency domain description, balanced modulator, Ring modulator, Coherent detection of DSBSC modulated waves, Coastas loop.

UNIT - II

SSB MODULATION: SSB modulation frequency domain description, frequency discrimination method for generation of AM SSB modulated wave, time domain description, phase discrimination method for generating SSB, Demodulation of SSB waves.

VESTIGIAL SIDEBAND MODULATION: Frequency description, Generation of VSB modulated wave, Time domain description, Envelope detection of VSB wave plus carrier, Comparison of AM techniques, Applications of different AM systems, Frequency division multiplexing.

UNIT - III

BASIC CONCEPTS OF FREQUENCY MODULATION: Single tone frequency modulation, Spectrum analysis of sinusoidal FM wave, Narrow band FM, Wideband FM, Constant Average Power, Transmission Bandwidth of FM Wave-Comparison of FM&AM.

GENERATION AND DETECTION OF FM WAVES: Generation of FM :direct method- Parametric variation method, Varactor Diode, Reactance Modulator, Indirect Method- Armstrong Method, detection of FM waves: Balanced Frequency Discriminator, Zero crossing Detector, Phase locked loop, Foster Seeley Discriminator, Ratio detector.

UNIT - IV

NOISE: Introduction, Noise in DSBSC, Noise in SSBSC, Noise in AM, Noise in FM, Threshold effect in Angle Modulation System, Pre-emphasis & de-emphasis.

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

UNIT - V

TRANSMITTERS: Classification of Transmitters, AM transmitter, Effect of feedback on performance of AM transmitter, FM Transmitter, frequency stability in FM transmitter.

RECEIVERS: Introduction, TRF receiver, Super heterodyne receiver, Receiver characteristics, Local oscillator, Image frequency, , Choice of IF, AGC, Frequency changing and tracking, FM Receiver, Amplitude limiting, Comparison with AM Receiver.

TEXT BOOKS:

1. Simon Haykin (1994), *Communication Systems*, 2nd edition, Wiley Eastern, India.
2. Taub and schilling (2011), *Principles of Communication Systems*, Tata McGraw Hill, India.

REFERENCE BOOKS:

1. Kennedy (2005), Davis, *Electronic Communication Systems*, 4th Edition, Tata McGraw Hill, New Delhi.
2. B. P. Lathi (1998), *Modern Digital and Analog Communication Systems*, 3rd edition, BPB Publication, New Delhi.
3. R. P. Singh, S. D. Sapre (2009), *Communication Systems*, 2nd edition, Tata McGraw Hill, New Delhi.

B .Tech. ECE V SEMESTER

ANTENNAS AND WAVE PROPAGATION

Course Code: **A1418**

L	T	P	C
3	1	-	4

UNIT - I

ANTENNA BASICS: Introduction, Radiation Mechanism – single wire, 2 wires, dipoles, Current Distribution on a thin wire antenna. Basic Antenna Parameters -Patterns, Beam widths, Beam Area, Radiation Intensity, Beam Efficiency, Directivity, Gain and Resolution, Antenna Apertures, Antenna efficiency, Effective Height, Related Problems. Retarded vector potentials, Short Electric Dipole-Field, radiation resistance, Thin linear antenna ,half wave dipole-Field, current pattern, Power Radiated, radiation resistance, Beam widths, Directivity, Effective Area and Effective Height, Radiation Resistance at a point which is not current maximum.

UNIT - II

LOOP ANTENNAS: The Small Loop, Comparison of far fields of small loop and short dipole, Loop antenna general case, far field pattern of circular loop antenna with uniform current, small loop as special case, Radiation resistance of loop, Directivity of circular loop antenna with uniform current.

ANTENNA ARRAYS: Two element arrays, Multiplication of patterns, Linear Array with n -isotropic point sources of equal amplitude and spacing (Broadside, End fire Arrays), EFA with Increased Directivity, Scanning Arrays, N element linear array and directivity, Binomial Arrays- Uniform spacing and Non-uniform Amplitude.

UNIT - III

NON-RESONANT RADIATORS: Long wire antennas, V-antennas, Rhombic Antennas and Design Relations, Travelling wave antenna.

BROADBAND ANTENNAS: The Helical Antennas - Significance, Geometry, helix modes, Practical design considerations for monofilar axial mode helical antenna, linear polarization with monofilar axial mode helical antenna.

UNIT - IV

VHF, UHF AND MICROWAVE ANTENNAS : Dipole array with Parasitic Elements, Folded Dipoles & their characteristics, Yagi-Uda Antenna, Reflector Antennas : Flat Sheet and Corner Reflectors, Paraboloidal Reflectors –Beam formation, Types of parabolic reflectors, F/D Ratio, Spill Over, Back Lobes, Aperture Blocking, Feed systems, Off-set Feeds, Cassegrainian Feeds, Horn Antennas – Types, Optimum Horns, Design Characteristics of Pyramidal Horns; Lens Antennas – principle, types of lens antenna, non metallic dielectric lens antenna, primary feed and its uses, E –plane metal plate lens antenna, Antenna Measurements – Patterns measurement-arrangement for radiation pattern, Distance requirements, Directivity and Gain Measurements, Introduction to microstrip antennas.

UNIT - V

WAVE PROPAGATION: Introduction**,** classification, modes of Propagation, Ground Wave Propagation–Characteristics, Parameters, Wave Tilt, Flat and Spherical Earth Considerations. Sky Wave Propagation – Formation of Ionospheric Layers and their Characteristics, Mechanism of Reflection and Refraction, Critical Frequency, Virtual Height, MUF– Calculations, LUHF, Skip Distance, Optimum working Frequency, Ionospheric Abnormalities, Ionospheric Absorption, multi-hop propagation, Space Wave Propagation – LOS, Tropospheric Wave Propagation – Radius of Curvature of path, Effective Earth's Radius, Effect of Earth's Curvature, Field Strength Calculations, Duct Propagation(M-curves).

TEXT BOOKS:

1. John D. Kraus, Ronald J. Marhefka (2003), *Antennas for All Applications,* 3rd edition, Tata McGraw Hill, New Delhi, India.
2. K. D. Prasad, Satya Prakashan (2001), *Antennas and Wave Propagation,* Tech India Publications, New Delhi.

REFERENCE BOOKS:

1. C. A. Balanis (2001), *Antenna Theory,* 2nd Edition, John Wiley & Sons, India.
2. E. C. Jordan, K. G. Balmain (2000), *Electromagnetic Waves and Radiating Systems*, 2nd Edition, PHI.
3. E. V. D. Glazier, H. R. L. Lamont (2001), *Transmission and Propagation –The Services Text Book of Radio*, Standard Publishers Distributors, New Delhi.
4. F. E. Terman (1955), *Electronic and Radio Engineering*, 4th edition, Tata McGraw Hill, New Delhi.
5. John D. Kraus (1988), *Antennas,* 2nd edition, Tata McGraw Hill, New Delhi.

B .Tech. ECE V SEMESTER

INTEGRATED CIRCUITS APPLICATIONS LAB

Course Code: **A1420**

L	T	P	C
-	-	3	2

LIST OF EXPERIMENTS:

PART - A
LINEAR ICS: (Hardware Verification)

1. Measurement of IC741 op-amp parameters.
2. Basic applications of IC741 op-amp.
3. Integrator and differentiator using IC741 op-amp.
4. Precision rectifiers using IC741 op-amp.
5. Adder, Subtractor, Comparator using IC 741 Op-Amp.
6. Active Low Pass & High Pass Butterworth filters (1^{st} & 2^{nd} Order).
7. RC Phase Shift and Wien Bridge Oscillators using IC 741 Op-Amp
8. IC 555 timer in Astable and Monostable operation.
9. Schmitt trigger circuits using IC 741 op-amp & IC 555 timer.
10. Operation of phase locked loop using IC565.
11. Voltage regulator IC 723, three terminal voltage regulators- 7805, 7809, 7912.

PART - B
DIGITAL ICS: (HDL Coding and Simulation using Active HDL 8.1/Xilinx ISE 9.2i)

1. Adder and Subtractor
2. Parity generator.
3. Code converters
4. Comparator
5. Decoders and Encoders.
6. Multiplexers and De-multiplexers.
7. Flip-flops.
8. Counters.
9. Shift Registers.
10. Random Access Memory (RAM).

B .Tech. ECE V SEMESTER

ANALOG COMMUNICATIONS LAB

Course Code: **A1421**

L	T	P	C
-	-	3	2

Note: Minimum 12 Experiments to be conducted:
All these Experiments are to be simulated first either using Commsim, MATLAB, SCILAB, OCTAVE, LAB VIEW or any other simulation package and then to be realized in hardware.

PART - A

1. Amplitude modulation and demodulation
2. DSB-SC Modulator & Detector
3. SSB-SC Modulator & Detector (Phase Shift Method)
4. Frequency modulation and demodulation
5. Study of Spectrum analyzer and analysis of AM and FM Signals
6. Pre-emphasis and de-emphasis
7. PLL as FM Demodulator

PART - B

1. Time Division Multiplexing & De-multiplexing
2. Frequency Division Multiplexing & De-multiplexing
3. Pulse Amplitude Modulation & Demodulation
4. Pulse Width Modulation & Demodulation
5. Pulse Position Modulation & Demodulation
6. Frequency synthesizer
7. AGC Characteristics

SYLLABI FOR VI SEMESTER

B .Tech. ECE VI SEMESTER

COMPUTER NETWORKS

Course Code: **A1512**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION: Network applications, network hardware, network software, reference models: OSI, TCP/IP, Internet, Connection oriented network - X.25, frame relay.

THE PHYSICAL LAYER: Theoretical basis for communication, guided transmission media, wireless transmission, the public switched telephone networks, mobile telephone system.

UNIT - II

THE DATA LINK LAYER: Design issues, error detection and correction, elementary data link protocols, sliding window protocols, example data link protocols - HDLC, the data link layer in the internet.

THE MEDIUM ACCESS SUBLAYER: Channel allocations problem, multiple access protocols, Ethernet, Data Link Layer switching, Wirelwss LAN, Broadband Wireless, Bluetooth

UNIT - III

THE NETWORK LAYER: Network layer design issues, routing algorithms, Congestion control algorithms, Internetworking, the network layer in the internet (IPv4 and IPv6), Quality of Service.

UNIT – IV

THE TRANSPORT LAYER: Transport service, elements of transport protocol, Simple Transport Protocol, Internet transport layer protocols: UDP and TCP.

UNIT - V

THE APPLICATION LAYER: Domain name system, electronic mail, World Wide Web: architectural overview, dynamic web document and http.

APPLICATION LAYER PROTOCOLS: Simple Network Management Protocol, File Transfer Protocol, Simple Mail Transfer Protocol, Telnet.

TEXT BOOKS:

1. A. S. Tanenbaum (2003), *Computer Networks*, 4th edition, Pearson Education/ PHI, New Delhi, India.

REFERENCE BOOKS:

1. Behrouz A. Forouzan (2006), *Data communication and Networking*, 4th Edition, McGraw Hill, India.
2. Kurose, Ross (2010), *Computer Networking: A top down approach,* Pearson Education, India.

B .Tech. ECE VI SEMESTER

MICROPROCESSORS AND INTERFACING
(Common to ECE & EEE)

Course Code: **A1423**

L	T	P	C
3	1	-	4

UNIT - I

INTRODUCTION: Architecture of 8086 microprocessor, Register organization, 8086 flag register and its functions, addressing modes of 8086, Pin diagram of 8086, Minimum mode system operation, Timing diagram.

UNIT - II

8086 FAMILY ASSEMBLY LANGUAGE PROGRAMMING: 8086 Instruction Set, Simple programs, Assembly language programs involving logical, branch and call instructions, sorting, evaluation of arithmetic expressions, string manipulation, assembler directives, procedures and macros.

UNIT - III

8086 MEMORY AND DIGITAL INTERFACING: 8086 addressing and address decoding, Interfacing RAM, ROM, EPROM to 8086, 8255 programmable Peripheral Interface, various modes of operation and interfacing to 8086, Interfacing keyboard, Interfacing to Alphanumeric Displays, seven segment LED displays, stepper motor, D/A and A/D converter interfacing.

UNIT - IV

INTERRUPTS AND PROGRAMMABLE INTERRUPT CONTROLLERS: 8086 Interrupts and Interrupt Responses introduction to DOS and BIOS interrupts. 8259A Priority Interrupt Controller, Software Interrupt Applications.

The 8086 Maximum Mode, Direct Memory Access (DMA) Data Transfer, Interfacing and Refreshing Dynamic RAMs, 8254 Software-Programmable Timer/Counter.

UNIT - V

SERIAL DATA TRANSFER SCHEMES: Asynchronous and synchronous data transfer schemes, 8251 USART architecture and interfacing, RS - 232C Serial data standard, RS - 423A and RS - 422A, sample program of serial data transfer.

ADVANCED MICROPROCESSORS: Introduction to 80286, salient features of 80386, real and protected mode segmentation and paging.

TEXT BOOKS:

1. Douglas V. Hall (2007), *Microprocessors Interface*, 2nd edition, Tata McGraw Hill, New Delhi.

REFERENCE BOOKS:

1. Walter A. Triebel, Avtar Singh (2003), *The 8088 and 8086 Microprocessors* 4th edition, Prentice Hall of India, New Delhi.
2. Mazidi (2000), *The 8051 Microcontroller and Embedded System*, Prentice Hall of India, New Delhi.
3. Deshmukh (2004), *Microcontrollers*, Tata McGraw Hill Edition, New Delhi.

B .Tech. ECE VI SEMESTER

DIGITAL COMMUNICATIONS

Course Code: **A1424**

L	T	P	C
3	1	-	4

UNIT - I

INTRODUCTION: Introduction, elements of a digital communication systems, PCM, quantization noise and SNR, robust quantization, DPCM, DM, ADM, comparison of PCM and DM systems, noise in PCM systems, noise in DM systems.

UNIT - II

DIGITAL CARRIER MODULATION SCHEMES: Optimum receiver for binary digital modulation schemes, binary ASK signaling schemes, binary PSK signaling schemes, binary FSK signaling schemes, probability of error for ASK, FSK and PSK, comparison of digital modulation schemes-bandwidth requirements, power requirements, error probability (coherent & non-coherent), DPSK, QPSK, matched filter receiver, pulse shaping by digital methods, ISI, eye pattern.

UNIT - III

INFORMATION THEORY: Introduction, measure of information, discrete memory less channels, mutual information, channel capacity, Additive White Gaussian Noise channel.

SOURCE CODING: Shannon's theorem, Shannon - fano coding, Huffman coding, efficiency calculations, capacity of Gaussian channel, bandwidth-S/N trade off.

UNIT - IV

LINEAR BLOCK CODES: Matrix description of Linear Block codes, Error detection and error correction capabilities of Linear block codes, single error correcting Hamming codes, Binary cyclic codes, Algebraic structure of cyclic codes, encoding using (n-k) bit shift register, syndrome calculation, error detection and error correction.

UNIT - V

CONVOLUTIONAL CODES: Encoding of convolutional codes, time domain approach, transform domain approach. Graphical approach: code tree, trellis and state diagram, maximum likelihood decoding of convolutional codes, sequential decoding of convolutional codes.

TEXT BOOKS:

1. K. Sam Shanmugam (2006), *Digital and Analog Communication Systems*, John Wiley & Sons, New Delhi.
2. Simon Haykin(1988), *Digital Communications*, John Wiley & Sons, New Delhi.

REFERENCE BOOKS:

1. Hwei P. HSU (2006), Schaums outlines of Analog and Digital Communications, 2nd edition, Tata McGraw Hill Publishing Company Limited, New Delhi.
2. John G. Proakis (2001), *Digital Communications,* 4th edition, Tata McGraw Hill Publishing Company Limited, New Delhi.
3. Herbert Taub, Donald L. Schilling (1986), *Principles of Communication Systems*, 2nd edition, Tata McGraw Hill Publishing Company Limited, New Delhi.
4. Amitabha Bhattacharya(2006), *Digital Communication*, Tata McGraw Hill Publishing Company Limited, New Delhi.
5. Theodore S. Rappaport(2009), *Wireless Communications: Principles and Practice*, 2nd édition, Pearson Education, India.

B .Tech. ECE VI SEMESTER

DIGITAL SIGNAL PROCESSING

Course Code: **A1425**

L	T	P	C
3	1	-	4

UNIT - I

INTRODUCTION TO DIGITAL SIGNAL PROCESSING: Discrete time signals & systems, linear shift invariant systems, stability and causality, Discrete time systems described by difference equations, Frequency domain representation of discrete time signals and systems.

UNIT - II

FOURIER SERIES AND FOURIER TRANSFORMS: Discrete Fourier series representation of periodic sequences, Properties of discrete Fourier series, Discrete Fourier transforms: frequency domain sampling, , linear convolution of sequences using DFT, Computation of DFT, Relationship of DFT to other transforms, Properties of DFT, Fast Fourier transforms (FFT) - Radix-2 FFT algorithm, Radix-4 FFT algorithms, Inverse FFT.

UNIT - III

Z-TRANSFORMS: Review of Z-transforms, Properties of Z-transform, Rational Z-transforms, Inversion of Z- transforms, stability and causality.

REALIZATION OF DIGITAL FILTERS: Structures for FIR systems: Direct form structure, Cascade form structures, Structures for IIR systems: Direct form structures, Signal flow graphs and transposed structures, cascade form structures, Parallel form structures.

UNIT - IV

DESIGN OF FIR DIGITAL FILTERS: Symmetric and antisymmeric FIR filters, Design of linear phase FIR Digital Filters using Windows, Design of linear phase FIR Digital Filters by Frequency Sampling method.

DESIGN OF IIR DIGITAL FILTERS: IIR filter design by Approximation of Derivatives, IIR filter design by impulse invariance, IIR filter design by bilinear transformation, Characteristics of commonly used analog filters (Butter worth and Chebyshev), Frequency transformations, comparison of IIR & FIR filters.

UNIT - V

MULTIRATE DIGITAL SIGNAL PROCESSING: Decimation by a factor D, interpolation by a factor I, sampling rate conversion by a rational factor I/D, Filter Design & Implementation for sampling rate conversion, Multi stage Implementation of sampling rate conversion.

