SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

(Affiliated to J.N.T. University Anantapur)

ACADEMIC REGULATIONS

B.Tech. Regular Four Year Degree Programme

(for the batches admitted from the academic year 2010–11)

&

B.Tech. (Lateral Entry Scheme)

(for the batches admitted from the academic year 2011–12)

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

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 2010-2011 onwards. Any reference to "College" in these rules and regulations stands for Sree Vidyanikethan Engineering College (Autonomous).

2. Extent : All the rules and regulations, specified herein after shall be read as a whole for the purpose of interpretation and as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. As per the requirements of statutory bodies, Principal, Sree Vidyanikethan Engineering College 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 JNTUA, Anantapur) or a Diploma in Engineering in the relevant branch conducted by the Board of Technical Education, Andhra Pradesh (or equivalent Diploma recognized by JNTUA, Anantapur) 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) By the Convener, EAMCET, (for Category-A Seats).

(b) By the Management (for Category-B Seats).

3.2. Admission into the Second Year of Four year B.Tech. Degree programme in Engineering

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

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

3.2.2. Admission Procedure: 10% of the sanctioned strength in each programme of study as lateral entry students or as stipulated by APSCHE shall be filled by the Convener, ECET (FDH).

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

Following are the four year undergraduate Degree programmes of study offered in various branches in SVEC (Autonomous) leading to the award of B.Tech. (Bachelor of Technology) Degree:

1) B.Tech. (Biotechnology)
2) B.Tech. (Civil Engineering)
3) B.Tech. (Computer Science & Engineering)
4) B.Tech. (Computer Science & Systems Engineering)
5) B.Tech. (Electrical & Electronics Engineering)
6) B.Tech. (Electronics & Communication Engineering)
7) B.Tech. (Electronics & Control Engineering)
8) B.Tech. (Electronics & Instrumentation Engineering)
9) B.Tech. (Information Technology)
10) B.Tech. (Mechanical Engineering)

5. Academic Year: The College shall follow Year-wise pattern for First year course of four year B.Tech programme and Semester system from second year onwards for conducting all its curricula. An academic year shall consist of a first semester and a second semester from second year onwards and the summer term follows in sequence.

The first year of four year B.Tech programme shall have a duration to accommodate a minimum of 31 instructional weeks. The first and second semesters (from second year onwards) shall have the duration to accommodate a minimum of 17 instructional weeks per semester.

First Year B.Tech (38 weeks)	Instruction Period: I Spell :11 weeks II Spell :10 weeks III Spell :10 weeks Mid Examinations: I Mid :1 week II Mid :1 week III Mid :1 week	34 weeks
	Preparation & Practical Examinations	2 weeks
	External Examinations	2 weeks
	Summer vacation	4 weeks
First Semester (23 weeks)	Instruction Period: I Spell :9 weeks II Spell :8 weeks Mid Examinations: I Mid :1 week II Mid :1 week	19 weeks
	Preparation & Practical Examinations	2 weeks
	External Examinations	2 weeks
Second Semester (23 weeks)	Semester Break	2 weeks
	Instruction Period: I Spell :9 weeks II Spell :8 weeks Mid Examinations: I Mid :1 week II Mid :1 week	19 weeks
	Preparation & Practical Examinations	2 weeks
	External Examinations	2 weeks
	Summer vacation	4 weeks

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

- General Courses comprising of the following:
  - i. Language / Communication Skills
  - ii. Humanities and Social Sciences
  - iii. Economics and Principles of Management
  - iv. Environmental Sciences

The above courses are common to all branches.

- Basic Science Courses comprising of the following:
    i. Computer Literacy with Numerical Analysis
    ii. Mathematics
    iii. Physics
    iv. Chemistry

The above courses are common to all branches.

- Core Engineering Courses comprising of the following, depending on the branch:
    i. Engineering Graphics
    ii. Workshop Practice
    iii. Engineering Mechanics
    iv. Electrical Sciences
    v. Thermodynamics and Heat Transfer
    vi. Material Sciences and Engineering
    vii. Engineering Systems Design
    viii. Building Materials
    ix. Surveying
    x. Transport Phenomena
    xi. Basic Electronics
    xii. Computer Programming
- Compulsory Discipline Courses:

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

- Elective Courses:

Electives will be offered to the students to diversify the spectrum of knowledge. The electives can be chosen based on the interest of the student to broaden his individual skill and knowledge.

The students shall complete:

- A mini project in an industry during the summer term following the second semester of third year B.Tech. programme for a period of 4 weeks. A report shall be submitted to the Department after successful completion of the mini project.

Every programme of study shall be designed to have 40-42 theory courses and 14-16 laboratory courses. Distribution of types of courses is indicated below:

General Courses	5-10%
Basic Science Courses	15-25%
Core Engineering Courses	15-25%
Compulsory Discipline Courses	45-55%
Elective Courses	10-15%

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.

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

Norms for assigning credits are shown below :

Subject	Year Pattern		Semester Pattern	
	Period(s)/ Week	Credits	Period(s)/ Week	Credit(s)
Theory	01	02	01	01
Practical	03	04	03	02
Mini Project	--	--	--	02
Seminar	--	--	--	02
Comprehensive Viva-Voce	--	--	--	02
Final Year Project	--	--	--	12

i. As a norm, for the theory subjects, **one credit** for one contact period per week is assigned in semester system. In yearly pattern **two credits** for one contact period per week is assigned.

ii. As a norm, for practical courses **two credits** will be assigned for three contact periods per week in semester pattern. In yearly pattern **four credits** will be assigned for three contact periods per week.

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

iv. For courses like Mini Project/Project/Seminar/Comprehensive Viva-Voce, where formal contact hours are not specified, credits are assigned based on the complexity of the work to be carried out.

- The four year curriculum of any B.Tech. programme of study shall have total of 220 credits. The exact requirements of credits for each course will be as recommended by the concerned Board of Studies and approved by the Academic Council.
- In the case of lateral entry students, B.Tech. programme for II, III, IV years of study shall have a total 170 credits.

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

8.1. Distribution of Marks:

<table>
<tr><th>S.No.</th><th>Examination</th><th>Marks</th><th colspan="2">Examination and Evaluation</th><th>Scheme of examination</th></tr>
<tr><td rowspan="3">1</td><td rowspan="3">Theory</td><td>70</td><td colspan="2">Year-end / Semester-end examination (external evaluation)</td><td>The examination question paper in theory subjects will be for a maximum of 70 marks. The question paper shall be of descriptive type with 8 questions out of which 5 are to be answered in 3 hours duration of the examination.</td></tr>
<tr><td rowspan="2">30</td><td rowspan="2">20</td><td rowspan="2">Mid - Examination of 90 Min. duration (Internal evaluation). The question paper shall be of descriptive type with 5 questions out of which 3 are to be answered and evaluated for 20 marks.</td><td><u>For I B.Tech:</u> Three (03) mid-term exams, each for 20 marks are to be conducted. For a total of 20 marks, average of the best two mid-term exams shall be considered.
Mid-I: After first spell of instructions (I and II Units).
Mid-II: After second spell of instructions (III to V Units).
Mid-III: After third spell of instructions (VI to VIII Units)</td></tr>
<tr><td><u>For a Semester:</u> Two midterm exams , each for 20 marks are to be conducted. For a total of 20 marks, better of the two shall be considered.
Mid-I: After first spell of instructions (I to IV Units).
Mid-II: After second spell of instructions (V to VIII Units).</td></tr>
</table>

			10	Assignment Tests (Internal evaluation)	For I B.Tech: Three assignment tests each of 10 marks shall be conducted. Average of best two assignment tests shall be taken as internal marks for the assignments.
					For a Semester: Two assignment tests each of 10 marks shall be conducted. Better of the two assignments shall be internal marks for the assignments.
2	Laboratory	50	Year-end / Semester-end Lab Examination (External evaluation)		50 marks are allotted for laboratory/drawing examination during year-end / semester-end.
		25	15	Day-to-Day evaluation	Performance in laboratory experiments/ drawing and record.
			10	Internal evaluation	Practical Tests. (For first year three tests and for semester two tests.)
3	a) Seminar	75	75	Internal evaluation	Continuous evaluation during a semester by the Departmental Committee (DC).
	b) Comprehensive Viva-Voce	100	100	Internal evaluation	Viva-Voce examination will be conducted during IV year II semester by a committee consisting of HOD and two senior faculty members of the department
4	Mini Project	75	50	External evaluation	Semester-end Mini-Project Viva-Voce examination will be conducted in the manner similar to external evaluation of laboratory course by HOD and supervisor as examiners.
			25	Internal evaluation	Continuous evaluation by the DC

5	Project Work	225	150	External evaluation	Semester-end Project Viva-Voce Examination by Committee as detailed under 8.2.
			75	Internal evaluation	Continuous evaluation by the DC

8.2 Seminar/ Project Work / Machine Drawing/Audit Course Evaluation:

i. There shall be a seminar presentation in III year II Semester. For the seminar, the student shall collect information on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the Department before presentation. The report and the presentation shall be evaluated by the Departmental Committee (**DC**) consisting of Head of the Department, supervisor and a senior faculty member. There shall be no external examination for seminar.

ii. The Semester-End Examination (Project viva-voce) shall be conducted by a Committee consisting of an External examiner nominated by the Chief Controller of Examinations, HOD & Supervisor. The evaluation of project work shall be conducted at the end of the IV year. The Internal Evaluation shall be made by the Departmental Committee, on the basis of two seminars presented by each student on the topic of his project.

iii. For the subject Machine Drawing, the distribution shall be 30 marks for internal evaluation and 70 marks for end examination. The internal evaluation will be 15 marks for day-to-day work in the class that shall be evaluated by the concerned subject teacher based on the reports/ submissions prepared in the class. And there shall be two midterm exams in a Semester for a duration of 3 hours each, evenly distributed over the syllabi for 15 marks and the better of the two shall be considered as internal test marks. The sum of day to day evaluation and the internal test marks will be the final sessionals for the subject. End examination will be conducted for 4 hours.

iv. For audit courses, attendance has to be considered like in case of any regular subject. For theory subjects course files and for laboratory subjects laboratory manuals and student observations have to be maintained. Two internal tests per semester (three in case of yearly pattern) have to be conducted by the subject teacher, preferably just before regular mid-term examinations. Students may be encouraged to give seminars on the course topics.

8.3. Eligibility to appear for the Year-end / Semester-end examination:

1. A student shall be eligible to appear for year-end / semester-End examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects in a year/ semester.
2. Condonation of shortage of attendance in aggregate upto 10% (65% and above and below 75%) in first year or each semester may be granted by the College Academic Committee.
3. Shortage of Attendance below 65% in aggregate shall in no case be condoned.
4. Students whose shortage of attendance is not condoned in First year/any semester are not eligible to take their Semester-end examination of that class and their registration shall stand cancelled.
5. A student will not be promoted to the next semester unless he satisfies the attendance requirements of the current year/semester, as applicable. The student may seek readmission for the year/ 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.
6. A stipulated fee shall be payable towards condonation of shortage of attendance to the College.

8.4. Evaluation: Following procedure governs the evaluation.

8.4.1. 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 year/semester-end examinations, to arrive at total marks for any subject in that year/semester.

8.4.2. Performance in all the courses is tabulated course-wise and will be scrutinized by the Examination Committee and moderation is applied if needed, and course-wise marks lists are finalized. Total marks obtained in each course are converted into letter grades.

8.4.3. Student-wise tabulation is done and student-wise memorandum of grades (Grade Sheet) is generated which is issued to the student.

8.5. Personal verification / Revaluation / Recounting :

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

After recounting or revaluation, records are updated with changes if any and the student will be issued a revised grade sheet. If there are no changes, the student shall be intimated the same through a letter or a notice.

8.6. Supplementary Examination:

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

9. Academic Requirements for promotion/ completion of regular B.Tech 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 40% 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. For the seminar he should secure 40% of marks in the internal evaluation.

ii. A student shall be promoted from second year to third year of programme of study only if he fulfils the academic requirement of securing 39 credits from

a. One regular and one supplementary examinations of first year

b. One regular examination of second year first semester

irrespective of whether the candidate appear the semester-end examination or not as per the normal course of study.

iii. A student shall be promoted from third year to fourth year of programme of study only if he fulfils the academic requirements of securing 67 credits from

a. Two regular and two supplementary examinations of first year

b. Two regular and one supplementary examinations of second year first semester

c. One regular and one supplementary examinations of second year second semester

d. One regular examination of third year first semester

irrespective of whether the candidate appear the semester-end examination or not as per the normal course of study and in case of getting detained for want of credits by sections 9(ii) and 9(iii) above, the student may make up the credits through supplementary examinations before the date of commencement of class work for III year I semester or IV year I semester respectively.

iv 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 basing on CGPA.

v. 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.

vi. 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 2011–2012):

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 40% 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. For the seminar he should secure 40% of marks in the internal evaluation.

ii. A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of securing 42 credits from :

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

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

iii. A student shall register for all 170 credits and earn all the 170 credits. Marks obtained in all 170 credits shall be considered for the award of the class basing on CGPA.

iv. A student who fails to earn 170 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.

v. 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 classwork 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.

10. 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.

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

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

Grades conversion and Grade points attached

% of Marks obtained	Grade	Description of Grade	Grade Points (GP)
≥ 95	O+	Extraordinary	10
≥ 90 & < 95	O	Outstanding	9
≥ 80 & < 90	A+	Excellent	8
≥ 70 & < 80	A	Very Good	7
≥ 60 & < 70	B	Good	6
≥ 50 & < 60	C	Fair	5
≥ 40 & < 50	D	Pass	4
Less than 40	F	Fail	0
Not Appeared	N	Absent	0

- **Pass Marks:** A student is declared to have passed theory and/ or laboratory subject, if he secures minimum of 40% marks in external examination, and a minimum of 40% marks in the sum total of internal evaluation and external examination taken together. Otherwise he will be awarded fail grade - **F** in such a course irrespective of internal marks.

  F is considered as a fail grade indicating that the student has to pass the semester-end examination in that course in future and obtain a grade other than **F** and **N** for clearing this subject.

11.2. Grade Point Average (GPA):

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

$$GPA = \frac{\sum(C \times GP)}{\sum C}$$

where ***C*** denotes the credits assigned to the courses undertaken in that Year/ semester and ***GP*** denotes the grade points earned by the student in the respective courses.

Note:GPA is calculated for the candidates who passed all the courses in that Year/Semester.

11.3. Cumulative Grade Point Average (CGPA):

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

$$CGPA = \frac{\sum(C \times GP)}{\sum C}$$

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

Note: The CGPA is awarded only when the student passes in all the courses prescribed for the programme.

Grade Sheet: A grade sheet (Marks Memorandum) will be issued to each student indicating his performance in all courses registered in that semester/year indicating the GPA.

12. 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. Duplicate 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.

13. Award of Degree: The Degree will be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Anantapur on the recommendations of the Principal of SVEC (Autonomous).

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

- Registered and successfully completed all the components prescribed in the 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 CGPA greater than or equal to 4.0 (Minimum requirement for declaring as passed).
- Has no dues to the College, Hostel, Library etc. and to any other amenities provided by the College.
- No disciplinary action is pending against him.

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

Cumulative Grade Point Average	Class
> = 7.0	First Class with Distinction
> = 6.0 and < 7.0	First Class
> = 5.0 and < 6.0	Second Class
> = 4.0 and < 5.0	Pass Class

14. Additional academic regulations:

i. A student can appear for any number of supplementary examinations till he clears all courses in which he could not clear in the first attempt.

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

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

iv. A transcript containing the performance in all the components required for eligibility for award of the Degree will be issued to the student.

v. Any attempt to impress upon the examiners, faculty and staff or Controller of Examinations, canvassing in any form either for marks or attendance will be treated as malpractice and the student shall be summarily debarred from the College.

vi. Courses like Projects / Mini-Projects / Seminars can be repeated only by re-registering for all the components in that semester.

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

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

15. Amendments to regulations:

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

16. 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.***

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

COURSE STRUCTURE (2010-2011)

I Year B.Tech. (yearly pattern)

Common to ECE, EEE, EIE, E Con E , CSE, CSSE and IT

Code	Subject	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
10BT1HS01	Technical English	2	-	-	4	30	70	100
10BT1BS01	Engineering Physics	2	1	-	4	30	70	100
10BT1BS02	Engineering Chemistry	2	1	-	4	30	70	100
10BT1BS03	Engineering Mathematics	3	1	-	6	30	70	100
10BT1BS04	Mathematical Methods	3	1	-	6	30	70	100
10BT1EC01	Problem Solving and Computer programming	3	1	-	6	30	70	100
10BT1EC02	Engineering Drawing	-	1	3	4	25	50	75
10BT1EC03	Computer programming Lab	-	-	3	4	25	50	75
10BT1BS06	Engineering Physics and Engineering Chemistry Lab	-	-	3	4	25	50	75
10BT1HS02	English Language and Communication skills Lab	-	-	3	4	25	50	75
10BT1EC04	Engineering and IT workshop	-	-	3	4	25	50	75
	TOTAL	**15**	**6**	**15**	**50**	**305**	**670**	**975**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

Sree Sainath Nagar, A. Rangampet – 517 102

COURSE STRUCTURE

DEPARTMENT OF ELECTRONICS AND COMMUNICATON ENGINEERING

II B.Tech I Semester

Code	Subject	Periods per weeks			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
10BT3BS03	Special Functions and Complex Analysis	4	1	-	4	30	70	100
10BT30401	Semiconductor Devices and Circuits	4	1	-	4	30	70	100
10BT30223	Circuit Theory	4	1	-	4	30	70	100
10BT3BS02	Environmental Sciences	4	1	-	4	30	70	100
10BT30402	Probability Theory and Stochastic Processes	4	1	-	4	30	70	100
10BT30403	Signals and Systems	4	1	-	4	30	70	100
10BT30411	Semiconductor Devices and Circuits Lab	-	-	3	2	25	50	75
10BT30412	Simulation Lab	-	-	3	2	25	50	75
	Total	**24**	**6**	**6**	**28**	**230**	**520**	**750**

II B.Tech II Semester

Code	Subject	Periods per weeks			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
10BT40401	Electronic Circuit Analysis	4	-	-	4	30	70	100
10BT41301	Control Systems	4	1	-	4	30	70	100
10BT40402	Pulse and Digital Circuits	4	-	-	4	30	70	100
10BT40403	Electromagnetic Waves and Transmission Lines	4	1	-	4	30	70	100
10BT40404	Switching Theory and Logic Design	4	-	-	4	30	70	100
10BT40221	Principles of Electrical Engineering	4	1	-	4	30	70	100
10BT40411	Electronic Circuits Lab	-	-	3	2	25	50	75
10BT40231	Electrical Engineering Lab	-	-	3	2	25	50	75
10BT4HS02	Advanced English Communication Skills (Audit Course)	-	3	-	-	-	-	-
	Total	**24**	**6**	**6**	**28**	**230**	**520**	**750**

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COURSE STRUCTURE

DEPARTMENT OF ELECTRONICS AND COMMUNICATON ENGINEERING

III B.Tech I Semester

Code	Subject	Periods per weeks			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
10BT40501	Computer Architecture and Organization	4	1	-	4	30	70	100
10BT50401	Analog Communications	4	1	-	4	30	70	100
10BT50402	Antennas and Wave Propagation	4	1	-	4	30	70	100
10BT50403	Linear IC Applications	4	1	-	4	30	70	100
10BT50404	Digital IC Applications	4	1	-	4	30	70	100
10BT4HS01	Managerial Economics and Principles of Accountancy	4	1	-	4	30	70	100
10BT50411	Analog Communications Lab	-	-	3	2	25	50	75
10BT50412	Pulse and Digital Circuits Lab	-	-	3	2	25	50	75
	Total	**24**	**6**	**6**	**28**	**230**	**520**	**750**

III B.Tech II Semester

Code	Subject	Periods per weeks			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
10BT6HS01	Management Science	4	-	-	4	30	70	100
10BT60401	Digital Signal Processing	4	1	-	4	30	70	100
10BT60402	Digital Communications	4	-	-	4	30	70	100
10BT60403	Microwave Engineering	4	1	-	4	30	70	100
10BT60404	Microprocessors and Microcontrollers	4	1	-	4	30	70	100
10BT60405	VLSI Design	4	-	-	4	30	70	100
10BT60411	Microprocessors and Microcontrollers Lab	-	-	3	2	25	50	75
10BT60412	IC Applications and ECAD Lab.	-	-	3	2	25	50	75
10BT60413	Seminar	-	-	3	2	75	-	75
	Total	**24**	**3**	**9**	**30**	**305**	**520**	**825**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

Sree Sainath Nagar, A. Rangampet – 517 102

COURSE STRUCTURE

DEPARTMENT OF ELECTRONICS AND COMMUNICATON ENGINEERING

IV B.Tech I Semester

Code	Subject	Periods per weeks			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
10BT70401	Electronic Measurements and Instrumentation	4	1	-	4	30	70	100
10BT61202	Computer Networks	4	1	-	4	30	70	100
10BT40502	Object Oriented Programming	4	1	-	4	30	70	100
10BT70402	Digital Image Processing	4	1	-	4	30	70	100
Elective-I								
10BT70403	Spread Spectrum Communications	4	-	-	4	30	70	100
10BT70404	Telecommunication Switching Systems							
10BT70405	Embedded and real time Systems							
10BT70406	DSP Processors and Architecture							
Elective-II								
10BT70407	Optical Communications	4	-	-	4	30	70	100
10BT50504	Operating Systems							
10BT70408	Radar Systems							
10BT70409	Digital Design Through Verilog							
10BT70411	Digital Communications and Microwaves Lab	-	-	3	2	25	50	75
10BT70412	Digital Signal Processing Lab	-	-	3	2	25	50	75
10BT70413	Mini-Project	-	-	-	2	25	50	75
10BT7HS01	Professional Ethics (Audit Course)	-	2	-	-	-	-	-
	Total	**24**	**6**	**6**	**30**	**255**	**570**	**825**

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

Sree Sainath Nagar, A. Rangampet – 517 102

COURSE STRUCTURE

DEPARTMENT OF ELECTRONICS AND COMMUNICATON ENGINEERING

IV B.Tech II Semester

Code	Subject	Periods per weeks			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
10BT80401	Cellular and Mobile Communications	4	1	-	4	30	70	100
Elective-III								
10BT80402	Wireless Communications & Networks	4	-	-	4	30	70	100
10BT71204	Cryptography and Network Security							
10BT80403	Television Engineering							
10BT80404	Advanced Digital Signal Processing							
Elective-IV								
10BT80405	Low Power VLSI Design	4	-	-	4	30	70	100
10BT80406	Satellite Communications							
10BT61002	Biomedical Instrumentation							
10BT71301	Neural Networks and Fuzzy Systems							
10BT80411	Comprehensive Viva-Voce	-	-	-	2	100	-	100
10BT80412	Project Work	-	-	12	12	75	150	225
	Total	**12**	**1**	**12**	**26**	**265**	**360**	**625**

Total Credits: 220
Total Marks: 5500

B.Tech I Year

10BT1HS01: TECHNICAL ENGLISH

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, E Con E, EEE, EIE and IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
2	-	-	4

PREREQUISITE: Basic Grammar and Fundamentals of Writing Skills.

COURSE DESCRIPTION: Heaven's Gate and Mokshagundam Visvesvaraya; Sir C.V.Raman and Mother Teresa; The Connoisseur and Dr. Amartya Kumar Sen; The Cuddalore Experience and Kalpana Chawla; Bubbling Well Road and Nandan Nilekani; The Odds Against us and Charles Chaplin; Exercises on Reading and writing skills and Remedial Grammar.

COURSE OUTCOMES: After completion of the course, a successful student will be able to**:**

1. Acquire fundamental and functional knowledge of English Language, Grammar and Communication Skills.

2. Analyze and judge the situation through productive skills (speaking and writing) and receptive skills (listening and reading) of English Language for effective communication and practice.

3. Communicate effectively with the engineering community and society to deliver effective solutions for professional practice.

Detailed Syllabus:

UNIT – I:

Lesson entitled **Heaven's Gate** from **Enjoying EverydayEnglish,** Published by Sangam Books, Hyderabad.
Lesson entitled **Mokshagundam Visvesvaraya** from **Inspiring Lives,** Published by Maruthi Publications, Guntur.

UNIT – II:

Lesson entitled **Sir CV Raman: a Path breaker in the Saga of Indian Science** from **Enjoying Everyday English,** Published by Sangam Books, Hyderabad.
Lesson entitled **Mother Teresa** from **Inspiring Lives,** Publishedby Maruthi Publications, Guntur.

UNIT – III:

Lesson entitled **The Connoisseur** from **Enjoying Everyday English,** Published by Sangam Books, Hyderabad
Lesson entitled **Dr. Amartya Kumar** Sen from **Inspiring Lives,** Published by Maruthi Publications, Guntur

UNIT – IV:
Lesson entitled **The Cuddalore Experience** from **Enjoying Everyday English,** Published by Sangam Books, Hyderabad
Lesson entitled Kalpana Chawla from Internet

UNIT – V:
Lesson entitled **Bubbling Well Road** from **Enjoying Everyday English,** Published by Sangam Books, Hyderabad
Lesson entitled **Nandan Nilekani** from Internet.

UNIT – VI:
Lesson entitled **The Odds against** Us from E**njoying Everyday English,** Published by Sangam Books, Hyderabad
Lesson en tit led **Charles Chaplin** from **Inspiring Lives,** Published by Maruthi Publications, Guntur
Exercises from the lessons not prescribed shall also be used for classroom tasks.

UNIT – VII:
Exercises on Reading and Writing Skills :
Reading Comprehension
Letter writing
Essay writing

UNIT – VIII:
Practice Exercises on Remedial Grammar :
Common errors in English
Subject-Verb agreement
Articles
Prepositions
Tenses
Active/Passive Voice
Reported Speech

TEXT BOOKS:
1. **Detailed study :** Enjoying Everyday English, Sangam Books, 2009.
2. **Non-detailed study :** Inspiring Lives, Maruthi Publications, 2009.

REFERENCE BOOKS:
1. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books
2. English Grammar Practice, Raj N Bakshi, Orient Longman, 2005
3. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, and P Sreehari, Published by Pearson.