TEXT BOOKS:

1. John G. Proakis, Dimitris G. Manolakis (2007), *Digital Signal Processing, Principles, Algorithms, and Applications*, Pearson Education / PHI, India.
2. A. V. Oppenheim, R. W. Schaffer (2009), *Discrete Time Signal Processing*, Prentice Hall of India, New Delhi.

REFERENCE BOOKS:

1. Andreas Antoniou (2006), *Digital Signal Processing*, Tata McGraw Hill, New Delhi.
2. M. H. Hayes (2007)*, Schaums Outlines of Digital Signal Processing,* Tata McGraw Hill, India.
3. C. Britton Rorabaugh (2005), *Digital Signal Processing Primer,* Tata McGraw Hill, New Delhi.
4. Robert J. Schilling, Sandra L. Harris (2007)*, Fundamentals of Digital Signal Processing using Matlab,* Thomson Publications, India.
5. Alan V. Oppenheim, Ronald W. Schafer (2006), *Digital Signal Processing,* Prentice Hall of India, New Delhi.

B .Tech. ECE VI SEMESTER

MICROWAVE ENGINEERING

Course Code: **A1426**

L	T	P	C
4	-	-	4

UNIT - I

MICROWAVE TRANSMISSION LINES: Introduction, microwave spectrum and bands, applications of microwaves. rectangular waveguides –solution of wave equations in rectangular coordinates, 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 related problems rectangular guide- power transmission and power losses Impossibility of TEM mode, microstrip lines– introduction, Z_O relations, effective dielectric constant, losses, Q factor ,cavity resonators– introduction, rectangular cavities, dominant modes and resonant frequencies, Q factor and coupling coefficients, related Problems.

UNIT - II

WAVEGUIDE COMPONENTS AND APPLICATIONS: Coupling mechanisms – probe, loop, aperture types, waveguide discontinuities – waveguide windows, tuning screws and posts, matched loads, waveguide attenuators – resistive card, rotary vane types; waveguide phase shifters – dielectric, rotary vane types, waveguide multiport junctions – E plane and H plane tees, magic tee, hybrid ring, directional couplers – 2 hole, bethe hole types, related problems ferrites– composition and characteristics, faraday rotation, ferrite components – gyrator, isolator, circulator, scattering matrix– significance, formulation and properties, S matrix calculations for – 2 port junction, e plane and h plane tees, magic tee, directional coupler, circulator and isolator, related problems.

UNIT - III

MICROWAVE TUBES: Limitations and losses of conventional tubes at microwave frequencies, microwave tubes – O type and M type classifications, O-type tubes: 2 cavity klystrons – structure, reentrant cavities, velocity modulation process and applegate diagram, bunching process and small signal theory – expressions for o/p power and efficiency. reflex klystrons – structure, applegate diagram and principle of working, mathematical theory of bunching, power output, efficiency, oscillating modes and o/p characteristics, effect of repeller voltage on power o/p, related problems, HELIX TWTS: Significance, types and characteristics of slow wave structures, structure of TWT and amplification process (qualitative treatment), suppression of oscillations, gain considerations.

UNIT - IV

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 operation, separation of Pi-mode, o/p characteristics.

MICROWAVE SOLID STATE DEVICES: Introduction, Classification, Applications. TEDs - Introduction, Gunn Diode - Principle, RWH Theory, Characteristics, Basic Modes of Operation, Gunn Oscillation Modes. LSA mode Avalanche Transit Time Devices.

UNIT - V

MICROWAVE MEASUREMENTS: Description of Microwave Bench – Different Blocks and their Features, Precautions; Microwave Power Measurement - Bolometers, Measurement of Attenuation, Frequency standing wave measurements –measurement of low and High VSWR, Cavity Q. Impedance Measurements.

TEXT BOOKS:

1. Samuel Y. Liao (1994), *Microwave Devices and Circuits*, 3rd edition, Prentice Hall of India, New Delhi.
2. Herbert J. Reich, J. G. Skalnik, P. F. Ordung, H. L. Krauss (2004)*, Microwave Principles,* CBS Publishers, New Delhi, India.
3. M. Kulkarni (1998), *Micro Wave and Radar Engineering,* Umesh Publications, New Delhi.

REFERENCE BOOKS:

1. R. E. Collin (2002), *Foundations for Microwave Engineering,* 2nd edition, IEEE Press, John Wiley, India.
2. M. L. Sisodia, G. S. Raghuvanshi (1995), *Microwave Circuits and Passive Devices,* Wiley Eastern Ltd., New Age International Publishers Ltd.
3. Peter A. Rizzi (1999), *Microwave Engineering Passive Circuits*, Prentice Hall of India, New Delhi.
4. F. E. Terman (1955), *Electronic and Radio Engineering*, 4th edition, McGraw Hill, New Delhi.

B. Tech. ECE VI SEMESTER

HUMAN VALUES AND ETHICS
Interdepartmental Elective - I
(Common to ECE, CSE & IT)

Course Code: **A1016**

L	T	P	C
4	-	-	4

UNIT - I

HUMANVALUES: Morals, values and ethics, integrity, work ethic, service learning, civic virtue, respect for others, living peacefully, caring, sharing, honesty, courage, valuing time, co-operation, commitment, empathy, self-confidence, character and spirituality.

UNIT - II

ENGINEERING ETHICS: Senses of 'Engineering Ethics', variety of moral issued, types of inquiry, moral dilemmas, moral autonomy, Kohlberg's theory, Gilligan's theory, consensus and controversy, models of professional roles, theories about right action, self-interest, customs and religion, uses of ethical theories.

UNIT - III

ENGINEERING AS SOCIAL EXPERIMENTATION: Engineering as experimentation, engineers as responsible experimenters, codes of ethics, a balanced outlook on law, the challenger case study.

UNIT - IV

SAFETY, RESPONSIBILITIES AND RIGHTS: Safety and risk, assessment of safety and risk, risk benefit analysis and reducing risk, the Three Mile Island and Chernobyl case studies. Collegiality and loyalty, respect for authority, collective bargaining, confidentiality, conflicts of interest, occupational crime, professional rights, employee rights, Intellectual Property Rights (IPR), discrimination.

UNIT - V

GLOBAL ISSUES: Multinational corporations, environmental ethics, computer ethics, weapons development, engineers as managers-consulting engineers-engineers as expert witnesses and advisors -moral leadership-sample code of ethics like ASME, ASCE, IEEE, institution of engineers (India), Indian institute of materials management, institution of electronics and telecommunication engineers (IETE),India, etc.

TEXT BOOKS:

1. Mike Martin, Roland Schinzinger(1996), *Ethics in Engineering*, McGraw-Hill, New York.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S (2004), *Engineering Ethics*, Prentice Hall of India, New Delhi, India.

REFERENCE BOOKS:

1. Charles D. Fleddermann(2004), *Engineering Ethics*, Pearson Education / Prentice Hall, New Jersey.
2. Charles E Harris, Michael S. Protchard, Michael J Rabins(2000), *Engineering Ethics - Concepts and Cases*, Wadsworth Thompson Learning, United States.
3. John R Boatright(2003), *Ethics and the Conduct of Business*, Pearson Education, New Delhi.
4. Edmund G Seebauer and Robert L Barry, (2001), *Fundamentals of Ethics for Scientists and Engineers,* Oxford University Press, New York.

B. Tech. ECE VI SEMESTER

HUMAN RESOURCE MANAGEMENT
Interdepartmental Elective - I
(Common to ECE, CSE & IT)

Course Code: **A1017**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION HUMAN RESOURCE MANAGEMENT: Introduction and significance of HRM, Scope, functions of HRM, changing environment of HRM and Challenges. Human Resource Planning, Objectives, Factors influencing Human Resource planning, HR Planning Process.

UNIT - II

JOB ANALYSIS AND RECRUITMENT: Process and Sources of Recruitment; Selection, process of selection and techniques, Retention of Employees.

UNIT - III

HUMAN RESOURCES DEVELOPMENT: Training Vs Development, Need, Process of training, Methods of training, Training Evaluation, Career planning, Performance Management System, Methods of Appraisal, Common Errors.

UNIT - IV

COMPENSATION MANAGEMENT: Concepts and components of wages, Factors influencing wage fixation, Job evaluation, Methods of payment, Incentives and Fringe benefits.

UNIT - V

MANAGING INDUSTRIAL RELATIONS: Components of Industrial Relation, Trade Unions, functions of Trade Union, Employee Participation, Importance and Schemes, Collective Bargaining, Grievance Redressal, Industrial Dispute Settlement machinery.

TEXT BOOKS:

1. Biswajeet Pattnayak (2009), *Human Resource Management*, Prentice hall of India, New Delhi, India.
2. R. Wayne Mondy and Robert M. Noe (2009), *Human Resource Management*, Pearson, India.

REFERENCE BOOKS:

1. Aswathappa. K. (2007), *Human Resources and Personnel Management*, Tata MC Graw Hill, New Delhi, India.
2. Monappa. A, Saiyadain. M. (1979), *Personnel Management*, Tata Mc Graw Hill, New Delhi, India.
3. C. B. Mamoria (2003), *Personnel Management*, Himalaya Publishing House, India.

B. Tech. ECE VI SEMESTER

ENTERPRENEURSHIP
Interdepartmental Elective – I
(Common to ECE, CSE & IT)

Course Code: **A1018**

L	T	P	C
4	-	-	4

UNIT - I

ENTREPRENEURSHIP: Importance and role of entrepreneurship, Characteristics of entrepreneurship, Qualities of an entrepreneur, Functions of entrepreneur; Theories of entrepreneurship, Stimulants of entrepreneurship and Barriers to entrepreneurship, Ethics and Social Responsibility, Role of entrepreneur in economic development.

UNIT - II

INSTITUTIONAL SUPPORT: Role of Government; Role of IDBI, SIDBI, SIDO, NIESBUD, SISI, DIC, Entrepreneurship Development Institute, MSMEs.

UNIT - III

WOMEN ENTREPRENEURSHIP: Role & Importance, Functions of women entrepreneur, Profile of Indian Women Entrepreneur, Problems of Women Entrepreneurs, Women Entrepreneurship Development in India and in Foreign Countries.

UNIT - IV

PROJECT MANAGEMENT: Concept of project and classification of project identification, project formulation - project report - project design, Project appraisal - profitability appraisal - project planning - social cost benefit analysis - financial analysis and project financing.

UNIT - V

TRAINING: Designing appropriate training programmes to inculcate Entrepreneurial Spirit, significance of entrepreneurial training, Training for New and Existing Entrepreneurs, Feedback and Performance of Trainees.

TEXT BOOKS:

1. Robert Hisrich, Michael P. Peter, Dean A. Shepherd (2010), E*ntrepreneurship*, Tata Mc Graw Hill, New Delhi.

REFERENCE BOOKS:

1. Bholanath Datta (2009), *Entrepreneurship*, Excel publications, India.
2. David H Holt (2010), *Entrepreneurship*, Prentice hall of India, New Delhi, India.

B. Tech. ECE VI SEMESTER

BUSINESS COMMUNICATION
Interdepartmental Elective – I
(Common to ECE, CSE & IT)

Course Code: **A1019**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION TO MANAGERIAL COMMUNICATION: Meaning, Importance and objectives, Principles of Communication, Forms of communication, Communication Process, Barriers To effective communication, Gateways to effective communication.

UNIT - II

NONVERBAL COMMUNICATION: Body Language, Gestures, Postures, Facial Expressions, Dress Code. Listening and Speaking Skills, Probing questions, Observation, Business and Social etiquette.

UNIT - III

MANAGERIAL SPEECHES: Principles of Effective Speech & Presentations. Technical and Non-technical presentations. Speech of introduction, speech of thanks, occasional speech, theme speech, Use of audio visual aids.

UNIT - IV

INTERVIEW TECHNIQUES: Mastering the art of conducting and giving interviews, Placement interviews, discipline/technical interviews, appraisal interviews, exit Interviews. *Group communication*: Importance, Meetings, group discussions, Video conferencing.

UNIT - V

INTRODUCTION TO BUSINESS CORRESPONDENCE: *Business letters*: Enquiries, Circulars, Quotations, Orders, Acknowledgments, Executions, Complaints, Persuading letters, Sales letters, Job application letters, Bio-data, Covering Letter, Interview Letters, Letter of Reference, Memos, minutes, Circulars and Notices. *Reports:* Types of Business Reports - Format, Choice of vocabulary, Coherence, paragraph writing, organization reports by individual, Report by committee.

TEXT BOOKS:

1. Lesikar R. V, Flatley M. E (2005), *For Empowering the Internet Generation*, Tata McGraw Hill Publishing Company Ltd., New Delhi, India.
2. Ludlow. R, Panton. F (1998), *The Essence of Effective Communications*, Prentice Hall of India Pvt. Ltd., New Delhi, India.

REFERENCE BOOKS:

1. Adair .J (2003), *Effective Communication,* Pan Macmillan, London.
2. Pan Mcmillan Thill J. V, Bovee G. L (1993), *Excellence in Business Communication,* Tata McGraw Hill, New York.
3. Bowman J.P, Branchaw P. P (1987), *Business Communications: From Process to Product*, Dryden Press, Chicago.

B. Tech. ECE VI SEMESTER

INTELLECTUAL PROPERTY AND PATENT RIGHTS
Interdepartmental Elective - I
(Common to ECE, CSE & IT)

Course Code: **A1020**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION TO INTELLECTUAL PROPERTY: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT - II

TRADE MARKS: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark' trade mark registration processes.

UNIT - III

LAW OF COPY RIGHTS : Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right regisffation, notice of copy right' international copy right law.

LAW OF PATENTS: Foundation of patent law, patent searching process' ownership rights and transfer.

UNIT - IV

TRADE SECRETS: Trade secrete law, determination of trade secrete status' liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

UNFAIR COMPETITION: Misappropriation right of publicity, false advertising.

UNIT - V

NEW DEVELOPMENT OF INTELLECTUAL PROPERTY: New developments in trade mark law; copy right law patent law, intellectual property audits'. International overview on intellectual property, international - trade mark law, copy right law, international patent law, and international development trade secrets law.

TEXT BOOKS:

1. Deborah. E. Bouchoux (2009*), Intellectual property*, Cengage learning, India.
2. Deborah. E. Bouchoux (2001), *Protecting your companies intellectual property*, AMACOM, USA.

REFERENCE BOOKS:

1. Prabudda ganguli (2003), *Intellectual property right*, Tata McGraw Hill Publishing company ltd., India.
2. Robert Hisrich, Michael P. Peter, Dean A. Shepherd (2010), *Entrepreneurship*, Tata Mc Graw Hill., India.

B. Tech. ECE VI SEMESTER

PROJECT PLANNING AND MANAGEMENT
Interdepartmental Elective - I
(Common to ECE, CSE & IT)

Course Code: **A1021**

L	T	P	C
4	-	-	4

UNIT - I

PERT AND CPM : Introduction, origin of PERT and CPM, planning, scheduling and controlling, bar charts, milestone charts, weaknesses in bar charts, PERT and CPM networks comparison, event, activity, rules for drawing networks, numbering the events (Fulkerson's law), dummy activities.

UNIT - II

CPM - PERT NETWORK ANALYSIS : Time estimate, expected time, earliest allowable occurrence time, latest allowable occurrence time, slack, project duration, probability of completion, start and finish time estimates, floats, project scheduling, critical and sub-critical path. Updating - process of updating, when to update.

UNIT - III

CPM COST MODEL & RESOURCES ALLOCATIONS, RESOURCE SCHEDULING : Cost analysis, direct and indirect costs, operation time, normal and crash times and costs, optimizing project cost, crash limit, free float limit, optimization. Resource smoothening, resource leveling.

UNIT - IV

MANAGEMENT: Scope of construction management, significance of construction management, concept of scientific management, psychology in management, a historical account of management philosophy, qualities of manager, the roles/functions performed by effective and competent managers, the manager - as a decision maker, as a motivator, as a communication-link, as a conflict resolver, as a well wisher of co-employees and the employer etc.

UNIT - V

ORGANIZATION: Types of organization, merits and demerits of different types of organization, authority, policy, recruitment process and training; development of personnel department; labor problems; labor legislation in India; 'workmen's compensation act of 1923 and minimum wages act of 1948', and subsequent amendments. Safety in construction.

TEXT BOOKS:

1. Punmia, Khandelwal (2006), *Project planning and control with PERT and CPM*, 3rd edition, Laxmi Publications, New Delhi, India.

REFERENCE BOOKS:

1. L. S. Srinath (1975), *PERT and CPM*, 2nd Edition, Afflicted East West Press Pvt. Ltd, New Delhi, India.
2. U. K. Shrivastava (1999), Construction Planning and Management, Galgotia Publications Pvt. Ltd., New Delhi**,** India**.**

B .Tech. ECE VI SEMESTER

MICROPROCESSORS AND INTERFACING LAB
(Common to ECE & EEE)

Course Code: **A1427**

L	T	P	C
-	-	3	2

LIST OF EXPERIMENTS:

I. MICROPROCESSOR 8086:

1. Programs involving data Transfer Instructions
   a. Byte and word transfer in different addressing modes
   b. Block move Without overlapping
   c. Block move With overlapping
   d. Block interchanging

2. Programs involving arithmetic and logical operations like addition and subtraction of multi precision numbers
   a. Addition and Subtraction of Multi precision numbers
   b. Multiplication and division of signed and unsigned Hexadecimal numbers
   c. ASCII adjustment instructions
   d. Code Conversion
   e. Arithmetic program to find square ,cube ,LCM ,GCD and factorial

3. Programs involving bit manipulation instructions like checking
   a. If given data is positive or negative
   b. If given data is odd or even
   c. Logical ones and zeros in a given data
   d. 2 out of 5 code
   e. Bit wise palindrome
   f. Nibble wise palindrome

4. Programs involving Branch / Loop instructions like :
   a. Programs on arrays : addition/subtraction of N nos., finding largest/smallest no., ascending/descending order, etc.
   b. Near and Far Conditional and Unconditional jumps, Calls and Returns

5. Programs on String Manipulations like string transfer, string reversing, searching for a character in a string, palindrome etc.