4. Handbook of English Grammar & Usage, Mark Lester and Larry Beason, Tata Mc Graw-Hill, 2008.
5. Spoken English, R.K. Bansal & JB Harrison, Orient Longman, 1989
6. Technical Communication, Meenakshi Raman and Sangeetha Sharma, Oxford University Press, 2009.
7. Objective English, Edgar Thorpe & Showick Thorpe, Pearson Education, 2009.
8. Grammar Games, Renuvolcuri Mario, Cambridge University Press, 2008.
9. Murphy's English Grammar with CD, Murphy, Cambridge University Press, 2004.
10. Everyday Dialogues in English, Robert J. Dixson, Prentice Hall India Pvt. Ltd., 2005.
11. ABC of Common Errors, Nigel D Turton, Mac Millan Publishers
12. Effective Technical Communication, M Ashraf Rizvi, Tata McGraw-Hill, 2009.
13. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO.
14. A Communicative Grammar of English, Geoffrey Leech, Jan Svartvik, Pearson Education, 2003
15. Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt. Ltd.
16. A Grammar Book for You And I, C. Edward Good, MacMillan Publishers, 2008.
17. Learning English A Communicative Approach, Orient Longman, 2005.

B.Tech I Year

10BT1BS01: **ENGINEERING PHYSICS**

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
2	1	-	4

PREREQUISITE: Intermediate/Senior Secondary Physics

COURSE DESCRIPTION: Crystallography; principles of quantum mechanics; band theory of solids; semiconductors, properties; applications of magnetic materials; dielectric materials; acoustics of buildings; superconductors; different lasers; optical fibers ; holograms; nano materials.

COURSE OUTCOMES: After completion of the course, a successful student will be able to**:**

1. Acquire basic knowledge of crystallography, quantum mechanics, semiconductors, magnetic materials, dielectrics, acoustics, superconductors, lasers, optical fibers, holography, and nanomaterials.

2. Develop skills in designing of lasers, fiber optic cable, holograms, acoustically good hall, semiconductor devices and nanomaterials.

3. Develop problem solving skills in engineering context

Detailed Syllabus:

UNIT – I:

Crystal Structures and X-Ray Diffraction : Introduction, space lattice, basis, unit cell, lattice parameter, Bravais lattices, crystal systems, structure of simple cubic, body centered cubic, face centered cubic crystals, Miller indices of planes and directions in crystals, separation between successive (hkl) planes.

Crystal Defects: Point defects, line defects, Burger's vector, X-ray diffraction by crystal planes, Bragg's law, Laue and powder methods.

UNIT – II:

Principles of Quantum Mechanics: Waves and particles, de-Broglie's hypothesis, G.P.Thomson experiment, He Isenberg's uncertainty principle, significance of wave function, Schrödinger's one dimensional wave equation (time independent), particle in a one dimensional potential box, Fermi-Dirac distribution and effect of temperature (qualitative treatment only), scattering-source of electrical resistance.

Band Theory of Solids: Electron in a periodic potential, Kronig-Penney model (qualitative treatment only), origin of energy band formation in solids, distinction between metals, semiconductors and

insulators based on band theory.

UNIT – III:

Semiconductors : Introduction, intrinsic and extrinsic semiconductors, carrier concentration, electrical conductivity in semiconductors, drift and diffusion, Einstein's relation, Hall effect, direct and indirect band gap semiconductors, p-n junction, energy diagram of p-n diode, diode equation, LED, LCD and photo diode.

UNIT – IV:

Magnetic Properties: Introduction, origin of magnetic moment, classification of magnetic materials into dia, para, ferro, anti-ferro and ferri magnetism, hysteresis, soft and hard magnetic materials, magnetic bubbles memory.

Dielectric Properties: Introduction, dielectric constant, electronic, ionic and orientation polarizations (qualitative treatment only), local field , Clausius-Mossotti equation, frequency dependence of polarisability (qualitative treatment only), ferro and piezo electricity.

UNIT – V:

Acoustics of Buildings and Acoustic Quieting: Basic requirement of acoustically good hall, reverberation and time of reverberation, Sabine's formula for reverberation time (qualitative treatment), easurement of absorption coefficient of a material, factors affecting the architectural acoustics and their remedies.

Acoustic Quieting: Aspects of acoustic quieting, methods of quieting, quieting for specific observers, mufflers and sound proofing.

UNIT – VI:

Superconductivity: General properties, Meissner effect, penetration depth, Type-I and Type-II superconductors, flux quantization, Josephson effects, BCS theory, applications of superconductors.

Lasers: Introduction, characteristics of laser, spontaneous and stimulated emission of radiation, Einstein's coefficients, population inversion, ruby laser, Helium-Ne on laser, semiconductor laser, applications of lasers in industry, scientific and medical fields.

UNIT – VII:

Fiber Optics: Introduction, principle of optical fiber, acceptance angle and acceptance cone, numerical aperture, types of optical fibers and refractive index profiles, optical fiber communication systems, application of optical fibers.

Holography: Introduction, construction of a hologram, reconstruction of image from hologram and applications.

UNIT – VIII:

Nanomaterials: Introduction, basic principles of nanomaterials, preparation of nanomaterials, ball milling, plasma arching, chemical vapour deposit ion method, sol-gel method , fabrication of nanomaterials, properties of nanomaterials, carbon nanotubes, properties and applications of carbon nanotubes, applications of nanomaterials.

TEXT BOOKS:

1. Applied Physics, S. Mani Naidu, Pearson Education, 1st Edition.
2. Engineering Physics, P.K. Palaniswamy, Scitech Publications India Private Limited, 2009.
3. Engineering Physics, M.R. Srinivasan, New Age Publications International (P) Limited, 1st Edition.

REFERENCE BOOKS:

1. Applied Physics, S.O. Pillai and Sivakami, New Age International (P) Ltd., 2nd Edition.
2. Introduction to Nanoscience and Nano technology , K .K. Chatopadhyaya and A.N. Benarjee, Prentice Hall of India, 1st Edition.
3. Introduction to Solid State Physics, C. Kittel, John Wiley & Sons, Inc., 7th Edition.
4. Solid State Physics, A.J. Dekker, Macmillan India Limited, 1996
5. Engineering Physics, V. Rajendran an d K. T hyagarajan, TataMcGraw Hill Education, 2010.

B.Tech I Year

10BT1BS02: **ENGINEERING CHEMISTRY**

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
2	1	-	4

PREREQUISITE: Intermediate/Senior Secondary Chemistry.

COURSE DESCRIPTION: Chemistry of Engineering materials; Polymer science and technology; Electrochemistry; Corrosion and its control; Surface chemistry; Chemistry of nanomaterials; Analytical techniques and Water technology.

COURSE OUTCOMES: After completion of the course, a successful student will be able to**:**

1. Acquire basic knowledge in chemistry of Engineering materials, Polymer science and technology, Electro chemistry, Corrosion and its control, Surface chemistry , Chemistry of nanomaterials, Analytical techniques and Water technology.

2. **Develop analytical skills in:**

a. Determination of hardness of water.

b. Determination of viscosity, flame and fire points, cloud and pour points.

3. **Develop skills in design of:**

a. Methods for control of corrosion

b. Chemical methods for the synthesis of Nanomaterials.

c. Analysis of the structure of compounds using various Analytical techniques.

4. **Develop skills for providing solutions through:**

a. Newer Nanomaterials for specific applications

b. Mitigation of hardness of water

5. **Acquire awareness to societal issues on:**

a. Quality of water.

b. Chemical materials utility and their impact.

c. Phenomenon of corrosion.

Detailed Syllabus:

UNIT – I:

Chemistry of Engineering Materials:

Lubricants: Definition, functions of lubricants, mechanism of lubrication, classification of lubricants, properties of lubricant s-viscosity, flash and fire points, cloud and pour points, Aniline point, neutralization number and mechanical strength.

Liquid Crystals: Definition, structure, classification and engineering applications of liquid crystals.

Insulators: Definition, classification, characteristics of insulating material and their engineering applications.

UNIT – II:

Polymer Science and Technology: Introduction, classification of polymers, functionality, polymerization and types of polymerization, plastics-thermoplastics, thermo settings, composition, preparation and engineering applications of PVC, Teflon and Bakelite.

Rubber: Vulcanization of rubber.

Elastomers: BUNA-N, BUNA-S and polyurethane.

Conducting Polymers: Definition, classification and engineering applications.

UNIT – III:

Electrochemistry: Introduction, conductivity, equivalent conductivity and molar conductivity. Redox reactions, electrode potential and measurement of elect rode potential (Nernst equation). Electrochemical series, electrochemical cell and measurement of EMF of electrochemical cell. Concentration cell, **Reference Electrodes:** hydrogen and calomel electrodes. **Batteries:** Introduction, Ni-Cd batteries, Lithium batteries. **Fuel cells:** Introduction, Hydrogen-Oxygen fuel cell, Methanol-Oxygen fuel cell.

UNIT – IV:

Corrosion and its Control: Introduction, definition, types of corrosion; dry corrosion, wet corrosion, concentration cell corrosion, galvanic series, galvanic corrosion , pitting corrosion , factors influencing the corrosion. Control of corrosion; cathodic protection, sacrificial anodic protection, impressed current cathodic protection, uses of inhibitors, electroplating and electroless plating**.**

UNIT – V:

Surface Chemistry: Adsorption, types of adsorption, adsorption of gases on solids, adsorption from solutions, applications of adsorption, Langmuir theory of adsorption. Colloids, types of colloidal systems, applications of colloids. Emulsions and micelles.

UNIT – VI:

Chemistry of Nanomaterials: Introduction to nanochemistry, classification of nanomaterials, size and scale, units, scaling laws, properties of nanomaterials, methods of synthesis - top down and bottom up methods, sol-gel process, plasma enhanced vapor decomposition process, applications of nanomaterials.

UNIT – VII:

Analytical Techniques: Introduction to spectroscopy.

U.V.Visible Spectroscopy: Basic principle, origin of absorption bands, chromophores and their absorption values.

I.R. Spectroscopy: Principle, modes of vibration, group frequencies.

NMR Spectroscopy: Principle, shielding and deshilding of protons, chemical shift and applications of NMR spectroscopy.

Atomic Absorption Spectroscopy: Principle and applications.

Flame photometry: Principle and applications.

UNIT – VIII:

Water Technology: Introduction, sources of water, types of impurities in water, hardness of water- temporary and permanent hardness, u nits of hardness, disadvantages of hard water. Estimation of hardness by EDTA method, boiler troubles.

Softening methods: Internal treatment, external treatment; zeolite process, ion exchange process, desalination of brackish water - reverse osmosis.

TEXT BOOKS:

1. A Text Book of Engineering Chemistry, Jain and Jain, Dhanpat Rai Publishing Company, 15th Edition.
2. Engineering Chemistry, K.N. Jayaveera, G.V.Subba Reddy and C.Ramachandraiah, Tata McGraw Hill Education, 1st Edition.
3. A Text Book of engineering Chemistry, Shashi Chawla, Dhanpat Rai Publishing Company, 15th Edition.

REFERENCE BOOKS:

A Text Book of Engineering Chemistry, S.S.Dara, S.Chand and Co., 10th Edition.

2. Engineering Chemistry (Vol 1&2), J.C.Kuriacose and Rajaram, Tata McGraw Hill, 2nd Edition.
3. Chemistry of Engineering Materials, C.V. Agarval, Tara Publication, 15th Edition.
4. Nanomaterials, A.K.Bandyopadhyay, New Age International publishers, 2nd Edition.
5. Hand book of Nanostructured Materials and Nanotechnology, H.S. Nalwa, Volumes - (I to V), Academic press, 2001.

B.Tech I Year

10BT1BS03: **ENGINEERING MATHEMATICS**

(Common to CIVIL, ME, CSE, CSSE, ECE, EConE, EEE ,EIE and IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	6

PREREQUISITE: Intermediate/ senior secondary Mathematics.

COURSE DESCRIPTION: Differential equations of first and higher order; Partial differentiation; Applications of derivatives, integrals; Laplace transforms; fundamentals of vector calculus.

COURSE OUTCOMES: After completion of the course, a successful student will be able to**:**

1. Acquire knowledge in

a) Different types of higher order differential equations.

b) Finding maxima and minima values of functions of several variables with constrains.

c) Finding center, radius, and circle of curvatures for different curves.

d) Solving differential equations through Laplace transforms.

e) Differentiation and integration of vector functions.

2. Develop analytical skills in providing solutions for

a) Higher order differential equations.

b) Work done, Flux , linear, surface and volume integrals vector methods.

c) Line, surface and volume integrals.

d) Length of curve, area of surface and volume of solids of revolution

e) Problems involving LRC oscillatory circuits, deflection of beams,

f) Problems involving maxima and minima for functions of two variables with constraints.

g) Circle of curvature, evolutes and envelopes for families of curves.

h) Differential equations using Laplace transform.

3. Design mathematical model equations which involve

a) LRC circuits.

b) Deflection of beams.

c) Newton's laws of cooling and heat transfer

Detailed Syllabus:

UNIT – I:

First Order Differential Equations: Ordinary differential equations of first order and first degree: Linear and Bernoulli type equations, exact equations and reducible to exact. Applications of first order equations to orthogonal trajectories (both Cartesian and polar forms), law of natural growth and decay, Newton's law of cooling.

UNIT – II:

Higher Order Differential Equations: Non-homogeneous linear differential equations of second and higher order with constant coefficient s. Methods of finding the particular integrals for Q(x)=e ax, sin ax, cos ax, xn, e ax V(x), x V(x) and xnV(x). Method of variation of parameters. Applications to L-R-C circuits, deflection of beams.

UNIT – III:

Partial Differentiation : Functions of two or more variables, homogeneous functions, total derivatives, derivatives of implicit function, jacobian, errors and approximations, maxima and minima of functions of two variables with and without constraints, Lagrange's method of undetermined multipliers.

UNIT – IV:

Applications of Derivatives : Radius, centre and circle of curvature, evolutes and envelopes. Tracing of curves in cartesian, parametric and polar forms.

UNIT – V:

Laplace Transformations: Laplace transforms of standard functions. Properties of LTs, first and second shifting theorems, LTs of derivatives and integrals, LTs of periodic functions. Unit step function, dirac delta function. Inverse transforms and convolution theorem.

UNIT – VI:

Applications of Laplace Transformations : Applications of LTs to ordinary differential equations of first and second order, Heaviside's partial fraction expansion theorem.

UNIT – VII:

Applications of Integration: Applications of integration to lengths of curves, areas of surfaces and volumes of solids and to surfaces and solids of revolutions. Double and Triple integrals - change of variables, change of order of integration and volume as double integral.

UNIT – VIII:

Vector Calculus : Vector differentiation, tangent and normal to curves, gradient, divergence, curl and vector identities. Laplacian operator, vector integration. Line integrals independent of path, work done, conservative field and scalar potential functions. Surface integrals, flux and volume integrals, verifications and applications of vector integral theorems: Greens theorem, Stokes theorem and Gauss divergence theorem (without proof).

TEXT BOOKS:

1. Engineering Mathematics volume-1, T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N. Prasad, S. Chand and Company, 9th Edition.

REFERENCE BOOKS:

1. Higher engineering mathematics, B.S.Grewal, Khanna publishers, 36th Edition.
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & sons, Inc. 8th Edition.
3. Engineering Mathematics for JNTU, B.V.Ramana, Tata McGraw Hill, 3rd Edition.

B.Tech I Year

10BT1BS04: MATHEMATICAL METHODS

(Common to CSE, CSSE, ECE, EConE, EEE, EIE and IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	6

PREREQUISITE: Intermediate/ senior secondary Mathematics.

COURSE DESCRIPTION: Matrices and systems of linear equations; Eigen values, Eigen vectors; Solutions for algebraic and transcendental equations; interpolation; Numerical differentiation and integration; Numerical solutions of differential equations; Z - transforms; Fourier series and Fourier transforms.

COURSE OUTCOMES: After completion of the course, a successful student will be able to**:**

1. **Acquire knowledge in**

a. Ranks of matrices and linear equations.

b. Eigen values and Eigen vectors of matrices.

c. Algebraic and transcendental equations numerically.

d. Interpolating the data.

e. Numerical differentiation and numerical integration.

f. Numerical solutions of differential equations.

g. Z. transforms, Fourier series and Fourier transforms.

2. **Design mathematical equations and arrive at the numerical solutions to the problems involving**

a. Fitting of different types of curves to the given data.

b. Estimation of missing numerical values in the given data.

c. Integration of higher complexity

d. Differential equations.

3. **Develop skills in solving engineering problems involving**

a. Linear equations with higher complexity.

b. Complex Eigen values and Eigen vectors.

c. Algebraic and transcendental equations.

d. Interpolating polynomials.

e. Differentiation and integration of functions.

f. Differential equations of higher complexity through numerical values

g. Z-transforms, Fourier series and Fourier transforms.

Detailed Syllabus:

UNIT – I:

Matrices and Linear System of Equations : Rank of a matrix, echelon form, normal form, inverse of a matrix by normal form. Homogenous and non-homogenous linear systems, consistency and solutions of linear system of equations. Direct methods, Gauss elimination method, Gauss Siedel, Gauss Jordan method, factorization method.

UNIT – II:

Eigen Values and Eigen Vectors : Definitions, evaluation of eigen values, eigen vectors and properties. Cayley Hamilton theorem (without proof), inverse and powers of a matrix by Cayley Hamilton theorem, diagonalization of a matrix, quadratic forms and reduction to its normal form (problems dealing with distinct eigen values only).

UNIT – III:

Algebraic, Transcendental Equations and Curve Fitting: Solutions of algebraic and transcendental equations by bisection method, false position method, Newton-Raphson's method, iterative method.Curve fitting by the principle of least squares, fitting of a straight line, parabola, exponential and power curves.

UNIT – IV:

Interpolation: Interpolation, forward difference operator, backward difference operator, central difference operator, relationship between operators, Newton's forward formula, Newton's backward formula, Gauss forward formula, Gauss backward formula, Lagrange's interpolation formula.

UNIT – V:

Numerical Differentiation and Integration: Numerical values of derivatives using Newton's forward formula, Newton's backward formula.

Numerical Integration: Trapezoidal rule, Simpsons 1/3 rule, Simpsons 3/8 rule

UNIT – VI:

Numerical Solutions of Ordinary Differential Equations: Numerical solutions of ordinary differential equations using Taylor series, Euler's method, modified Euler's method, Runge-Kutta method (2nd and 4thorders only), Milne's predictor corrector method.

UNIT – VII:

Z - Transformations: Z -transforms, inverse Z-transform, properties, damping rule, shifting rule, initial and final value theorems. Convolution theorem, solution of difference equations by Z-transforms.

UNIT – VIII:

Fourier Series and Fourier Transforms: Definition, Dirichlets conditions, determination of Fourier coefficients (Euler's formulae), even and od d function , half-rang e Fourier sine an d cosine expansions. Fourier integral theorem (statement only), Fourier sine and cosine integrals, Fourier sine and cosine transforms, properties, inverse transform, finite Fourier transforms.

TEXT BOOK:

1. Mathematical Methods, T. K.V. Iyenger, B. Krishna Gandhi, S.Ranganadham and M.V.S.S.N. Prasad, S.Chand and Company, 5th edition.

REFERENCE BOOKS:

1. Higher engineering mathematics, B.S.Grewal, Khanna publishers, 36th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley and Sons, Inc., 8th Edition
3. Introductory methods of Numerical Analysis , S.S.Sastry, Prentice Hall of India, 3rd Edition
4. Engineering Mathematics for JNTU, B.V.Ramana, Tata McGraw Hill, 3rd Edition.

B.Tech I Year

10BT1EC01: PROBLEM SOLVIN G AND COMPUTER PROGRAMMING

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	6

PREREQUISITE: Logical thinking and Aptitude.

COURSE DESCRIPTION: Algorithm, Flowchart; Top-down design concepts; Types of operators, Structure of C program; Control statements; Searching and Sorting, String manipulation functions; Structures, Unions; Pointer arithmetic; Operations on Files, Overview of data structures.

COURSE OUTCOMES: After completion of the course, a successful student will be able to**:**

1. Gain knowledge on developing algorithms and problem solving techniques.
2. Analyze and develop programs using the basic elements like control statements, arrays, functions and strings.
3. Develop C Programs for software applications.
4. Skills to solve problems using pointers and strings.
5. Implement the concepts of data structures like stacks, queues and linked lists for solving real time problem

Detailed Syllabus:

UNIT – I:

Introduction to Computers: Computer system s, computer hardware, computer software, computing environments, computer languages, writing, editing, compiling and linking programs, program execution, algorithm and flowchart.

Introduction to Problem Solving: The problem solving aspect, top-down design, implementation of algorithms, program verification and efficiency of algorithms.

UNIT – II:

Introduction to the C Language: C programs, identifiers, types, variables, types of operators, constants, coding constants, type casting and conversion, formatted input and output. Structure of a C program - expressions, precedence and associativity, evaluation of expressions, mixed type expressions.

UNIT – III:
Selection - Making Decisions: Two way selection: if, if-else and nested if-else.
Multi-way selection: else-if ladder and switch statements.
Repetition : concept of loop, pre-test an d post -test loops, initialization and updating, event and counter controlled loops, loops in C, break, continue and goto statements.

UNIT – IV:
Fundamental Algorithms: Exchanging the values of two variables, counting, summation of a set of numbers, factorial computation, generation of the Fibonacci sequence, reversing the digits of an integer, number base conversion, character to number conversion, the smallest divisor of an integer, greatest common divisor of two integers and generating prime numbers.

UNIT – V:
Arrays: Arrays in C, one, two and multidimensional arrays, linear search, binary search, bubble sort, selection sort and insertion sort.
Strings: Concepts, strings in C, string input/output functions, array of strings and string manipulation functions.

UNIT – VI:
Functions: Designing structured programs, functions in C, user-defined functions, types of functions, call by value and call by reference, recursion, factorial using recursion, standard library functions, scope, storage classes and preprocessor directives.
Derived Types: Type definition (typedef), enumerated types, structure , accessing structures,
Complex Structures: Nested structures, structures containing arrays, array of structures.
Structures and Functions: Sending individual members, sending the whole structure, unions and bit fields.

UNIT – VII:
Pointers: Concepts, pointer variables, accessing variables through pointers, pointer declaration and definition, initialization, pointer arithmetic, array of pointers, pointers to array s, pointer s and functions, pointers to pointers, pointers to structures and memory allocation functions.

UNIT – VIII:
Files :introduction and classification of files, opening and closing of files, read and write operations, conversion of files and command line arguments.

Basic Data Structures: Overview of data structures, implementation of stack operations (push, pop), implementation of linear queue operations (insertion, deletion), circular queues, singly linked list, doubly linked list and circular linked list.

TEXT BOOKS:

1. A Structured Programming Approach using C, Behrouz A. Forouzan and Richard F. Gilberg, Cengage Learning, 2nd Edition.
2. How to Solve it by Computer, R.G. Dromey, Pearson Education, 1st Edition.

REFERENCE BOOKS:

1. Classic Data Structures, D. Samanta, Prentice Hall of India rivate Limited, 2004.
2. C and Data Structures, P. S. Deshpande and O. G. Kakde, ILEY-dreamtech India Pvt. Ltd. 2005.
3. Programming in C, Pradip Dey and Manas Ghosh , Oxford University Press, 2007.
4. C Programming with Problem Solving, Jacqueline A. Jones and Keith Harrow, Dreamtech Press, 2007.

B.Tech I Year

10BT1EC02: **ENGINEERING DRAWING**

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

Int. Marks: 25; Ext. Marks: 50; Total Marks: 75

L	T	P	C
-	1	3	4

PREREQUISITE: Nil

COURSE DESCRIPTION: Essentials of engineering drawing; free hand sketching; geometrical constructions; projection of points; line; planes; solids; development of surfaces; interpenetration of solids; perspective projections; isometric views and projections; orthographic views; introduction to basic AutoCAD commands.

COURSE OUTCOMES: After completion of the course, a successful student will be able to**:**

1. Convey visual perception information regarding relative locations of objects through an orthographic/isometric view.

2. Analyze a drawing and bring out any inconsistencies to put forth inferences graphically.

3. Create feasible designs of simple objects with drawing tools and/or free-hand.

Detailed Syllabus:

UNIT – I:

Scales and Curves :

Scales: Full size, reduced and enlarged scales, representative fraction, plain, diagonal scales, scale of chords.

Curves: Curves used in engineering practice, conic sections-ellipse, parabola and hyperbola, construction-general method only**.**

UNIT – II:

Projections of Points and Lines : Introduction, representation of three dimensional objects, general principles of orthographic projection, importance of multiple views and their placement, first angle and third angle projections, projections of points, two view and three view projections. Projection of lines inclined to one plane, inclined to both the planes, finding true lengths, true inclinations and traces of lines.

UNIT – III:

Projections of Planes and Solids : Projections of regular plane surfaces, planes parallel to one plane, planes inclined to one plane and inclined to both the planes, projections on auxiliary planes. Projections of regular solids (prism, cylinder, pyramid and cone), solids inclined to one plane and both planes, auxiliary views.

UNIT – IV:

Sections of Solids and Development of Surfaces :

Sections of Solids: Section planes and sectional views of right regular solids - prisms, cylinder, pyramids and cone. True shapes of the sections.

Development of surfaces : Right regular solids- prisms, cylinder, Pyramids, cone and their sectional parts.

UNIT – V:

Isometric Projections: Principles of isometric projections, isometric scale, isometric views, conventions. Isometric views of planes, simple solids. Isometric projections of spherical parts. Conversion of isometric views into orthographic views.

UNIT – VI:

Perspective Projections : Perspective view of plane figures and simple solids, vanishing point method and visual ray methods.

UNIT – VII:

Introduction to Computer Aided Drafting : Introduction to AutoCAD, beginning a new drawing, exploring and interacting with the drawing window, saving and opening a file, coordinate systems (Cartesian, polar and relative co-ordinate system) , introduction to draw commands and modify commands, dimension commands, display commands and miscellaneous commands.

UNIT – VIII:

Drafting Of 2D and 3D Figures : Generation of curves, points, lines, polygons, simple solids with dimensioning. Drawing of simple building plans.

TEXT BOOKS:

1. Engineering Drawing, P. Khanniah, K.L. Narayana and K. Venkata Reddy, Radiant Publishing House, 2009.

2. Engineering Drawing, N.D. Bhatt, Charotar Publishing House Private Limited, 2008.

REFERENCE BOOKS:

1. Engineering Drawing, Johle, Tata McGraw Hill, 2009.
2. Engineering Drawing, Shah and R ana, Pearson Education, 2nd Edition.
3. Engineering Drawing and Graphic s, K. Venugopal, New age International Publishers, 5thEdition.
4. Computer Aided Engineering Drawing, Trymbaka Murthy, I.K.International, 1st Edition.
5. AutoCAD, Shyam Tikko, Autodesk Press, 1st Edition.

B.Tech I Year

10BT1EC03: **COMPUTER PROGRAMMING LAB**

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

Int. Marks: 25; Ext. Marks: 50; Total Marks: 75

L	T	P	C
-	-	3	4

PREREQUISITE: --

COURSE DESCRIPTION: This course deals with hands on experience in developing simple programs and implementing basic data structures - stack and queue, searching and sorting in C language. Each exercise is designed to reinforce the theory through practical hands on experience.

COURSE OUTCOMES: After completion of the course, a successful student will be able to**:**

1. Select the appropriate data structure and algorithm design method for a specified problem.
2. Design, code, test, debug, and execute programs in C.
3. Implement and use common features found in C programs -arrays, pointers, strings, stacks and Queues, linked list

Detailed Syllabus:

WEEK– 1:

a. Let a and b are two integer variables whose values are 10 and 13 respectively. Write a program to evaluate the following arithmetic expressions.

i. a + b
ii. a - b
iii. a * b
iv. a / b
v. a % b

b. Write a program that evaluates the following algebraic expressions after reading necessary values from keyword.

i) $(ax + b)/(ax - b)$

ii) $2.5 \log x + \text{Cos } 32^0 + | x^2 + y^2| + \sqrt{2xy}$

iii) $x^5 + 10 x^4 + 8 x^3 + 4 x + 2$

iv) ae^{kt}

WEEK– 2:

a. Mr. Gupta deposited Rs.1000 in a bank. The bank gives simpleinterest at the rate of 15% per annum. Write a program to determine the amount in Mr. Gupta's account at the end of 5 years. (Use the formula I = P T R / 100)

b. A cashier has currency notes of denominations Rs. 10, Rs. 50 and Rs. 100. If the amount to be withdrawn is input in hundreds, find the total number of notes of each denomination the cashier will have to give to the withdrawer.

c. In a town, the percentage of men is 52. The percentage of total literacy is 48. If total percentage of literate men is 35 of the total population, write a program to find the total number of illiterate men and women if the population of the town is 8000.

WEEK– 3:

a. Write a program that prints the given 3 integers in ascending order using if - else.

b. Write a program to calculate commission for the input value of sales amount.

Commission is calculated as per the following rules:

i. Commission is NIL for sales amount Rs. 5000.

ii. Commission is 2% for sales when sales amount is >Rs. 5000 and < = Rs. 10000.

iii. Commission is 5% for sales amount > Rs. 10000.

c. A character is entered through keyboard. Write a program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol. The following table shown the range of ASCII values for various characters.

Characters	**ASCII values**
A - Z	65 - 90
A - z	97 - 122
0 - 9	48 - 57
Special Symbols	0 - 47, 58 - 64, 91 - 96, 123 - 127

WEEK– 4:

a. If cost price and selling price of an item is input through the keyboard, write a program to determine whether the seller has made profit or incurred loss. Also determine how much profit or loss he incurred in percentage.

b. An insurance company calculates premium as follows:

i. If a person's health is excellent and the person is between 25 and 35 years of age and lives in a city and is a male then premium is Rs.4 per thousand and the policy amount cannot exceed Rs.2 lacks.

ii. If a person satisfies all the above conditions and is female then the premium is Rs.3 per thousand and the policy amount cannot exceed Rs. 1 lack.

iii. If a person's health is poor and the person is between 25 and 35 years of age and lives in a village and is a male then premium is Rs.6 per thousand and the policy cannot exceed Rs. 10000

iv. In all other cases the person is not insured.

Write a program to determine whether the person should be insured or not, his/her premium rate and maximum amount for which he/ she can be insured.

WEEK– 5:

a. Write a program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*,/,%, use switch statement)

b. Write a program to find the grace marks for a student using switch. The user should enter the class obtained by the student and the number of subjects he has failed in. Use the following rules:

i. If the student gets first class and the number of subjects failed in is >3, then no grace marks are awarded.. If the number of subjects failed in is < or = 3 then the grace is 5 marks per subject.

ii. If the student gets second class and the number of subjects failed in is >2, then no grace marks are awarded. If the number of subjects failed in is < or = 2 then the grace is 4 marks per subject.

iii. If the student gets third class and the number of subjects failed in is >1, then no grace marks are awarded. If the number of subjects failed in is = 1 then the grace is 5 marks per subjects.

WEEK– 6:

a. Write a program to find the sum of individual digits of a positive integer.

b. A Fibonacci sequence is defined as follows: The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.

Write a program to generate the first N terms of the sequence.

c. Write a program to generate all the prime numbers between 1 and N, where N is a value supplied by the user.

WEEK– 7:

a. Write a program to calculate the following sum:

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

b. i) A perfect number is a number that is the sum of all its divisors except itself. Six is the perfect number. The only numbers that divide 6 evenly are 1, 2, 3 and 6 (i.e., 1+2+3=6).

ii) An abundant number is one that is less than the sum of its divisors (Ex: 12<1+2+3+4+6).

iii) A Deficient number is one that is greater than the sum of its divisors (Ex: 9>1+3).

Write a program to classify N integers (Read N from keyboard each as perfect, abundant or deficient.

WEEK– 8:

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

b. Write a program to perform the following:

i. Addition of two matrices.

ii. Multiplication of two matrices.

WEEK– 9:

a. Write a program to perform the following:

i) Linear search ii) Binary search

WEEK– 10:

a. Write a program to perform the following:

i) Bubble sort ii) Selection sort iii) Insertion sort

WEEK– 11:

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

i. To insert a sub-string in main string at a specified position.

ii. To delete N characters from a given string from a specified position.

b. Write a program to determine whether the given string is palindrome or not.

WEEK– 12:

a. Write a program to display the position or index in the main string S where the sub string T begins. Display - 1 if S does not contain T.

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

WEEK– 13:

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

b. Write a program to convert a roman number in to its decimal equivalent using functions.

WEEK– 14:

Write programs to perform the following using recursion.

i) To find the factorial of a given integer.

ii) To find the GCD (Greatest common Divisor) of two given integers.

iii) To solve Towers of Hanoi problem.

WEEK– 15:

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

i) Reading a complex number

ii) Writing a complex number

iii) Addition of two complex numbers

iv) Multiplication of two complex numbers

(Note: Represent complex number using a structure.)

WEEK– 16:

a. Write a program to accept the elements of the structure as :

Employee-name

Basic pay

Display the same structure along with the DA, CCA, and Gross salary for 5 employees.

Note: DA=51% of Basic pay, CCA = Rs.100 consolidated.

b. Define a structure to store employee's data with the following specifications:

Employee-Number, Employee-Name, Basic pay, Date of Joining

i) Write a function to store 10 employee details.

ii) Write a function to implement the following rules while revising the basic pay.

If Basic pay <=Rs. 5000 then increase it by 15%.

If Basic pay > Rs. 5000 and < = Rs.25000 then it increase by 10%

If Basic pay > Rs. 25000 then there is no change in basic pay.

iii) Write a function to print the details of employees who have completed 20 years of service from the date of joining.

WEEK– 17:

a. Write a program which copies one text file to another.

b. Write a program to reverse the first N characters of a given text file.

Note: The file name and N are specified through command line.

WEEK– 18:

Consider the following text file:

Input File:

S.No	Customer ID	Item No.	Qty.	Price Per Item (Rs.)
1.	C01	11	2	10
2.	C02	12	5	50
3.	C03	12	5	50
4.	C04	14	10	10

Write a program to print the output in following format by giving the Customer_ID as an input.

OUTPUT:

S.V.PROVISION STORES
TIRUPATI

Customer_ID:C01 **Date: 12-08-2010**

Item	Qty		Price
11	2		20
		Total	**20**

WEEK– 19:

Write a program to implement stack operations using:
i) Arrays ii) Pointers

WEEK– 20:

Write a program to implement linear queue operations using:
i) Arrays ii) Pointers

WEEK– 21:

Write a program to implement circular queue operations using arrays.

WEEK– 22:

Write a program to implement the following operations on singly linked list.
a. List Creation b. Insertion c. Deletion d. Display

WEEK– 23:

Write a program to implement the following operations on Doubly Linked List.
a. List Creation b. Insertion c. Deletion d. Display

WEEK– 24:

Write a program to implement the following operations on circular linked list.
a. List Creation b. Insertion c. Deletion d. Display

TEXT BOOKS:

1. A Structured programming Approach using C, Behrouz A. Forouzan and Richard F.Gilberg, Cengage Learning, 2nd Edition.
2. How to Solve it by computer, R.G.Dromey, Pearson Education, 1st Edition.

REFERENCE BOOKS:

1. Classic Data Structures, D.Samanta, Prentice Hall of India Private Limited, 2004.
2. C and Data Structures, P.S.Deshpande and O.G.Kakde, WILEY-Dreamtech India Private Limited, 2005.
3. Programming in C, pradip Dey and Manas Ghosh, Oxford University Press, 2007.
4. C programming with problem Solving, Jacqueline A. Jones and Keith Harrow, Dreamtech Press, 2007.

B.Tech I Year

10BT1BS06: ENGINEERING PHYSICS & ENGINEERING CHEMISTRY LABORATORY

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

Int. Marks: 25; Ext. Marks: 50; Total Marks: 75

L	T	P	C
-	-	3	4

PREREQUISITE: Intermediate / Senior secondary Physics and Chemistry.

COURSE DESCRIPTION:

Engineering Physics : Experimental verification of characteristics of p-n junction diode, Photodiode, LED, Thermistor ,semiconductor laser diode; Determination of energy gap, carrier concentration of a semiconductor material, wave length of a laser source, B-H curve, size of fine particle, dielectric constant, numerical aperture and bending losses of optical fiber, frequency of a electrically vibration tuning fork, magnetic field along axial line of a current carrying coil; verification of transverse laws of stretched string.

Engineering Chemistry: Estimation of hardness, alkalinity, dissolved oxygen of water samples and estimation of copper by volumetric methods; instrumental methods like potentiometer, conductivity meter and colorimeter, synthesis of polymers.

COURSE OUTCOMES:

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

Engineering Physics :

1. **Acquire analytical skills in the determination of**

a) Wave length of laser.

b) Divergence angle for laser beam.

c) Numerical aperture and bending losses of an optical fibre.

d) Hall coefficient for semiconductor material.

e) Energy gap of semiconductor material.

f) Verifying the laws of stretched string.

g) Dielectric constant

h) B - H Curve

i) Characteristics of p.n. junction diode, photodiode, thermistor and light emitting diode.

Engineering Chemistry:

1. a) Acquire analytical skills in the estimation of hardness of water, alkalinity of water, dissolved oxygen in water and estimation of iron through wet laboratory methods

   b) Acquire hands-on experience on different instrumental methods for the determination of PH of a solution, EMF of a solution and estimation of iron in cement.
2. Develop skills in the designing of synthetic methods for the preparation of polymers.

List of Experiments:

Engineering Physics:

Conduct a minimum of any Twelve experiments.

1. I-V characteristics of a P-N Junction diode
2. Characteristics of LED source.
3. Determination of wavelength of a laser source-diffraction grating
4. Determination of particle size by using a laser source
5. Photo diode - characteristics
6. Thermistor characteristics.
7. Hall effect
8. Magnetic field along the axis of a current carrying coil-Stewart and Gee's method.
9. Energy gap of a material of a P-N junction
10. B - H curve
11. Determination of dielectric constant
12. Verification of laws of stretched string - sonometer
13. Melde's experiment- transverse and longitudinal modes
14. Characteristics of laser sources.
15. Determination of numerical aperture of an optical fiber
16. Determination of bending losses of an optical fibre

List of Experiments:

Engineering Chemistry:

Conduct a minimum of any Ten experiments.

1. Preparation of standard EDTA and estimation of hardness of water
2. Preparation of standard EDTA and estimation of copper
3. Estimation of alkalinity of water
4. Preparation of standard potassium dichromate and estimation of ferrous iron
5. Preparation of standard potassium dichromate and estimation of copper by iodometry
6. Estimation of iron in cement by colorimetry
7. Conductometric titration of strong acid and strong base.
8. Preparation of phenol-formaldehyde resin.
9. Determination of viscosity of the oils through redwood -viscometer
10. Determination of pH of a given solution by pH metry.
11. Estimation of dissolved oxygen
12. Determination of calorific value of fuel using bomb calorimeter.

TEXT BOOKS:

1. Vogel's Book of Quantitative Inorganic Analysis, ELBS 5th edition
2. Chemistry laboratory manual, K.N. Jayaveera and K.B.Chandra sekhar, S.M. Enterprizes Ltd, 2009.

B.Tech I Year

10BT1HS02: ENGLISH LANGUAGEAND COMMUNICATION SKILLS LAB

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

Int. Marks: 25; Ext. Marks: 50; Total Marks: 75

L	T	P	C
-	-	3	4

PREREQUISITE: Basic Grammar and Functional English.

COURSE DESCRIPTION: Introduction to Phonetics; Consonants, Vowels and Diphthongs; Accent and Rhythm; Functional Grammar; Situational Dialogues; Story Telling; Describing People, Objects and Places; Movie Review; Just A Minute and Elocution; Public Speaking and Presentation Skills.

COURSE OUTCOMES:

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

1. Acquire knowledge in.
   a. Speech Sounds
   b. Stress Patterns
   c. Intonation and Rhythm
2. Analyze the functional knowledge of English Grammar for writing and speaking correct English in academic, professional and personal contexts.
3. Interpret and synthesize the language functions through:
   a. Just A Minute
   b. Impromptu
   c. Elocution
   d. Role Plays
   e. Project Presentations
4. Use and create techniques and language lab software for enhancing the language skills.
5. Communicate effectively with engineering community and society in formal and informal situations.
6. Inculcate attitude to upgrade communicative competence for meeting global challenges.

Detailed Syllabus:

The following course content is prescribed for the English language laboratory sessions.

1. Introduction to Phonetics.
2. Introduction to Consonants, Vowels and Diphthongs.
3. Introduction to Accent and Rhythm.
4. Functional Grammar.
5. Conversation Starters.
6. Situational Dialogues.
7. Just a Minute (JAM), Elocution, Debate and Impromptu.
8. Story telling.
9. Describing people, places and objects.
10. Movie Review.
11. Public speaking.
12. Presentation Skills.

Suggested Softwares:

- Cambridge Advanced Learners' English Dictionary withCD
- The Rosetta stone English Library.
- Clarity Pronunciation Power - Part-I.
- Mastering English in Vocabulary, Grammar, Punctuation and Composition.
- Dorling Kindersley series of grammar, Punctuation, Composition etc.
- Language in use. Foundation Books Pvt Ltd with CD.
- Oxford Advanced Learner's Compass, 7th Edition.
- Learning To speak English - 4 CDs.
- Microsoft Encarta CD.
- Murphy's English Grammar, Cambridge with CD
- English in Mind, Herbert Puchta and Jeff Strank s with Meredith Levy, Cambridge.
- English Pronunciation Dictionary
- Speech Solutions
- Sky Pronunciation
- Tense Buster

B.Tech I Year

(10BT1EC04) ENGINEERING & IT WORKSHOP

(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

Int. Marks: 25; Ext. Marks: 50; Total Marks: 75

L	T	P	C
-	-	3	4

PREREQUISITE: --

COURSE DESCRIPTION:

Engineering Workshop: The course provides hands-on training in the trades Carpentry, Fitting, House-wiring, Tin Smithy, Foundry. Overview of metal cutting processes, plumbing and welding is provided through live demonstrations.

IT workshop : This course deals with practice sessions on PC hardware, Internet, World Wide Web, MS-Word, Excel, Power Point, Publisher and LaTex Tool. Demonstrations on installations of system software such as MS-Windows, Linux and device drivers, hardware and software troubleshooting, and protecting the personal computer from viruses and other cyber attacks are included.

COURSE OUTCOMES:

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

Engineering workshop :

1. Utilize workshop tools for engineering practice.
2. Analyze and find out suitable method of fabrication of a given simple component.
3. Employ skills acquired to provide quick fixes for routine domestic and/or industrial problems.
4. Appreciate the hard work and intuitive knowledge of the manual workers.

IT Workshop :

1. Acquire analytical skills in:

(a) Identification of functional parts of PC

(b) Internet and World Wide Web.

(c) Computer security issues and preventive measures.

(d) Operating Systems.

2. Design document and presentations effectively.
3. Apply modern tools to develop IT based applications.
4. Gain effective communication skills through IT tools.
5. Update knowledge and skills in PC maintenance and usage of latest Operating Systems and Office automation tools.

Detailed Syllabus:

Engineering Workshop:

1. Trades for Exercise:

a. **Carpentry Shop:** Two joints: bridle joint, mortise and tenon T-joint.

b. **Fitting Shop:** Two joints: Square joint and V-joint.

c. **Sheet Metal Shop:** Two jobs: Trapezoidal tray and square tin.

d. **House Wiring:** Two jobs: Wiring for two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp.

Earthing: Concept and establishment, safety precautions while house wiring.

e. **Foundry:** Preparation of two moulds: For a single pattern and a double pattern.

2. Trades for Demonstration:

i. Welding

ii. Metal Cutting

iii. Plumbing

In addition to the above, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, plastics, steels, meters, gauges, equipment, first-aid and shop safety shall be demonstrated through charts, layouts, figures, circuits, CD or DVD.

IT Workshop:

PC Hardware:

1. Identifying the peripherals of a Computer, components in a CPU and its functions, block diagram of CPU along with the configuration of each peripheral.
2. Disassembling and assembling the PC back to working condition, videos for assembling and disassembling a PC.

3. Introduction to Operating System (OS) as system software, features of OS, need of OS, components of OS, installation of Microsoft Windows XP Operating System on the personal computer, examples of operating systems.
4. Introduction to UNIX OS and basic commands in UNIX such as cat, ls, pwd,, rm, rmdir, ln, head, tail, cd, cp, mv, who, date, cal, clear, man, tty, wc, diff, cmp, grep etc. and vi editors and sample C programs.
5. Hardware and Software Troubleshooting: PC symptoms when computer malfunctions, types of faults, common errors and how to fix them, basic hardware and software troubleshooting steps, PC diagnostic tools.

MS Office 2007: MS Word:

6. Introduction to MS Word, importance of Word as Word Processor, overview of toolbars, saving, accessing files, using help and resources.

   Create a word document using the features: Formatting fonts, drop cap, applying text effects, using character spacing, borders and shading, inserting headers and footers, using date and time option.
7. Create a project using MS Word using the features: Inserting tables, bullets and numbering, changing text direction, hyperlink, images from files and clipart, drawing toolbar and word art, mail merge.

MS Excel:

8. Introduction to MS Excel as a Spreadsheet tool, overview of toolbars, accessing, saving excel files, using help and resources. Create a spreadsheet using the features: Gridlines, format cells, summation, auto fill, formatting text, formulae in excel charts.
9. Create a spreadsheet using the features: Split cells, Sorting, Conditional formatting, freeze panes, pivot tables, data validation.

MS Powerpoint:

10. Introduction to MS PowerPoint, utilities, overview of toolbars, PPT orientation, slide layouts, types of views. Create a PowerPoint presentation using the features: Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows.
11. Create a PowerPoint presentation using the features: Auto content wizard, hyperlinks, Inserting images, clip art, audio, video, custom animation, slide hiding, tables and charts.

MS Publisher:

12. Introduction to MS Publisher, overview of toolbars, saving files, templates, layouts.

    Create a website using the features: Home page, about us, Department, Contact page etc.

LaTex:

13. Introduction to LaTeX tool: Importance of LaTeX as document preparation system for high quality typesetting, accessing, overview of toolbars, saving files, overview of features like typesetting of article, journal, books, control over large documents, using help and resources..

Internet and World Wide Web:

14. Web Browsers, Search Engines: Introduction to types of networks, customizing web browsers with LAN proxy settings, bookmarks, search toolbars and popup blockers, types of search engines and how to use search engines.
15. Cyber Hygiene: Introduction to various threats on Internet, types of attacks and how to overcome, installation of antivirus software, configuration of personal firewall and Windows update on Computers.

REFERENCE BOOKS:

Engineering Workshop:

1. Engineering Workshop practice, V. Ramesh Babu, VRB Publishers Private Limited, 2009.
2. Work shop Manual, P.Kannaiah and K.L.Narayana, SciTech Publishers, 2009.
3. Workshop Practice Manual, K. Venkata Reddy, BS Publications, 2008.

IT Workshop:

1. Introduction to Computers, Peter Norton, Tata McGraw Hill, 4th Edition.
2. IBM PC and Clone-Hardware, Troubleshooting and Maintenance, B. Govindarajulu, Tata McGraw Hill, 2nd Edition
3. Comdex Information Technology Course Kit, Vikas Gupta, WILEY Dreamtech, 2nd Edition.
4. PC Hardware and A + Handbook, Kate J. Chase, Prentice Hall India, 2004.
5. A Document Preparation System LaTeX User's Guide and Reference Manual, Leslie Lamport, Pearson Education, 2nd Edition.

II B.Tech. I Semester

10BT3BS03: SPECIAL FUNCTIONS AND COMPLEX ANALYSIS

(Common to ECE, EEE, EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITE: Intermediate / Senior Secondary mathematics and Engineering mathematics of I. B.Tech.

COURSE DESCRIPTION:

Limits, continuity and analyticity of complex functions; Integration; power series; singularities, residues and conformal mappings; Partial differential equations; special functions with engineering applications.

COURSE OUTCOMES: After completion of the course, a successful student is able to

1. Demonstrate knowledge in
   a) Linear partial differential equations, heat equation, wave and Laplace with boundary conditions.
   b) Integrals through beta and gamma functions.
   c) Analytic nature of complex functions.
   d) Integration of complex functions on different types of curves.
   e) Residues of complex functions.
   f) Properties of complex functions through mappings.

2. Design mathematical models for
   a) Fluid flow patterns.
   b) Evaluation of complicated real integrals
   c) Integrations through complex variable techniques

3. Develop skills in solving problems involving
   a) Improper integrals through beta and gamma functions
   b) Flow patterns of fluids.
   c) Magnetic and electrical potential functions.
   d) Evaluation of real and improper integrals through complex variable technique.
   e) Integration of complex functions on complicated curves.
   f) Investigating the behavior of complex function in a given region.
   g) Contour integration of complex functions
   h) Heat transfer and wave motions.

DETAILE SYLLABUS:

UNIT-I: PARTIAL DIFFERENTIAL EQUATIONS
Formation of Partial differential equations, Solutions of first order Partial Differential Equations using Lagrange's method. Method of separation of variables - solutions of one dimensional wave equation - Heat equation- Two dimensional Laplace equation under boundary conditions.

UNIT-II: SPECIAL FUNCTIONS
Euler's Integrals - Beta and Gamma functions - properties - Relationship between beta and gamma functions- applications - evaluation of improper integrals using Beta and Gamma functions
BESSEL FUNCTION: Generating function-properties of Bessel functions - recurrence relations-Orthogonality.

UNIT-III: LIMITS AND CONTINUITY - ANALYTIC FUNCTIONS
Exponential, Trigonometric, logarithmic, Hyperbolic and general power (Z^c) - separation of real and imaginary parts - Limits and Continuity of functions. Differentiability - Analyticity - Cauchy Riemann equations- conjugate and harmonic conjugate functions - Milne Thompson method- potential functions.

UNIT-IV: COMPLEX INTEGRATION
Line integral - evaluation of line integrals along curves and closed contours - Cauchy's Integral theorem - Cauchy's integral formula - Derivatives of analytic function - generalized integral formula- Evaluation of integrals using integral formula.

UNIT-V: COMPLEX POWER SERIES
Taylor theorem (with proof) - Laurent's theorem (without proof) - Taylor and Laurent series expansions of complex functions - Singularities - types - residues - poles of order m.

UNIT-VI: RESIDUE CALCULUS
Residue theorem - proof - applications - evaluation of integrals using residue theorem - evaluation of improper and real integrals of the type

i) $\int_{-\infty}^{\infty} f(x)dx$ ii) $\int_{0}^{2\Pi} f(\cos\theta, \sin\theta)d\theta$ iii) $\int_{-\infty}^{\infty} e^{imx} f(x)dx$

UNIT-VII: ROUCHE'S THEOREM - APPLICATIONS

Argument principle - Rouche's theorem - determination of number of zeros of complex polynomials - maximum modules principle - Fundamental theorem of Algebra - Cauchy's inequality - Liouville's theorem.

UNIT-VIII: CONFORMAL MAPPING

Definitions and examples, Mappings defined by $w = e^z$, $\ln z$, z^2, $\sin z$, $\cos z$. Translation, Rotation, Inversion and Bilinear transformation - properties - fixed point - cross ratio - invariance of circles under bilinear transformation - determination of bilinear transformation using three given points.

TEXT BOOKS:

1. T.K.V. Iyenger, B. Krishna Gandhi, S.Ranganatham and M.V.S.S.N. Prasad, *Mathamatical Methods*, 5th Revised Edition, S. Chand & Company, 2010.
2. T.K.V. Iyenger, B. Krishna Gandhi..et al., *Text book of Engineering Mathematics*, Vol-III, 8th Edition, S. Chand & Company, 2011.

REFERENCE BOOKS:

1. Grewal, B.S., *Higher engineering Mathematics*, 36th Edition, Khanna Publishers, Delhi.
2. Kreyszig, E., *Advanced Engineering Mathematics*, 8th Edition, John-Wiley.

II B.Tech. I Semester

10BT30401: SEMICONDUCTOR DEVICES AND CIRCUITS

(Common to ECE, EEE, EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: A course on Engineering Physics.

COURSE DESCRIPTION: Characteristics of general and special purpose electronic devices; Rectifiers and regulators; Biasing and small signal analysis of BJT and FET.

COURSE OUTCOMES:

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

1. Demonstrate fundamental knowledge on
   - Electronic devices and circuits
   - Characteristics of electronic devices
2. Analyze numerical and analytical problems in
   - Regulated Power Supplies
   - Transistor biasing circuits
   - Transistor amplifiers
   - FET biasing circuits and
   - FET amplifiers
3. Design the electronic circuits like
   - Regulated Power Supplies
   - Transistor biasing circuits
   - Transistor amplifiers
   - FET biasing and
   - FET amplifiers
4. Solve engineering problems and arrive at solutions pertaining to electronic circuits.

DETAILED SYLLABUS:

UNIT-I: PN JUNCTION DIODE

PN Junction Diode Equation, Volt-Ampere (V-I) Characteristics, Temperature Dependence of V-I Characteristics, Ideal Versus Practical, Static and Dynamic Resistances, Diode Equivalent circuits, Junction capacitances, Break down Mechanisms in semiconductor Diodes, Zener Diode Characteristics.

UNIT-II: RECTIFIERS, FILTERS AND REGULATORS

Halfwave rectifier and fullwave rectifiers (Qualitative and quantitative analysis), Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L - section filter, p - section filter, comparison of various filter circuits in terms of ripple factors. Simple circuit of a regulator using Zener diode. Problems on rectifier circuits.

UNIT-III: BIPOLAR JUNCTION TRANSISTOR

Transistor construction, BJT Operation, Transistor as an amplifier, Transistor currents and their relations, Input & Output Characteristics of a Transistor in Common Emitter, Common Base and Common Collector Configurations, BJT specifications.