6. Programs involving on Software Interrupts

7. Programs to use DOS interrupt INT 21H Function calls For:
   a. Reading a Character from Keyboard, Buffer Keyboard input
   b. Display of characters/String on console
   c. Creation of a new file, read/write from a file,
   d. Read system date, set system date, read system time, set system time

II. INTERFACING 8086:

1. Experiments on interfacing 8086 with the following modules through 8255 PPI / 8257 DMA / 8259 PIC
   a. A/D and D/A converters
   b. Matrix keyboard interface
   c. Seven segment display interface
   d. Logical controller interface
   e. Stepper motor interface
   f. Traffic signals by interfacing traffic controller to 8086
   g. Real time Clock using PIT 8253/8254

2. Interfacing a printer to an 8086 Microcomputer kit

B .Tech. ECE VI SEMESTER

DIGITAL SIGNAL PROCESSING LAB

Course Code: **A1428**

L	T	P	C
-	-	3	2

The programs shall be implemented in soft ware (using MATLAB/ Lab view/ C programming/OCTAVE or Equivalent) and hard ware (using TI/Analog devices/Motorola/ Equivalent DSP processors).

PART - A

1. Generation of Various Signals and sequences
2. Operations on signals and Sequences such as addition, Multiplication, scaling, Shifting, folding, computation of energy and average power.
3. Convolution between Signals and sequences
4. Auto Correlation and Cross Correlation between Signals and sequences.
5. Verification of Linearity and Time Invariance properties of a given Continuous/Discrete System
6. Generation of Sinusoidal waveform / signal based on recursive difference equations.
7. To find DFT/IDFT of given DT signal.
8. To find frequency response of a given system given in (Transfer Function/Differential equation form).
9. Implementation of FFT of given sequence.

PART - B

1. Determination of Power Spectrum of a given signal(s).
2. Implementation of LPF, HPF, BPF, BSF FIR filter for a given sequence.
3. Implementation of LPF IIR filter for a given sequence.
4. Generation of Sinusoidal signal through filtering.
5. Implementation of Decimation and Interpolation Process.
6. Implementation of sampling rate I/D converters.
7. Noise removal: Add noise above 3 KHz and then remove, interference suppression using 400 Hz tone.
8. Impulse response of first order and second order systems.

SYLLABI FOR VII SEMESTER

B .Tech. ECE VII SEMESTER

INDUSTRIAL MANAGEMENT AND PSYCHOLOGY

Course Code: **A1015**

L	T	P	C
4	-	-	4

UNIT - I

CONCEPTS OF MANAGEMENT AND ORGANISATION: Functions of management, evolution of management thought, Taylor's scientific management, fayol's principles of management, Hertzberg's Maslow's hierarchy of human needs, systems approach to management.

DESIGNING ORGANISATIONAL STRUCTURES: Basic concepts related to organisation - departmentation and decentralization, types of mechanistic and organic structures of organisation (line organization, line and staff organization, functional organization.

UNIT - II

PLANT LOCATION: Definition, factors affecting the plant location, comparison of rural and urban sites, methods for selection of plant- matrix approach. Plant layout - definition, objectives, types of production, types of plant layout, various data analyzing forms travel chart.

WORK STUDY: Definition, objectives, method study - definition, objectives, steps involved- various types of associated charts, difference between micromotion and memomotion studies. Work measurement- definition, time study, steps involved, equipment, different methods of performance rating, allowances, standard time calculation. Work Sampling - definition, steps involved, standard time calculations, differences with time study.

UNIT - III

INTRODUCTION TO PERT / CPM : Project management, network modeling-probabilistic model, various types of activity times estimation, programme evaluation review techniques, critical path, probability of completing the project, deterministic model, critical path method (CPM), critical path calculation, crashing of simple of networks.

INSPECTION AND QUALITY CONTROL: Types of inspections, statistical quality control, techniques, variables and attributes, assignable and non assignable causes, variable control charts, and R charts, attributes control charts, p charts and c charts. Acceptance sampling plan, single sampling and double sampling plans, OC curves. Introduction to TQM - quality circles, ISO 9000 series procedures.

UNIT - IV

MATERIALS MANAGEMENT: Objectives, inventory functions, types, associated costs, inventory classification techniques-ABC and VED analysis. Inventory control systems, continuous review system, periodical review system. Stores management and stores records. Purchase management, duties of purchase of manager, associated forms.

INTRODUCTION TO HUMAN RESOURCE MANAGEMENT: Functions of HRM, job evaluation, different types of evaluation methods. Job description, merit rating, difference with job evaluation, different methods of merit ratings, wage incentives, different types of wage incentive schemes. Marketing, marketing vs. selling, marketing mix, product life cycle.

UNIT - V

INDUSTRIAL PSYCHOLOGY: Definition and concept, industrial psychology vs. personnel management, aims and objectives of industrial psychology, scope of industrial psychology, individual and group, individual differences in behavior, group dynamics, theory x and y, Hawthorne experiment, morale, motivation, working environmental conditions, industrial fatigue.

TEXT BOOKS:

1. O. P. Khanna (2004), *Industrial Engineering and Management*, Dhanpat Rai, New Delhi.

REFERENCE BOOKS:

1. Stoner, Freeman (2005), *Gilbert, Management*, 6th edition, Pearson Education, New Delhi.
2. Panner Selvam (2004), *Production and Operations Management*, Prentice Hall of India, New Delhi.
3. Ralph M. Barnes (2004), *Motion and Time Studies*, John Wiley and Sons.
4. L. S. Srinath (2000), *PERT / CPM*, affiliate East-West Press, New Delhi.
5. Gary Dessler (2002), *Human Resource Management*, Pearson Education Asia, India.

B .Tech. ECE VII SEMESTER

VLSI DESIGN
(Common to ECE, CSE & IT)

Course Code: **A1429**

L	T	P	C
3	1	-	4

UNIT - I

MOS TRANSISTOR THEORY: Introduction, MOS Device Design Equations–Threshold Voltage-Body Effect, Channel Length Modulation, MOS Models, the Complementary CMOS Inverter-DC characteristics, the differential inverter, the Tristate inverter, Bipolar devices.

UNIT - II

CMOS PROCESSING TECHNOLOGY: Overview-Wafer Processing, Oxidation, Epitaxy, deposition, ion-implantation and diffusion, the silicon gate process, Basic CMOS technology, Latchup – Origin of Latchup, Latchup triggering, Latchup prevention.

UNIT - III

MOS-CIRCUIT DESIGN PROCESSES: MOS Layers, Stick Diagrams-nMOS Design style, CMOS design style, Design Rules and Layout-Lambda based design rules, contact cuts, double metal MOS process rules, CMOS Lambda based design rules, general observations on design rules, 2 µm Double metal Double poly CMOS rules, Layout Diagrams.

CIRCUIT CHARACTERIZATION: Introduction, Resistance Estimation, Capacitance Estimation, Inductance, Switching Characteristics-analytic delay models, Power Dissipation, Scaling of MOS Transistor Dimensions.

UNIT - IV

CMOS CIRCUIT DESIGN AND LOGIC DESIGN: Introduction, CMOS logic gate design, Basic Physical design of simple logic gates, CMOS logic structures-CMOS complementary logic, Pseudo-nMOS logic, Dynamic CMOS logic, Pass transistor Logic, CMOS Domino Logic.

UNIT - V

CMOS TESTING: Need for Testing, Manufacturing Test Principles-fault models, Observability, Controllability, Design Strategies for Test, Chip Level test Techniques.

TEXT BOOKS:

1. Neil H. E. Weste, Kamran Eshraghian (2001), *Principles of CMOS VLSI Design – A System Perspective*, 2nd Edition, Pearson Education Asia, India.
2. Kamran Eshraghian, Dougles A. Pucknell, Sholeh Eshraghian (2005)*, Essentials of VLSI Circuits and Systems*, PHI, New Delhi.

REFERENCE BOOKS:

1. John .P. Uyemura (2011), *Introduction to VLSI Circuits and Systems,* John Wiley, India.
2. S.M. Sze (2003), *VLSI Technology,* 2nd Edition, Tata McGraw Hill, New Delhi.

B .Tech. ECE VII SEMESTER

EMBEDDED SYSTEMS
(Common to ECE & EEE)

Course Code: **A1430**

L	T	P	C
3	1	-	4

UNIT - I

EMBEDDED COMPUTING: Introduction, complex systems and microprocessor, the embedded system design process, formalisms for system design, design examples.

UNIT - II

THE 8051 ARCHITECTURE: Introduction, 8051 micro controller hardware, input/output ports and circuits, external memory, counter and timers, serial data input/output, interrupts.

BASIC ASSEMBLY LANGUAGE PROGRAMMING CONCEPTS: The assembly language programming process, programming tools and techniques, programming the 8051. Data transfer and logical instructions, arithmetic operations, decimal arithmetic, jump and call instructions.

UNIT - III

INTRODUCTION TO REAL-TIME OPERATING SYSTEMS: Tasks and task states, tasks and data, semaphores, and shared data; message queues, mailboxes and pipes, timer functions, events, memory management, interrupt routines in an RTOS environment.

BASIC DESIGN USING A REAL-TIME OPERATING SYSTEM: Principles, semaphores and queues, hard real-time scheduling considerations, saving memory and power, an example RTOS like uC-OS (open source).

UNIT - IV

EMBEDDED SOFTWARE DEVELOPMENT TOOLS: Host and target machines, linker/locators for embedded software, getting embedded software into the target system

DEBUGGING TECHNIQUES: Testing on host machine, using laboratory tools, an example system.

UNIT - V

INTRODUCTION TO ADVANCED ARCHITECTURES: ARM and SHARC, processor and memory organization and instruction level parallelism; networked embedded systems: bus protocols, I^2C bus and CAN bus; internet-enabled systems, design example-elevator controller.

TEXT BOOKS:

1. Wayne Wolf (2008), *Computers as Components-principles of embedded computer system design*, Elseveir, New Delhi, India.
2. Kenneth J. Ayala (2008), *The 8051 Microcontroller*, 3rd edition, Cengage Learning, India.
3. David E. Simon (1999), *An Embedded Software Primer*, Pearson Education, India.

REFERENCE BOOKS:

1. Jean J. Labrosse (2000), Embedding System Building Blocks, 2nd edition, CMP publishers, USA.
2. Raj Kamal (2004), *Embedded Systems*, Tata McGraw hill, India.
3. Ajay V. Deshmukh (2005), *Micro Controllers*, Tata McGraw hill, India.
4. Frank Vahid, Tony Givargis (2002), *Embedded System Design*, John Wiley, India.

B .Tech. ECE VII SEMESTER

CELLULAR AND MOBILE COMMUNICATIONS

Course Code: **A1431**

L	T	P	C
4	-	-	4

UNIT - I

CELLULAR MOBILE RADIO SYSTEMS: Introduction to Cellular Mobile System, Why Cellular Mobile Telephone Systems, History Of 800mhz Spectrum Allocation, Trunking Efficiency, A Basic Cellular System, Performance Criteria, Uniqueness of Mobile Radio Environment, Operation of Cellular Systems, Marketing Image of Hexagonal Shaped Cells, Planning a Cellular system, Analog cellular Systems.

ELEMENTS OF CELLULAR 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, Handoff Mechanism, Cell Splitting, Consideration of The Components of Cellular System.

UNIT - II

INTERFERENCE: Co-Channel Interference, Exploring Co-Channel Interference areas in a system, Real Time Co-Channel Interference Measurement at mobile radio transceivers, Design of an Omni Directional Antenna System in the worst case, Design of a Directional Antenna System, Lowering the Antenna height, Reduction of Co-channel Interference by means of a notch in the tilted antenna pattern, Umbrella-pattern effect, use of parasitic elements, power control, Diversity Receiver.

NON CO-CHANNEL INTERFERENCE: Subjective test Vs objective test, Adjacent-channel interference, near-end-far-end interference, effect on near-end mobile units, cross talk-A unique characteristics of voice channels, effects on coverage and interference by applying power decrease, antenna height decrease, beam tilting, effects of cell-site components, interference between systems, UHF TV interference, long-distance interference.

UNIT - III

CELL COVERAGE FOR SIGNAL AND TRAFFIC: General Introduction, Obtaining the Mobile Point-to-Point Model (Lee Model), Propagation over Water or Flat Open Area, Foliage Loss, Propagation in Near-in Distance, Long –Distance Propagation, Obtain Path Loss from a Point-to-Point Prediction Model-A General Approach, Form of a Point-to-Point Model.

CELL SITE AND MOBILE ANTENNAS: Sum and Difference Patterns and their Synthesis, Antennas at Cell Site, Omni-directional Antennas, Directional Antennas for Interference Reduction, Unique Situations of Cell-Site Antennas, Mobile Antennas.

UNIT - IV

FREQUENCY MANAGEMENT AND CHANNEL ASSIGNMENT: Frequency Management, Frequency –Spectrum Utilization, Set-up Channels , Channel Assignments to Cell Sites and Mobile Units, Fixed Channel Assignment, Adjacent Channel Assignment, Channel Sharing and Borrowing, Sectorization, Underlay-Overlay arrangement, Nonfixed Channel Assignment Algorithms.

HANDOFF: Value of Implementing Handoffs, Why handoffs, Types of Handoff, Initiation of a Handoff, Delaying a Handoff, Forced Handoffs, Queuing of Handoffs, Power-Difference Handoffs, Mobile Assisted Handoff(MAHO) and Soft Handoff, Cell-Site Handoff, Intersystem Handoff, Introduction to Dropped Call Rate, Formula of Dropped Call Rate.

UNIT - V

DIGITAL CELLULAR NETWORKS: GSM- Architecture, Channels, Multiple-access scheme, Radio resource management, Mobility management, Communication management, Network management, North American TDMA-History, Architecture, CDMA.

TEXT BOOKS:

1. William C. Y. Lee (2006), *Mobile Cellular Telecommunications*, 2nd edition, Tata McGraw Hill, India.
2. Theodore S. Rappaport (2002), *Wireless Communications*, 2nd edition, Pearson education, India.

REFERENCE BOOKS:

1. Gordon L. Stuber (2007), *Principles of Mobile Communication*, 2nd edition, Springer International, India.
2. William C. Y. Lee (2006), *Wireless and Cellular Telecommunications*, 3rd edition, McGraw Hill, New Delhi.

B .Tech. ECE VII SEMESTER

OPERATING SYSTEMS
(Interdepartmental Elective - II)

Course Code: **A1508**

L	T	P	C
4	-	-	4

UNIT - I

OPERATING SYSTEMS OVERVIEW: Introduction, operating system operations, process management, memory management, storage management, protection and security, distributed systems, special purpose systems.

OPERATING SYSTEMS STRUCTURES: Operating system services and systems calls, system programs, operating system structure, operating systems generations.

PROCESS MANAGEMENT: Process concepts, process state, process control block, scheduling queues, process scheduling, multithreaded programming, threads in UNIX, comparison of UNIX and windows.

UNIT - II

CONCURRENCY AND SYNCHRONIZATION: Process synchronization, critical section problem, Peterson's solution, synchronization hardware, semaphores, classic problems of synchronization, readers and writers problem, dining philosophers problem, monitors, synchronization examples(Solaris), atomic transactions. Comparison of UNIX and windows.

DEADLOCKS: System model, deadlock characterization, deadlock prevention, detection and avoidance, recovery from deadlock banker's algorithm.

UNIT - III

MEMORY MANAGEMENT: Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, page-replacement algorithms, allocation of frames, thrashing, case study - UNIX.

FILE SYSTEM: Concept of a file, access methods, directory structure, file system mounting, file sharing, protection. File system implementation: file system structure, file system implementation, directory implementation, allocation methods, free-space management, efficiency and performance, comparison of UNIX and windows.

UNIT - IV

I/O SYSTEM: Mass storage structure - overview of mass storage structure, disk structure, disk attachment, disk scheduling algorithms, swap space management, stable storage implementation, tertiary storage structure.

I/O: Hardware, application I/O interface, kernel I/O subsystem, transforming I/O requests to hardware operations, streams, performance.

UNIT - V

PROTECTION: Goals of protection, principles of protection, domain of protection access matrix, implementation of access matrix, access control, revocation of access rights.

SECURITY: The security problem, program threats, system and network threats cryptography as a security tool, user authentication, implementing security defenses, fire walling to protect systems.

TEXT BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne (2006), *Operating System Principles*, 7th edition, Wiley India Private Limited, New Delhi.

REFERENCE BOOKS:

1. Stallings (2006), *Operating Systems*, Internals and Design Principles, 5th edition, Pearson Education, India.
2. Andrew S. Tanenbaum (2007), *Modern Operating Systems*, 2nd edition, Prentice Hall of India, India.
3. Deitel & Deitel (2008), *Operating systems*, 3rd edition, Pearson Education, India.
4. Dhamdhere (2008), *Operating Systems*, Second Edition, Tata Mc graw Hill, New Delhi.

B .Tech. ECE VII SEMESTER

ADVANCED COMPUTER ARCHITECTURE
Interdepartmental Elective - II
(Common to EC & CSE)

Course Code: **A1528**

L	T	P	C
4	-	-	4

UNIT - I

PARALLEL COMPUTER MODELS: The State of Computing, Computer development milestones, Elements of modem computers, Evolution of computer architecture, System attributes to performance, Multiprocessors and Multicomputers, Shared -Memory Multiprocessors, Distributed -Memory Multicomputers, A Taxonomy of MIMD Computers, Multivector and SIMD computers, Vector Supercomputers, SIMD Supercomputers, Program and Network Properties, Conditions of Parallelism, Data and Resource Dependences, Hardware and Software Parallelism, The Role of Compilers, Program Partitioning and Scheduling, Grain Sizes and Latency, Grain Packing and Scheduling, Program flow Mechanisms, Control Flow Versus Data Flow , Demand-Driven Mechanisms, Comparisons of Flow Mechanisms.

UNIT - II

SYSTEM INTERCONNECT ARCHITECTURE: Network properties and Routing , Static Connection Networks, Dynamic Connection Networks, Processor and Memory Technologies, Advanced Processor Technology, Instruction Pipelines, Processors and Co-processors, Instruction Set Architectures, CISC Scalar Processor (exclude CISC Microprocessor Families), RISC Scalar Processor (exclude Sun Microsystems SPARC Architecture), Superscalar and Vector Processor, Superscalar Processors (exclude IBM RS/6000 Architecture), VLIW Architecture, Shared-Memory, Organizations, Interleaved Memory Organization, Bandwidth and fault Tolerance, Memory Allocation Schemes (exclude swapping in Unix, Demand Paging system and Hybrid Paging system).