UNIT-IV: TRANSISTOR BIASING AND STABILIZATION

Operating Point, DC and AC Load Lines, Importance of Biasing, Fixed Bias, Emitter Feedback Bias, Collector to Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization against Variations in V_{BE} and b, Bias Compensation using Diodes and Transistors, Thermal Runaway, Condition for Thermal Stability in CE configuration, Problems on biasing circuits.

UNIT-V: SMALL SIGNAL ANALYSIS OF BJT AMPLIFIERS

BJT Modeling, Hybrid Modeling, Determination of h-Parameters from Transistor Characteristics, Measurement of h-Parameters, Analysis of CE, CB and CC configurations using h-Parameters, Comparison of CB, CE and CC configurations, Simplified Hybrid Model, Millers Theorem, Dual of Millers Theorem.

UNIT-VI: FIELD EFFECT TRANSISTOR

Construction, Principle of Operation and Characteristics of JFET and MOSFET (Enhancement & Depletion), Small Signal Model of JFET & MOSFET.

UNIT-VII: FET AMPLIFIERS
Common Source and Common Drain Amplifiers using FET, Generalized FET Amplifier, Biasing of FET, FET as Voltage Variable Resistor, Comparison between BJT and FET.

UNIT-VIII: SPECIAL PURPOSE ELECTRONIC DEVICES
Principle of Operation and Characteristics of Tunnel Diode, Uni-Junction Transistor (UJT), Varactor Diode, Silicon Control Rectifier (SCR). Principle of operation of Schottky Barrier Diode.

TEXT BOOKS:

1. J. Millman, Christos C. Halkias, *Electronic Devices and Circuits,* 1991 Edition, TMH, 2008.
2. R.L. Boylestad and Louis Nashelsky, *Electronic Devices and Circuits,* 9th Edition, PHI, 2006.
3. David A. Bell, *Electronic Devices and Circuits,* 5th Edition, Oxford University press, 2008.

REFERENCE BOOKS:

1. J. Millman and C.C. Halkias, *Integrated electronic*, TMH, 2nd Edition, 1998.
2. K. Lal Kishore, *Electronic Devices and Circuits*, 2nd Edition, BSP, 2005.
3. Robert T. Paynter, *Introductory Electronic Devices and Circuits*, 7th Edition, PHI, 2005.
4. S. Salivahana, N. Suresh Kumar, A. Vallavaraj, *Electronic Devices and Circuits*, 2nd Edition, TMH, 2008.
5. Henry and Jeager, *Semiconductor Devices and Circuits,* Mc-Graw Hill.

II B.Tech. I Semester

10BT30223: CIRCUIT THEORY

(Common to ECE, EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: A course on "Physics and Mathematics".

COURSE DESCRIPTION: Basic concepts of Electric circuits; voltage - current relationship of basic circuit elements; mesh and nodal analysis; AC circuits; Magnetic circuits; Network theorems.

COURSE OUTCOMES:

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

1. Demonstrate knowledge on fundamentals of electrical and magnetic circuits.
2. Analyze electrical circuits using mesh and nodal techniques, magnetically coupled circuits and Transient response of A.C. circuits.
3. Solve complex electrical circuits using network theorems.

DETAILED SYLLABUS:

UNIT-I : FUNDAMENTALS OF ELECTRICAL CIRCUITS

Concepts of charge, current, voltage and power, active & passive elements, reference concepts of direction for voltages & currents, voltage and current relationships for passive elements, Ohm's law,

Kirchoff Laws, current division and voltage division rules, network reduction techniques, series, parallel, series-parallel circuits, star-delta and delta-star transformations, source transformation.

UNIT-II : BASIC NODAL & MESH ANALYSIS

Basic definitions: node, path, loop, branch , nodal analysis and super node concept, mesh analysis and super mesh concept - problems.

UNIT-III : FUNDAMENTALS OF AC CIRCUITS

Introduction - advantages of AC supply, types of waveforms, importance of sinusoidal waveforms, basic definitions: waveform, cycle, time period, frequency, amplitude, determination of average and RMS value, form factor & peak factor for different alternating waveforms, phase and phase difference.

UNIT-IV : SINGLE PHASE AC CIRCUITS

Sinusoidal response of R, L, C and combination of R, L, C circuits, concept of impedance and power triangles, power factor, resonance, bandwidth and quality factor for series and parallel networks, locus diagram.

UNIT-V : TRANSIENT ANALYSIS

Introduction - transient response of RL, RC and RLC for DC excitation, transient response of RL, RC and RLC for sinusoidal excitation, numerical problems.

UNIT-VI : MAGNETICALLY COUPLED CIRCUITS

Coupled circuits, self & mutual inductance, DOT conventions, coefficient of coupling, analysis of magnetic circuits: series, parallel and composite, comparison of electrical and magnetic circuits.

UNIT-VII : NETWORK THEOREMS - I

Thevenin's, Norton's, Maximum power transfer and Superposition theorems for DC and sinusoidal excitations - applications.

UNIT-VIII : NETWORK THEOREMS - II

Tellegen's, Millman's, Reciprocity, Substitution and Compensation theorems for DC and sinusoidal excitation - applications.

TEXT BOOKS:

1. A. Sudhakar & Shyam Mohan, *Electric Circuits*, TMH, 3rd Edition, 2007.
2. A. Chakrabarthi, *Circuits Theory*, Dhanpat Rai & Co, New Delhi, 2009.

REFERENCE BOOKS:

1. M.E. Van Valkenberg, *Network Analysis,* Pearson Publications, 3rd Edition, New Delhi 2006.
2. William H. Hayt & Jack E. Kennedy & Steven M. Durbin, *Engineering Circuit Analysis*, 6th Edition, TMH, 2009.
3. J.A. Edminister & M.D.Nahvy, *Theory and Problems of Electric Circuits,* Schaums Outline Series,4th Edition, TMH, 2004.
4. G. K. Mittal, Ravi Mittal, *Network Analysis*, Khanna Publishers, 14th Edition, New Delhi, 1997.
5. C. K. Alexander and M. N. O. Sadiku, *Fundamentals of Electric Circuits*, 3rd Edition, TMH, 2010.

II B.Tech. I Semester

10BT3BS02: ENVIRONMENTAL SCIENCES

(Common to BOT & ECE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PRE-REQUISITES: A course on "Basic Sciences".

COURSE DESCRIPTION: Introduction to environment, Need for public awareness; Natural resources, conservation and management; Ecology and ecosystems; Biodiversity, conservation and management; Environment pollution and Control; Social issues and environment; Human population and environment; Field study and analysis.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in
   - Different components of environment and natural resources.
   - Green technology
   - Ecology and Ecosystems
   - Biodiversity and its conservation
   - Population and Human health
2. Identify sources of pollution and provide suggestions for protection of natural resources.
3. Follow environmental ethics to protect the diversified ecosystems and make environment sustainable.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO ENVIRONMENTAL SCIENCES

Definition and concept of the term environment – Various components of environment – Abiotic and biotic – Atmosphere – Hydrosphere – Lithosphere – Biosphere – Inter relationships – Need for public awareness – Role of important national and international individuals and organizations in promoting environmentalism.

UNIT-II: NATURAL RESOURCES, CONSERVATION AND MANAGEMENT

Renewable and Non renewable resources and associated problems – Forests: Deforestation, Causes, effects and remedies – Effects of mining, dams and river valley projects – case studies; Water resources: Water use and over exploitation – Conflicts over water – Large dams – benefits and problems; Food resources : World food problems – Adverse effects of modern agriculture – Fertilizer and pesticide problems; Land resources: Land degradation – Land slides- Soil erosion – desertification- water logging – salinity – Causes, effects and remedies; Mineral resources: Mining – Adverse effects; Energy resources: Growing needs – Renewable and Non renewable resources – Alternate resources: Coal, Wind, Oil, Tidal wave, Natural gas, Biomass and Biogas, Nuclear energy, Hydrogen fuel and Solar energy - Impact on environment - Sustainable life styles.

UNIT-III: ECOLOGY AND ECOSYSTEMS

Definitions and concepts – Characteristics of ecosystem – Structural and functional features – Producers, consumers and decomposers and food webs – Types of ecosystems – Forests grassland, desert, crop land, pond, lake, river and marine ecosystems – Energy flow in the ecosystem – Ecological pyramids – Ecological successions.

UNIT-IV: BIO DIVERSITY, CONSERVATION AND MANAGEMENT

Introduction – Definition and concept of biodiversity – Value of biodiversity – Role of biodiversity in addressing new millennium challenges – Global, national biodiversity – Hot spots of biodiversity – Threats to biodiversity – Man and wild life conflicts – Remedial measures – Endemic, endangered and extinct species – In-situ and ex-situ conservation of biodiversity.

UNIT-V: ENVIRONMENTAL POLLUTION AND CONTROL

Definition, causes, adverse effects and control measures of air pollution, indoor pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, nuclear pollution – Solid waste management – Causes, effects, control and disposal methods – Role of individuals in the prevention of pollution – Hazards and disaster management – Floods – Earthquakes – Tsunamis – Cyclones – Land slides – Case studies.

UNIT-VI: SOCIAL ISSUES AND THE ENVIRONMENT

Concept of sustainable development – Methods of rainwater harvesting – Watershed management – Waste land reclamation – Green cover – Green power – Green technology – Resettlement and rehabilitation of people and related problems – Case studies – Issues and possible solutions - Greenhouse effect and global warming – Carbon credits – Acid rains – Ozone layer depletion – Causes, effects and remedies – Consumerism and waste production – Environment protection acts – Air act – Water act – Forest conservation act – Wild life protection act – Issues involved in the enforcement.

UNIT-VII: HUMAN POPULATION AND ENVIRONMENT

Population growth and its impact on environment – Environmental ethics – Family welfare programmes – Human health: T.B., Cancer, HIV/AIDS – Causes, effects and remedies – Occupational health hazards – Human rights – Important international protocols and conventions on environment.

UNIT-VIII: FIELD WORK/ENVIRONMENTALIST'S DIARY/ ASSIGNMENTS/SEMINARS

TEXT BOOKS:

1. Erach Barucha, *Environmental Studies*, 1st Edition, Universities Press, Hyderabad, 2010.
2. A. Kaushik and Kaushik, *Environmental Studies,* 3rd Edition, New Age International Publishers, 2011.

REFERENCE BOOKS:

1. Desh wal, *Environmental Studies,* 2nd Edition, Khanna Publicaions, New Delhi, 2010.
2. Rajagopalan, *Environmental Studies,* 1st Edition, Oxford University Press, 2009.
3. Joseph Benny, *Environmental Studies,* 2nd Edition, TMH, 2010.

II B.Tech. I Semester

10BT30402: PROBABILITY THEORY AND STOCHASTIC PROCESSES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: A Course on engineering mathematics containing elementary probability theory, ordinary and partial differential equations and linear algebra.

COURSE DESCRIPTION: Probability theory; The Random Variable; Operation on Single and Multiple Random Variables; Stochastic Processes - Temporal and spectral Characteristics; spectral characteristics of system response.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in
   - Probability theory
   - Single and multiple random variables
   - Operation on Single and multiple random variables
   - Random processes and their characteristics
2. Analyze operation on single and multiple random variables and processes.
3. Design solutions for complex engineering problems involving random processes.
4. Conduct investigation on random processes for valid conclusions.

DETAILED SYLLABUS:

UNIT-I: PROBABILITY

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

UNIT-II: THE RANDOM VARIABLE

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

UNIT-III: OPERATION ON SINGLE RANDOM VARIABLE

EXPECTATIONS: Introduction, Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Chebychev's Inequality, Characteristic Function, Moment Generating Function.
TRANSFORMATIONS OF A RANDOM VARIABLE: Monotonic Transformations for a Continuous Random Variable, Nonmonotonic Transformations of Continuous Random Variable, Transformation of a Discrete Random Variable.

UNIT-IV: MULTIPLE RANDOM VARIABLES

Vector Random Variables, Joint Distribution Function, Properties of Joint Distribution, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Conditional Distribution and Density – Interval conditioning, Statistical Independence, Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem, (Proof not expected). Unequal Distribution, Equal Distributions.

UNIT-V: OPERATIONS ON MULTIPLE RANDOM VARIABLES

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

UNIT-VI: STOCHASTIC PROCESSES

Concept of Stochastic process, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, concept of Stationarity and Statistical Independence, First-Order Stationary Processes, Second- Order and Wide-Sense Stationarity, Nth-Order and Strict-Sense Stationarity.

UNIT-VII: STOCHASTIC PROCESSES – TEMPORAL CHARACTERISTICS

Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, Covariance and its properties, Linear system response of Mean and mean-squared value, Autocorrelation function, Cross-correlation functions, Gaussian Random Processes, Poisson Random Process.

UNIT-VIII: STOCHASTIC PROCESSES – SPECTRAL CHARACTERISTICS

The Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, The Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross-Correlation function.

SPECTRAL CHARACTERISTICS OF SYSTEM RESPONSE: Power density spectrum of response, Cross-power spectral density of input and output of a linear system.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. George R. Cooper, Clave D. MC Gillem, *Probability Methods of Signal and System Analysis,* 3rd Edition, Oxford University Press, 1999.
2. Henry Stark and John W. Woods, *Probability and Random Processes with Application to Signal Processing,* 3rd Edition, Pearson Education, 2002.
3. S.P. Eugene Xavier, *Statistical Theory of Communication,* 1st Edition, New Age Publications, 2003.

II B.Tech. I Semester

10BT30403: SIGNALS AND SYSTEMS

(Common to ECE, EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: A Course on Engineering Mathematics.

COURSE DESCRIPTION: Classification of signals and systems; Basic operations on signals; Representation of periodic signals using Fourier series; Fourier transform of signals and its properties; Response of linear systems; concept of convolution and correlation; Laplace transform and its properties; Sampling and types of sampling; Z-Transform of sequences.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in:

- Trigonometric and exponential Fourier series representation of periodic signals.
- Fourier transform of signals.
- Convolution and correlation of functions.
- Laplace transform, ROC for Laplace Transform.
- Sampling Process.
- Z-Transform of discrete sequences and ROC for Z-Transform.

2. Perform the analysis of various continuous and discrete time signals and systems.
3. Design and develop solutions for complex engineering problems with appropriate consideration to meet the societal needs.
4. Solve engineering problems critically in the area of signal processing.

DETAILED SYLLABUS:

UNIT-I: SIGNAL ANALYSIS

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

UNIT-II: FOURIER SERIES REPRESENTATION OF PERIODIC SIGNALS

Representation of Fourier series, Continuous time periodic signals, properties of Fourier series, Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Complex Fourier spectrum.

UNIT-III: FOURIER TRANSFORMS

Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Fourier transform of periodic signals, properties of Fourier transforms, Fourier transforms involving impulse function and Signum function. Introduction to Hilbert Transform.

UNIT-IV: SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS

System definition, classification of systems, Linear system, impulse response, Response of a linear system, Linear time invariant (LTI) system, Linear time variant (LTV) system, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, system bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Poly-Wiener criterion for physical realization, relationship between bandwidth and rise time.

UNIT-V: CONVOLUTION AND CORRELATION OF SIGNALS

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

UNIT-VI: LAPLACE TRANSFORMS

Review of Laplace transforms, Partial fraction expansion, Inverse Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of L.T's relation between L.T's, and F.T. of a signal. Laplace transform of certain signals using waveform synthesis.

UNIT-VII: SAMPLING

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

UNIT-VIII: Z–TRANSFORMS

Discrete time signal representation using complex exponential and sinusoidal components, Periodicity of discrete time using complex exponential signal, Concept of Z- Transform of a discrete sequence. Distinction between Laplace, Fourier and Z transforms. Region of convergence in Z-Transform, constraints on ROC for various classes of signals, Inverse Z-transform, properties of Z-transforms.

TEXT BOOKS:

1. B.P. Lathi, *Signals, Systems & Communications,* BS Publications, 2003.
2. A.V. Oppenheim, A.S. Willsky and S.H. Nawab, *Signals and Systems,* 2nd Edition, PHI.
3. Simon Haykin and Van Veen, *Signals & Systems,* 2nd Edition, Wiley.

REFERENCE BOOKS:

1. M.E. Van Valkenburg, *Network Analysis,* 3rd Edition, PHI, 2000.
2. Michel J. Robert, *Fundamentals of Signals and Systems,* McGraw-Hill, International Edition, 2008.
3. C. L. Philips, J.M.Parr and Eve A.Riskin, *Signals, Systems and Transforms,* 3rd Edition, Pearson Education, 2004.

II B.Tech. I Semester

10BT30411: SEMICONDUCTOR DEVICES AND CIRCUITS LAB

(Common to ECE, EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: A course on Semiconductor Devices and Circuits.

COURSE DESCRIPTION: Identification and testing of active and passive components; RPS, DMM, Function Generator, CRO; Diode characteristics; Rectifiers; Transistor and FET characteristics; UJT and SCR characteristics; BJT and FET amplifiers.

COURSE OUTCOMES:

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

1. Analyze the characteristics of different electronic devices, like
   - Diode
   - Zener Diode
   - Transistor
   - FET and
   - UJT
2. Design and analyze the electronic circuits like transistor and FET amplifiers
3. Solve engineering problems and arrive at solutions pertaining to electronics.

PART A: (Only for viva voce Examination)

ELECTRONIC WORKSHOP PRACTICE (in 3 lab sessions):

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCBs.

2. Identification, Specifications and Testing of Active Devices, Diodes: BJTs, Low-power JFETs, MOSFETs, Power Transistors, LEDs, LCDs, Optoelectronic Devices, SCR, UJT, DIACs, TRIACs, Linear and Digital ICs.

3. Study and operation of
   - Multimeters (Analog and Digital)
   - Function Generator
   - Regulated Power Supplies
   - CRO.

PART B: (Minimum of 10 experiments to be conducted)

1. Forward and Reverse bias characteristics of PN Junction diode
2. Zener diode characteristics and Zener as Voltage Regulator.
3. Input and Output characteristics of Transistor in CB Configuration.
4. Input and Output characteristics of Transistor in CE Configuration
5. Halfwave Rectifier with and without filters.
6. Fullwave Rectifier with and without filters.
7. FET characteristics
8. Measurement of h parameters of transistor in CE configurations
9. Frequency response of CE Amplifier.
10. Frequency response of CC Amplifier.
11. Frequency response of Common Source FET Amplifier.
12. SCR Characteristics.
13. UJT Characteristics.

II B.Tech. I Semester

10BT30412: SIMULATION LAB

(Common to ECE, EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Courses on Engineering Mathematics and Signals & Systems.

COURSE DESCRIPTION: Generation and operation of signals and sequence; convolution and correlation; Verification of Sampling theorem and Gibbs Phenomenon; Fourier transform and Laplace transform; Mean and PSD.

COURSE OUTCOMES:

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

1. Demonstrate programming skills in
   a) Basic Operations on Matrices.
   b) Various signals and Sequences.
   c) Convolution of signals and Sequences
   d) Fourier Tranform ,Laplace Transform and Z-Transforms
   e) Sampling Theorem and Weiner-Khinchine Relations
2. Conduct experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
3. Use MATLAB Toolboxes to complex engineering activities in the domain of Signal processing.

List of Experiments:

1. Basic Operations on Matrices
2. Generation of Various signals and Sequences (Periodic and Aperiodic), Such as Unit Impulse, Unit Step, Square, Saw Tooth, Triangular, Sinusoidal, Ramp, Sinc function.
3. Operations on Signals and Sequences such as Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.
4. Finding the Even and Odd Parts of Signal or Sequence and Real and Imaginary Parts of Signal.
5. Convolution between Signals and Sequences.
6. Autocorrelation and Cross correlation between Signals and Sequences.
7. Verification of Linearity and Time Invariance Properties of a Given Continuous / Discrete System.
8. Computation of Unit Sample, Unit Step and Sinusoidal Responses of the Given LTI System and Verifying its Physical Realizability and Stability Properties.
9. Gibbs Phenomenon.
10. Finding the Fourier Transform of a given Signal and plotting its Magnitude and Phase Specturm.
11. Waveform Synthesis using Laplace Transform.
12. Locating Zeros and Poles, and plotting the Pole-Zero maps in S-Plane and Z-Plane for the given Transfer Functions.
13. Generation of Gaussian Noise (Real and Complex), Computation of its Mean, M.S. Values and its Skew, Kurtosis, and PSD, Probability Distribution Function.
14. Sampling Theorem Verification.
15. Removal of Noise by Auto Correlation / Cross correlation in a given signal corrupted by noise.
16. Impulse response of a raised cosine filter.
17. Verification of Weiner-Khinchine Relations.
18. Checking a Random Process for Stationary in Wide Sense.

II B.Tech. II Semester

10BT40401: ELECTRONIC CIRCUIT ANALYSIS

(Common to ECE, EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: A courses on Semiconductor devices and circuits.

COURSE DESCRIPTION: BJT - Small signal single stage & Multistage amplifiers; Frequency Response; Feedback Amplifiers; Oscillators; Large Signal Amplifiers; Tuned Amplifiers; MOSFET amplifiers.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in
   - Single and Multi Stage Amplifiers.
   - BJT Frequency Response.
   - MOSFET Amplifiers.
   - Feedback Amplifiers.
   - Oscillators.
   - Power Amplifiers.
   - Tuned Amplifiers.
2. Perform analysis of any electronic circuit.
3. Design and develop circuits from simple design like single stage amplifier to complex designs like Multistage Amplifiers.
4. Solve problems arising due to poor circuit design by choosing the appropriate design.

DETAILED SYLLABUS:

UNIT-I: SINGLE STAGE AMPLIFIERS

Classification of Amplifiers – Distortion in amplifiers, Analysis of CE, CC & CB Configurations with simplified hybrid model, Analysis of CE amplifier with Emitter Resistance and Emitter Follower, Design of single stage RC Coupled Amplifier Using BJT.

UNIT-II: MULTI STAGE AMPLIFIERS

Analysis of Cascaded RC Coupled BJT Amplifiers, Cascode Amplifier, Darlington Pair, Different Coupling Schemes used in Amplifiers – RC Coupled Amplifier, Direct and Transformer Coupled Amplifiers.

UNIT-III: BJT FREQUENCY RESPONSE

Logarithms, Decibels, General Frequency Considerations, Frequency Response of BJT Amplifier, Analysis at Low and High Frequencies, Effect of Coupling and Bypass Capacitors, The Hybrid –Pi, Common Emitter Transistor Model, CE Short Circuit Current Gain, Current Gain with Resistive Load, Single Stage CE Transistor Amplifier Response, Gain – Bandwidth product, Emitter Follower at Higher Frequencies.

UNIT-IV: MOSFET AMPLIFIERS

Basic Concepts, MOSFET Small Signal Model, Common Source Amplifier with Resistive Load, Diode Connected Load and Current Source Load, Source Follower, Common gate stage cascode and folded cascode amplifier and their Frequency Response.

UNIT-V: FEEDBACK AMPLIFIERS

Classification of Amplifiers, Concepts of Feedback, Classification of Feedback Amplifiers, General Characteristics of Negative Feedback Amplifiers, Effect of feedback on Amplifier Characteristics, Voltage Series, voltage Shunt, Current series and Current Shunt Feedback Configurations, Illustrative Problems.

UNIT-VI: OSCILLATORS

Conditions for oscillations, RC and LC Type Oscillators, Crystal oscillators, Frequency and amplitude stability of oscillators, Generalized Analysis of LC Oscillators, Quartz, Hartley and Colpitts Oscillators, RC-Phase Shift and Wien-Bridge Oscillators.

UNIT-VII: LARGE SIGNAL AMPLIFIERS

Class A Power Amplifier, Maximum Value of Efficiency of Class-A Amplifier, Transformer Coupled Amplifier, Transformer Coupled Audio Amplifier, Push Pull Amplifier - Complimentary Symmetry, Class - B Power Amplifier, Phase Inverters, Transistor power Dissipation.

UNIT-VIII: TUNED AMPLIFIERS

Introduction, Q-Factor, Small Signal Tuned Amplifiers, Effect of Cascading Single Tuned Amplifiers on Bandwidth, Effect of Cascading Double Tuned Amplifiers on Bandwidth, Stagger Tuned Amplifiers, Stability of Tuned Amplifiers.

TEXT BOOKS:

1. Jacob Millman and Christos C. Halkias, *Integrated Electronics,* McGraw-Hill.
2. Robert L. Boylestad and Louis Nashelsky, *Electronic Devices and Circuits Theory*, 9th Edition, PE, 2008.
3. David A. Bell, *Electronic Devices and Circuits*, 5th Edition, Oxford University Press.
4. Behzad Razavi, *Design of Analog CMOS Integrated Circuits*, TMS, 2008.

REFERENCE BOOKS:

1. Donald A. Neaman, *Electronic Circuit Analysis and Design*, 3rd Edition, TMH, 2007.
2. Robert T. Paynter, *Introductory Electronic Devices and Circuits*, 7th Edition, PEI, 2009.
3. Sedra/Smith, *Micro Electronic Circuits*, 5th Edition, Oxford University Press, 2009.
4. K. Lal Kishore, *Electronic Circuit Analysis*, BSP, 2004.
5. S. Salivahanan, N.Suresh Kumar, A. Vallavaraj, *Electronic Devices and Circuits*, 2nd Edition, TMH, 2009.

II B.Tech. II Semester

10BT41301: CONTROL SYSTEMS

(Common to ECE, EEE, EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Courses on Engineering Mathematics and Circuit Theory.

COURSE DESCRIPTION: Concepts of control systems; modeling of physical systems; effect of feedback; block diagram and transfer function representation of various systems; time domain and frequency domain analysis; design of compensators; state space analysis.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in

i. representation of physical systems

ii. time and frequency domain specifications for stability analysis.

iii. methods of determining the stability of the system

iv. concept of controllability and observability.

2. Analyze the stability of the system in time and frequency domains.

3. Design compensators to meet the desired specifications.

4. Demonstrate problem solving skills in

i. deducing the transfer function using block diagram reduction technique and signal flow graph.

ii. evaluating the system stability in time and frequency domains.

iii. solving the state equations of a system.

iv. evaluating controllability and observability of a system.

DETAILED SYLLABUS:

UNIT I : INTRODUCTION
Concepts of Control Systems, Open Loop and closed loop control systems, Feed-Back Characteristics, Effects of feedback, Block diagram representation of physical systems, Mathematical models-differential Equations.

UNIT II: TRANSFER FUNCTION REPRESENTATION
Analogous systems, electrical analogy of physical systems, Derivation of transfer function, Transfer function of DC Servomotor, Synchro transmitter and receiver, Block diagram algebra, Signal Flow graph and Mason's gain formula.

UNIT III: TIME RESPONSE ANALYSIS
Types of test signals, Response of first and second order system, Time domain specifications, type and order of systems, steady state error, static error constants, generalized error co-efficients. Effect of P, PI, PID on time response.

UNIT IV: STABILITY ANALYSIS IN S-DOMAIN
Concepts of stability: Characteristic equation, location of roots in s-plane for stability, asymptotic stability and relative stability, Routh-Hurwitz stability criterion.
ROOT LOCUS TECHNIQUE: Root locus concept, construction of root loci, effects of adding poles and zeros to G(s)H(s) on the root loci.

UNIT V: FREQUENCY RESPONSE ANALYSIS
Introduction, Frequency domain specifications, Bode diagrams, Determination of Frequency domain specifications and transfer function from the Bode Diagram, Phase margin and Gain margin, Stability Analysis from Bode Plots.

UNIT VI: STABILITY ANALYSIS IN FREQUENCY DOMAIN
Polar Plots, Nyquist plots, stability in frequency domain using Nyquist stability criterion, simple problems.

UNIT VII: DESIGN AND COMPENSATION OF CONTROL SYSTEMS
Introduction to Compensation networks, Lag, Lead, lead-lag compensation, Compensation using Bode plots.

UNIT VIII: STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS Concepts of state, state variables and state model, derivation of state model for physical systems Diagonalization, State Transition Matrix and its Properties, Solution of linear state equation, Concepts of Controllability and Observability, Kalman's test only.

TEXT BOOKS:

1. I. J. Nagrath and M. Gopal, *Control Systems Engineering,* 2nd Edition, New Age International (P) Limited.
2. Katsuhiko Ogata, *Modern Control Engineering,* 3rd Edition, Prentice Hall of India Pvt. Ltd.

REFERENCE BOOKS:

1. B.C.Kuo, *Automatic Control Systems*, Weilly Eastern, 2004.
2. John wiley, *Control Systems Engineering*, 3rd Edition, NISE.
3. Richard C. Dorf, Robert H. Bishop, *Modern Control Systems,* 11th Edition, Pearson Education, 2007.
4. Graham Goodwin, Stefan Graebe and Mario Salgado, *Control System Design,* Prentice Hall.

II B.Tech. II Semester

10BT40402: PULSE AND DIGITAL CIRCUITS

(Common to ECE, EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: A course on Semiconductor Devices and Circuits.

COURSE DESCRIPTION: Wave shaping circuits; switching characteristics of Diode and Transistor; multivibrators; sweep circuits; sampling and logic gates.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in:
   - Responses of high pass and low pass RC circuits for different inputs
   - Clipping and clamping operations
   - Methods of generating Time-base waveforms
   - Operation of Sampling gates
   - Realization of logic gates using Diodes and Transistors
2. Perform the analysis of Wave shaping circuits
3. Design and develop different Multivibrator Circuits
4. Solve engineering problems pertaining to pulse and Digital circuits.

DETAILED SYLLABUS:

UNIT-I: LINEAR WAVE SHAPING

High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square and ramp inputs. High pass RC network as differentiator and Low pass RC network as integrator, attenuators and its applications in CRO probe, RL and RLC circuits and their response for step input, Ringing circuit. Problem solving.

UNIT-II: NON-LINEAR WAVE SHAPING

Diode clippers, Transistor clippers, clipping at two independent levels, Comparators, applications of voltage comparators, clamping operation, clamping circuits taking source and diode resistances into account, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage, Synchronized clamping.

UNIT-III: SWITCHING CHARACTERISTICS OF DEVICES

Diode as a switch, piecewise linear diode characteristics, Diode switching times, Transistor as a switch, Break down voltages, transistor in saturation, temperature variations of saturation parameters, Transistor-switching times, Silicon-controlled-switch circuits.

UNIT-IV: MULTIVIBRATOR CIRCUITS

Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger Circuit using BJT, Concept of triggering, Symmetrical and asymmetrical configurations.

UNIT-V: 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, Transistor Current time base generators, Methods of linearity improvements.

UNIT-VI: SAMPLING GATES

Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates, Four Diode Sampling gate, Reduction of pedestal in gate circuits, Six diode gate, Applications of sampling gates.

UNIT-VII: SYNCHRONIZATION AND FREQUENCY DIVISION

Principles of Synchronization of relaxation Devices, Frequency division in sweep circuit, Stability of relaxation devices, Astable relaxation circuits, Monostable relaxation circuits, Synchronization of a sweep circuit with symmetrical signals, Sine wave frequency division with a sweep circuit, A Sinusoidal Divider using Regeneration and Modulation.

UNIT-VIII: REALIZATION OF LOGIC GATES USING DIODES & TRANSISTORS

AND, OR & NOT gates using Diodes & Transistors, DCTL, RTL, DTL, TTL and CMOS Logic families, and Comparison between the logic families.

TEXT BOOKS:

1. J. Millman and H. Taub, *Pulse, Digital and Switching Waveforms*, McGraw-Hill, 1991.
2. David A. Bell, *Solid State Pulse circuits*, 4th Edition, PHI, 2002.
3. Jacob Milliman, Christors C Halkias, *Integrated Electronics,* 1st Edition, TMH, 2004.

REFERENCE BOOKS:

1. A. Anand Kumar, *Pulse and Digital Circuits*, 2nd Edition, PHI, 2005.
2. L. Strauss, *Wave Generation and Shaping*, 5th Edition, TMH, 2010.
3. R.Venkataraman, *Pulse, Digital Circuits and Computer Fundamentals*, 3rd Edition, Dhanapat Rai Publications, 2005.

II B.Tech. II Semester

10BT40403: ELECTROMAGNETIC WAVES AND TRANSMISSION LINES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Engineering Mathematics & Engineering Physics.

COURSE DESCRIPTION: Electrostatics; Magnetostatics; Time varying fields; EM wave's characteristics; Transmission lines.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in
   - Electrostatics
   - Magnetostatics
   - Boundary conditions
   - Maxwell's equations
   - Poynting theorem
   - Transmission line applications
   - EM wave's characteristics
2. Analyze different electromagnetic problems.
3. Design and Develop different impedance transformation techniques.
4. Solve engineering problems by proposing Maxwell's equations.

DETAILED SYLLABUS:

Review of Coordinate Systems, Vector Calculus.

UNIT-I: **ELECTROSTATICS-I**

Coulomb's Law, Electric Field Intensity – Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Maxwell's Two Equations for Electrostatic Fields, Energy Density, illustrative Problems.

UNIT-II: **ELECTROSTATICS-II**

Convection and Conduction Currents, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations; Capacitance – Parallel Plate, Coaxial, Spherical Capacitors, illustrative Problems.

UNIT-III: MAGNETOSTATICS

Biot-Savart's Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductances and Magnetic Energy, illustrative Problems.

UNIT-IV: MAXWELL'S EQUATIONS (TIME VARYING FIELDS)

Faraday's Law and Transformer emf, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements. Conditions at a Boundary Surface: Dielectric-Dielectric and Dielectric-Conductor Interfaces, illustrative Problems.

UNIT-V: **EM WAVE CHARACTERISTICS – I**

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

UNIT-VI: EM WAVE CHARACTERISTICS – II

Reflection and Refraction of Plane Waves – Normal and Oblique Incidences for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector and Poynting Theorem – Applications, Power Loss in a Plane Conductor, illustrative Problems.

UNIT-VII:TRANSMISSION LINES - I

Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Losslessness/Low Loss Characterization, Distortion – Condition for Distortionless and Minimum Attenuation, Loading - Types of Loading, illustrative Problems.

UNIT-VIII: TRANSMISSION LINES – II

Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR, UHF Lines as Circuit Elements; $\lambda/4$, $\lambda/2$, $\lambda/8$ Lines – Impedance Transformations. Significance of Z_{min} and Z_{max}, Smith Chart – Configuration and Applications, Single and Double Stub Matching, illustrative Problems.

TEXT BOOKS:

1. E.C. Jordan and K.G. Balmain, *Electromagnetic Waves and Radiating Systems*, 2nd Edition, PHI, 2000.
2. Matthew N.O. Sadiku, *Elements of Electromagnetic*, 3rd Edition, Oxford University Press, 2001.

REFERENCE BOOKS:

1. William H. Hayt Jr. and John A. Buck, *Engineering Electromagnetics*, 7th Edition, TMH, 2006.
2. John D. Ryder, *Networks, Lines and Fields*, 2nd Edition, PHI, 1999.
3. Nathan Ida, *Engineering Electromagnetics*, 2nd Edition, Springer (India) Pvt. Ltd., New Delhi, 2005.
4. Schaum's Out-lines, *Electromagnetics,* 2nd Edition, TMH, 2006.

II B.Tech. II Semester

10BT40404: SWITCHING THEORY AND LOGIC DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: A course on Basic algebra.

COURSE DESCRIPTION: Introduction to number systems; logic gates, simplification of switching functions using Karnaugh Map method and Quine Mccluskey method; Design of combinational circuits; Basics of Programmable Logic Devices(PLDs); Implementation of Boolean Functions using PLDs; Design of sequential circuits; Algorithmic State Machines.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in:

- Basic theorems, properties and postulates of Boolean algebra.
- Minimization of switching functions using Map method and Tabular method.
- Design of combinational and sequential circuits.
- Realization of Boolean functions using PLDs.
- ASM charts.

2. Perform the analysis of reduction of boolean functions and implementation using PLDs.
3. Design and develop various combinational and sequential circuits.
4. Solve engineering problems and arrive at optimal solutions pertaining to Digital Electronics.

DETAILED SYLLABUS:

UNIT-I: NUMBER SYSTEMS & CODES
Philosophy of number systems – complement representation of negative numbers, binary arithmetic, binary codes, error detecting & error correcting codes, hamming codes.

UNIT-II: BOOLEAN ALGEBRA AND SWITCHING FUNCTIONS
Fundamental postulates of Boolean Algebra, Basic theorems and properties, switching functions, Canonical and Standard forms, algebraic simplification, digital logic gates, properties of XOR gate, universal gates, Multilevel NAND/NOR realizations.

UNIT-III: MINIMIZATION OF SWITCHING FUNCTIONS
Map method, Prime implicants, Don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime-Implicant chart, simplification rules.

UNIT-IV: COMBINATIONAL LOGIC DESIGN
Design using conventional logic gates-Binary Adders, Subtractors, Look ahead carry generator, Decimal adder-BCD adder, Binary multiplier, Modular design using IC chips-Magnitude comparator, Encoder, Decoder, Multiplexer- MUX Realization of switching functions, De-Multiplexer, Parity bit generator, Code-converters, Hazards and hazard free realizations.

UNIT-V: PROGRAMMABLE LOGIC DEVICES, THRESHOLD LOGIC
Basic PLD's-ROM, PROM, PLA, PAL, Realization of Switching functions using PLD's. Capabilities and limitations of Threshold gate, synthesis of threshold functions, multigate synthesis.

UNIT-VI: SEQUENTIAL CIRCUITS - I
Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples),Basic flip-flops, Triggering and excitation tables, Steps in synchronous sequential circuit design, Design of Synchronous counters – modulo-N, up/down counter, ring counter, Johnson counter, Design of Asynchronous counter-modulo-N , Sequence detector, Serial binary adder.

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

UNIT-VIII: ALGORITHMIC STATE MACHINES

Salient features of the ASM chart, Simple examples, System design using data path and control subsystems, control implementations, examples of Weighing machine and Binary multiplier.

TEXT BOOKS:

1. Morris Mano, *Digital Design,* 3rd Edition, PHI.
2. Zvi Kohavi, *Switching & Finite Automata theory,* 2nd Edition, TMH.

REFERENCE BOOKS:

1. Charles H. Roth, *Fundamentals of Logic Design*, 5th Edition, Thomson Publications, 2004.
2. Fletcher, *An Engineering Approach to Digital Design,* 1st Edition, PHI, 2005.
3. John M. Yarbrough, *Digital Logic Applications and Design,* Thomson Publications, 2006.
4. A Anand Kumar, *Switching Theory and Logic Design,* PHI, 2008.

II B.Tech. II Semester

10BT40221: PRINCIPLES OF ELECTRICAL ENGINEERING

(Common to ECE, EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Courses on physics and circuit theory.

COURSE DESCRIPTION: Two port networks; Filters; Different types of attenuators; DC Machines; Three phase balanced and unbalanced systems; operation and performance of a transformer; AC Machines and special machines.

COURSE OUTCOMES:

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

1. Demonstrate knowledge on

i) Two port network parameters, filters and attenuators

ii) Operation of electrical machines

iii) Poly phase systems and power measurement

2. Analyze the performance of electrical machines
3. Design and develop electrical circuits to meet desired requirements within realistic constraints.

DETAILED SYLLABUS:

UNIT-I: TWO PORT NETWORKS
Impedance parameters, admittance parameters, hybrid parameters, transmission (ABCD) parameters, conversion of one parameter to another, conditions for reciprocity and symmetry, interconnection of two port networks in series, parallel and cascaded configurations, image parameters, illustrative problems.

UNIT-II: FILTERS
Classification of filters, filter networks, classification of pass band and stop band, characteristic impedance in the pass band & stop bands, constant-k Low pass filter, high pass filter, m-derived T-section, band pass filter and band elimination filter, illustrative problems.

UNIT-III: SYMMETRICAL ATTENUATORS
Symmetrical attenuators, T- type attenuator, Π - type attenuator, bridged T type attenuator, lattice attenuator.

UNIT-IV: DC MACHINES
Principle of operation of DC Machines- constructional features, EMF equation, Types of DC machines, Magnetization and load characteristics of DC generators, characteristics of DC motors, losses and efficiency, Swinburne's test, Speed control: flux and armature voltage control of DC shunt motor.

UNIT-V: POLY PHASE SYSTEM
Advantages of poly phase system over single phase system - phase sequence - star & delta connections, relationship between phase and line quantities, balanced and unbalanced circuits, power measurement in three phase systems using two wattmeter method - problems.

UNIT-VI: TRANSFORMERS AND THEIR PERFORMANCE
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 (simple problems).

UNIT-VII: THREE PHASE INDUCTION MOTORS AND ALTERNATORS
Principle of operation of three phase induction motors, slip ring and squirrel cage motors, alternators: constructional features, principle of operation, types, EMF equation (simple problems).

UNIT-VIII: SPECIAL MACHINES

Principle of operation - shaded pole motors, capacitor motors, AC servomotor, AC tachometers, synchros, stepper motor - characteristics.

TEXT BOOKS:

1. A. Sudhakar, Shyammohan S. Palli, *Network Analysis,* TMH, 3rd Edition, New Delhi, 2009.
2. B.L. Theraja and A.K. Theraja, *A Text Book Electrical Technology*, Vol - 2, S. Chand Company, New Delhi, 2010.

REFERENCE BOOKS:

1. John D. Ryder, *Networks, Lines and Fields*, 2nd edition, Prentice Hall India, New Delhi, 2009.
2. C.L. Wadhwa, *Network Analysis and Synthesis*,3rd Edition, NewAge International Publishers, 2007.
3. T.K. Nagasarkar and M.S. Sukhija, *Basic Electrical Engineering,* Oxford University Press, New Delhi, 2005.
4. W.H. Hayt and J.E. Kemmerly and S.M. Durbin, *Engineering Circuits Analysis*, 6th Edition, TMH, New Delhi, 2006.
5. M.S. Naidu and S. Kamakshaiah, *Introduction to Electrical Engineering*, TMH, 2008.

II B.Tech. II Semester

10BT40411: ELECTRONIC CIRCUITS LAB

(Common to ECE & EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Courses on Semiconductor devices & circuits and Electronic circuit analysis.

COURSE DESCRIPTION: Design, simulation and verification of single and multistage amplifiers, feedback amplifiers, power amplifiers and oscillators.

COURSE OUTCOMES:

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

1. Analyze amplifier, oscillator and tuned circuits.
2. Design and develop multistage & power amplifiers and oscillator circuits.
3. Conduct of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
4. Use PSPICE tools for simulation of amplifier and oscillator circuits.

List of Experiments: (Minimum of Twelve experiments to be conducted)

I) Design and Simulation in Simulation Laboratory using Any Simulation Software.

(Minimum of Six Experiments to be conducted):

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

II) Testing in the Hardware Laboratory:

Any Three circuits simulations in Simulation laboratory

Any Three of the following

Class A Power Amplifier (with transformer load)

Class C Power Amplifier

Single Tuned Voltage Amplifier

Hartley and Colpitt's Oscillators

Darlington Pair

MOSFET Amplifier

II B.Tech. II Semester

10BT40231: ELECTRICAL ENGINEERING LAB

(Common to ECE, EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Courses on Principles of electrical engineering and circuit theory.

COURSE DESCRIPTION: Determination of Two port network parameters; Verification of network theorems; Response of RLC circuits; Performance characteristics of AC and DC Machines; Determination of losses in a transformer.

COURSE OUTCOMES:

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

1. Analyze electrical circuits using network theorems and performance of electrical machines.
2. Design various types of passive filters.
3. Solve complex problems in electrical circuits and machines

Any SIX experiments from each part to be conducted

PART - A

1. Series and parallel resonance - timing, resonant frequency, bandwidth and Q-factor determination for RLC network
2. Time response of first order RL/RC network for periodic non-sinusoidal inputs - time constant and steady state error determination
3. Two port network parameters - Z and Y parameters
4. Two port network parameters - ABCD and h-parameters
5. Verification of Superposition and Reciprocity theorems
6. Verification of maximum power transfer theorem. Verification on both DC and AC
7. Experimental determination of Thevenin's and Norton's equivalent circuits and verification by direct test
8. Constant - k low pass filter and high pass filter - design and test

PART - B

1. Magnetization characteristics of DC shunt generator. Determination of critical filed resistance
2. Swinburne's test on DC shunt machine (Predetermination of efficiency of a given DC shunt machine working as motor and generator)
3. Brake test on DC shunt motor. Determination of performance characteristics
4. Speed control of DC motor by
    a. Field flux control method
    b. Armature voltage control method
5. OC and SC tests on single-phase transformer (predetermination of efficiency and regulation at given power factors and determination of equivalent circuit)
6. Load test on single phase transformer
7. Brake test on three-phase induction motor. Determination of performance characteristics

II B.Tech. II Semester

10BT4HS02: ADVANCED ENGLISH COMMUNICATION SKILLS

(Common to ECE, EIE, EEE, EConE & BOT)

(Audit Course)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
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PREREQUISITES: Basic Grammar and Fundamentals of Writing Skills.

COURSE DESCRIPTION: Vocabulary Building; Reading Comprehension; Academic Essay; Technical Report; Career Skills; Resume Writing; Group Discussion; Interview Skills.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in.
    a. Vocabulary
    b. Etymology
    c. Idioms and Phrases
2. Analyze the functional knowledge of writing, styles and techniques for academic and professional requirements.
3. Interpret and synthesize the language functions through:
    a. Role Plays
    b. Group Discussions
    c. Mock Interviews
4. Use and create techniques and language lab software for enhancing the language skills.
5. Communicate effectively with engineering community and society in formal and informal situations.
6. Inculcate attitude to upgrade communicative competence for meeting global challenges.

DETAILED SYLLABUS:

UNIT I: VOCABULARY BUILDING

Synonyms and Antonyms, Word roots, One-word substitutes, Prefixes and Suffixes, Study of word origin, Analogy, Idioms and Phrases.

FUNCTIONAL ENGLISH: starting conversation, responding appropriately and relevantly, using the right body language, role play in different situations.

UNIT II: READING COMPREHENSION

Reading for facts, Guessing meanings from context, Scanning, Skimming, Inferring meaning and Critical reading.

UNIT III: ACADEMIC ESSAY WRITING

Accuracy, Brevity, Clarity, Brainstorm, List your ideas, Sub-headings, Revising Content and Organisation.

UNIT IV: TECHNICAL REPORT WRITING

Types of formats and styles, Subject-matter, Subject-organization, Clarity, Coherence and Style, Planning, Data-collection, Tools, Analysis.

UNIT V: CAREER SKILLS

Career direction, Exploring your talents, Personality inventories, Write a "Who I Am" statement, Thinking further, Perform career research, How do I get hired, Creating job satisfaction, Identify your satisfaction triggers, Positive attitude, Maintain a balanced lifestyle, Analyze your job in terms of your interests, Set goals to bring your interests and responsibilities in line, Personal SWOT analysis, Making the most of your talents and opportunities, Shaping your job to fit you better, Future proof your career, Managing your emotions at work, Get the recognition you deserve.

UNIT VI: RESUME WRITING

Structure and Presentation, Planning, Defining the career objective, Projecting ones strengths and skill-sets, Summary, Formats and Styles, Cover letter.

UNIT VII: GROUP DISCUSSION

Dynamics of group discussion, Intervention, Summarizing, Modulation of voice, Fluency and Coherence, Participation, Relevance, Assertiveness, Eye contact and Body language.

UNIT VIII: INTERVIEW SKILLS

Concept and Process, Pre-interview planning, Opening strategies, Answering strategies, Interview through Tele and Video-conferencing.

REFERENCE BOOKS:

1. M. Ashraf Rizvi, "Effective Technical Communication Skills". TMH, 2005.
2. Meenakshi Raman and Sangetha Sharma, "Technical Communication, Principles and Practice." Oxford University Press, New Delhi, 2010.
3. Santha Kumar R, "Secrets of Success in Interviews". Crucial Books, Secunderabad, 2007.
4. M. Ashraf Rizvi, "Resumes and Interviews - The Art of Wining". TMH, 2008.
5. Gopala Swamy Ramesh and Mahadevan Ramesh, "The Ace of Soft Skills: Attitude, Communication and Etiquette for Success", Pearson Education, New Delhi, 2009.

SUGGESTED SOFTWARE:

1. TOEFL, GRE and IELTS (Kaplan, Aarco and Barrons, Cliffs)
2. Softwares from 'train2success.com'
3. Resume Preparation, K-Van Solutions.
4. Facing Interviews, K-Van Solutions.
5. Study Skills Success, (Essay, Vocabulary strategies, IELTS), Young India Films.
6. Vocabulary Builder, Young India Films.
7. E-correspondence, Young India Films.
8. Group Discussions, (Ease - 2), Young India Films.
9. Report Writer, Young India Films.

III B.Tech. I Semester

10BT40501: COMPUTER ARCHITECTURE AND ORGANIZATION

(Common to ECE, EEE & EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: A Course on "Digital Logic Design".

COURSE DESCRIPTION: Structure of Computers; Register Transfer and Micro-Operations; Micro-programmed Control; Pipeline and Vector Processing; the Memory System, Input-Output Organization; Multi-Processors and Case studies.

COURSE OUTCOMES:

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

1. Demonstrate knowledge on organization of basic building blocks of digital computer, Peripheral devices, Buses, Register Transfer Language, Communication protocols, Multiprocessors, RISC and CISC architectures.
2. Understand the operation of the arithmetic unit and implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
3. Apply concepts of pipelining, vector processing and multiprocessing to enhance the performance.

DETAILED SYLLABUS:

UNIT I: STRUCTURE OF COMPUTERS
Computer Types, Functional Units, Basic Operational concepts, Von-Neumann Architecture, Bus Structures, Software, Performance, Multiprocessors and Multicomputers.
Computer Arithmetic: Review of Representation of Information, Addition and Subtraction, Multiplication and Division Algorithms, Floating-Point Arithmetic Operation, Decimal Arithmetic Unit, Decimal Arithmetic operations.

UNIT II: 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, 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). Comparison of RISC and CISC.

UNIT III: MICROPROGRAMMED CONTROL
Control Memory, Address Sequencing, Micro-program Example, Design of Control Unit, Hardwired Control, Micro-programmed Control, Nanoprogramming.

UNIT IV: PIPELINE AND VECTOR PROCESSING
Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Data Hazards, Instruction Hazards, Influence on Instruction sets, Data Path & Control Consideration, Superscalar Operations, Vector Processing, Array Processors.

UNIT V: THE MEMORY SYSTEM
Basic Concepts, Semiconductor RAM, Types of Read-only Memory (ROM), Cache Memory, Performance Considerations, Virtual Memory, Secondary Storage, and Introduction to Redundant Array of Inexpensive Disks (RAID).

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA).

UNIT-VI: INPUT-OUTPUT ORGANIZATION (ADVANCED)
Input-Output Processor (IOP), Serial communication, Introduction to peripheral component Interconnect (PCI) bus, Introduction to Standard Serial Communication Protocols Like RS232, USB, and IEEE1394.

UNIT VII: MULTIPROCESSORS
Characteristics of Multiprocessors, Interconnection Structures, Interprocessor Arbitration, Interprocessor Communication and Synchronization, Cache Coherance, Shared Memory Multiprocessors.

UNIT VIII: CASE STUDIES
CISC Architecture-Pentium IV, RISC Architecture-PowerPC.

TEXT BOOKS:

1. M. Moris Mano, *Computer System Architecture*, 3rd Edition, Pearson/PHI, 2008.
2. William Stallings, *Computer Organization and Architecture*, 6th Edition, Pearson/PHI.

REFERENCE BOOKS:

1. Carl Hamacher, Zvonks Vranesic, SafeaZaky, *Computer Organization*, 5th Edition, McGraw Hill, 2002.
2. Andrew S. Tanenbaum, *Structured Computer Organization*, 4th Edition, PHI/Pearson
3. Sivarama P. Dandamudi, *Fundamentals of Computer Organization and Design*, Springer International Edition, 2003.
4. John P. Hayes, *Computer Architecture and Organization*, 3rd Edition, TMH, 1998.

III B.Tech. I Semester

10BT50401: ANALOG COMMUNICATIONS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Courses on Semiconductor Devices and circuits, Signals and Systems.

COURSE DESCRIPTION: Analog modulations; Modulators and De-Modulators; Transmitters; Receivers and Signal to noise ratio calculations.

COURSE OUTCOMES:

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

1. Demonstrate fundamental knowledge in
   - Elements of communication systems.
   - Amplitude, Frequency, and Phase Modulations
   - Amplitude, Frequency, and Phase Modulatiors and De-Modulators .
   - Types of noise
   - Time Division Multiplexing.
   - Frequency Division Multiplexing.
2. Perform analysis of different modulations and calculate total power, bandwidth in the modulated wave.
3. Design an efficient Transmitter and Receiver Which has High SNR (signal to noise Ratio).
4. Formulate and solve technology specific problems in developing Modulators using integrated circuits.

DETAILED SYLLABUS:

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

UNIT-II: DSB MODULATION
Double side band suppressed carrier modulators, time domain and frequency domain description, Generation of DSB-SC Waves- Balanced Modulators, Ring Modulator, Detection of DSB-SC Modulated waves- Coherent detector, COSTAS Loop

UNIT-III: SSB & VSB MODULATION
Frequency domain description, Frequency discrimination method for generation of AM SSB Modulated Wave, Time domain description, Phase discrimination method for generating AM SSB Modulated waves. Demodulation of SSB Waves, Vestigial side band modulation: Frequency description, Generation of VSB Modulated wave, Time domain description, Envelope detection of a VSB Wave pulse Carrier, Comparison of AM Techniques, Applications of different AM Systems.