UNIT - III

MEMORY HIERARCHY: Hierarchical Memory Technology, Inclusion, Coherence and Locality, Memory Capacity Planning, Cache Memory Organization, Cache Addressing Models.

BUSES AND ARBITRATION: Hierarchical Bus System, Backplane Bus Specification, Bus Arbitration and Control, Arbitration, Transaction and Interrupt, IEEE Futurebus+ Standards.

UNIT - IV

PIPELINING AND SUPERSCALAR TECHNIQUES: Linear Pipeline Processors, Asynchronous and Synchronous Models, Clocking and Timing control, Speed up, Efficiency and Throughput, Nonlinear Pipeline Processors, Reservation and Latency Analysis, Collision-Free Scheduling, Instruction Pipeline Design, Instruction Execution Phases, Mechanism for Instruction, Pipelining ,Dynamic Instruction Scheduling, Branch Handling Techniques, Arithmetic Pipeline Design, Computer Arithmetic Principles, Static Arithmetic Pipeline, Multifunctional Arithmetic Pipeline (exclude IBM360 Floating Point Unit).

UNIT - V

MULTIPROCESSORS AND MULTI-COMPUTERS: Multiprocessor System Interconnects, Hierarchical Bus Systems: Crossbar Switch and Multiport Memory, Multistage and Combing Networks, Cache Coherence and Synchronization Mechanisms, The Cache Coherence Problem, Snoopy Bus Protocol, Directory-based protocols, Hardware Synchronization Mechanisms, Message Passing Mechanisms, Message Routing Schemes, Deadlock and Virtual Channels, Flow Control Strategy.

TEXT BOOKS:

1. Kai Hwang (2000), *Advanced Computer Architecture- Parallelism, Scalability, Programmability*, The McGraw Hill Companies, New Delhi.

REFERENCE BOOKS:

1. David E. Culler, J. P. Singh, Anoop Gupta, Harcourt Asiam, Morgan Kaufmann (1999), *Parallel Computer Architecture,* Elsevier, India.
2. John P. Hayes (1998), *Computer Architecture and Organization*, 3rd edition, The McGraw Hill Companies, New Delhi, India.
3. Rajararnan, C. Siva Ram Murthy (2000), *Parallel Computers - Architecture and Programming*, Prentice Hall of India, New Delhi.

B .Tech. ECE VII SEMESTER

NETWORK SECURITY AND CRYPTOGRAPHY
Interdepartmental Elective - II
(Common to ECE & IT)

Course Code: **A1606**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION: Security trends, The OSI Security Architecture, Security Attacks, Security Services and Security Mechanisms, A model for Network security.

CLASSICAL ENCRYPTION TECHNIQUES: Symmetric Cipher Modes, Substitute Techniques, Transposition Techniques, Rotor Machines, Stenography.

UNIT - II

BLOCK CIPHER AND DATA ENCRYPTION STANDARDS: Block Cipher Principles, Data Encryption Standards, the Strength of DES, Differential and Linear Crypt Analysis, Block Cipher Design Principles.

ADVANCED ENCRYPTION STANDARDS: Evaluation Criteria for AES, the AES Cipher.

MORE ON SYMMETRIC CIPHERS: Multiple Encryption, Triple DES, Block Cipher Modes of Operation, Stream Cipher and RC4.
INTRODUCTION TO NUMBER THEORY: Prime Numbers, Fermat's and Euler's Theorem, Testing for Primality, The Chinese Remainder Theorem, Discrete logarithms,

UNIT - III

PUBLIC KEY CRYPTOGRAPHY AND RSA: Principles Public key crypto Systems the RSA algorithm, Key Management, Diffie Hellman Key Exchange, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.

MESSAGE AUTHENTICATION AND HASH FUNCTIONS: Authentication Requirement, Authentication Function, Message Authentication Code, Hash Function, Security of Hash Function and MACs.

HASH AND MAC ALGORITHM: Secure Hash Algorithm, Whirlpool, HMAC, CMAC.

DIGITAL SIGNATURE: Digital Signature, Authentication Protocol, Digital Signature Standard.

UNIT - IV

AUTHENTICATION APPLICATION: Kerberos, X.509 Authentication Service, Public Key Infrastructure.

EMAIL SECURITY: Pretty Good Privacy (PGP) and S/MIME.

IP SECURITY: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT - V

WEB SECURITY: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET), Intruders, Viruses and related threats.

FIREWALL: Firewall Design principles, Trusted Systems.

TEXT BOOKS:

1. William Stallings (2006), *Cryptography and Network Security: Principles and Practice*, 4th edition, Pearson Education, India.
2. William Stallings (2000), *Network Security Essentials (Applications and Standards)*, Pearson Education, India.

REFERENCE BOOKS:

1. Charlie Kaufman (2002), *Network Security: Private Communication in a Public World*, 2nd edition, Prentice Hall of India, New Delhi.
2. Atul Kahate (2008), *Cryptography and Network Security,* 2nd edition, Tata Mc Grawhill, India.
3. Robert Bragg, Mark Rhodes (2004), *Network Security: The complete reference,* Tata Mc Grawhill, India.

B .Tech. ECE VII SEMESTER

ENERGY MANAGEMENT
Interdepartmental Elective - II
(Common to ECE & EEE)

Course Code: **A1228**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION: Principles of Energy Management, Managerial Organization, Functional Areas for Manufacturing Industry. Process Industry, Commerce Government. Role of Energy Manager in each of the organization. Initiating, Organizing and Managing Energy Management Programs.

UNIT - II

ENERGY AUDIT: Definition and Concepts, Types of Energy Audits, Basic Energy Concepts. Resources for Plant Energy Studies , Data Gathering, Analytical Techniques. Energy Conservation: Technologies for Energy Conservation, Design for Conservation of Energy materials ,energy flow networks , critical assessment of energy usage. Formulation of objectives and constraints, synthesis of alternative options and technical analysis of options, process integration.

UNIT - III

ECONOMIC ANALYSIS: Scope, Characterization of an Investment Project. Types of Depreciation, Time Value of money , budget considerations, Risk Analysis.

UNIT - IV

METHODS OF EVALUATION OF PROJECTS: Payback, Annualized Costs , Investor's Rate of return. Present worth, Internal Rate of Return, Pros and Cons of the common methods of analysis , replacement analysis. Energy Consultant: Need of Energy Consultant , Consultant Selection Criteria.

UNIT - V

ALTERNATIVE ENERGY SOURCES: Solar Energy : Types of devices for Solar Energy Collection. Thermal Storage System ,Control Systems. Wind Energy: Availability, Wind Devices , Wind Characteristics , Performance of Turbines and systems.

TEXT BOOKS:

1. W. R. Murphy, G. McKay (2008), *Energy Management,* 1st edition*,* B.S. Publications, New Delhi.

REFERENCE BOOKS:

1. B. Smith (2007), *Energy Management Principles*, 1st edition, Pergamon Press, Inc., England.

B .Tech. ECE VII SEMESTER

OPERATIONS RESEARCH
Interdepartmental Elective - II
(Common to ECE, CSE, IT & ME)

Course Code: **A1331**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION TO OPERATIONS RESEARCH: Basics definition, scope, objectives, phases, models and limitations of Operations Research. Linear Programming Problem, Formulation and Graphical solution of Linear Programming Problem. Simplex Method, Artificial variables Techniques, big -M method, two -phase simplex method, degeneracy and unbound solutions.

UNIT - II

TRANSPORTATION PROBLEM: Formulation, solution, unbalanced Transportation problem. Finding basic feasible solutions, North-West corner rule, least cost method and Vogel's approximation method. Optimality test - MODI method.

ASSIGNMENT MODEL: Formulation, Hungarian method for optimal solution, solving unbalanced problem, Traveling salesman problem as assignment problem.

UNIT - III

SEQUENCING MODELS: Solution of Sequencing Problem, Processing n Jobs through two machines, Processing n Jobs through three machines, Processing two Jobs through m machines, Processing n Jobs through m Machines.

QUEUING THEORY: Introduction, Single Channel, Poisson arrivals, exponential service times with infinite population and finite population models.

UNIT - IV

REPLACEMENT MODELS: Replacement of Items that Deteriorate whose maintenance costs increase with time without change in the money value, Replacement of items that fail suddenly, individual replacement policy, group replacement policy.

INVENTORY MODELS: Inventory costs, Models with deterministic demand model: (a) Demand rate uniform and production rate infinite, (b) Demand rate non-uniform and production rate infinite, (c) Demand rate uniform and production rate finite.

UNIT - V

GAME THEORY: Competitive game, rectangular game, saddle point, minimax (maximin) method of optimal strategies, value of the game. Solution of games with saddle points, dominance principle, Rectangular games without saddle point, mixed strategy for 2 X 2 games.

DYNAMIC PROGRAMMING: Characteristics of dynamic programming, Dynamic programming approach for priority management employment smoothening, Capital budgeting, Stage Coach/Shortest Path, cargo loading and Reliability problems.

TEXT BOOKS:

1. A. M. Natarajan, P. Balasubramani, A. Tamilarasi (2006), *Operations Research*, Pearson Education, India.
2. S. D. Shama (2009), *Operation Research,* Tata McGraw Hill, New Delhi.

REFERENCE BOOKS:

1. J. K. Sharma (2007), *Operations Research – Theory and Applications,* 3rd edition, Macmillan India Ltd, India.
2. R. Panneerselvam (2008), *Operations Research*, 2nd edition, Prentice Hall of India, India.
3. F. S. Hillier, G. J. Lieberman (2007), *Introduction to Operations Research,* 8th edition, Tata McGraw Hill, New Delhi, India.

B .Tech. ECE VII SEMESTER

AVIONICS
Interdepartmental Elective - II
(Common to ECE & AE)

Course Code: **A1725**

L	T	P	C
4	-	-	4

UNIT - I

BASICS: Basic principles of Avionics, Typical avionics sub system in civil/ military aircraft and space vehicles.

FLIGHT DECK AND DISPLAY SYSTEMS: Flight deck display technologies, CRT, LED, LCD, Touch screen, Head up display, Electronic instrumentation systems.

UNIT - II

AUDIO AND COMMUNICATION SYSTEMS: Aircraft audio systems, basic audio transmitter and receiver principles, VHF communication system, UHF communication systems.

UNIT - III

RANGING AND LANDING SYSTEMS: VHF Omnirange, VOR receiver principles, distance maturity equipment, principles of operation, Instrument landing system, localizer and glideslope.

POSITIONG SYSTEM: Global positioning system principles, triangulation, position accuracy, applications in aviation.

UNIT - IV

INERTIAL NAVIGATION SYSTEM: Principle of Operation of INS, navigation over earth, components of inertial Navigation systems, accelerometers, gyros and stabilized platform.

SURVELLIENCE SYSTEM: ATC surveillance systems principles and operation interrogation and replay standards, Collision avoidance system, ground proximity warning system.

UNIT - V

AUTO FLIGHT SYSTEM: Automatic flight control systems fly by wire and fly by light technologies, flight director systems, flight management systems. Integrated Data transfer methodology by use of MILS - STD - 1553/ ARINC - 429.

TEXT BOOKS:

1. N. S. Nagaraja(1996), *Elements of electronic navigation*, 2nd edition, Tata McGraw Hill, New Delhi.
2. Janes W. Wasson, Jeppesen Sandersen(1994), *Avionic systems Operation and maintenance*, Sterling Book House, Mumbai.

REFERENCE BOOKS:

1. Albert Hel frick (2010), *Principle of Avionics*, 6th edition, Avionics Communications Inc, India
2. E. H. J. Pallet (2010), *Aircraft Instrumentation and Integrated systems*, Pearson Education, New Delhi.
3. J. Powell (1998), *Aircraft Radio Systems*, Pitman publishers, London.

B .Tech. ECE VII SEMESTER

TELECOMMUNICATION SWITCHING SYSTEMS

(Professional Elective - I)

Course Code: **A1432**

L	T	P	C
4	-	-	4

UNIT - I

SWITCHING SYSTEMS: Evolution of Telecommunications, simple telephone communication, Basics of a Switching System, Manual Switching System, major Telecommunication Networks.

STROWGER SWITCHING SYSTEMS: Rotary Dial Telephone, Signaling Tones, Strowger Switching Components, Step by Step Switching, Design Parameters, 100 Line Switching systems, 1000 Line Blocking Exchange, 10000 Line Exchange.

CROSSBAR SWITCHING: Principles of Common Control, Touch Tone Dial Telephone, Principles of Crossbar Switching, Crossbar Switch Configurations, Cross point Technology, Crossbar Exchange Organization.

UNIT - II

ELECTRONIC SPACE DIVISION SWITCHING: Stored Program Control, Centralized SPC, Distributed SPC, Software Architecture, Application Software, Enhanced Services, Two-Stage Networks, Three-Stage Networks, *n*-Stage Networks.

TIME DIVISION SWITCHING- Basic Time Division Space Switching, Basic Time Division Time Switching, Time Multiplexed Space Switching, Time Multiplexed Time Switching; Combination Switching-Three Stage Combination Switching, n-stage Combination Switching.

UNIT - III

TELECOMMUNICATIONS TRAFFIC: Introduction, The Unit of Traffic, Congestion, Traffic Measurement, A Mathematical Model, Lost-call Systems –Theory, Traffic Performance, Loss Systems in Tandem, Use of traffic Tables; Queuing Systems -The Second Erlang Distribution, Probability of Delay, Finite Queue Capacity, Some Other Useful Results, Systems with a Single Server, Queues in tandem, Delay Tables, Applications of Delay Formulae.

SWITCHING NETWORKS: Introduction, Single Stage networks, Gradings –Principle, Design of Progressive Gradings, Other forms of grading, Traffic Capacity of Gradings, Applications of Gradings; Link Systems -General, Two Stage Networks, Three Stage Networks, Four Stage Networks, Discussion; Grades of Service of Link Systems.

UNIT - IV

TELEPHONE NETWORKS: Subscriber Loop Systems, Switching Hierarchy and Routing, Transmission Plan, Numbering Plan, Charging Plan.

SIGNALLING: Introduction, Customer Line Signaling, Audio-frequency Junctions and Trunk Circuits, FDM Carrier Systems-Outbound signaling, Inband (VF) Signaling; PCM Signaling, Inter Register Signaling, Common Channel Signaling Principles-General , Signaling Networks, CCITT Signaling System no. 6, CCITT Signaling System no. 7- The High Level data link Control Protocol, Signal Units, The Signaling Information field, Digital Customer Line Signaling.

UNIT - V

PACKET SWITCHING: Introduction, Statistical multiplexing, Local-area and Wide-area Networks– Bus Networks, Ring Networks, Comparison of Bus and Ring Networks, Optical Fiber Networks; Large-scale Networks – General, Datagram's and Virtual Circuits, Routing, Flow Control, Standards, Frame Relay; Broadband Networks-General, The Asynchronous Transfer Mode, ATM Switches.

INTEGRATED SERVICES DIGITAL NETWORK (ISDN): Introduction, Motivation for ISDN, Network and Protocol Architecture, Transmission Channels, User- Network Interfaces, Signaling, Numbering and Addressing, service characterisation, Interworking, ISDN Standards, Broadband ISDN.

TEXT BOOKS:

1. Thiagarajan Viswanathan (2007), *Telecommunication Switching Systems and Networks,* Prentice Hall of India, New Delhi, India.
2. J. E. Flood (2008), *Telecommunications Switching, Traffic and Networks,* Pearson Education, New Delhi.

REFERENCE BOOKS:

1. John. C. Bellamy (2010), Digital *Telephony*, 3rd edition, John Wiley, India.
2. Roger L. Freeman (2010), *Telecommunication System Engineering*, 4th edition, John Wiley & Sons, India.
3. Achyut S. Godbole (2005), *Data Communications & Networks*, Tata McGraw Hill, New Delhi.
4. H. Taub, D. Schilling (2003), *Principles of Communication Systems,* 2nd edition, Tata McGraw Hill, New Delhi.

B .Tech. ECE VII SEMESTER

DIGITAL IMAGE PROCESSING

(Professional Elective - I)

Course Code: **A1433**

L	T	P	C
4	-	-	4

UNIT - I

DIGITAL IMAGE FUNDAMENTALS: Fundamental Steps in Digital Image Processing, Components of an Image Processing System, A Simple Image Formation Model, Image Sampling and Quantization, Relationships Between Pixels, Imaging Geometry.

UNIT - II

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

UNIT - III

IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN: Introduction, Gray Level Transformations, Histogram Processing, Arithmetic and Logic Operations, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters.

IMAGE ENHANCEMENT IN FREQUENCY DOMAIN: Smoothing Frequency-Domain Filters, Sharpening Frequency-Domain Filters, Homomorphic Filtering.

UNIT - IV

IMAGE RESTORATION: Image Degradation/Restoration Process, Noise Models, Restoration in the Presence of Noise Only-Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering, Constrained Least Squares Filters.

COLOR IMAGE PROCESSING: Pseudo-color Image Processing, Full-color Image Processing.

UNIT - V

IMAGE COMPRESSION: Fundamentals, Image Compression Models, Elements of information Theory, Error Free Compression, Lossy Compression.

IMAGE SEGMENTATION: Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Based Segmentation, Segmentation by Morphological Watersheds

TEXT BOOKS:

1. R. C. Gonzalez, R. E. Woods (2002), *Digital Image processing*, 3rd edition, Addison Wesley/ Pearson education, New Delhi, India.

REFERENCE BOOKS:

1. A. K. Jain (1997), *Fundamentals of Digital Image processing*, Prentice Hall of India, New Delhi.
2. Rafael C. Gonzalez (2004), *Digital Image processing using MATLAB*, Richard E. Woods and Steven Low price Edition, Pearson Education Asia, India.
3. William K. Pratt, (2004), *Digital Image Processing*, 3rd edition, John Wiley & Sons, New Delhi, India.
4. Arthur R. Weeks, Jr. (1996), *Fundamentals of Electronic Image Processing,* SPIE Optical Engineering Press, New Delhi, India.