UNIT-IV: ANGLE MODULATION
Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Waves, Direct FM, Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Comparison of FM & AM.

UNIT-V: NOISE
Noise in Analog communication System, Signal to Noise ratio in AM, DSB & SSB System, Signal to Noise ratio in Angle Modulation System, Threshold effect in Angle Modulation System, Pre-emphasis & De-emphasis.

UNIT-VI: TRANSMITTERS
Radio Transmitter - Classification of Transmitter, AM Transmitter, Effect of feed back on performance of AM Transmitter, FM Transmitter – Variable reactance type and phase modulated FM Transmitter, frequency stability in FM Transmitter.

UNIT-VII: RECEIVERS

Radio Receiver - Receiver Types - Tuned radio frequency receiver, Superhetrodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Comparison with AM Receiver, Amplitude limiting.

UNIT-VIII: PULSE MODULATION

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

MULTIPLEXING:Introduction to multiplexing, Time division multiplexing, Frequency division multiplexing.

TEXT BOOKS:

1. Simon Haykin, *Communication Systems*, 2nd Edition, John Wiley, 1978.
2. B.P. Lathi, *Communication Systems*, BS Publication, 2006.
3. George Kennedy and Bernard Davis, *Electronics & Communication System*, TMH, 2004.

REFERENCE BOOKS:

1. H Taub & D. Schilling, Gautam Sahe, *Principles of Communication Systems*, 3rd Edition, TMH, 2007.
2. R.P. Singh, SP Sapre, *Communication Systems*, 2nd Edition, TMH, 2007.
3. G.K. Mithal, *Radio Engineering*, 20th Edition, Khanna Publishers, 2003.

III B.Tech. I Semester

10BT50402: ANTENNAS AND WAVE PROPAGATION

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: A Course on Electromagnetic wave and transmission line.

COURSE DESCRIPTION: Antenna parameters; Wire antennas; Antenna arrays; VHF, UHF and Microwave antennas; Antenna measurements; Wave propagation.

COURSE OUTCOMES:

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

1. Demonstrate knowledge on the fundamental principles of antenna theory.
2. Analyze complex engineering problems critically for conducting research in antennas design.
3. Solve engineering problems with wide range of solutions in antennas and wave propagation.
4. Apply appropriate techniques, resources and tools to engineering activities in the field of Antenna Design.

DETAILED SYLLABUS:

UNIT-I: ANTENNA BASICS

Introduction, Basic antenna parameters- patterns, Beam Area, Radiation Intensity, Beam Efficiency, Directivity-Gain-Resolution, Antenna Apertures, Effective height, Illustrative problems. Fields from oscillating dipole, Field Zones, Shape-Impedance considerations, Antenna temperature, front–to-back ratio, antenna theorems, radiation- basic Maxwell's equations, retarded potential-Helmholtz Theorem.

UNIT-II: THIN LINEAR WIRE ANTENNAS

Radiation from Small Electric Dipole, Quarter wave Monopole and Half wave Dipole – Current Distributions, Field Components, Radiated power, Radiation Resistance, Beam width, Directivity, Effective Area and Effective Height. Natural current distributions, far fields and patterns of Thin Linear Center-fed Antennas of different lengths, Illustrative problems. Loop Antennas: Introduction, Small Loop, Comparison of far fields of small loop and short dipole, Radiation Resistances and Directives of small and large loops (Qualitative Treatment).

UNIT-III: ANTENNA ARRAYS

Point sources- Definition, Patterns, arrays of 2 Isotropic sources-Different cases. Principle of Pattern Multiplication, Uniform Linear Arrays – Broadside Arrays, Endfire Arrays, EFA with Increased Directivity, Derivation of their characteristics and comparison, BSA with Non-uniform Amplitude Distribution - General considerations and Binomial Arrays, Illustrative problems.

UNIT-IV: VHF, UHF AND MICROWAVE ANTENNAS - I

Arrays with Parasitic Elements, Yagi - Uda Arrays, Folded Dipoles & their characteristics. Helical Antennas-Helical Geometry, Helix modes, Practical Design considerations for Monofilar Helical Antenna in Axial and Normal Modes. Horn Antennas- Types, Fermat's Principle, Optimum Horns, Design Considerations of Pyramidal Horns, Illustrative Problems.

UNIT-V: VHF, UHF AND MICROWAVE ANTENNAS - II
Microstrip Antennas- Introduction, features, advantages and limitations, Rectangular patch antennas- Geometry and parameters, characteristics of Microstrip antennas, Impact of different parameters on characteristics, reflector antennas- Introduction, Flat sheet and corner reflectors, paraboloidal reflectors- geometry, pattern characteristics, Feed Methods, Reflector Types- Related Features, Illustrative Problems.

UNIT-VI: LENS ANTENNAS
Introduction, Geometry of Non-metallic Dielectric Lenses, Zoning, Tolerances, Applications.
ANTENNA MEASUREMENTS: Introduction, Concepts- Reciprocity, Near and Far Fields, Coordination system, sources of errors, Patterns to be Measured, Pattern Measurement Arrangement, Directivity Measurement , Gain Measurements (by comparison, Absolute and 3-Antenna Methods).

UNIT-VII: WAVE PROPAGATION - I
Introduction, Definitions, Characterizations and general classifications, different modes of wave propagation, Ray/ Mode concepts. Ground wave propagation (Qualitative treatment)- Introduction, Plane earth reflections, Space and surface waves, wave tilt, curved earth reflections. Space wave propagation- Introduction, field strength variation with distance and height, effect of earth's curvature, absorption. Super refraction, M-curves and duct propagation, scattering phenomena, tropospheric propagation, fading and path loss calculations.

UNIT-VIII: WAVE PROPAGATION – II
Sky wave propagation- Introduction, structure of Ionosphere, refraction and reflection of sky waves by Ionosphere, Ray path, Critical frequency, MUF, LUF, OF, Virtual height and Skip distance, Relation between MUF and Skip distance, Multi-HOP propagation, Energy loss in Ionosphere, Summary of Wave Characteristics in different frequency ranges.

TEXT BOOKS:

1. John D. Kraus and Ronald J. Marhefka and Ahmad S.Khan, *Antennas and wave propagation,* 4th Edition (special Indian Edition), TMH, New Delhi, 2010.
2. E.C. Jordan and K.G. Balmain, *Electromagnetic Waves and Radiating Systems,* 2nd Edition, PHI, 2000.

REFERENCE BOOKS:

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

III B.Tech. I Semester

10BT50403: LINEAR IC APPLICATIONS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Course on Semiconductor Devices and Circuits and Electronic Circuit Analysis.

COURSE DESCRIPTION: Operational Amplifiers (Op-Amp) basics and its characteristics, study of Op-Amp Linear and Non Linear Applications, Designing of Filter circuits, study of internal functional blocks and the applications of special ICs like Timers, PLL circuits, DACs /ADCs, Analog Multipliers and Modulators.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in
   - Op-Amp IC application.
   - 555 Timer applications.
   - PLL applications.
2. Analyze Op-Amp circuits and evaluate its Gain, Bandwidth, Input and Output impedances.
3. Design and Develop Linear ICs subsystems and systems.
4. Solve engineering problems by proposing potential solutions leading to design better Linear ICs.

DETAILED SYLLABUS:

UNIT-I: INTEGRATED CIRCUITS

Differential amplifier –DC and AC analysis of Dual input balanced output configuration, Properties of other differential amplifier configuration (dual input unbalanced output, single ended input-balanced/unbalanced output), DC coupling and cascade differential amplifier stages, Level Translator.

UNIT-II:

Characteristics of OP-Amps, integrated circuits-types, classification, package types and temperature ranges, power supplies, OP-Amp Block diagram, ideal and practical OP-Amp specifications, DC and AC characteristics, 741 OP-Amp and its features, FET input OP-Amps, OP-Amp parameters and measurement, input and output offset voltages and currents, slew rate, CMRR, PSRR, drift, Frequency compensation technique.

UNIT-III: LINEAR APPLICATIONS OF OPERATIONAL AMPLIFIER

Inverting and non-inverting amplifier, integrator and differentiator, difference amplifier, instrumentation amplifier, AC amplifier, V-I, I-V converters, Buffers.

UNIT-IV: NON - LINEAR APPLICATIONS OF OPERATIONAL AMPLIFIER

Non-linear function generation, comparators, Multivibrators, Triangular and square wave generators, Log and antilog amplifiers, precision rectifiers.

UNIT-V: ANALOG FILTERS

Introduction, Butterworth filters-first order, second order Low Pass, High Pass, Band pass, Band reject and all pass filters.

UNIT-VI: TIMERS AND PHASE LOCKED LOOPS

Introduction to 555 Timer, functional diagram, Monostable and Astable operations and applications, Schmitt Trigger, PLL-Introduction, Block schematic, principles and description of individual blocks,565 PLL, applications of PLL-Frequency multiplication, frequency translation, AM, FM and FSK demodulators.

UNIT–VII: D/A AND A/D CONVERTERS

Introduction, Basic DAC techniques, weighted resistor DAC, R-2R Ladder DAC, Inverted R-2R DAC and IC 1408 DAC, different types of ADCs-parallel comparator type ADC, counter type ADC, successive approximation ADC and Dual slope ADC. DAC and ADC specifications, specifications of AD 574 (12 bit ADC).

UNIT-VIII: ANALOG MULTIPLIERS AND MODULATORS

Four quadrant multiplier, Balanced modulator, IC 1496, applications of analog switches and multiplexers, sample and hold amplifiers.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. David A. Bell, *Operational Amplifiers & Linear ICs,* 2nd Edition, Oxford University Press, 2010.
2. R.F.Coughlin & Fredrick Driscoll, *Operational Amplifiers & Linear Integrated Circuits,* 6th Edition, PHI, 2001.
3. Sergio Franco, *Design with Operational Amplifiers & Analog Integrated Circuits,* McGraw Hill, 1988.

III B.Tech. I Semester

10BT50404: DIGITAL IC APPLICATIONS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Courses on Switching Theory and Logic Design, Semiconductor Devices and Circuits.

COURSE DESCRIPTION: Logic Families - Bipolar, CMOS and its Interfacing; VHDL Language Design Flow and Elements; IC Level Combinational and Sequential Logic Design and Modeling; Memories.

COURSE OUTCOMES:

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

1. Demonstrate fundamental knowledge in
   - Classification of Integrated Circuits.
   - Characteristics of ICs.
   - TTL, ECL and MOS Logic families.
   - Interfacing between different Logic Families.
   - Design Combinational and Sequential circuits using Digital ICs such as 74XX, 40XX IC's and model them in different modeling styles in VHDL.
   - Identify various types of memories and their interfacing.
2. Perform analysis of any Small Scale or Medium Scale Integrated Circuit.
3. Design and develop circuits from simple design like adders to complex designs like interfacing memories.
4. Solve problems arising due to poor interfacing between ICs by choosing the appropriate IC to develop complex designs.

DETAILED SYLLABUS:

UNIT-I: CMOS LOGIC

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

UNIT-II: BIPOLAR LOGIC AND INTERFACING

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

UNIT-III: THE VHDL HARDWARE DESCRIPTION LANGUAGE

Design flow, program structure, types and constants, functions and procedures, libraries and packages.

UNIT-IV: THE VHDL DESIGN ELEMENTS

Structural design elements, data flow design elements, behavioral design elements, time dimension and simulation synthesis.

UNIT-V: COMBINATIONAL LOGIC DESIGN

Decoders, encoders, three state devices, multiplexers and demultiplexers, Code Converters, EX-OR gates and parity circuits, comparators, adders & subtractors, ALUs, Combinational multipliers. VHDL modes for the above ICs.

UNIT-VI: DESIGN EXAMPLES (USING VHDL)

Design examples (using VHDL) - Barrel shifter, comparators, floating-point encoder, dual parity encoder.

UNIT-VII: SEQUENTIAL LOGIC DESIGN

Latches and flip-flops, PLDs, counters, shift registers, and their VHDL models, synchronous design methodology, impediments to synchronous design.

UNIT-VIII: MEMORIES

ROM: Internal structure, 2D-decoding commercial types, timing and applications.

Static RAM: Internal structure, SRAM timing, standard SRAM, synchronous SRAM.

Dynamic RAM: Internal structure, timing, synchronous DRAM. Familiarity with Component Data Sheets – Cypress CY6116, CY7C1006, Specifications.

TEXT BOOKS:

1. John F. Wakerly, *Digital Design Principles & Practices,* 3rd Edition, PHI/ Pearson Education, Asia, 2005.
2. J. Bhasker, *A VHDL Primer*, 3rd Edition, Pearson Education/ PHI.

REFERENCE BOOKS:

1. Charles H. Roth Jr., *Digital System Design Using VHDL*, 2nd Edition, PWS Publications, 2008.
2. Stephen Borwn and Zvonko Vramesic, *Fundamentals of Digital Logic with VHDL Design*, 2nd Edition, McGraw Hill, 2005.

III B.Tech. I Semester

10BT4HS01: MANAGERIAL ECONOMICS AND PRINCIPLES OF ACCOUNTANCY

(Common to ECE, CSSE & IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Nil.

COURSE DESCRIPTION: Managerial Economics; Demand and Elasticity of Demand; Production Functions; Markets and Pricing Policies; Formation of different types of Business Organizations; Principles of Accounting; Final Accounts; Capital Budgeting and its Techniques; and Computerized Accounting with Tally software.

COURSE OUTCOMES:

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

1. Demonstrate Knowledge in

a) Tools and concepts of Micro Economics.

b) Basic Principles and concepts of Accountancy.

c) Provides life skills for effective utilization of scarce resources.

d) Financial Accounting.

e) Using advanced tools like tally and SAP.

f) Significance of Economics and Accountancy

2. Develop skills in providing solutions for

a) Managerial decisions of an organization.

b) Demand & Supply, Production & Cost and Markets & Price through Economic theories.

c) Financial data in decision making.

3. Develop effective communication in Business and Accounting transactions.

4. Ascertain the profitability and soundness of the organization.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO MANAGERIAL ECONOMICS AND DEMAND ANALYSIS

Definition, Nature and scope of managerial economics. Demand Analysis: Determinants of demand – Demand Function-Law of demand and its exceptions. Elasticity of demand. Types, Measurement and significance of Elasticity of demand. Demand forecasting and methods of demand forecasting.

UNIT-II: THEORY OF PRODUCTION AND COST ANALYSIS

Production Function: isoquants and isocosts. Input – output relationship. Law of returns, internal and external economies of scale. Cost Concepts: opportunity Vs out lay costs, Fixed Vs Variable costs, Explicit Vs implicit costs, out of pocket Vs inputted costs. Break Even Analysis (BEA), Determination of break even point (Simple problems).

UNIT-III: INTRODUCTION TO MARKETS AND PRICING

Market Structure: Types of Markets. Features of Perfect competition. Monopoly and Monopolistic competition. Price and Output determination in Perfect competition and Monopoly. Pricing: Objectives and policies of Pricing – Sealed bid pricing, Marginal cost pricing, Cost plus pricing, Going rate pricing, Limit Pricing, Market Penetration, Market Skimming, Block pricing, Bundling, Peak load pricing, Cross subsidization,Duel Pricing, Administrated pricing.

UNIT-IV: BUSINESS AND NEW ECONOMIC ENVIRONMENT

Characteristic features of Business, features and evolution of Sole proprietorship, Partnership, Joint stock Company, New Economic policy 1991.

UNIT-V: INTRODUCTION AND PRINCIPLES OF ACCOUNTING

Accountancy: Introduction – Concepts – Conventions – Accounting Principles - Double Entry Book Keeping, Journal, Ledger, Trail Balance (Simple Problems).

UNIT – VI: FINAL ACCOUNTS

Introduction to Final Accounts. Trading Account, Profit and Loss Account, and Balance Sheet with simple adjustments (Simple Problems).

UNIT – VII: CAPITAL AND CAPITAL BUDGETING

Capital: Significance, Types of capital. **Capital Budgeting:** Nature and scope of capital budgeting. Features and Methods of capital budgeting. Pay Back Period Method, Accounting Rate of Return Method, Internal Rate of Return Method, Net present Value Method and Profitability Index (Simple Problems).

UNIT – VIII: COMPUTERIZATION OF ACCOUNTANCY SYSTEM

Manual Accounting Vs Computerized Accounting – Advantages and Disadvantages of Computerized Accounting – Using Accounting Software. Tally: Tally features – Company Creation – Account Groups – Group Creation – Ledger Creation**.**

TEXT BOOKS:

1. A.R. Aryasri, *Managerial Economics and Financial Analysis*, 3rd Edition, TMH, 2007.
2. R. Cauvery, U.K.Sudhanayak, M.Girija and R. Meenakshi, *Managerial Economics,* 1st Edition, S.Chand and company, New Delhi, 1997.

REFERENCE BOOKS:

1. Ms. Samba Lalita, *Computer Accounting Lab Work*, 1st Edition, Kalyani Publishers, Ludhiana, 2009.
2. Vershaney and Maheswari, *Managerial Economics,* 19th Edition Sultan Chand and Sons, New Delhi, 2005.
3. H.Craig Petersen and W.Cris Levis, *Managerial Economics*, 4th Edition, Pearson Education, 2009.
4. Lipsy and Chrystel, *Economics,* 4th edition,Oxford University Press, New Delhi, 2008.
5. S.N.Maheswari and S.K.Maheswari, *Financial Accounting,* 4th Edition, Vikas Publishing House, 2005.
6. S.P. Jain and K.L. Narang, *Financial Accounting,* 5th Edition, Kalyani Publishers, Ludhiana, 2000.

III B.Tech. I Semester

10BT50411: ANALOG COMMUNICATIONS LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: A course on Analog communications.

COURSE DESCRIPTION: Modulators and demodulators for AM and FM systems; Associated circuits; Spectral analysis of AM and FM signals.

COURSE OUTCOMES:

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

1. Analyze problems pertaining to analog modulation, demodulation and associated circuits.
2. Design and develop analog modulation, demodulation and associated circuits.
3. Conduct of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

Minimum Twelve experiments to be conducted:

1. Amplitude modulation and demodulation.
2. Diode detector characteristics.
3. Frequency modulation and demodulation.
4. Balanced modulator.
5. Pre-emphasis & de-emphasis.
6. Characteristics of mixer.
7. Digital Phase detector.
8. Phase locked loop.
9. Synchronous detector.
10. SSB system.
11. Spectral analysis of AM and FM signals using spectrum analyzer.
12. Squelch Circuit.
13. Frequency Synthesizer.
14. AGC Characteristics.

III B.Tech. I Semester

10BT50412: PULSE AND DIGITAL CIRCUITS LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: A course on Pulse and Digital Circuits.

COURSE DESCRIPTION: Wave shaping circuits; switching characteristics of transistor; UJT relaxation oscillator; sampling and logic gates; Design of multivibrator circuits.

COURSE OUTCOMES:

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

1. Analyze electronic circuits pertaining to Integrator , Differentiator, Clipping and clamping circuits.
2. Design and develop multivibrator circuits.
3. Conduct of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

List of Experiments: (Minimum of twelve experiments to be conducted)

PART – A

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers and Clampers.
3. Transistor as a switch.
4. Sampling Gates.
5. Schmitt Trigger.
6. UJT Relaxation Oscillator.
7. Bootstrap sweep circuit.
8. Constant Current Sweep Generator using BJT.
9. Study of Logic Gates & Some applications.
10. Study of Flip-Flops & some applications.

PART – B (Design aspects to be included)

1. Bistable Multivibrator.
2. Monostable Multivibrator.
3. Astable Multivibrator.

III B.Tech. II Semester

10BT6HS01: MANAGEMENT SCIENCE

(Common to ECE & BOT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: Nil.

COURSE DESCRIPTION: Management science approaches in organizations, including modeling and rational approaches to decision-making process; Historic development of management thought: decision making; the management functions of planning, organizing, leading and controlling. Case analysis; materials management; business simulations and real-time projects; analysis and communication, using real world applications and cases; decision analysis as applied to tactical and strategic business decisions.

COURSE OUTCOMES:

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

1. Understand fundamental needs of a small business enterprise and identify the avenues for improvement.
2. Analyze lacunae in management practices in an organization and provide qualitative assessment of the possible remedies to address the lacunae.
3. Design administrative system and process flow for small enterprises for maximizing efficiency.
4. Apply problem-structuring methods used within Management Science.
5. Exercise discernment in implementing managerial decisions for ethical, safe, and sustainable operations of the business operations.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO MANAGEMENT
Concepts of management and organization - Nature and Importance of management - Evolution of management thought - Functions of management - Contributions of F.W. Taylor and Henri Fayol to the management - Systems approach to management - Managerial skills - Elements of corporate planning process - Environmental scanning - SWOT Analysis - Social responsibilities of management.

UNIT-II: DESIGNING ORGANIZATIONAL STRUCTURES
Basic concepts related to organization - Departmentation and decentralization - Types of organizations - Merits, demerits and adoptability to modern firms.

UNIT-III: OPERATIONS MANAGEMENT
Principles and types of plant layout - Methods of production - Forecasting - Forecasting methods - Work study - Basic procedure involved in method study and work measurement - Statistical quality control: Factors affecting quality - Quality control using control charts (simple problems) - Acceptance sampling.

UNIT-IV: MATERIALS MANAGEMENT
Materials management objectives - Inventory - Types of inventory - Safety stock - Classical EOQ model - Need for inventory control - EOQ simple problems - ABC analysis - Purchase procedure - Stores management.
MARKETING: Functions of marketing - Marketing mix - Channels of distribution.

UNIT-V: HUMAN RESOURCES MANAGEMENT (HRM)
Nature and scope of HRM - HRD and personnel management and industrial relations - Functions of HRM - Role of HR Manager in an organization - Performance appraisal - Job evaluation and merit rating - Motivation - Importance of motivation - Maslow's theory of human needs - McGregor's theory X and theory Y - Herzberg's two-factor theory.

UNIT-VI: PROJECT MANAGEMENT (PERT/CPM)
Network analysis - Program evaluation and review technique (PERT) - Critical path method (CPM) - Identifying critical path - Probability of completing the project within given time - Project cost analysis - Project crashing (simple problems).

UNIT- VII: ENTREPRENEURSHIP

Introduction to entrepreneurship - Definition of an entrepreneur - Entrepreneurial traits - Entrepreneur vs. manager - Entrepreneurial decision process - Role of entrepreneurship in economic development - Social responsibilities of entrepreneurs - Opportunities for entrepreneurs in India and abroad - Women as an entrepreneur.

UNIT-VIII: CONTEMPORARY MANAGEMENT PRACTICES

Basic concepts of Just-In-Time (JIT) system - Total quality management (TQM) - Value chain analysis - Enterprise resource planning (ERP) - Business process outsourcing (BPO) - Globalization-Management challenges - Intellectual property rights - Supply chain management - Role of information technology in managerial decision making.

TEXT BOOKS:

1. O.P. Khanna, *Industrial Engineering and Management*, Dhanpat Rai and Sons, 2010.
2. Stoner, Freeman and Gilbert, *Management*, 6th Edition, Pearson Education, New Delhi, 2005.

REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane, *Marketing Mangement*, 12th Edition, PHI, New Delhi, 2007.
2. Koontz and Weihrich, *Essentials of Management,* 6th Edition, TMH, New Delhi, 2007.
3. N.D. Vohra, *Quantitative Techniques in Management,* 2nd Edition, TMH, New Delhi.
4. Heinz Weihrich and Harold Koontz, *Management- A Global Perspective*, 10th Edition, McGraw-Hill International.

III B.Tech. II Semester

10BT60401: DIGITAL SIGNAL PROCESSING

(Common to ECE, EEE, EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: A Course on Signals and Systems.

COURSE DESCRIPTION: Continuous and discrete signals, sequences and systems; DFT and FFT algorithms for the analysis of discrete sequences design and realization of Digital IIR and FIR filters; Multirate systems; Signal processing applications.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in

· Digital signals, sequences and systems.

· DFT and FFT transforms.

· Analog & Digital Design.

· Digital Filter Realization.

· Multirate systems.

2. Analyze the real time situations and requirements to design an appropriate digital filer in suppressing unnecessary frequency components and smoothening the signals.
3. Design and develop digital filters and multi rate system to optimize system performance.
4. Solve problems in processing of signals through digital systems using frequency domain, digital filters and multirate systems.
5. Apply appropriate techniques to engineering activities in processing signals through digital systems.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO DIGITAL SIGNAL PROCESSING
Discrete-time signals and sequences, Linear shift invariant systems, Stability and Causality, Linear constant coefficient difference equations. Frequency domain representation of discrete-time signals and systems.

UNIT-II: DISCRETE FOURIER SERIES
DFS representation of periodic sequences, properties of Discrete Fourier Series. Discrete Fourier Transforms: properties of DFT, Linear convolution of sequences using DFT, Computation of DFT. Relation between Z-Transforms and DFS.

UNIT-III: FAST FOURIER TRANSFORMS
Fast Fourier transforms (FFT): Radix-2 Decimation in time (DIT) and Decimation in frequency (DIF), FFT algorithms, Inverse FFT and FFT for composite N.

UNIT-IV: REALIZATION OF DIGITAL FILTERS
Review of Z-transforms, Applications of Z-Transforms, Solution for difference equations of digital filters, Block diagram representation of linear constant-coefficient difference equations. Basic structures of IIR systems, Transposed forms. Basic structures of FIR systems, System function.

UNIT-V: IIR DIGITAL FILTERS
Introduction to analog and digital filters, Analog filter approximations-Butterworth and chebyshev, Design of IIR digital filters from analog filters, Design examples: analog-digital transformations.

UNIT-VI: FIR DIGITAL FILTERS
Characteristics of FIR digital filters, Frequency response. Design of FIR digital filters using windowing techniques, Frequency sampling technique, Comparison of IIR and FIR filters.

UNIT-VII: MULTIRATE DIGITAL SIGNAL PROCESSING FUNDAMENTALS
Basic sample rate alteration devices, Decimation, Interpolation, Sampling rate conversion, Implementation of sampling rate conversion, Multistage design of decimator and Interpolator.

UNIT-VIII: APPLICATIONS OF DIGITAL SIGNAL PROCESSING
Spectral analysis of nonstationary Signals, Musical sound processing, Signal Compression, Transmultiplexers, Discrete multitone transmission of digital data.

TEXT BOOKS:
1. John G. Proakis, Dimitris G. Manolakis, *Digital signal processing, principles, Algorithms and applications,* 4th Edition, Pearson Education/PHI, 2007.
2. A.V. Oppenheim and R.W. Schaffer, *Discrete Time Signal Processing,* 2nd Edition, PHI, 2006.
3. Sanjit K Mitra, *Digital signal processing, A computer base approach,* 3rd Edition, TMH, 2009.

REFERENCE BOOKS:
1. S Salivahana, A Vallavaraj, C Gnanapriya, *Digital Signal Processing,* TMH, 2005.
2. Andreas Antoniou, *Digital signal processing,* TMH, 2006.

III B.Tech. II Semester

10BT60402: DIGITAL COMMUNICATIONS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: Courses on analog communications, probability and stochastic processes.

COURSE DESCRIPTION: Digitization techniques - PCM, DPCM, Delta modulation and Adaptive delta modulation; Digital modulation techniques; Detection of baseband signals; Channel coding.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in
   - Digitization techniques
   - Digital modulation techniques
   - Data transmission and detection of digital signals
   - Coding techniques.
2. Analyze complex engineering problems critically in the domain of digital communications and systems for conducting research.
3. Design and develop digital communication system.
4. Solve engineering problems for feasible and optimal solutions in the core area of digital communications and systems.

DETAILED SYLLABUS:

UNIT-I: PULSE DIGITAL MODULATION
Elements of digital communication systems, advantages of digital communication systems, Elements of PCM: Sampling, Quantization & Coding, Quantization error, Compading in PCM systems, Electrical Representation of binary signals, Differential PCM systems (DPCM).

UNIT-II: DELTA MODULATION
Delta modulation and its drawbacks, Adaptive Delta modulation, comparison of PCM and DM systems, SNR in PCM and DM systems.

UNIT-III: DIGITAL MODULATION TECHNIQUES
Introduction, ASK, FSK, PSK, DPSK, DEPSK, QPSK, M-ary schemes: PSK, ASK, FSK. Similarity of BFSK and BPSK.

UNIT-IV: DATA TRANSMISSION
Base band signal receiver, probability of error, the optimum filter, White noise: matched filter, probability of error using matched filter, coherent reception: correlation, non-coherent detection of FSK, calculation of error probability of ASK, BPSK, BFSK, QPSK.

UNIT-V: INFORMATION THEORY
Discrete messages, concept of amount of information and its properties. Average information, Entropy and its properties. Information rate, Mutual information and its properties.

UNIT-VI: SOURCE CODING
Introduction, Advantages, Shannon's theorem, Shanon-Fano coding, Huffman coding, efficiency calculations, channel capacity of discrete and analog Channels, capacity of a Gaussian channel, bandwidth –S/N trade off.

UNIT-VII: LINEAR BLOCK CODES
Introduction, Matrix description of Linear Block codes, Error detection and error correction capabilities of Linear block codes, Hamming codes, Binary cyclic codes, Algebraic structure, encoding, syndrome calculation, BCH Codes.

UNIT-VIII: CONVOLUTIONAL CODES
Introduction, encoding of convolutional codes, time domain approach, transform domain approach. Graphical approach: state, tree and trellis diagram decoding using Viterbi algorithm.

TEXT BOOKS:

1. H. Taub and D. Schilling, *Principles of Communication Systems,* 2nd Edition, TMH, 2003.
2. Simon Haykin, *Digital communications,* John Wiley, 2005.
3. B.P.Lathi, *Modern Analog and Digital Communication,* 3rd Edition, Oxford reprint, 2004.

REFERENCE BOOKS:

1. R.P. Singh and S D Sapre, *Communication Systems Analog and Digital,* 2nd Edition, TMH, 2004.
2. Sam Shanmugam, *Digital and Analog Communication Systems,* John Wiley, 2005.
3. John Proakis, *Digital Communications,* 3rd Edition, TMH, 1983.
4. Bernard Sklar, Pabitra Kumar Ray, *Digital Communications Fundamentals and Applications,* 2nd Edition, Pearson Education, 2001.

III B.Tech. II Semester

10BT60403: MICROWAVE ENGINEERING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: A course on Electromagnetic Waves and Transmission Lines.

COURSE DESCRIPTION: Rectangular waveguides and its characteristics; Strip lines and Micro-strip lines; Waveguide components; Microwave tubes; Microwave solid state devices; and Microwave measurements.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in
   - Waveguides
   - Microwave Components
   - Microwave Tubes
   - Microwave Measurements
2. Perform analysis mathematically the operation and working of the various tubes. Quantify the signal and noise characteristics of microwave systems such as communication networks, Radars, and Radiometers and relate this to the design process.
3. Design microwave components such as power dividers, hybrid junctions, microwave filters, ferrite devices, and single stage microwave transistor amplifier.
4. Solve problems in effects of noise on microwave systems.

DETAILED SYLLABUS:

UNIT-I: MICROWAVE TRANSMISSION LINES - I

Introduction, Microwave spectrum and bands, applications of Microwaves. Rectangular Waveguides-Solution of Wave Equation in Rectangular Coordinates, TE and TM mode analysis, Expressions for fields, Characteristic equation and cutoff frequencies, filter characteristics, dominant and degenerate modes, sketches of TE and TM mode fields in the cross section. Mode characteristics - Phase and Group velocities, wavelengths and impedance relations, Illustrative Problems.

UNIT-II: MICROWAVE TRANSMISSION LINES - II

Rectangular Waveguides – Power Transmission and Power Losses, Impossibility of TEM Modes, Micro strip lines-introduction, Z_0 relations, effective dielectric constant, losses, Q-factor, Cavity resonators-introduction, Rectangular cavities, dominant modes and resonant frequencies, Q-factor and coupling coefficients, Illustrative Problems.

UNIT-III: WAVEGUIDE COMPONENTS AND APPLICATIONS-I

Coupling mechanisms- probe, loop, aperture types. Waveguide discontinuities - waveguide Windows, tuning screws and posts, matched loads. Waveguide attenuators - resistive card, rotary vane Attenuators, waveguide phase shifters-dielectric, rotary vane phase shifters. Waveguide multiport junctions-E plane and H plane Tees, Magic Tee, Directional couplers-2 hole, Bath hole types, Illustrative Problems.

UNIT-IV: WAVEGUIDE COMPONENTS AND APPLICATIONS-II

Ferrites-composition and characteristics, Faraday rotation, Ferrite components-Gyrator, Isolator and 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, Illustrative Problems.

UNIT-V: MICROWAVE TUBES-I

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, Velocity Modulation, Applegate diagram, mathematical theory of bunching, power output, efficiency, oscillating modes and O/P characteristics, Effect of Repeller Voltage on Power O/P, Illustrative Problems.

UNIT-VI: MICROWAVE TUBES-II

HELIX TWTs: Significance, types and characteristics of slow wave structures; structure of TWT and amplification process (qualitative treatment), suppression of oscillations, gain considerations.

M -TYPE TUBES: Introduction, cross field effects, Magnetrons-different types, cylindrical travelling wave magnetron-Hull cutoff and Hartree conditions, modes of resonance and PI-mode operation, separation of PI-mode, O/P characteristics, Illustrative Problems.

UNIT-VII: MICROWAVE SOLID STATE DEVICES

Introduction, classification, applications, Transfer Electronic Devices, Gunn diode - principles, RWH theory, characteristics, basic modes of operation - Gunn oscillation modes. LSA Mode, Varactor Diode, Parametric Amplifier, Introduction to Avalanche Transit time devices (brief treatment only).

UNIT-VIII: MICROWAVE MEASUREMENTS

Description of Microwave bench-different blocks and their features, errors and precautions; Microwave power measurement-Bolometer method, Measurement of attenuation, frequency, low and high VSWR, Q of the cavity and impedance measurements.

TEXT BOOKS:

1. Samuel Y. Liao, *Microwave devices and circuits*, 3rd Edition, Pearson Education, 2003.
2. Herbert J.Reich, J.G.Skalnik, P.F.Ordung and H.L.Krauss, *Microwave principles*, CBS publishers and distributors, New Delhi, 2004.

REFERENCE BOOKS:

1. R. E. Collin, *Foundations for Microwave Engineering,* 2nd Edition, IEEE Press, John Wiley, 2002.
2. M. L. Sisodia and G. S. Raghuvanshi, *Microwave circuits and Passive Devices*, Wiley Eastern Ltd., New Age International Publishers Ltd., 1995.
3. Peter A. Rizzi, *Microwave Engineering Passive Circuits*, PHI, 1999.
4. F. E. Terman, *Electronic and Radio Engineering*, 4th Edition, McGraw-Hill, 1995.
5. A. Das, *Microwave Engineering*, 2nd Edition, TMH, 2009.

III B.Tech. II Semester

10BT60404: MICROPROCESSORS AND MICROCONTROLLERS

(Common to ECE, EEE, EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Courses on Digital Logic Design, Computer Organization.

COURSE DESCRIPTION: Intel 8085, 8086 & 8031/51- Architectures, Instruction set; Programmable Interfacing Concepts; Serial Communication; Advanced peripheral Interfacing; Applications.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in

· Internal hardware details of Intel 8085,8086,8051

· Interfacing various peripherals to build stand alone systems.

2. Critically analyze various interfacing methods.
3. Design and develop microcomputer based system to suit a particular application.
4. Choose suitable Hardware and software components of a system that work together to solve engineering problems to exhibit a specific behavior.

DETAILED SYLLABUS:

UNIT-I: 8085 ARCHITECTURE
Microprocessor evolution and types, introduction to 8085 architecture, register organization, pin description, instruction set (briefly), simple programs, interrupts of 8085, interfacing I/O devices using memory mapped I/O and I/O mapped I/O.

UNIT-II: 8086 ARCHITECTURE
Architecture of 8086 microprocessor, register organization, special functions of general purpose registers, memory segmentation, pin description, minimum and maximum mode operation of 8086, timing diagram.

UNIT-III: 8086 INSTRUCTION SET AND ASSEMBLER DIRECTIVES
Machine language instruction formats, addressing modes, instruction set of 8086, assembler directives, simple programs - procedures and macros.

UNIT-IV: PROGRAMMABLE INTERFACING DEVICES
Types of data communication, serial and parallel, methods of parallel data transfer, 8255A (programmable peripheral interface) internal block diagram, operational modes and initialization, interface of I/O devices: A/D, D/A, key board, stepper motor.

UNIT-V: SERIAL DATA COMMUNICATION
Types of serial data transmission, synchronous and asynchronous, 8251 (USART), simple programs for sending and receiving characters with an 8251 (polling & interrupt basis), serial communication standard, RS232C, RS232C to TTL and TTL to RS232C conversion, USB.

UNIT-VI: INTERFACING WITH ADVANCED DEVICES
Memory (static RAM and EPROM) and I/O interfacing with 8086, 8257 (DMA controller), interrupt structure, interrupt vector table, 8259 Programmable Interrupt Controller (PIC), importance of cascading of PICs.

UNIT-VII: 8051 MICROCONTROLLER
Architecture of 8051 microcontroller, internal and external memories, addressing modes and instruction set of 8051, simple programs using 8051.

UNIT-VIII: 8051 INTERRUPTS, COMMUNICATION AND APPLICATIONS

Interrupts, timers/counters and serial communication, programming of interrupts, timers/counters and serial communication interrupts. Interfacing LEDs, seven segment display.

TEXT BOOKS:

1. Douglas V.Hall, *Microprocessors and Interfacing: Programming and Hardware,* revised 2nd edition, TMH.
2. Mazidi and Mazidi, *The 8051 Microcontroller and Embedded Systems*, PHI, 2000.

REFERENCE BOOKS:

1. Ramesh S. Goankar, *Microprocessor- Architecture, Programming and Applications with the 8085*, 5th edition, Penram International publishing private limited.
2. A.K. Ray & K.M.Bhurchandi, A*dvanced Microprocessors and Peripherals- Architecture, Programming and Interfacing,* TMH, 2002 reprint.
3. Yu-cheng Liu, Glenn A. Gibson, *Microcomputer systems: The 8086 / 8088 Family architecture, Programming and Design,* PHI, 2006.

III B.Tech. II Semester

10BT60405: VLSI DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: Courses on Switching Theory and Logic Design and Digital ICs and their Applications.

COURSE DESCRIPTION: Introduction to the design and implementation of VLSI circuits for complex digital systems; CMOS technology; submicron design; clocking; subsystem design; CAD tools and algorithms; simulation; verification; testing and design methodology.

COURSE OUTCOMES:

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

1. Demonstarte knowledge in

· Understanding the Fabrication of MOS Transistors.

· Electrical properties of CMOS and BiCMOS Circuits

· Designing Static Combinational and Sequential logic at transistor level, including Mask layout.

· Estimating and optimizing combinational RC Circuit delay using RC delay models and logical effort.

· Design methodology and tools.

· Testing the chip at various abstraction levels.

2. Perform analysis of Circuit Characterization and Performance Estimation of CMOS device and Create models of moderately sized CMOS circuits that realize specified digital functions.
3. Formulate and solve technology specific problems in developing an IC circuit using EDA tools.
4. Use modern design tools to IC devices to create system-on - chip (SOC) designs in FPGAs.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION
Introduction to IC Technology – MOS, PMOS, NMOS, CMOS & BiCMOS technologies- Oxidation, Lithography, Diffusion, Ion implantation, Metallisation, Encapsulation, Probe testing, Integrated Resistors and Capacitors.

UNIT-II: BASIC ELECTRICAL PROPERTIES
Basic Electrical Properties of MOS and BiCMOS Circuits: I_{ds}-V_{ds} relationships, MOS transistor threshold Voltage, g_m, g_{ds}, figure of merit, Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

UNIT-III: VLSI CIRCUIT DESIGN PROCESSES
VLSI design flow, MOS layers, Stick diagrams, Design rules and Layout, 2 micron CMOS design rules for Wires, Contacts and Transistors, Layout diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling.

UNIT-IV: GATE LEVEL DESIGN
Logic Gates and Other complex gates, Switch logic, Alternate gate circuits, Basic circuit concepts, Sheet Resistance R_S and its concept to MOS, Area Capacitance Units, Calculations - Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out, Choice of layers

UNIT-V: SUBSYSTEM DESIGN
Adders – Transmission based Adder, Carry Bypass Adder, Carry Skip Adder, Carry Select Adder, Shifters- Barrel Shifter, Logarithmic Shifter, Multipliers – Definitions, Array Multiplier, Carry Save multiplier, Booth Multiplier, ALUs, Parity generators, Comparators, Zero/One Detectors, Counters- Synchronous & Asynchronous Counter, High Density Memory Elements.

UNIT-VI: SEMICONDUCTOR INTEGRATED CIRCUIT DESIGN
PLAs, FPGAs, CPLDs, PALs, Cell based Design Methodology, Design Approach.

UNIT-VII: VHDL SYNTHESIS
VHDL Synthesis, Circuit Design Flow, Circuit Synthesis, Types of Simulation, Layout Synthesis, Design capture tools, Design Verification Tools.

UNIT-VIII: CMOS TESTING

CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Chip level Test Techniques, System-level Test Techniques, Layout Design for improved Testability.

TEXT BOOKS:

1. Kamran Eshraghian, Eshraghian Douglas and A. Pucknell, *Essentials of VLSI Circuits and Systems,* PHI, 2005 Edition.
2. Weste and EShraghian, *Principles of CMOS VLSI Design,* Pearson Education, 1999.

REFERENCE BOOKS:

1. John M. Rabaey, *Digital Integrated Circuits: A Design Perspective,* 2nd Edition, PHI, EEE, 1997.
2. Wayne wolf, *Modern VLSI Design,* 3rd Edition, Pearson Education, 1997.
3. Charles H. Roth, *Fundamentals of Logic Design,* 5th Edition, Thomson Publications, 2004.

III B.Tech. II Semester

10BT60411: MICROPROCESSORS AND MICROCONTROLLERS LAB

(Common to ECE, EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Course on Digital logic design, Microprocessors and Microcontrollers.

COURSE DESCRIPTION: Assembly language Programming for Intel 8085, 8086 & 8051; Interfacing standard peripherals & Programming-DAC, Stepper Motor, ADC, Logic Controller, Keyboard, Seven Segment Display.

COURSE OUTCOMES:

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

1. Analyze various programming alternatives & interfacing methods to build a typical microcomputer based system.
2. Design and develop microcomputer based system to solve various problems.
3. Conduct of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

Any **TWELVE** experiments to be conducted

I Programs using 8085

1. Arithmetic operations
2. Logical operations

II Programs using 8086

1. Introduction to MASM/TASM
2. Arithmetic operations
3. Logic operations
4. String operations
5. Modular program: use procedure

III Interfacing Programs with 8086

1. Stepper motor
2. Logic controllers
3. A/D and D/A converter
4. Seven segment display
5. Keyboard interfacing

IV Programs using 8051

1. Arithmetic operations
2. Addition operation using external memory
3. Programs using special instructions like SWAP, bit/byte, set/ reset etc.

III B.Tech. II Semester

10BT60412: IC APPLICATIONS AND ECAD LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Courses on Linear IC applications and Digital IC applications.

COURSE DESCRIPTION: Design, simulation and verification of OPAMP Applications; Filters, Timers, VCO, Voltage Regulator, ADC and DAC; Simulation and synthesis of combinational and sequential circuits.

COURSE OUTCOMES:

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

1. Perform analysis of linear circuits and Digital system design.
2. Acquire skills by solving problems in the domain of linear and Digital Systems.
3. Use modern CAD tools to analyze problems of RTL, Technology schematic, and system implementation in digital domain.

Minimum Twelve Experiments to be conducted:

Part A (IC Application Lab): (Minimum Six experiments to be conducted)

1. OP AMP Applications – Adder, Subtractor, Comparator Circuits.
2. Active Filter Applications – LPF, HPF (First & Second order).
3. Function Generator using OP AMPs.
4. IC 555 Timer – Monostable and Astable Operation Circuit.
5. IC 566 – VCO Applications.
6. Voltage Regulator using IC 723.
7. 4 bit ADC & DAC.
8. Precision rectifier using OP Amp.

Part B (ECAD Lab): (Minimum Six experiments to be conducted)

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

1. Logic Gates- 74XX.
2. Half Adder, Half Subtractor, Full Adder, Full Subtractor & Ripple Carry Adder.
3. 3-8 Decoder -74X138 & 8-3 Encoder- 74X148.
4. 8 x 1 Multiplexer -74X151 and 2x4 Demultiplexer-74X155.
5. 4 bit Comparator-74X85.
6. D Flip-Flop 74X74 and JK Flip-Flop 74X109.
7. Decade counter-74X90.
8. Universal shift register -74X194
9. RAM(16x4)-74189.

III B.Tech. II Semester

10BT60413: SEMINAR

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
75	-	75	-	-	3	2

PREREQUISITES: All the courses of the program up to III B. Tech. - I Semester.

COURSE DESCRIPTION: Identification of topic for the seminar; Literature survey; Performing critical study and analysis of the topic identified; Preparation of report and presentation.

COURSE OUTCOMES:

On successful completion of seminar work, the students will be able to:

1. Demonstrate in-depth knowledge on the seminar topic.
2. Analyze critically, chosen seminar topic for substantiated conclusions.
3. Undertake investigation of issues related to seminar topic providing valid conclusions.
4. Use appropriate techniques and resources necessary for doing seminar work.
5. Apply the conclusions of the seminar for sustainable development of the society.
6. Understand the impact of seminar conclusions in the context of environmental sustainability.
7. Understand professional and ethical responsibilities while carrying out the seminar work.
8. Function effectively as individual on the chosen seminar topic.
9. Develop communication skills, both oral and written for preparing and presenting seminar report.
10. Engage in lifelong learning to improve knowledge and competence in the chosen field of seminar.

IV B.Tech. I Semester

10BT70401: ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Courses on Linear and Digital IC Applications.

COURSE DESCRIPTION: To study Performance characteristics of Instruments, Indicators, Signal Generators, Analyzers, Oscilloscopes; Data Acquisition System and Computer Controlled Test Systems; Analysis of AC and DC Bridges.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in

· Working of Instruments.

· Various measurement techniques available.

· Errors in measurements and their rectification.

2. Analyze parameters measuring methods and evaluate errors involved in measurement
3. Solve engineering problems by proposing potential solutions leading to better instruments designs.

DETAILED SYLLABUS:

UNIT-I: PERFORMANCE CHARACTERISTICS OF INSTRUMENTS
Static characteristics, Accuracy, Precision, Resolution, Sensitivity, Errors in measurement, Dynamic Characteristics-speed of response, fidelity, lag and dynamic error, Statistical Analysis.
INDICATORS: Basic meter movement, DC voltmeters-multirange, range extension, Loading, Transistor Voltmeter, Solid State Voltmeter, AC voltmeters –using rectifiers, Multirange, range extension, Ammeters- Multirange, Universal Shunt, Extending Ranges, Thermocouple type RF ammeter, ohmmeters, series type and shunt type, Calibration of DC Instrument & Ohmmeter, Multimeter for Voltage, Current and Resistance measurements.

UNIT-II: SIGNAL GENERATORS
Fixed and Variable AF oscillators, Standard Signal Generator, AF Sine & Square wave Generator, Function Generators-Square & Pulse, Random noise, Sweep, and Arbitrary waveform generators specifications and principles of working (Block diagram approach).

UNIT-III: ANALYZERS
Wave analyzers, Harmonic distortion analyzers, Spectrum analyzers, Digital Fourier analyzers, and Logic analyzers.

UNIT-IV: OSCILLOSCOPES
Standard specifications of CRO, CRT features, Vertical and Horizontal amplifiers, Horizontal and Vertical deflection systems, triggered sweep CRO, and Delayed sweep, sync selector circuits, probes for CRO – active, passive, and attenuator type, Dual Beam & Trace CRO, Measurement of amplitude, frequency and phase (Lissajous method).

UNIT-V: OSCILLOSCOPE TYPES
Sampling oscilloscope, Storage oscilloscope, Digital readout Oscilloscope, Digital storage oscilloscope, Digital frequency counter, time and phase measurement.

UNIT-VI:
DC BRIDGES: Wheatstone bridge, Wein bridge.
AC BRIDGES: Maxwell's bridge, Anderson bridge. Measurement of capacitance- Schearing bridge. Kelvin bridge, Errors and precautions in using bridges. Q-meter, EMI and EMC, Interference and noise reduction techniques.

UNIT-VII: SENSORS AND TRANSDUCERS

Active and passive transducers: Measurement of displacement (Resistance, capacitance, inductance; LVDT) Force (strain gauges) Pressure (piezoelectric transducers) Temperature (resistance thermometers, thermocouples, and Thermistors), Velocity, Acceleration, Vibration, pH measurement.

UNIT-VIII: DATA ACQUISITION SYSTEM

Generalized Data Acquisition System, Signal Conditioning, Single & Multi Channel DAS.

COMPUTER CONTROLLED TEST SYSTEMS: Testing an Audio Amplifier, Testing a Radio Receiver, Instruments used in Computer Controlled Instrumentation.

TEXT BOOKS:

1. H.S.Kalsi, *Electronic instrumentation,* 2nd Edition, TMH, 2004.
2. A.D. Helfrick and W.D. Cooper, *Modern Electronic Instrumentation and Measurement Techniques,* 5th Edition, PHI, 2002.
3. David A. Bell, *Electronic Instrumentation & Measurements,* 2nd Edition, PHI, 2003.

REFERENCE BOOKS:

1. Ernest O Doebelin and Dhanesh N Manik, *Measurement Systems Application and Design,* 5th Edition, TMH, 2009.
2. Oliver and Cage, *Electronic Measurement and Instrumentation,* TMH.
3. Robert A.Witte, *Electronic Test Instruments, Analog and Digital Measurements,* 2nd Edition, Pearson Education, 2004.
4. K. Lal Kishore, *Electronic Measurements & Instrumentations,* Pearson Education, 2005.

IV B.Tech. I Semester

10BT61202: COMPUTER NETWORKS

(Common to ECE, EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Courses on Analog Communications, Digital Communications.

COURSE DESCRIPTION: Reference models; Issues, Responsibilities, Protocols at various layers in hybrid reference model; IEEE Networking standards (802.11, 802.15 & 802.16); Network security.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in

· Knowing how communication works in data networks and internet

· Recognizing various networking devices and their functions

· Identifying role of protocols in networking

2. Critically analyze Services and features at various layers of data networks.
3. Design, calculate and apply subnet masks, routes and addresses to full fill networking requirements.
4. Choose suitable protocols at different layers that work together to solve engineering problems relating to data networks.

DETAILED SYLLABUS:

UNIT I: INTRODUCTION
Network Applications, Network Hardware, Network Software, Reference Models: OSI, TCP/IP, Example Networks: Novell Network, X.25, Internet.

UNIT II: THE PHYSICAL LAYER
Theoretical Basis for communication, Guided Transmission media, Wireless Transmission, The public switched telephone Networks, Mobile telephone system.

UNIT III: THE DATA LINK LAYER
Design Issues, Error detection and correction-CRC, Hamming codes, Elementary Data Link Protocols, Sliding Window Protocols, Example Data Link Protocols: HDLC, The Data Link Layer in the Internet.

UNIT IV: THE MEDIUM ACCESS SUBLAYER
Channel Allocations problem, Multiple Access protocols: ALOHA, CSMA, CSMA/CD protocols, Collision free protocols, Limited contention protocols, Ethernet, DLL Switching.

UNIT V: THE NETWORK LAYER
Network Layer Design Issues, Routing Algorithms: Shortest path, Flooding, Distance vector, Hierarchical, Broadcast and Multicast, Congestion Control Algorithms, Internetworking, The Network Layer in the Internet: The IP Protocol, IP Addresses, Internet Control Protocols, Ipv6 Main Header.

UNIT VI: THE TRANSPORT LAYER
Transport Service, Elements of transport protocol, Internet Transport layer protocols: UDP and TCP.

UNIT VII: THE APPLICATION LAYER
DNS: The Domain name system, Electronic Mail, World Wide Web: Architectural Overview, Dynamic Web Document, HTTP.

UNIT VIII: IEEE STANDARDS AND NETWORK SECURITY
Introduction to IEEE standards, Wi-Fi: 802.11b, Bluetooth: 802.15, 3G: 802.16, 4G: 802.16m, Wi-Max: 802.16a.
Introduction to Network Security: Cryptography - Substitution Techniques, Transposition Techniques.

TEXT BOOKS:

1. A.S. Tanenbaum, *Computer Networks*, 4th Edition, Pearson Education/ PHI.

REFERENCE BOOKS:

1. Behrouz A. Forouzan, *Data communication and Networking*, TMH, 2004.
2. Peterson and Davie, *Computer Networks*, 2nd Edition, Morgan Kaufmann.
3. Kurose, Ross, *Computer Networking*, Pearson Education, 2010.
4. Leon-Garcia and Widjaja, *Communication Networks*, 2nd Edition, TMH.
5. S.Keshay, *An Engg. Approach to Computer Networking*, Addison Wesley, 1997.