B .Tech. ECE VII SEMESTER

CPLD AND FPGA ARCHITECTURES AND APPLICATIONS

(Professional Elective - I)

Course Code: **A1434**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION TO PROGRAMMABLE LOGIC ARCHITECTURES: Introduction to PLA, Programmable Sum-of-products Arrays, PAL fuse matrix and, Combinational Outputs, PAL Outputs with programmable polarity, PAL devices with programmable polarity, universal PAL and generic array logic.

FPGA BASED SYSTEMS: Introduction, Basic Concepts, Digital Design and FPGAs, FPGA - Based System Design.

UNIT - II

FPGA FABRICS: Introduction, FPGA architectures, SRAM based FPGAs, permanently programmed FPGAs. Chip input/output, circuit design of FPGA fabrics, architecture of FPGA fabrics.

UNIT - III

COMBINATIONAL LOGIC: The logic design process, combinational network delay, power and energy optimization, arithmetic logic.

SEQUENTIAL MACHINES: Introduction, the sequential machine design process, sequential design styles, rules for clocking, performance analysis.

UNIT - IV

LOGIC IMPLEMENTATION USING FPGAs: Syntax directed translation, logic implementation by macro, logic synthesis, technology independent and dependent logic optimizations, physical design for FPGAs, logic design process revisited.

UNIT - V

FINITE STATE MACHINE: State Transition table, state assignment for FPGAs, hazard and one hot encoding.

CASE STUDIES: Case studies Xilinx XC4000 and ALTERA's FLEX 8000.

TEXT BOOKS:

1. Wayne Wolf (2004), *FPGA Based System Design*, Pearson Education, New Delhi.
2. Robert Dueck (2000), *Digital design With CPLD Applications and VHDL*, Thomson Learning, USA.
3. P. K. Chan, S. Mourad (1994), *Digital Design Using Field Programmable Gate Array*, Prentice Hall of India, India.

REFERENCE BOOKS:

1. S. Trimberger, Edr. (1994), *Field Programmable Gate Array Technology*, Kluwer Academic Publications, New Dehi, India.
2. John F. Wakerly (), *Digital Design*, 3rd Edition, Prentice Hall of India, New Delhi.
3. J. Old Field, R. Dorf (1995), *Field Programmable Gate Arrays*, John Wiley & Sons, New York.
4. S. Brown, R. Francis, J. Rose, Z. Vransic (1992), *Field Programmable Gate Array*, Kluwer Academic Publications, New Dehi, India.

B .Tech. ECE VII SEMESTER

REAL TIME OPERATING SYSTEMS

(Professional Elective - I)

Course Code: **A1435**

L	T	P	C
4	-	-	4

UNIT - I

BASIC REAL-TIME CONCEPTS: Terminology, Real-Time System Design Issues, Example Real-Time Systems, Common Misconceptions, Brief History; Hard Vs Soft Real-Time Systems.

A REFERENCE MODEL OF REAL TIME SYSTEMS: Processors and Resources, Temporal Parameters of Real Time Work Load, Periodic Task Model Precedence Constraints and Data Dependency, Functional Parameters, Resource Parameters of Jobs and Parameters of Resources, Typical Real Time Applications.

UNIT - II

REAL-TIME KERNELS: Pseudo kernels, Interrupt-Driven Systems, Preemptive-Priority Systems, Hybrid Systems, The Task-Control Block Model, Theoretical Foundations of Real-Time Operating Systems.

INTERTASK COMMUNICATION AND SYNCHRONIZATION: Buffering Data, Time-Relative Buffering, Ring Buffers, Mailboxes, Queues, Critical Regions, Semaphores, Other Synchronization Mechanisms, Deadlock, Priority Inversion.

UNIT - III

REAL TIME SCHEDULING: Commonly used Approaches to Real Time Scheduling, Clock Driven Scheduling, Priority Driven Scheduling; Scheduling Aperiodic and Sporadic jobs in priority driven systems.

MEMORY MANAGEMENT: Process Stack Management , Run-Time Ring Buffer, Maximum Stack Size , Multiple-Stack Arrangements ,Memory Management in the Task-Control-Block Model ,Swapping , Overlays , Block or Page Management , Replacement Algorithms , Memory Locking Working Sets ,Real-Time Garbage Collection , Contiguous File Systems ,Building versus Buying Real-Time Operating Systems , Selecting Real-Time Kernels .

UNIT - IV

HADRWARE CONSIDERATIONS TO REAL TIME SYSTEMS: Basic Architecture ,Hardware Interfacing , Central Processing Unit, Memory , Input/output , Enhancing Performance , Other Special Devices , Non Von-Neumann Architectures.

UNIT - V

REAL TIME COMMUNICATION: Model of Real Time communication, Priority based service disciplines for switched networks, Weighted Round Robin Service disciplines, Medium Access-Control protocols of Broadcast networks, internet and Resource Reservation Protocols, Real Time Protocol, Communication in Multicomputer Systems.

CASE STUDIES: Threads ,POSIX Mutexes and Condition ,POSIX Semaphores ,Using Semaphores and Shared Memory ,POSIX Messages ,Real-Time POSIX Signals ,Clocks and Timers ,Asynchronous Input and Output ,
POSIX Memory Locking.

TEXT BOOKS:

1. Liu, Jane W. S. (2009), *Real-Time Systems*, 8th edition, Pearson Education, India.
2. A. Phillip Laplante (2004)*, Real Time Systems Design and Analysis,* 3rd edition, John Wiley and Sons, India.

REFERENCE BOOKS:

1. C. M. Krishna, Kang G. Shin (2010), *Real Time Systems*, Tata McGraw-Hill, New Delhi.
2. K. V. K. K. Prasad (2005), *Embedded / Real Time Systems*, Dreamtech Press, New Delhi.
3. Sri Ram V. Iyer, Pankaj Gupta (2004), *Embedded Real Time Systems Programming*, Tata McGraw-Hill, New Delhi, India.

B .Tech. ECE VII SEMESTER

MOBILE COMPUTING TECHNOLOGIES

(Professional Elective - I)

Course Code: **A1436**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION TO MOBILE COMPUTING ARCHITECTURE: Mobile computing, dialog control, Networks, Middleware and Gateways, Application and Services, developing Mobile computing Applications, Security in Mobile Computing, Architecture for Mobile Computing, Three Tier Architecture, Design considerations for Mobile computing, Mobile Computing through Internet, Making existing Applications Mobile Enabled.

UNIT - II

CELLULAR TECHNOLOGIES (GSM): Bluetooth, Radio frequency Identification, Wireless Broadband, Mobile IP Internet Protocol Version 6(IPv6), Java Card, GSM Architecture, GSM Entities, Call routing in GSM, PLNM Interfaces, GSM addresses and Identifiers, Network aspects in GSM, Authentication and Security.

GPS, GPRS, CDMA And 3G: Mobile computing over SMS, GPRS and packet data Network, GPRS Network Architecture, GPRS Network Operations, Data Services in GPRS, Applications for GPRS, Limitations of GPRS, Spread Spectrum Technology, Is-95, CDMA Versus GSM, Wireless Data, Third Generation Networks, Applications on 3G.

UNIT - III

WIRELESS APPLICATION PROTOCOL (WAP) AND WIRELESS LAN: WAP, MMS Wireless LAN Advantages, IEEE 802.11 Standards, Wireless LAN Architecture, Mobility in wireless LAN.

INTELLIGENT AND INTERNETWORKING: Introduction, Fundamentals of call processing, intelligence in the Networks, SS#7 Signaling, IN Conceptual Model (INCM), softswitch, Programmable Networks, Technologies and Interfaces for IN.

UNIT - IV

CLIENT PROGRAMMING, PLAM OS, SYMBIAN OS, WIN CE ARCHITECTURE: Introduction, Moving beyond the desktop, A Peek Under the Hood: Hardware overview, Mobile phones, PDA, Design Constraints in Applications for Handheld Devices, Palm OS Architecture, Application Development, Multimedia Symbian OS Architecture, Applications for Symbian , Different flavours of Windows CE, Windows CE Architecture.

J2ME: Java in the Handset, The Three-prong approach to JAVA Everywhere, JAVA 2 Micro Edition (J2ME) technology, Programming for CLDC, GUI in MIDP, UI Design Issues, Multimedia Record Management System, Communication in MIDP, Security Considerations in MIDP, Optional Packages.

UNIT - V

VOICE OVER INTERNET PROTOCOL AND CONVERGENCE: Voice over IP- 11.323 Frame work for Voice over IP, Session Initiation Protocol, Comparison between H.323 and SIP, Real time Protocols, Convergence Technologies, Call Routing, Voice over IP Applications, IP multimedia subsystem (IMS), Mobile VoIP.

SECURITY ISSUES IN MOBILE COMPUTING: Introduction, Information Security, Security Techniques and Algorithms, Security Protocols, Public Key Infrastructure, Trust – Security Models, Security frameworks for Mobile Environment.

TEXT BOOKS:

1. Asoke K. Talukder, Roopa R. Yavagal (2009), *Mobile computing: Technology, Applications and Service Creation,* Tata McGraw-Hill, New Delhi.
2. Jochen Schiller (2004), *Mobile Communications*, 2nd edition, Low price edition, Pearson Education, New Delhi.

REFERENCE BOOKS:

1. Vieri Vaughi, Alexander Damn Jaonvic(2004), *The cdma2000 System for Mobile Communications:* 3G Wireless Evolution, Pearson Education India, New Delhi.
2. Adalestein (2008), *Fundamentals of Mobile and Parvasive Computing*, Tata McGraw-Hill, New Delhi, India.

B .Tech. ECE VII SEMESTER

OPTICAL COMMUNICATIONS

(Professional Elective - I)

Course Code: **A1437**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION: Historical development, the general system, advantages of optical fiber communications.

OPTICAL FIBER WAVE GUIDES: Introduction, Ray theory transmission, Total Internal Reflection, Acceptance angle, Numerical Aperture, Skew rays. Cylindrical fiber - Modes, Mode coupling, Step Index fibers, Graded Index fibers. Single mode fibers- Cut off wavelength, Mode Field Diameter, Effective Refractive Index. Graded Index Fiber Structure. Fiber materials.

UNIT - II

SIGNAL DEGRADATION IN OPTICAL FIBERS: Attenuation, Signal Distortion in Fibers, Characteristics of Single-Mode Fibers.

OPTICAL FIBER CONNECTION: Introduction, Fiber alignment and joint loss, Fiber Splicing, Optical fiber Connectors.

UNIT - III

OPTICAL SOURCES: Topics from Semiconductor Physics, Light Emitting Diodes, Laser Diodes, Line Coding, Line Source Linearity, Reliability Considerations.

POWER LAUNCHING AND COUPLING: Source to Fiber Power Launching, Launching Schemes for Coupling Improvement.

UNIT - IV

PHOTODETECTORS: Physical principles of Photodiodes, Photo detector Noise, Detector response time, Avalanche Multiplication Noise, Structure for In GaAs APDs, Temperature Effect on Avalanche gain, Comparison of Photo detectors.

OPTICAL RECEIVER OPERATION: Fundamental receiver operation, Digital receiver performance, Eye Diagrams, Analog receivers.

UNIT - V

OPTICAL FIBER SYSTEMS: Introduction, the Optical Transmitter circuit, the Optical Receiver circuit, System design considerations.

DIGITAL LINKS: Point-to- point links.

ADVANCED MULTIPLEXING STRATEGIES: Optical time division multiplexing, subcarrier multiplexing, orthogonal frequency division multiplexing, wavelength division multiplexing.

TEXT BOOKS:

1. Gerd Keiser (2010)*, Optical Fiber Communications,* 4th edition, McGraw-Hill International Edition.
2. John M. Senior (2005), *Optical Fiber Communications,* 2nd edition, Prentice Hall of India, New Delhi.

RERFERENCE BOOKS:

1. D. K. Mynbaev, S. C. Gupta, Lowell L. Scheiner (2005), *Fiber Optic Communications*, Pearson Education, India.
2. S. C. Gupta (2005), *Optical Fiber Communication and its Applications*, Prentice Hall of India, New Delhi.

B .Tech. ECE VII SEMESTER

DIGITAL COMMUNICATIONS AND MICROWAVE ENGINEERING LAB

Course Code: **A1438**

L	T	P	C
-	-	3	2

PART - A: DIGITAL COMMUNICATIONS LAB (Any 6 Experiments)

1. Pulse code modulation Generation and Detection.
2. Differential pulse code modulation and demodulation.
3. Delta modulation and demodulation.
4. Amplitude shift keying Generation and Detection
5. Frequency shift keying Generation and Detection
6. phase shift keying Generation and Detection
7. study of spectral characteristics of PAM, QAM
8. Differential phase shift keying Generation and Detection
9. Quadrature Phase shift Keying Generation and Detection

PART - B: MICROWAVE ENGINEERING LAB (Any 6 Experiments)

1. Reflex Klystron Characteristics.
2. Gunn Diode Characteristics.
3. Directional Coupler Characteristics.
4. VSWR Measurement.
5. Measurement of Wave Guide Parameters.
6. Measurement of Impedance of a given load.
7. Measurement of Scattering Parameters of a Magic Tee.
8. Measurement of Scattering Parameters of a Circulator.
9. Attenuation Measurement.
10. Microwave Frequency Measurement.

Equipment Required For Laboratory.

Digital Communications Lab

1. Trainer Kits.
2. CRO 30MHz
3. Function Generator 0-1 MHz.
4. RF Generators 0-1 MHz
5. Regulated Power Supplies: 0-30 Volts.

Microwave Engineering Lab

1. Microwave Bench Setup with Klystron Power Supply.
2. Microwave Bench Setup with Gunn Power Supply.
3. Micro Ammeter.
4. VSWR Meter.
5. Microwave Components.

B .Tech. ECE VII SEMESTER

VLSI LAB

Course Code: **A1439**

L	T	P	C
-	-	3	2

PART - A

It is expected that every student learn simulation using SPICE and should conduct any six of the following experiments.

1. Introduction to SPICE and its importance in designing of VLSI circuits
2. SPICE simulation of RC circuit and ladder connected RC network
3. SPICE simulation of RL circuit and ladder connected RL network
4. SPICE simulation of RLC circuit and ladder connected RLC network
5. SPICE simulation of Tree and Mesh RLC network
6. SPICE simulation of CS and CD Amplifier
7. SPICE Simulation of basic analog circuits: Inverter and Differential amplifier
8. SPICE simulation of NMOS and PMOS
9. SPICE simulation of CMOS circuit design (DC and transient analysis)
    a. CMOS Inverter
    b. CMOS NOR/NAND gates
10. System Level Design using PLL

PART- B

It is expected that every student learn synthesis on Cadence and should conduct all the following experiments.

1. Introduction to layout Design Rules.
2. Layout, Physical Verification, Placement & Route for Complex Design, Static Timing Analysis, IR drop analysis and crosstalk analysis of the following
    a. Basic logic gates
    b. CMOS Inverter
    c. CMOS NOR/NAND gates
    d. CMOS XOR and MUX gates
    e. CMOS 1-bit full adder
    f. Static/Dynamic logic circuit
    g. Latch
    h. Pass transistor
3. Layout of any combinational circuit (complex CMOS logic gate)-Learning about data paths.

SYLLABI FOR VIII SEMESTER

B .Tech. ECE VIII SEMESTER

SATELLITE AND RADAR COMMUNICATIONS

Course Code: **A1441**

L	T	P	C
3	1	-	4

UNIT - I

ORIGIN OF SATELLITE COMMUNICATIONS: Historical Background, Basic Concepts of Satellite Communications, Frequency allocations for Satellite Services, Applications, Future Trends of Satellite Communications.

SATELLITE SUBSYSTEMS: Attitude and orbit control system, telemetry, tracking, Command and monitoring, power systems, communication subsystems, Satellite antenna Equipment reliability and Space qualification.

UNIT - II

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

MULTIPLE ACCESSES: Frequency division multiple access (FDMA) Inter modulation, Calculation of C/N. Time division Multiple Access (TDMA) Frame structure, Examples. Code Division Multiple access (CDMA).

UNIT - III

EARTH STATION TECHNOLOGY: Introduction, Transmitters, Receivers, Antennas, Tracking systems, Terrestrial interface, Primary power test methods.

INTRODUCTION TO RADAR: The Nature of Radar, Maximum unambiguous range, Radar waveforms, Simple form of Radar equation, Radar block diagram & Operation, Radar frequencies and applications, Related Problems.

UNIT - IV

RADAR EQUATION: Prediction of Range performance, Minimum detectable signal, Receiver Noise & SNR, Integration of Radar pulses, PRF & Range Ambiguities, System losses, Related Problems.

CW AND FREQUENCY MODULATED RADAR: Doppler Effect, CW Radar, Block Diagram, Isolation between Transmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth Requirements, Applications of CW radar, FM-CW Radar-Range and Doppler Measurement, FM-CW altimeter.

UNIT - V

MTI AND PULSE DOPPLER RADAR: Introduction, Principle, MTI Radar with - Power Amplifier Transmitter and Power Oscillator Transmitter. Delay Line Cancellers, Filter Characteristics, Blind Speeds, Double Cancellation, MTI Radar Parameters, Limitations to MTI Performance. Non-coherent MTI, MTI versus Pulse Doppler Radar.

TRACKING RADAR: Tracking with Radar, Sequential Lobing, Conical Scan, Monopulse Tracking Radar - Amplitude Comparison Monopulse (one- and two- coordinates), Phase Comparison Monopulse.

TEXT BOOKS:

1. Timothy Pratt (2003), *Satellite Communications,* 2nd edition, Wiley Publications, India.
2. Merill I. Skolnik (2007), *Introduction to Radar Systems*, 2nd edition, Tata McGraw-Hill, India.

REFERENCE BOOKS:

1. M. Richharia (2003), *Satellite Communications: Design Principles*, 2nd edition, BS publications, India.
2. Dennis Roddy (2006), *Satellite Communications*, 2nd edition, Tata McGraw-Hill, India.
3. Merill I. Skolnik (2001), *Introduction to Radar Systems*, 3rd edition, Tata McGraw-Hill, India.

B .Tech. ECE VIII SEMESTER

WIRELESS COMMUNICATIONS AND NETWORKS

(Professional Elective - II)

Course Code: **A1442**

L	T	P	C
3	1	-	4

UNIT - I

INTRODUCTION TO WIRELESS COMMUNICATION SYSTEMS: Evolution of mobile radio communications, examples of wireless communication systems-paging systems, cordless telephone systems, cellular telephone systems, comparison of common wireless communication systems, trends in cellular radio and personal communications.

MODERN WIRELESS COMMUNICATION SYSTEMS: Second generation (2G) cellular networks, third generation (3G) wireless networks, wireless local loop (WLL) and LMDS, wireless local area networks (WLANs), Bluetooth and personal area networks (PANs).

UNIT - II

MULTIPLE ACCESS TECHNIQUES FOR WIRELESS COMMUNICATION: Introduction, FDMA, TDMA, spread spectrum multiple access, SDMA, packet radio, packet radio protocols, CSMA protocols, reservation protocols, capacity of cellular systems.

INTRODUCTION TO WIRELESS NETWORKING: Introduction to wireless networks, difference between wireless and fixed telephone networks, development of wireless networks, traffic routing in wireless networks-circuit switching, packet switching, x.25 protocol, wireless data services- cellular digital packet data(CDPD), advanced radio data information systems(ARDIS), RAM mobile data(RMD), common channel signaling, ISDN, BISDN and ATM, signaling system no .7(SS7),network services part(NSP) of SS7,The SS7 user part, signaling traffic In SS7 ,SS7 services, performance of SS7.

UNIT - III

MOBILE IP AND WIRELESS APPLICATION PROTOCOL: Mobile IP, operation of mobile IP, discovery, co-located addresses, registration, tunneling, WAP architectural overview, wireless markup language, WML script, wireless application environment, wireless session protocol, wireless transaction protocol, wireless transport layer security, wireless datagram protocol.

WIRELESS LAN TECHNOLOGY: overview**,** infrared LANs, spread spectrum LANs, narrowband microwave LANs.

UNIT - IV

WI-FI AND THE IEEE 802.11 WIRELESS LAN STANDARD: IEEE 802 Architecture, IEEE 802.11 Architecture and Services, 802.11 Medium Access Control, 802.11 Physical Layer, Other IEEE 802.11 Standards, Wi-Fi Protected Access.

BLUETOOTH AND IEEE 802.15: Overview, radio specification, baseband specification, link manager specification, logical link control and adaptation protocol, IEEE 802.15.

UNIT - V

MOBILE DATA NETWORKS: Introduction, data oriented CDPD network, GPRS and higher data rates, short messaging service in GSM, mobile application protocols.

WIRELESS ATM & HIPERLAN: Introduction, Wireless ATM, HIPERLAN, HIPERLAN-2.

TEXT BOOKS:

1. Theodore S. Rappaport (2002), *Wireless Communications - Principles Practice,* 2nd edition, Prentice Hall of India, New Delhi.
2. William Stallings (2009), *Wireless Communications and Networks,* 2nd edition, Pearson Education, India.
3. Kaveh PahLaven, Prashanth Krishna Murthy (2007), *Principles of Wireless Networks - A Unified Approach*, Pearson Education, India.

REFERENCE BOOKS:

1. Dr. Kamilo Feher (2003), *Wireless Digital Communications,* Prentice Hall of India, New Delhi.
2. Jochen Schiller (2009), *Mobile Communications*, 2nd edition, Pearson Education, India.
3. Andreas F. Molisch (2006), *Wireless Communications*, Wiley – India, New Delhi.

B .Tech. ECE VIII SEMESTER

DSP PROCESSORS AND ARCHITECTURES

(Professional Elective - II)

Course Code: **A1443**

L	T	P	C
3	1	-	4

UNIT - I

INTRODUCTION TO DIGITAL SIGNAL PROCESSING: Introduction, A Digital Signal-Processing System, The sampling process, Discrete Time Sequences, Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), Linear Time-Invariant Systems, Digital Filters, Decimation and Interpolation, Analysis and Design Tool for DSP Systems: MATLAB, Digital Signal Processing using MATLAB.

UNIT - II

COMPUTATIONAL ACCURACY IN DSP IMPLEMENTATIONS: Introduction, 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.

ARCHITECTURES FOR PROGRAMMABLE DSP DEVICES: Introduction, Basic Architectural Features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT - III

EXECUTION CONTROL AND PIPELINING: Hardware Looping, Interrupts, Stacks, Relative Branch Support, Pipelining and Performance, Pipeline Depth, Interlocking, Branching Effects, Interrupt Effects, Pipeline Programming Models.

PROGRAMMABLE DIGITAL SIGNAL PROCESSORS: Introduction, Commercial Digital Signal-Processing Devices, Data Addressing Modes of TMS320C54XX DSPs, Data Addressing Modes of TMS320C54XX Processors, Memory Space of TMS320C54XX Processors, Program Control, TMS320C54XX Instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline Operation of TMS320C54XX Processors.

UNIT - IV

IMPLEMENTATIONS OF BASIC DSP ALGORITHMS: Introduction, The Q-notation, FIR Filters, IIR Filters, Interpolation Filters, Decimation Filters, PID Controller, Adaptive Filters, 2-D Signal Processing.

IMPLEMENTATION OF FFT ALGORITHMS: Introduction, 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 - V

INTERFACING MEMORY AND I/O PERIPHERALS TO PROGRAMMABLE DSP DEVICES: Introduction, Memory Space Organization, External Bus Interfacing Signals, Memory Interface, Parallel I/O Interface, Programmed I/O, Interrupts and I/O, Direct Memory Access (DMA), Synchronous Serial Interface, A Multichannel Buffered Serial Port (McBSP), McBSP Programming, A CODEC Interface Circuit, CODEC Programming, A CODEC-DSP Interface Example.

TEXT BOOKS:

1. Avtar Singh, S. Srinivasan (2006), *Digital Signal Processing,* Thomson Publications, India.
2. Phil Lapsley, Jeff Bier, Amit Shoham, Edward A. Lee (2010), *DSP Processor Fundamentals, Architectures & Features*, John Wiley & Sons, India.

REFERENCE BOOKS:

1. B. Venkata Ramani, M. Bhaskar (2004), Digital *Signal Processors, Architecture, Programming and Applications,* Tata McGraw-Hill, New Delhi.
2. Jonatham Stein (2005), *Digital Signal Processing,* John Wiley, India.

B .Tech. ECE VIII SEMESTER

LOW POWER VLSI DESIGN

(Professional Elective - II)

Course Code: **A1444**

L	T	P	C
3	1	-	4

UNIT - I

PHYSICS OF POWER DISSIPATION: Introduction, sources of power dissipation, designing for low power .Physics of power dissipation in MOSFET devices-MIS structure, long channel and sub-micron MOSFET, Gate induced Drain leakage, Power dissipation in CMOS-Shot circuit dissipation, dynamic dissipation, load capacitance. Low power VLSI design limits-Principles of Low power design, hierarchy of limits, fundamental limits, material, device, circuit and system limits.

UNIT - II

POWER ESTIMATION IN CMOS CIRCUITS: Introduction, modeling of signals and probability calculations- signal probability using binary decision diagrams, probabilistic techniques for signal activity estimation- switching activity in combinational circuits, derivation of activity for static CMOS circuits switching activity in sequential circuits and approximation method.

STATISTICAL TECHNIQUES: Combinational and sequential circuits, estimation of glitching ,power- delay models and monte-carlo techniques, sensitivity analysis, power estimation using input vector compaction and domino CMOS circuits.

UNIT - III

SYNTHESIS FOR LOW POWER: Behavioral, logic and circuit level approaches, Algorithm level transforms, power- constrained least squares optimization for adaptive and non-adaptive filters, circuit activity driven architectural transformations, voltage scaling, operation reduction and substitution, pre-computation, logic level and circuit level optimization for low power.

UNIT - IV

DESIGN AND TEST OF LOW - VOLTAGE CMOS CIRCUITS: Introduction, circuit design styles, leakage current in deep sub - micrometer transistors, device design issues, minimizing short channel effect ,low voltage circuit design techniques using reverse V_{gs} ,Steep sub threshold swing and multiple threshold voltages, Testing with elevated intrinsic leakage , multiple supply voltages.

UNIT - V

LOW ENERGY COMPUTING: Energy dissipation in transistor channel, energy recovery circuit design, designs with reversible and partially reversible logic, energy recovery in adiabatic logic and SRAM core, design of Peripheral circuits-address decoder, level shifter and I/O Buffer, supply clock generation.

SOFTWARE DESIGN FOR LOW POWER: Introduction, sources of power dissipation, power estimation and optimization.

TEXT BOOKS:

1. Kaushik Roy, Sharat C. Prasad (2000), *Low-Power CMOS VLSI Circuit Design,* Wiley India, New Delhi.
2. Anantha P. Chandrakasan, Robert W. Brodersen (1998), *Low - Power CMOS Design*, IEEE Press, USA.

REFERENCE BOOKS:

1. Christian Piguet **(**2006), *Low-Power CMOS Circuits: Technology, Logic Design and CAD Tools,* CRC Taylor& Francis, USA.
2. Shin-ichi Minato (1995)**,** *Binary Decision Diagrams and Applications for VLSI CAD*, The Springer Engineering and Computer International Series, USA.

B .Tech. ECE VIII SEMESTER

NANOTECHNOLOGY

Professional Elective - II

(Common to ECE & ME)

Course Code: **A1344**

L	T	P	C
3	1	-	4

UNIT - I

INTRODUCTION TO NANOTECHNOLOGY: Importance of nanoscale, Nanostructure types, electronic, magnetic, optical Properties of Nano materials, top-down and bottom- up approach to nanostructures.

QUANTUM MECHANICAL PHENOMENON IN NANOSTRUCTURES: Quantum confinement of electrons in semiconductor Nano structures, one dimensional confinement (Quantum wires), two dimensional confinements (Quantum Wells), three dimensional confinements (Quantum dots).

UNIT - II

CARBON NANO STRUCTURES: Carbon nano tubes (CNTs), Fullerenes, C60, C80 and C240 Nanostructures, Properties (mechanical, optical and electrical) and applications.

UNIT - III

FABRICATION OF NANO MATERIALS: Physical Methods: Inert gas condensation, Arc discharge, RF plasma, Plasma arc technique, Ion sputtering, Laser ablation, Laser pyrolysis, Molecular beam epitaxy, Chemical vapour deposition method.

NANO SCALE CHARACTERIZATION TECHNIQUES: Scanning probe techniques (AFM, MFM, STM, SEM, TEM), XRD

UNIT - VI

NANO DEVICES AND NANO MEDICINE: Lab on chip for bio-analysis, Core/shell Nano particles in drug delivery systems (site specific and targeted drug delivery), cancer treatment, and bone tissue treatment.

UNIT - V

NANO AND MOLECULAR ELECTRONICS: Resonant-Tunneling structures, single electron tunneling, Single Electron transistors, coulomb blockade, giant magneto resistance, tunneling magneto resistance.

NANOLITHOGRAPHY AND NANO MANIPULATION: E-beam lithography and SEM based nanolithography and nano manipulation, Ion beam lithography, oxidation and metallization, Mask and its application. Deep UV lithography, X-ray based lithography.

TEXT BOOKS:

1. Charles P. Pode (2010), *Introduction to nanotechnology*, Reprint Edition, Springer, USA.
2. Bharat Bhusan (2010), *Springer Handbook of Nanotechnology,* 3rd edition, Springer, USA.

REFERENCES BOOKS:

1. Phani kumar (2012), *Principles of nanotechnology*, 3rd edition, Scitech publications, Chennai.
2. Challa S. S. Kumar (2007), Nanofabrication towards biomedical application: Techniques, tools, Application and impact, 1st Edition, Wiley- India, New Delhi.
3. Hari Singh Nalwa (2011), Encyclopedia of Nanotechnology, American Scientific Publishers, USA.
4. Michael J. O'Connell (2006), Carbon Nano tubes: Properties and Applications, Taylor & Francis, USA.
5. S. Dutta (2009), Electron Transport in Mesoscopic systems, 8th Print, Cambridge University press, New Delhi.

B .Tech. ECE VIII SEMESTER

SOFTWARE RADIO

(Professional Elective - II)

Course Code: **A1445**

L	T	P	C
3	1	-	4

UNIT - I

INTRODUCTION TO SOFTWARE RADIO CONCEPTS: The Need of Software Radios, What is Software Radio, Characteristics and benefits of software radio, Design Principles of Software Radio, RF Implementation issues, The Purpose of RF Front- End, Dynamic Range.

RADIO FREQUENCY IMPLEMENTATION ISSUES: The Principal Challenge of Receiver Design, RF Receiver Front-End Topologies, Enhanced Flexibility of the RF Chain with software Radios, Importance of the Components to Overall Performance, Transmitter Architectures and Their issues. Noise and distortion in the RF Chain, ADC and DAC distortion.

UNIT - II

MULTI RATE SIGNAL PROCESSING: Introduction, Sample Rate Conversion Principles, Polyphase Filters, Digital Filter Banks, Timing Recovery in Digital Receivers using machine Digital Filters.

DIGITAL GENERATION SIGNALS: Introduction, Comparison of direct Digital Synthesis with analog Signal Synthesis, Approaches to Direct Digital Synthesis, Analysis of Spurious Signals, Spurious Components due to Periodic Jitter – band Pass signals Generation, Performance of Direct digital Synthesis, hybrid DSS PLL Systems- Applications of direct Digital Synthesis.

UNIT - III

ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERSION: Parameters of ideal data converters, parameters of practical data convertors, Analog to Digital and Digital to Analog Conversion Techniques to improve data converter performance, Common ADC and DAC architectures.

SMART ANTENNAS: Vector Channel Modeling, Benefits of smart Antennas, Structures of Beam forming Systems, Smart Antenna, Algorithms. Diversity and space time adaptive signal processing, Algorithms for Transmit STAP, hardware implementation of Smart Antennas, Array Calibration.

UNIT - IV

DIGITAL HARDWARE CHOICES: Introduction, Key Hardware Elements, DSP processors, Field programmable GATE Arrays, trade-Offs in using DSPs, FPGAs and ASICs. Power Management issues: Using Communication of DSP, FPGASs and SASIC.

UNIT - V

OBJECT ORIENTED REPRESENTATION OF RADIOS AND NETWORK RESOURCES: Networks, Object Oriented Programming, Object Brokers, Mobile Applications Environments, Joint Tactical Radio Systems.

CASE STUDIES IN SOFTWARE RADIO DESIGN: Introduction and Historical perspective SPEAK easy- JTRS – JTRs Wireless Information Transfer system, SDR-3000 Digital Transceiver Subsystem, Spectrum Ware, CHARIOT.

TEXT BOOKS:

1. Jeffrey H. Redd (2002), *Software Radio: A modern Approach to Radio Engineering,* Pearson Education Asia, New Delhi, India.
2. Walter Tuttle Bee (2002), *Software Define Radio Fabrication Technologies*, Wiley publications, New Delhi.

REFERENCE BOOKS:

1. Paul Burns (2003), *Software Defined Radio for 3G,* Artech House mobile communications series, Norwood, MA.
2. Markus Dilinger, kambiz Madani, Nancy Alonistioti (2002), *Software Defined Radio: Architectures*, *Systems and Functions*, Wiley - India, New Delhi.
3. Josephal Itola (2000), *Software Radio Architecture: Object Oriented Approaches to Wireless of System Engineering*, John Wiley & sons, India.

B .Tech. ECE VIII SEMESTER

ARTIFICIAL NEURAL NETWORKS AND FUZZY LOGIC

(Professional Elective - II)

Course Code: **A1446**

L	T	P	C
3	1	-	4

UNIT - I

INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS: Introduction, Artificial Neural Networks, Historical Development of Neural Networks, Biological Neural Networks, Comparison Between Brain and the Computer, Comparison Between Artificial and Biological Neural Networks, Network Architecture, Setting the Weights, Activation Functions, Learning Methods.

UNIT - II

FUNDAMENTAL MODELS OF ARTIFICIAL NEURAL NETWORKS: Introduction, McCulloch: Pitts Neuron Model, Architecture, Learning Rules, Hebbian Learning Rule, Perceptron Learning Rule, Delta Learning Rule (Widrow-Hoff Rule or Least mean Square (LMS) rule, Competitive Learning Rule, Out Star Learning Rule, Boltzmann Learning, Memory Based Learning.

UNIT - III

FEED FORWARD NETWORKS : Introduction, Single Layer Perceptron Architecture, Algorithm, Application Procedure, Perception Algorithm for Several Output Classes, Perceptron Convergence Theorem, Brief Introduction to Multilayer Perceptron networks, Back Propagation Network (BPN), Generalized Delta Learning Rule, Back Propagation rule, Architecture, Training Algorithm, Selection of Parameters, Learning in Back Propagation, Application Algorithm, Local Minima and Global Minima, Merits and Demerits of Back Propagation Network, Applications, Radial Basis Function Network (RBFN), Architecture, Training Algorithm for an RBFN with Fixed Centers.

UNIT - IV

ADALINE AND MADALINE NETWORKS: Introduction, Adaline Architecture, Algorithm, Applications, Madaline, Architecture, MRI Algorithm.

COUNTER PROPAGATION NETWORKS: Winner Take: all learning, out star learning, Kohonen Self organizing network, Grossberg layer Network, Full Counter Propagation Network (Full CPN), Architecture, Training Phases of Full CPN, Training Algorithm, Application Procedure, Forward Only counter Propagation Network, Architecture, Training Algorithm, Applications, Learning Vector Quantizer (LVQ).

UNIT - V

CLASSICAL AND FUZZY SETS: Introduction to classical sets - properties, Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions.

FUZZY LOGIC SYSTEM COMPONENTS: Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

TEXT BOOKS:

1. S. N. Sivanandam, S. Sumathi, S. N. Deepa (2006), *Introduction to Neural Networks using MATLAB 6.0*, Tata McGraw-Hill, New Delhi.
2. S. Rajasekharan, G. A. Vijayalakshmi Pai(2004), *Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis And Applications*, Prentice Hall of India, New Delhi.

REFERENCE BOOKS:

1. B. Yegnanarayana (2007), Artificial *Neural Networks,* Prentice Hall of India, New Delhi.
2. Bart Kosko(1992), *Neural networks and fuzzy systems: a dynamical systems approach to machine intelligence, Volume 1***,** Prentice Hall of India, New Delhi.

HIGH SPEED NEWORKS
(Professional Elective - III)

Course Code: **A1447**

L	T	P	C
3	1	-	4

UNIT - I

DRIVERS OF THE COMMUNICATION WORLD: Technological drivers, Market drivers.

TRANSFER MODES: Introduction, Circuit Switching, Routing, Virtual Circuit Switching, Comparison of Transfer Modes.

OVERVIEW OF ATM: Introduction, Motivation for ATM, Definition of ATM, Genesis of ATM, Precursor Technologies, Basic Principle of ATM, ATM network architecture and interfaces, BISDN and ATM, Interworking with ATM, applications of ATM networks.

UNIT - II

ATM PROTOCOL REFERENCE MODEL: Introduction, Transmission Convergence (TC) Sub-layer, Physical Medium Dependent (PMD) Sub-layer, Physical Layer Standards for ATM.

ATM LAYER: ATM Cell Header Structure at UNI, ATM Cell Header Structure at NNI, ATM Layer Functions.

ATM ADAPTATION LAYER: Service Classes and ATM Adaptation Layer, ATM Adaptation Layer 1 (AAL1), ATM Adaptation Layer 2 (AAL2), ATM Adaptation Layer 3/4 (AAL3/4), ATM Adaptation Layer 5 (AAL5).

UNIT - III

ATM TRAFFIC AND SERVICE PARAMETERIZATION: ATM Traffic Parameters, ATM Service Parameters, Factors Affecting QoS Parameters, ATM Service Categories, QoS and QoS Classes.

ATM TRAFFIC MANAGEMENT: Introduction, ATM Traffic Contract Management, ATM Traffic Shaping, ATM Traffic Policing- Usage Parameter Control, ATM Priority Control, ATM Flow Control, ATM Congestion Control, Dynamics of TCP Traffic Over the ATM Networks.

ATM SWITCHING: Introduction, Components of a Typical Switch, Performance Measures in Switch Design, Switching Issues, Switching Architectures, Shared- Memory Architecture, Shared- Medium Architecture, Space- Division Architecture, Switching in ATM.

UNIT - IV

ATM ADDRESSING: Introduction, ATM End System Address (ASEA) Format, ATM Group Address, Acquiring ATM Address, ATM Name System (ANS).

ATM SIGNALING: Introduction, ATM Signaling Protocol Stack, Signaling ATM Adaptation Layer (SAAL), UNI Signaling, ATM Point to Point Signaling, ATM Point to Multipoint Signaling.

ATM ROUTING: Introduction, Interim Inter-switch Protocol (IISP), PNNI Protocol, PNNI Routing Hierarchy.

UNIT - V

ATM AND MPLS NETWORKS: Introduction, Overview of Multi-Protocol Label Switching (MPLS), ATM and MPLS.

VOICE OVER ATM: Introduction, Technical Challenges, Carrying Voice over ATM.

ATM AND DSL NETWORKS: Introduction, Overview of Digital Subscriber Line (DSL), ATM and DSL, Voice over DSL (VoDSL).

TEXT BOOKS:

1. Sumit Kasera (2008), *ATM Networks- Concepts and Protocols*, 2nd edition, Tata McGraw-Hill, New Delhi.

REFERENCE BOOKS:

1. Mahbub Hassan, Raj Jain (2005), *High performance TCP/IP Networkin:* concepts, issues, and solutions, Prentice Hall of India, New Delhi.
2. Rainer Handel, Manfired N. Hubber, Stefan Schroder (2002), *ATM Networks*, Pearson Education, New Delhi.
3. William Stallings (2002), *High speed Networks and Internets*, Pearson Education, New Delhi.

B .Tech. ECE VIII SEMESTER

SPEECH SIGNAL PROCESSING

(Professional Elective - III)

Course Code: **A1448**

L	T	P	C
3	1	-	4

UNIT - I

CLASSIFICATION OF SPEECH SOUNDS: Review of signal processing, anatomy and physiology of speech production, spectrographic analysis of speech, categorization of speech sounds, prosody-the melody of speech, speech perception.

ACOUSTICS OF SPEECH PRODUCTION: Introduction, physics of sound basics, the wave equation, uniform tube model-lossless case, effect of energy loss, boundary effects, a complete model, a discrete-time model based on tube concatenation.

UNIT - II

ANALYSIS AND SYNTHESIS OF POLE-ZERO SPEECH MODELS-I: Introduction, time-dependent processing, all-pole modeling of deterministic signals-formulation, error minimization, autocorrelation method, the levinson recursion and its associated properties, lattice filter formulation of the inverse filter, frequency-domain interpretation,linear prediction analysis of stochastic speech sounds formulation, error minimization, autocorrelation method.

UNIT - III

ANALYSIS AND SYNTHESIS OF POLE-ZERO SPEECH MODELS-II: Criterion of goodness time domain frequency domain, synthesis based on all-pole modeling, pole-zero estimation linearization, application to speech, high-pitched speakers- using two analysis windows, decomposition of the glottal flow derivative model, estimation.

UNIT - IV

HOMOMORPHIC SIGNAL PROCESSING: Introduction, homomorphic systems for convolution, complex cepstrum of speech-like sequences, sequences with rational z-transforms, impulse trains convolved with rational z-transform sequences, homomorphic filtering, discrete complex cepstrum, spectral root homomorphic filtering, short-time homomorphic analysis of periodic sequences, frequency-domain perspective, frequency-domain perspective.

UNIT - V

SHORT TIME SPEECH ANALYSIS: Short time speech analysis-complex cepstrum of voiced speech, complex cepstrum of unvoiced speech, analysis/synthesis structures- zero and minimum-phase synthesis, mixed-phase synthesis, spectral root deconvolution contrasting linear prediction and homomorphic filtering-properties, homomorphic prediction.

TEXT BOOKS:

1. Thomas F. Quatieri (2001), *Discrete-Time Speech Signal Processing: Principles and Practice*, 2nd edition, Dev Publishers & Distributors, New Delhi.
2. Ben Gold, Nelson Morgan (2006), *Speech and Audio Signal Processing: Processing and Perception of Speech and Music*, Wiley Publishers, New Delhi, India.

REFERENCE BOOKS:

1. Lawrence R. Rabiner, Ronald W. Schafer (1979), *Introduction to Digital Speech Processing*, Pearson Education, New Delhi, India.
2. Sadaoki Furui (2001), *Digital Speech Processing, Synthesis and Recognition*, 2nd edition, Prentice Hall of India, New Delhi, India.

B .Tech. ECE VIII SEMESTER

DESIGN OF FAULT TOLERANT SYSTEMS

(Professional Elective - III)

Course Code: **A1449**

L	T	P	C
3	1	-	4

UNIT - I

BASIC CONCEPTS OF RELIABILITY: The definition of reliability, reliability and failure rate, relation between reliability and meantime between failures, maintainability and availability, series and parallel systems.

FAULTS IN DIGITAL CIRCUITS: Failures and Faults, modeling of faults, temporary faults.

UNIT - II

TEST GENERARTION: Fault diagnosis of digital systems, test generation of combinational logic circuits, detection of multiple faults in combinational logic circuits, test generation for sequential logic circuits, random testing, transition count testing, signature analysis.

UNIT - III

FAULT TOLERANT DESIGN: The importance of fault tolerance, basic concepts of fault tolerance, static redundancy, dynamic redundancy, hybrid redundancy, self-purging redundancy, sift-out modular redundancy (SMR), 5MR reconfiguration scheme, time redundancy, software redundancy, fail-soft operation.

UNIT - IV

SELF-CHECKING AND FAIL-SAFE LOGIC: Introduction, design of totally self-checking checkers, self-checking sequential machines, partially self-checking circuits, strongly fault-secure circuits, fail-safe design, totally self-checking PLA design.

UNIT - V

DESIGN FOR TESTABILITY: Testability, controllability and observability, design of testable combinational logic circuits, testable design of sequential circuits, scan path technique, level sensitive scan design (LSSD), random access scan technique, built-in-test, design for autonomous self-test.

TEXT BOOKS:

1. Parag K. Lala (1984), *Fault Tolerant & Fault Testable Hardware Design*, Prentice Hall of India, New Delhi, India.
2. Alfred L. Crouch (2008), *Design for Test for Digital IC's and Embedded Core Systems*, Pearson Education, New Delhi, India.

REFERENCE BOOKS:

1. Miron Abramovici, Melvin A. Breuer, Arthur D. Friedman (1994), *Digital Systems Testing and Testable Design*, IEEE Press, New York, USA.
2. Michael L. Bushnell, Vishwani D. Agarwal(2000), *Essentials of Electronic Testing* For Digital, Memory, And Mixed-Signal Vlsi Circuits, Kluwer Academic Publishers, USA.

B .Tech. ECE VIII SEMESTER

BIOMEDICAL INSTRUMENTATION

(Professional Elective - III)

Course Code: **A1450**

L	T	P	C
3	1	-	4

UNIT - I

PHYSIOLOGY: Basic Charge on cell, transmission of action potentials, sources and theories of action potentials, physiology of Cardiac, Nervous and Respiratory Systems, Generalized Medical Instrumentation System, Problems Encountered with measurements from Human beings.

TRANSDUCERS: Different Types of transducers and their selection for biomedical applications, Electrode Theory, Various types of Electrodes, Errors caused by electrodes in measurement of body potential.

UNIT - II

ELECTRO CARDIOGRAPHY: Block Diagram of ECG Machine, Origin of ECG, different types of Lead Systems electrode positions, Noise problems and their elimination.

ELECTRO-ENCEPHALOGRAPHY: Block Diagram of EEG Recording System, Electrode Locations, 10-20 electrode system, Characteristics of Abnormal EEG, Resting Rhythms and sleep stages.

ELECTROMYOGRAPHY: Block Diagram of EMG Machine, simulation, strength duration curves, Electromyography with voluntary muscle action and electrical simulation.

UNIT - III

NEURO-MUSCULAR INSTRUMENTATION: Interpretation of EEG and EMG, Respiratory Instrumentation, Mechanism of respiration, Spirometry, Pnemuotachograph Ventilators.

CARDIAC INSTRUMENTATION: Direct and Indirect measuring techniques of Blood pressure, Blood flow measurement by Electromagnetic, Doppler and Plethysmographic and dilution methods, Einthoven triangle, Pacemaker, Defibrillator and Phonocardiography, Diathermy, Hemodialysis machine.

UNIT - IV

MEDICAL IMAGING: Ultra Sound Imaging, Radiography, MRI, electrical Tomography and applications.

BIO-ELECTRODES: Biopotential Electrodes-External electrodes, Internal Electrodes, Biochemical Electrodes, Mechanical function, Electrical Conduction system of the heart, Cardiac cycle. Relation between electrical and mechanical activities of the heart.

UNIT - V

BIOTELEMETRY: Transmission and Reception aspect of Biomedical Signals via long distances.

ELECTRICAL HAZARDS DURING BIO-ELECTRIC MONITORING: Safety, codes, standards Micro and Macro and their physiological effects, leakage currents and protection by use of isolation transformer, Equipotential grounding and earth free monitoring.

TEXT BOOKS:

1. Leslie Cromwell, F. J. Weibell, E. A. Pfeiffer (2006), *Biomedical Instrumentation and Measurements,* 2nd edition, Prentice Hall of India, New Delhi, India.
2. John G. Webster (2005), *Medical Instrumentation - Application and Design,* 3rd edition, John Wiley & Sons, New Delhi, India.

REFERENCE BOOKS:

1. L. A. Geoddes, L. E. Baker (2002), *Principles of Applied Biomedical Instrumentation*, John Wiley & Sons, New Delhi, India.
2. R. S. Khandpur (2003), *Hand-book of Biomedical Instrumentation*, 2nd edition, Tata McGraw-Hill, New Delhi.
3. Mackay, Stuart R. (2001), *Biomedical Telemetry*, John Wiley & Sons, New Delhi, India.
4. Willis J. Tompkins, Editor (2001), *Biomedical Digital Signal Processing*, Prentice Hall of India, New Delhi, India.
5. Dr. M. Arumugam (1994), *Biomedical Instrumentation*, 2nd edition, Anuradha Publications, India.

B .Tech. ECE VIII SEMESTER

RF CIRCUIT DESIGN

(Professional Elective - III)

Course Code: **A1451**

L	T	P	C
3	1	-	4

UNIT - I

INTRODUCTION: Importance of radio frequency design, dimensions and units, frequency spectrum, RF behavior of passive components, chip components and circuit board considerations.

TRANSMISSION LINE ANALYSIS: Why Transmission line theory, Examples of Transmission lines, Equivalent Circuit representation, Terminated Lossless Transmission line, Special termination conditions, Sourced and loaded transmission line.

UNIT - II

THE SMITH CHART: From reflection coefficient to load impedance, impedance transformation, admittance transformation, parallel and series connections.

SINGLE AND MULTIPORT NETWORKS: Basic definitions, interconnecting networks, scattering parameters.

UNIT - III

AN OVERVIEW OF RF FILTER DESIGN: Basic resonator and filter configurations, filter implementation, coupled filters.

ACTIVE RF COMPONENT MODELING: Diode models, transistor models, scattering parameter device characterization.

UNIT - IV

MATCHING AND BIASING NETWORKS: Impedance matching using discrete components, amplifier classes of operation and biasing networks.

UNIT V

RF TRANSISTOR AMPLIFIER DESIGN: Characteristics of amplifiers, amplifier power relations, stability considerations, constant gain, noise figure circles, constant vswr circles.

OSCILLATORS AND MIXERS: Basic oscillator models, high frequency oscillator configuration, basic characteristics of mixers.

TEXT BOOKS:

1. Reinhold Ludwig, Pavel Bretchko (2000), *RF Circuit Design: Theory and applications*, Prentice Hall of India, New Delhi, India.

REFERENCE BOOKS:

1. Matthew M. Radmanesh(2001), *Radio Frequency and Microwave Electronics,* Prentice Hall of India, New Delhi, India.
2. Chris Bowick, Cheryl Ajluni, John Blyler (2008), *RF Circuit Design,* 2nd edition, Elsevier Inc, USA.
3. Devendra K. Misra (2004), *Radio Frequency and Microwave communication circuits: Analysis and Design*, 2nd edition, John Wiley & Sons, India.

B .Tech. ECE VIII SEMESTER

OPTICAL NETWORKS

(Professional Elective - III)

Course Code: **A1452**

L	T	P	C
3	1	-	4

UNIT - I

CLIENT LAYERS OF THE OPTICAL NETWORKS: SONET/SDH -multiplexing, frame structure, physical layer, infrastructure, ATM – functions, adaptation layers, QoS, flow control, Signaling and Routing, IP -routing and forwarding, QoS, MPLS, storage area networks - ESCON, fiber channel, HIPPI and Gigabit Ethernet.

UNIT - II

WDM NETWORK ELEMENTS: Optical Line terminals and amplifiers, Add/Drop Multiplexers- OADM Architecture and reconfigurable OADMS, Optical cross connects, all-optical OXC configurations.

WDM NETWORK DESIGN: Cost tradeoffs in network design, LTD and RWA problems, dimensioning wavelength routing networks, statistical and maximum load dimensioning models.

UNIT - III

NETWORK CONTROL AND MANAGEMENT: Network management functions, optical layer services and interfacing, layers within optical layer, multivendor interoperability, performance and fault management, configuration management and optical safety.

NETWORK SURVIVABILITY: Basic concepts, protection in SONET/SDH links and rings, protection in IP networks, optical Layer protection service classes, protection schemes and Interworking between layers.

UNIT - IV

ACCESS NETWORKS: Network architecture, enhanced HFC, FTTC- PON evolution.

UNIT - V

PHOTONIC PACKET SWITCHING: OTDM, synchronization, header processing, buffering, burst switching and test beds.

DEPLOYMENT CONSIDERATIONS: SONET/SDH core network, architectural choices for next generation transport networks, designing the transmission layer using SDM, TDM and WDM, unidirectional and bidirectional WDM systems, long haul and metro networks.

TEXT BOOKS:

1. Rajiv Ramaswami, Kumar N. Sivarajan (2004), *Optical Networks a practical perspective*, 2nd edition, Morgan Kaufmann Publishers.
2. C. Siva Rama Murthy, Mohan Guruswamy (2003), *WDM Optical Networks: Concepts, Design and Algorithms,* 2nd edition, Pearson Education, India.

REFERENCE BOOKS:

1. Uyless Black (2009), *Optical Networks: third Generation Transport Systems*, 2nd edition, Pearson Education, New Delhi, India.
2. John M. Senior (2000), *Optical Fiber Communications: Principles and Practice,* 2nd edition, Pearson Education, New Delhi, India.
3. Harold Kolimbris (2004), *Fiber Optics Communications*, 2nd edition, Pearson Education, New Delhi, India.
4. Timothy S. Ramteke (2004), *Networks*, 2nd edition, Pearson Education, New Delhi, India.

B .Tech. ECE VIII SEMESTER

EMBEDDED SYSTEMS LAB

Course Code: **A1454**

L	T	P	C
-	-	6	2

Note: Minimum 12 Experiments to be conducted.

PART - A:
ASSEMBLY LANGUAGE PROGRAMS (Any 6 Experiments).

1. Programming using Arithmetic, logical and bit manipulations instructions of 8051.
2. Develop and execute the program to interface Keyboard to the 8051 microcontroller.
3. Develop and execute the program to interface DAC to the 8051 Microcontroller.
4. Develop and execute the program to interface stepper motor to the 8051 Microcontroller.
5. Develop and execute the program for controlling Traffic Light using 8051 Microcontroller
6. Program to verify Timer/Counter in 8051 Microcontroller.
7. Interrupt programming in 8051 Microcontroller.
8. To develop and execute the program for UART operation in 8051.

PART - B:
EMBEDDED C PROGRAMS (Any 6 Experiments).

1. Interface Seven Segment Display with 8051 Microcontroller.
2. Interface LEDs with 8051 Microcontroller.
3. Develop a program to perform Encryption and Decryption
4. Interface LCD with 8051 Microcontroller.
5. Develop a program to read data from Sensor and to display data.
6. Serial Communication between Microcontrollers to PC vice versa
7. Interfacing Switches with 8051 Microcontroller.
8. Interface ADC with 8051 Microcontroller.

EQUIPMENT REQUIRED FOR LABORATORY:

1. 89C51 Software Development Kit (SDK)
2. PC (Latest Configuration)
3. Eclipse Software
4. PHILIPS ISP Software
5. 8051 kits
6. Interfacing cards

B. Tech. ECE VIII SEMESTER

TECHNICAL SEMINAR

Course Code: **A1455**

L	T	P	C
-	-	6	2

1. OBJECTIVE:

Seminar is an important component of learning in an Engineering College, where the student gets acquainted with preparing a report & presentation on a topic.

2. **PERIODICITY / FREQUENCY OF EVALUATION: Twice**

3. PARAMETERS OF EVALUATION:

1. The seminar shall have two components, one chosen by the student from the course-work without repetition and approved by the faculty supervisor. The other component is suggested by the supervisor and can be a reproduction of the concept in any standard research paper or an extension of concept from earlier course work.
2. The two components of the seminar are distributed between two halves of the semester and are evaluated for 50 marks each. The average of the two components shall be taken as the final score.
3. The students shall be required to submit the rough drafts of the seminar outputs within one week of the commencement of the class work.
4. Supervisor shall make suggestions for modification in the rough draft. The final draft shall be presented by the student within a week thereafter.
5. Presentation schedules will be prepared by different Departments in line with the academic calendar.

The Seminars shall be evaluated in two stages as follows:

A. Rough draft

In this stage, the student should collect information from various sources on the topic and collate them in a systematic manner. He/ She may take the help of the concerned supervisor.

The report should be typed in “MS-Word” file with “calibri” font, with font size of 16 for main heading, 14 for sub-headings and 11 for the body text. The contents should also be arranged in Power Point Presentation with relevant diagrams, pictures and illustrations. It should normally contain 18 to 25 slides, consisting of the followings:

1.	Topic, name of the student & guide	1 Slide
2.	List of contents	1 Slide
3.	Introduction	1 - 2 Slides
4.	Descriptions of the topic (point-wise)	7 - 10 Slides
5.	Images, circuits etc.	6 - 8 Slides
6.	Conclusion	1 - 2 Slides
7.	References/Bibliography	1 Slide

The soft copy of the rough draft of the seminar presentation in MS Power Point format along with the draft Report should be submitted to the concerned supervisor, with a copy to the concerned HOD within 30 days of the commencement of class work.

The evaluation of the Rough draft shall generally be based upon the following.

1.	Punctuality in submission of rough draft and discussion	2 Marks
2.	Resources from which the seminar have been based	2 Marks
3.	Report	3 Marks
4.	Lay out, and content of Presentation	3 Marks
5.	Depth of the students knowledge in the subject	5 Marks
Total		15 Marks

After evaluation of the first draft the supervisor shall suggest further reading, additional work and fine tuning, to improve the quality of the seminar work.

Within 7 days of the submission of the rough draft, the students are to submit the final draft incorporating the suggestions made by the supervisor.

B. Presentation:

After finalization of the final draft, the students shall be allotted dates for presentation (in the designated seminar classes) and they shall then present it in presence students, supervisor, faculties of the department and at least one faculty from some department / other department.

The student shall submit 3 copies of the Report neatly bound along with 2 soft copies of the PPT in DVD medium. The students shall also distribute the title and abstract of the seminar in hard copy to the audience. The final presentation has to be delivered with 18-25 slides.

The evaluation of the Presentation shall generally be based upon the following.

1.	Contents	10 Marks
2.	Delivery	10 Marks
3.	Relevance and interest the topic creates	5 Marks
4.	Ability to involve the spectators	5 Marks
5.	Question answer session	5 Marks
Total		35 Marks

4. WHO WILL EVALUATE?

The presentation of the seminar topics shall be made before an internal evaluation committee comprising the Head of the Department or his/her nominee, seminar supervisor and a senior faculty of the department / other department.

B. Tech. ECE VIII SEMESTER

COMPREHENSIVE VIVA

Course Code: **A1456**

L	T	P	C
-	-	-	2

1. OBJECTIVE:

- To enable the examiners to assess the candidate's knowledge in his or her particular field of learning.
- To test the student's awareness of the latest developments and relate them to the knowledge acquired during the classroom teaching.

2. PARAMETERS OF EVALUATION:

Subject Knowledge	Current Awareness	Career Orientation	Communication Skills	Total
20	10	10	10	50

3. WHO WILL EVALUATE?

The comprehensive Viva will be conducted by a committee comprising Head of the Department or his/her nominee, two senior faculty of the respective department and an external examiner from outside the college. The comprehensive viva shall be evaluated for 50 marks at the end of VIII semester. A minimum of 40% of maximum marks shall be obtained to earn the corresponding credits.

4. **PERIODICITY / FREQUENCY OF EVALUATION: Once**

5. PEDAGOGY:

- The viva will be held on a face to face basis.
- The students will be expected to answer the questions related to latest developments and all courses taken till date.
- Viva voce will be conducted within week before the beginning of midterm examinations. However, in exceptional circumstances it can be scheduled immediately after the end of midterm examinations.
- Students will have to make themselves available on the date of the viva voce.

B. Tech. ECE VIII SEMESTER

MINI PROJECT / PROJECT WORK

Course Code: **A1457/ A1440**

L	T	P	C
-	-	12	8

1. OBJECTIVE:

The main objective of the Project Work is for the students to learn and experience all the major phases and processes involved in solving "real life engineering problems".

2. EXPECTED OUTCOME:

The major outcome of the B. Tech project must be well-trained students. More specifically students must have acquired:

- System integration skills
- Documentation skills
- Project management skills
- Problem solving skills

3. PROJECT SELECTION:

Projects are suggested by the faculty, with or without collaboration with an industry. All faculty are to suggest projects. Students are also encouraged to give project proposals after identifying a faculty who would be willing to supervisor the work. A Project brief is to be given by the faculty to the group defining the project comprehensively.

All B. Tech major projects are to be done in the Institute. For industry specified projects, students will be permitted to spend 1-2 weeks in the industry on recommendation by the supervisor. The number of students per batch should be between 2 and 4. If more number of students is really needed, the project may be split into functional modules and given to subgroups.

4. WHO WILL EVALUATE?

The end semester examination shall be based on the report submitted and a viva-voce exam for 150 marks by committee comprising of the Head of the Department, project supervisor and an external examiner.

5. EVALUATION:

The basic purpose is to assess the student competencies with regard to his project work. More specifically to assess the student's individual contribution to the project, to establish the level of understanding of basic theoretical knowledge relevant to the project and to ensure that the student has good understanding and appreciation of design and development decisions taken in the course of the project. It is desirable that all faculty members are present for the evaluations as this is a platform to get to know the student projects and to motivate the students to do good projects. The faculty should adopt a clear and consistent pattern of asking questions from general to specific aspects of the project. The presentation and evaluation is open to other students of the department.

The project work shall be evaluated for 200 marks out of which 50 marks for internal evaluation and 150 marks for end-semester evaluation. The evaluation shall be done on the following basis

Semester VII	**Semester VIII**
Preliminary Evaluation - 10 marks	Design Evaluation II - 25 marks
Design Evaluation I - 15 marks	Final Evaluation – 150 marks

6. GUIDELINES FOR THE PREPARATION OF B. TECH PROJECT REPORTS

1.1. Project reports should be typed neatly only on one side of the paper with 1.5 or double line spacing on a A4 size bond paper (210 x 297 mm). The margins should be: Left - 1.25", Right - 1", Top and Bottom - 0.75".

1.2. The total number of reports to be prepared are:

- One copy to the department
- One copy to the concerned guide(s)
- One copy to the candidate.

1.3. Before taking the final printout, the approval of the concerned guide(s) is mandatory and suggested corrections, if any, must be incorporated.

1.4. For making copies dry tone Xerox is suggested.

1.5. Every copy of the report must contain

- Inner title page (White)
- Outer title page with a plastic cover

- Certificate in the format enclosed both from the college and the organization where the project is carried out.
- An abstract (synopsis) not exceeding 100 words, indicating salient features of the work.

6.6. The organization of the report should be as follows:

1.	Inner title page	Usually numbered in roman
2.	Abstract or Synopsis	
3.	Acknowledgments	
4.	Table of Contents	
5.	List of table & figures (optional)	

6.7 Chapters (to be numbered) containing Introduction, which usually specifies the scope of work and its importance and relation to previous work and the present developments, Main body of the report divided appropriately into chapters, sections and subsections.

- The chapters, sections and subsections may be numbered in the decimal form for e.g. Chapter 2, sections as 2.1, 2.2 etc., and subsections as 2.2.3, 2.5.1 etc.
- The report should be typed in "MS-Word" file with "calibri" font. The chapter must be left or right justified (font size 16). Followed by the title of chapter centered (font size 18), section/subsection numbers along with their headings must be left justified with section number and its heading in font size 16 and subsection and its heading in font size 14. The body or the text of the report should have font size 11.
- The figures and tables must be numbered chapter wise for e.g.: Fig. 2.1 Block diagram of a serial binary adder, Table 3.1 Primitive flow table, etc.
- The last chapter should contain the summary of the work carried, contributions if any, their utility along with the scope for further work.

6.8. Reference OR Bibliography: The references should be **numbered serially** in the order of their occurrence in the text and their numbers should be indicated within square brackets for e.g. [3]. The section on references should list them in serial order in the following format.

1. For textbooks - A.V. Oppenheim and R.W. Schafer, Digital Signal Processing, Englewood, N.J., Prentice Hall, 3 Edition, 1975.
2. For papers - Devid, Insulation design to combat pollution problem, Proc of IEEE, PAS, Vol 71, Aug 1981, pp 1901-1907.

6.9. Only SI units are to be used in the report. Important equations must be numbered in decimal form for e.g. **V = IZ** ..... **(3.2)**

6.10. All equation numbers should be right justified.

6.11. The project report should be brief and include descriptions of work carried out by others only to the minimum extent necessary. Verbatim reproduction of material available elsewhere should be strictly avoided. Where short excerpts from published work are desired to be included, they should be within quotation marks appropriately referenced.

6.12. Proper attention is to be paid not only to the technical contents but also to the organization of the report and clarity of the expression. Due care should be taken to avoid spelling and typing errors. The student should note that report-write-up forms the important component in the overall evaluation of the project

6.13. Hardware projects must include: the component layout, complete circuit with the component list containing the name of the component, numbers used, etc. and the main component data sheets as Appendix. At the time of report submissions, the students must hand over a copy of these details to the project coordinator and see that they are entered in proper registers maintained in the department.

6.14. Software projects must include a virus free disc, containing the software developed by them along with the read me file. Read me file should contain the details of the variables used, salient features of the software and procedure of using them: compiling procedure, details of the computer hardware/software requirements to run the same, etc. If the developed software uses any public domain software downloaded from some site, then the address of the site along with the module name etc. must be included on a separate sheet. It must be properly acknowledged in the acknowledgments.

6.15. Sponsored Projects must also satisfy the above requirements along with statement of accounts, bills for the same dully attested by the concerned guides to process further, They must also produce NOC from the concerned guide before taking the internal viva examination.

6.16. The reports submitted to the department/guide(s) must be hard bounded, with a plastic covering.

6.17. Separator sheets, used if any, between chapters, should be of thin paper

VARDHAMAN COLLEGE OF ENGINEERING

(Autonomous)

Shamshabad – 501 218, Hyderabad, Andhra Pradesh, India

Department of ……..

CERTIFICATE

Certified that the project work entitled …….. carried out by Mr./Ms. ……., Roll Number ……, a bonafide student of ……in partial fulfillment for the award of **Bachelor of Technology** in …… of the Jawaharlal Nehru Technological University, Hyderabad during the year …….. It is certified that all corrections / suggestions indicated for Internal Assessment have been incorporated in the Report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the said Degree.

Name & Signature of the Guide **Name Signature of the HOD** **Signature of the Principal**

External Viva

Name of the examiners Signature with date

1.

2.

Certificate issued at the Organization where the project was carried out

(On a separate sheet, If applicable)

NAME OF THE INDUSTRY / ORGANIZATION, Address with pin code

CERTIFICATE

Certified that the project work entitled …….. carried out by Mr./Ms . ……., Roll Number……., a bonafide student of ……in partial fulfillment for the award of **Bachelor of Technology** in …… of the Jawaharlal Nehru Technological University, Hyderabad during the year …….. It is certified that, he/she has completed the project satisfactorily

Name & Signature of the Guide **Name & Signature of the Head of Organization**

7. **DISTRIBUTION OF MARKS FOR B.TECH DISSERTATION EVALUATION**

S No.	Particulars	Max. Marks
1	Relevance of the subject in the present context	**10**
2	Literature Survey	**10**
3	Problem formulation	**20**
4	Experimental observation / theoretical modeling	**10**
5	Results – Presentation & Discussion	**20**
6	Conclusions and scope for future work	**10**
7	Overall presentation of the Thesis / Oral presentation	**40**
8	Project Report Writing	**30**
Total Marks		**150**

MALPRACTICES RULES
DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices/Improper conduct	Punishment
	If the candidate:	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate, who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the

	examination hall.	candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

Frequently asked Questions and Answers about autonomy

1. Who grants Autonomy? UGC, Govt., AICTE or University

In case of Colleges affiliated to a university and where statutes for grant of autonomy are ready, it is the respective University that finally grants autonomy.

2. Shall VCE award its own Degrees?

No. Degree will be awarded by Jawaharlal Nehru Technological University, Hyderabad with a mention of the name Vardhaman College of Engineering on the Degree Certificate.

3. What is the difference between a Deemed University and an Autonomy College?

A Deemed University is fully autonomous to the extent of awarding its own Degree. A Deemed University is usually a Non-Affiliating version of a University and has similar responsibilities like any University. An Autonomous College enjoys Academic Autonomy alone. The University to which an autonomous college is affiliated will have checks on the performance of the autonomous college.

4. How will the Foreign Universities or other stake – holders know that we are an Autonomous College?

Autonomous status, once declared, shall be accepted by all the stake holders. Foreign Universities and Indian Industries will know our status through our college website.

5. What is the change of Status for Students and Teachers if we become Autonomous?

An autonomous college carries a prestigious image. Autonomy is actually earned out of continued past efforts on academic performances, capability of self-governance and the kind of quality education we offer.

6. Who will check whether the academic standard is maintained / improved after Autonomy? How will it be checked?

There is a built in mechanism in the autonomous working for this purpose. An Internal Committee called Academic Programme Evaluation Committee is a Non – Statutory body, which will keep a watch on the academics and keep its reports and recommendations every year. In addition to Academic Council, the highest academic body also supervises the academic matters. At the end of three years, there is an external inspection by the University for this purpose. The standards of our question papers, the regularity of academic calendar, attendance of students, speed and transparency of result declaration and such other parameters are involved in this process.

7. Will the students of VCE as an Autonomous College qualify for University Medals and Prizes for academic excellence?

No. VCE has instituted its own awards, medals, etc. for the academic performance of the students. However for all other events like sports, cultural and co-curricular organized by the University the students shall qualify.

8. Can VCE have its own Convocation?

No, since the University awards the Degree the Convocation will be that of the University.

9. Can VCE give a provisional degree certificate?

Since the examinations are conducted by VCE and the results are also declared by VCE, the college sends a list of successful candidates with their final percentage of marks to the University. Therefore with the prior permission of the University the college will be entitled to give the provisional certificate.

10. Will Academic Autonomy make a positive impact on the Placements or Employability?

Certainly. The number of students qualifying for placement interviews is expected to improve, due to rigorous and repetitive classroom teaching and continuous assessment, besides the autonomous status is more responsive to the needs of the industry. As a result, there will be a lot of scope for industry oriented skill development built-in into the system. The graduates from an autonomous college will therefore represent better employability.

11. What is the proportion of Internal and External Assessment as an Autonomous College?

Presently, it is 25 % for internal assessment and 75 % for external assessment. As the autonomy matures the internal assessment component shall be increased at the cost of external assessment.

12. Will there be any Revaluation or Re-Examination System?

No. There will not be any Revaluation system or Re-examination. But, there is a personal verification of the answer scripts.

13. How fast Syllabi can be and should be changed?

Autonomy allows us the freedom to change the syllabi as often as we need.

14. Will the Degree be awarded on the basis of only final year performance?

No. The percentage of marks will reflect the average performance of all the semesters put together.

15. Who takes Decisions on Academic matters?

The Academic Council of College is the top academic body and is responsible for all the academic decisions. Many decisions are also taken at the lower level like the BOS which are like Boards of Studies of the University.

16. What is the role of Examination committee?

The Exam Committee is responsible for the smooth conduct of inter and external examinations. All matters involving the conduct of examinations, spot valuations, tabulations, preparation of Memorandum of Marks etc fall within the duties of the Examination Committee.

17. Is there any mechanism for Grievance Redressal?

Yes, the college has grievance redressal committee, headed by a senior faculty member of the college.

18. How many attempts are permitted for obtaining a Degree?

All such matters are defined in Rules & Regulations.

19. Who declares the result?

The result declaration process is also defined. After tabulation work the entire result is reviewed by the Moderation Committee. Any unusual deviations or gross level discrepancies are deliberated and removed. The entire result is discussed in the College Academic Council for its approval. The result is then declared on the college notice boards as well put on the web site of the college. It is eventually sent to the University.

20. What is our relationship with the Jawaharlal Nehru Technological University, Hyderabad?

We remain an affiliated college of the Jawaharlal Nehru Technological University, Hyderabad. The University has the right to nominate its members on the academic bodies of the college.

21. Shall we require University approval if we want to start any New Courses?

Yes, It is expected that approvals or such other matters from an autonomous college will receive priority.

22. Shall we get autonomy for PG and Doctoral Programmes also?

Yes, presently our PG programmes are also enjoying autonomous status.

23. How many exams will be there as an autonomous college?

This is defined in the Rules & Regulations.