IV B.Tech. I Semester

10BT40502: OBJECT ORIENTED PROGRAMMING

(Common to ECE, EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: A Course on Problem solving and Computer programming.

COURSE DESCRIPTION: Object Oriented Thinking; Polymorphism and Inheritance; Basics of Java; Inheritance and Interfaces; Exception Handling; Multithreading; Event Handling and Swings.

COURSE OUTCOMES:

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

1. Demonstrate object oriented programming principles-Object, Class, Inheritance, Polymorphism, encapsulation, Abstraction, message passing.
2. Demonstrate Problem solving skills using multithreading, event handling, AWT, swings and applets.
3. Apply C++ and JAVA programming to solve real time problems and develop advanced applications.
4. Imbibe creative thinking and independently develop novel applications.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO OBJECT ORIENTED PROGRAMMING

Need for OOP paradigm, OOP concepts, methods, classes and instances, class hierarchies (Inheritance), method binding, overriding and exceptions. C++ class overview-class definition, objects, class members, access control, class scope, constructors and destructors, inline functions, static class members, this pointer, friend functions, dynamic memory allocation and deallocation (new and delete).

UNIT-II: POLYMORPHISM AND INHERITANCE

Function overloading, operator overloading, generic programming-function and class templates, inheritance basics, base and derived classes, different types of inheritance, base class access control, virtual base class, function overriding, run time polymorphism using virtual functions, abstract classes, Streams.

UNIT-III: BASICS OF JAVA

History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and costing, simple java program, classes and objects – concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

UNIT-IV: INHERITANCE AND INTERFACES

Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes. Interfaces: differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT-V: EXCEPTION HANDLING

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

Exception handling: Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.

UNIT-VI:MULTITHREADING AND APPLETS
Differences between multithreading and multitasking, thread life cycle, creating threads, synchronizing threads. Applets: Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets ,Graphics class.

UNIT-VII: EVENT HANDLING
Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scroll pane, dialogs, menu bar, graphics, layout manager – boarder, grid, flow, card and grid bag.

UNIT-VIII: SWINGS
Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing – Japplet, JFrame and JComponent, Icons and labels, text fields, The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed panes, Scroll Panes, Trees and Tables.

TEXT BOOKS:

1. Robert Lafore, *Waite Group's Object-Oriented Programming in C++,* 3rd Edition, 2007.
2. Herbert schildt, *Java- the complete reference*, 7th editon, 5th Reprint, TMH, 2008.

REFERENCE BOOKS:

1. Y. Daniel Liang, *Introduction to Java programming,* 6th edition, Pearson Education.
2. Cay.S.Horstmann and Gary Cornell, *Core Java 2,* Vol 1, 7th Edition, Pearson Education.
3. S.B.Lippman, *C++ primer*, 3rd Edition, Pearson Education.
4. W.Savitch, *Problem solving with C++*, *The OOP*, 4th edition, Pearson Education.
5. B. Stroustrup, *The C++ Programming Language*, 3rd edition, Pearson Education

IV B.Tech. I Semester

10BT70402: DIGITAL IMAGE PROCESSING

(Common to ECE, EIE & IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Courses on Digital signal processing, Digital communications.

COURSE DESCRIPTION: Fundamentals of digital image processing, Image transforms; Image enhancement techniques in spatial and frequency domains; Restoration techniques for degraded images, image segmentation techniques; Image compression techniques and color image processing.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in

· Image Fundamentals

· Image Enhancement & Restoration Techniques

· Image Segmentation & Compression Techniques

· Color image processing

2. Analyze complex engineering problems critically in the domain of Image Processing for conducting research.
3. Develop various image processing techniques related to image enhancement, restoration, Segmentation and compression.
4. Solve engineering problems for feasible and optimal solutions in the core area of Image Processing.

DETAILED SYLLABUS:

UNIT-I: DIGITAL IMAGE FUNDAMENTALS

Image sensing and acquisition, Image sampling & quantization, some basic relationships between pixels. Mathematical tools used in digital image processing – array Vs matrix operations, linear Vs non linear operations, Arithmetic operations, Set and Logical operations, Spatial operations, vector and matrix operations, Probabilistic methods.

UNIT-II: IMAGE TRANSFORMS

2D-DFT and properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar-Transform, Slant Transform, Hotelling Transform.

UNIT-III: IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN

Basic Intensity transformation functions, Histogram processing, Fundamentals of Spatial Filtering, Smoothing spatial filters, Sharpening spatial filters, Combining spatial Enhancement methods.

UNIT-IV: IMAGE ENHANCEMENT IN FREQUENCY DOMAIN

Basics of filtering in frequency domain, Correspondence between filtering in the spatial and frequency domains, Image smoothing using frequency domain filters, Image sharpening using frequency domain filters, Homomorphic filtering.

UNIT-V: IMAGE RESTORATION

Noise models, Restoration in the presence of Noise only-spatial filtering - mean, order- statistic and adaptive filters, Estimating the degradation function, Inverse filtering, Weiner filtering, Constrained least squares filtering.

UNIT-VI: IMAGE SEGMENTATION

Point, line and edge Detection, Thresholding, Region based Segmentation, The use of motion in Segmentation.

UNIT-VII: IMAGE COMPRESSION

Need for Image Compression, Classification of redundancy in Images, Image Compression models, Classification of image compression schemes, Run length coding, Arithmetic coding, Block truncation coding, Dictionary based compression, Transform based compression, Image compression standards.

UNIT-VIII: COLOR IMAGE PROCESSING

Color models, Pseudo color image processing, Color transformations, Smoothing and Sharpening, Image segmentation based on color.

TEXT BOOKS:

1. R. C .Gonzalez & R.E. Woods, *Digital Image Processing,* 2nd Edition, Addison Wesley/Pearson Education, 2002.
2. Malay K. Pakhira, *Digital Image processing and Pattern Recognition,* PHI, 2011.

REFERENCE BOOKS:

1. Rafael C. Gonzalez, Richard E woods and Steven L.Eddins, *Digital Image processing using MATLAB,* TMH, 2010.
2. S jayaraman, S Esakkirajan, T Veerakumar, *Digital Image processing,* TMH.
3. A .K. Jain, *Fundamentals of Digital Image processing,* PHI.

IV B.Tech. I Semester

10BT70403: SPREAD SPECTRUM COMMUNICATIONS

(Elective - I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: A Course on Digital Communications.

COURSE DESCRIPTION:

COURSE OUTCOMES:

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

1. Demonstrate knowledge in various types of spread spectrum and code division multiple access digital cellular systems and generation and detection of spread spectrum signals.
2. Analyze problems in direct sequence and avoidance-type spread spectrum systems.
3. Design and develop spread spectrum communication systems.

DETAILED SYLLABUS:

UNIT-I: FUNDAMENTALS OF SPREAD SPECTRUM

General concepts, Direct sequence (DS), Pseudo Noise (PN), Frequency Hopping, Time Hopping, Comparison of Modulation methods, Hybrid Spread spectrum systems, Chirp spread spectrum, Baseband modulation techniques.

UNIT-II: ANALYSIS OF DIRECT SEQUENCE SPREAD SPECTRUM SYSTEMS

Properties of PN sequences, Classes of periodic sequences, Properties of m sequences, Partial Correlation, PN signal from PN sequences, Partial correlation of PN signals, The PN Signal, De-spreading the PN signal, Interference rejection, Output signal to noise ratio, Anti-jam characteristics, Interception, Energy bandwidth efficiency.

UNIT-III: ANALYSIS OF AVOIDANCE – TYPE SPREAD SPECTRUM SYSTEMS

The frequency hopped signal, Interference rejection in a frequency hopping receiver, the time hopped signal.

UNIT-IV: GENERATION OF SPREAD SPECTRUM SIGNALS

Shift register sequence generators, Discrete frequency synthesizers, SAW device PN generators, Charge coupled devices, Digital tapped delay lines.

UNIT-V: DETECTION OF SPREAD SPECTRUM SIGNALS - TRACKING

Coherent direct sequence receivers, other method of carrier tracking, Delay lock loop analysis, Tau – Dither loop, Coherent carrier tracking, Non coherent frequency hop receiver.

UNIT-VI: DETECTION OF SPREAD SPECTRUM SIGNALS - AQUISITION

Acquisition of spread spectrum signals, Acquisition cell by cell searching, Reduction of acquisition time, Acquisition with matched filters, Matched filters for PN sequences, Matched filters for frequency hopped signals, Matched filters with acquisition - aiding waveform.

UNIT-VII: APPLICATION OF SPREAD SPECTRUM TO COMMUNICATIONS

General capabilities of spread spectrum, Multiple access considerations, Energy and bandwidth efficiency in multiple access, Selective calling and Identification, Anti-jam considerations, Error correction coding, Intercept consideration (AI), Miscellaneous considerations, Examples of spread spectrum systems.

UNIT-VIII: CODE DIVISION MULTIPLE ACCESS DIGITAL CELLULAR SYSTEMS

Introduction, Cellular radio concept, CDMA Digital cellular systems, Specific examples of CDMA digital cellular systems.

TEXT BOOKS:

1. George. R. Cooper and Clare D.McGillem, *Modern Communications and Spread Spectrum,* McGraw Hill.
2. Roger L. Peterson, Rodger E.Ziemer & David E. Borth, *Introduction to Spread Spectrum Communications,* Prentice Hall, 1995.

REFERENCE BOOKS:

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

IV B.Tech. I Semester

10BT70404: TELECOMMUNICATION SWITCHING SYSTEMS

(Elective - I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: Courses on Communication Systems, PTSP.

COURSE DESCRIPTION: Overview of telecommunications; switching systems; telecommunication networks; signaling techniques; traffic models including models for particular streams and multiplexing; multi-rate and multi-hour models; voice and data services; network architecture and protocols of local area, metropolitan and wide area networks ; narrow band ISDN; asynchronous transfer mode and broadband ISDN; DSL technology and SONET.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in
   - Elements of Switching systems
   - Signaling and traffic in the context of telecommunication network.
   - Telephone networks
   - Transmission systems and the impairments related to the transmission of signals
   - Digital switching and computer controlled switching procedures
   - Traffic engineering that covers various systems and blocking models
   - Understand the numbering plan, charging and how to organize an exchange
   - Deal with DSL technologies and SONET/SDH network
2. Perform analysis of Switching hierarchy and routing, Transmission plan, Numbering plan and charging plans.
3. Design for digital switching and computer controlled switching procedures.
4. Solve problems in traffic engineering that covers various systems and blocking models, numbering plan, charging and organize an exchange.

DETAILED SYLLABUS:

UNIT-I: TELECOMMUNICATION SWITCHING SYSTEMS
Introduction, Elements of switching systems, switching network configuration.

UNIT-II:
Electronic space division switching, Time division switching, Combination switching.

UNIT-III: TELEPHONE NETWORKS
Subscriber loop systems, switching hierarchy and routing, transmission plan, numbering plan, charging plans.

UNIT-IV: SIGNALING TECHNIQUES
In channel signaling, common channel signaling, Network traffic load and parameters, grade of service and blocking probability.

UNIT-V: DATA COMMUNICATION NETWORKS
Introduction, network architecture, layered network architecture, protocols, data communications hardware, data communication circuits.

UNIT-VI:
Public switched data networks, connection oriented & connection less service, Circuit Switching, packet switching and virtual circuit switching concepts, OSI reference model, Network Topologies, Repeaters, Bridges, Routers and gate ways, LAN-Ethernet, Token Ring , FDDI,WAN-DQDB,SMDS, MAN & Internet.

UNIT-VII: INTEGRATED SERVICES DIGITAL NETWORK (ISDN)
Introduction, motivation, ISDN architecture, ISDN interfaces, functional grouping, reference points, protocol architecture, signaling, numbering, addressing, BISDN.

UNIT-VIII: DSL TECHNOLOGY
ADSL, Cable Modem, Traditional Cable Networks, HFC Networks, Sharing, CM & CMTS and DOCSIS.
SONET: Devices, Frame, Frame Transmission, Synchronous Transport Signals, STS I, Virtual Tributaries and Higher rate of service.

TEXT BOOKS:

1. Thyagarajan Viswanath, *Telecommunication Switching Systems and Networks,* PHI, 2000.
2. Wayne Tomasi, *Advanced electronic communications systems,* PHI, 2004.
3. Achyut. S.Godbole, *Data Communications & Networks,* TMH, 2004.

REFERENCE BOOKS:

1. B.A. Forouzan, *Data Communication & Networking,* 4th Edition, TMH, 2006.
2. J. Bellamy, *Digital telephony,* 2nd Edition, John Wiley, 2001.
3. H. Taub & D. Schilling, *Principles of Communication Systems,* 2nd Edition, TMH, 2003.

IV B.Tech. I Semester

10BT70405: EMBEDDED AND REALTIME SYSTEMS

(Elective - I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: A course on Microprocessors and Microcontrollers.

COURSE DESCRIPTION: Introduction to Embedded System; Analysis of General Purpose Processor; State Machines and Concurrent Process Models; Various Communication interfacing Models; Embedded/ RTOS Concepts; Kernal objects; Target Architectures; Design Technology.

COURSE OUTCOMES:

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

1. Demonstrate fundamental knowledge on
   - Communication Interfacing Models
   - Kernal Objects
   - ARM and SHARC Controllers
2. Analyze Various problems in
   - Processor Technology
   - State Machines
   - Concurrent Process Models
   - Design Technology
3. Design and develop Embedded system to suit a particular application.
4. Choose suitable Hardware and software components of a system that work together to solve engineering problems to exhibit a specific behavior.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION
Embedded systems overview, classification, applications, design challenge, processor technology, IC technology, Design Technology, Trade-offs. Single purpose processors RT-level combinational logic, sequential logic (RT-level), custom single purpose processor design (RT-level), optimizing custom single purpose processors.

UNIT-II: GENERAL PURPOSE PROCESSORS
Basic architecture, operation, Pipelining, Programmer's view, development environment, Application Specific Instruction-Set Processors (ASIPs) – Microcontrollers and Digital Signal Processors.

UNIT-III: STATE MACHINE AND CONCURRENT PROCESS MODELS
Introduction, models versus languages, finite state machines with data path model (FSMD), using state machines, program state machine model (PSM), concurrent process model, concurrent processes, communication among processes, synchronization among processes, implementation, data flow model, real-time systems.

UNIT-IV: COMMUNICATION INTERFACE
Need for communication interfaces, RS232 / UART, RS422 / RS485, USB, Infrared, IEEE 1394 Firewire, Ethernet, I^2C bus and CAN.

UNIT-V: EMBEDDED/RTOS CONCEPTS–I
Architecture of the Kernel, Tasks and Task scheduler, Types of real-time tasks, Task periodicity, Task scheduling, Classification of scheduling algorithms, Clock driven Scheduling, Event driven Scheduling, resource sharing, Commercial RTOs.

UNIT-VI: EMBEDDED/RTOS CONCEPTS–II
Interrupt service routines, Semaphores, Mutex, Mailboxes, Message Queues, Event Registers, Pipes, Signals, Timers, Memory Management, Priority inversion problem.

UNIT-VII: TARGET ARCHITECUTERS
Host and target machines, linkers, loading software into target machine, debugging techniques, ARM microcontroller, ARM pipeline, Instruction set architecture, THUMB instructions, Exceptions in ARM, salient features of SHARC microcontroller and comparison with ARM microcontroller.

UNIT-VIII: DESIGN TECHNOLOGY

Introduction, Automation, Synthesis, Parallel evolution of compilation and synthesis, Logic Synthesis, RT synthesis, Behavioral Synthesis, Systems Synthesis and Hardware/ Software Co-Design, Verification, Hardware/Software co-simulation, Reuse of intellectual property codes.

TEXT BOOKS:

1. Frank Vahid, Tony D. Givargis, *Embedded System Design – A Unified Hardware/Software Introduction,* John Wiley, 2002.
2. KVKK Prasad, *Embedded/Real Time Systems,* Dreamtech Press, 2005.
3. Santanu Chattopadyay, *Embedded System Design,* PHI, 2010.

REFERENCE BOOKS:

1. Jonathan W. Valvano, Brooks/Cole, *Embedded Microcomputer Systems,* Thompson Learning, 2002.
2. David E. Simon, *An Embedded Software Primer,* Pearson Education, 2005.
3. Sri Ram VIyer, Pankaj Gupta, *Embedded Real Time Systems Programming,* TMH, 2004.

IV B.Tech. I Semester

10BT70406: DSP PROCESSORS AND ARCHITECTURE

(Elective - I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: Digital Communications, Digital Signal Processing.

COURSE DESCRIPTION: Programmable DSPs; Architectures for Programmable DSP Devices; Computational Accuracy in DSP Implementations; Implementations of basic DSP algorithms; Interfacing memory and I/O peripherals to programmable DSP devices; advancements in DSP System Design.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in

· The programmable DSPs.

· The Architectural features of programmable DSP devices.

· The Computational Accuracy in DSP Implementations.

· The concepts of Execution Control and Pipelining.

2. Analyze the architectures of the special purpose DSP Processors such as TMS320C54xx, C5x, C6x, etc.
3. Write assembler code to design and implement DSP algorithms such as FIR and IIR filters.
4. Investigate appropriate methodologies for the various issues that need to be addressed when implementing DSP algorithms in real hardware with finite resources such as processing speed, memory, and bit resolution.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO PRGRAMMABLE DSPs
Multiplier & Multiplier accumulator, Modified bus structures & memory access schemes in P – DSPs, Multiple access memory, Multi ported memory, VLIW architecture, Pipelining, Special addressing modes in P–DSPs, On chip peripherals.

UNIT-II: COMPUTATIONAL ACCURACY IN DSP IMPLEMENTATIONS
Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT-III: ARCHITECTURES FOR PROGRAMMABLE DSP DEVICES
Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT-IV: PROGRAMMABLE DIGITAL SIGNAL PROCESSORS
Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline Operation of TMS320C54XX Processors.

UNIT-V: IMPLEMENTATIONS OF BASIC DSP ALGORITHMS
The Q-notation, FIR Filters, IIR Filters, Interpolation Filters, Decimation Filters, PID Controller, Adaptive Filters, 2-D Signal Processing.

UNIT-VI: IMPLEMENTATION OF FFT ALGORITHMS
An FFT Algorithm for DFT Computation, A Butterfly Computation, Overflow and scaling, Bit-Reversed index generation, An 8-Point FFT implementation on the TMS320C54XX, Computation of the signal spectrum.

UNIT-VII: INTERFACING MEMORY AND I/O PERIPHERALS TO PROGRAMMABLE DSP DEVICES

Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA). A Multichannel buffered serial port (McBSP), McBSP Programming, a CODEC interface circuit, CODEC programming, A CODEC-DSP interface example.

UNIT-VIII: RECENT TRENDS IN DSP SYSTEM DESIGN

An over-view of the application nodes on DSP systems, An over-view of open multimedia applications platform (OMAP), An Introduction to FPGA, Design flow for an FPGA based system design, CAD tools for FPGA based system design, soft core processors, FPGA based DSP system design, New algorithms for Implementation of filters in VLSI, Distributed arithmetic algorithm, Case studies, Comparison of the performances of the systems designed using FPGAs and digital signal processors.

TEXT BOOKS:

1. Avtar Singh and S. Srinivasan, *Digital Signal Processing*, Thomson Publications, 2004.
2. B. Venkata Ramani and M. Bhaskar, *Digital Signal Processors: Architecture, Programming and Applications*, TMH, 2004.

REFERENCE BOOKS:

1. Jonathan Stein, *Digital Signal Processing*, John Wiley, 2005.
2. Lapsley et al., *DSP Processor Fundamentals: Architectures & Features*, S. Chand & Co, 2000.

IV B.Tech. I Semester

10BT70407: OPTICAL COMMUNICATIONS

(Elective - II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: Courses on Engineering Physics, Semiconductor Devices and Circuits, Microwave Engineering.

COURSE DESCRIPTION: Ray theory; single mode fibers; fiber materials; fiber losses; Optical sources and detectors; power launching in to the fiber; optical links; WDM.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in fibers, optical sources and detectors, power launching and coupling, links and WDM.
2. Perform analysis on single & multimode fibers and analog & digital links.
3. Design and develop Optical sources, Detectors and links.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO OPTICAL FIBER WAVEGUIDES
Historical Development, The General System, Advantages of Optical Fiber Communications, Ray Theory Transmission, Electromagnetic Mode Theory for Optical Propagation, Cylindrical Fiber.

UNIT-II:
Single Mode Fibers, Fiber Materials, Fiber Fabrication, Mechanical Properties of Fibers, Fiber Optic Cables.

UNIT-III: FIBER LOSSES
Attenuation, Absorption, Scattering, Bending and Core & Cladding losses. Signal Distortion in Fibers - Pulse Broadening.
Dispersion : Intramodal Dispersion, Intermodal Dispersion, Overall Fiber Dispersion in Multi Mode and Single Mode Fibers. Polarization.

UNIT-IV: OPTICAL SOURCES
LIGHT EMITTING DIODES (LEDs): LED Structures, Light Source Materials, Quantum Efficiency and LED Power, Modulation of LED.
LASER DIODES: Laser Diode Modes and Threshold Conditions, Laser Diode Rate Equations, External Quantum Efficiencies, Resonant Frequencies.

UNIT-V: POWER LAUNCHING AND COUPLING
Source to Fiber Power Launching, Lensing Schemes for Coupling Improvement, Fiber-to-Fiber Joints, Fiber alignment and joint loss, LED coupling to single mode fibers, Fiber Splices, Fiber Connectors.

UNIT-VI: OPTICAL DETECTORS
Physical Principles of Photo Diodes, Photo Detector Noise, Detector Response Time, Avalanche Multiplication Noise, Structures for InGaAs & APDs, Temperature Effect on Avalanche Gain, Comparisons of Photo Detectors.

UNIT-VII:
DIGITAL LINKS: Point-to-Point Links, Power Penalties, Error Control.
ANALOG LINKS: Overview, Carrier to Noise Ratio, Multi-channel Transmission Techniques, RF over Fiber, Radio over Fiber Links.

UNIT-VIII: WDM CONCEPTS AND COMPONENTS

Overview, Passive Optical Couplers, Isolators & Circulators, Fiber Grating Filters, Dielectric Thin Film Filters, Phased Array based Devices, Diffraction Gratings, Active Optical Components, Tunable Light Sources.

TEXT BOOKS:

1. Gerd keiser, *Optical Fiber Communications,* 4th Edition, McGraw Hill International, 2010.
2. John M. Senior, *Optical Fiber Communications,* 3rd Edition, PHI, 2010.

REFERENCE BOOKS:

1. Max Ming-Kang Liu, *Principles and Applications of Optical Communications,* TMH, 2010.
2. S.C.Gupta, *Optical Fiber Communication and its Applications,* PHI, 2005.
3. Satish Kumar, *Fundamentals of Optical Fiber Communications,* PHI, 2009.

IV B.Tech. I Semester

10BT50504: OPERATING SYSTEMS

(Elective - II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: Nil.

COURSE DESCRIPTION: Operating Systems Overview; Process management; Concurrency and Synchronization; Deadlocks; Memory Management; File System; I/ O System; Protection and Security.

COURSE OUTCOMES:

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

1. Demonstrate knowledge on: Operating system functions and services, file system, memory management, security and protection.
2. Analyses skills on

· CPU scheduling algorithms - FCFS, SJF, Priority and Round Robin

· Disk Scheduling algorithms - FCFS, SSTF, Scan, CScan, Look, Clock

· Memory Allocation algorithms - MFT, MVT

· Page replacement algorithms - FIFO, Optimal, LFU, LRU

· File and Directory maintenance.

3. Apply appropriate process synchronization techniques to real time problems.

DETAILED SYLLABUS:

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.

UNIT II: PROCESS MANAGEMENT
Process concepts, Process state, Process control block, Scheduling queues, Process scheduling, Multithreaded programming, threads in UNIX, Comparison of UNIX and Windows.

UNIT III: 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.

UNIT IV: DEADLOCKS
System model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock- bankers algorithm.

UNIT V: 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.

UNIT VI: 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 VII: 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 VIII: PROTECTION AND SECURITY

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 BOOK:

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, *Operating System Principles*, 7th Edition, John Wiley.

REFERENCE BOOKS:

1. Stallings, *Operating Systems, Internals and Design Principles*, 5th Edition, Pearson Education, 2006.
2. Andrew S. Tanenbaum, *Modern Operating Systems*, 2nd Edition, PHI, 2007.
3. Deitel & Deitel, *Operating systems*, 3rd Edition, Pearson Education, 2008.
4. Crowley, *Operating systems Oriented Approach*, TMH, 1998.
5. Dhamdhere, *Operating systems*, 2nd Edition, TMH, 2008.

IV B.Tech. I Semester

10BT70408: RADAR SYSTEMS

(Elective - II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: Courses on Analog communications, Antenna and wave propagation.

COURSE DESCRIPTION: Radar equation; Targets; classification of radars; MTI and pulsed radar; Tracking with radar; Echo signal detection in the presence of noise; radar receivers; Synthetic aperture radar.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in Radar types, tracking and detection of radar signals and radar receivers.
2. Perform analysis of Radar signals and system components.
3. Design and develop Matched filter for radar receiver.
4. Conduct investigation of complex problems in radar systems.

DETAILED SYLLABUS:

UNIT-I: BASICS OF RADAR
Introduction, Maximum Unambiguous Range, Simple form of Radar Equation, Radar Block Diagram and Operation, Radar Frequencies and Applications, Prediction of Range Performance, Minimum Detectable Signal, Receiver Noise, Modified Radar Range Equation, Illustrative Problems.

UNIT-II: RADAR EQUATION
SNR, Envelope Detector, False Alarm Time and Probability, Integration of Radar Pulses, Radar Cross section of Targets (simple targets - sphere, cone-sphere), Transmitter Power, PRF and Range Ambiguities, System Losses (qualitative treatment), Illustrative Problems.

UNIT-III: 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, Illustrative Problems.
FM-CW Radar, Range and Doppler Measurement, Block Diagram and Characteristics (Approaching/ Receding Targets), FM-CW altimeter, Multiple Frequency CW Radar.

UNIT-IV: MTI AND PULSE DOPPLER RADAR
Introduction, Principle, MTI Radar with - Power Amplifier Transmitter and Power Oscillator Transmitter, Delay Line Cancellers – Filter Characteristics, Blind Speeds, Double Cancellation, Staggered PRFs. Range Gated Doppler Filters, MTI Radar Parameters, Limitations to MTI Performance,MTI versus Pulse Doppler radar.

UNIT-V: RADAR TRACKING
Tracking with Radar, Sequential Lobing, Conical Scan, Monopulse Tracking Radar – Amplitude Comparison Monopulse (one- and two- coordinates), Phase Comparison Monopulse, Tracking in Range, Acquisition and Scanning Patterns, Comparison of Trackers.

UNIT-VI: DETECTION OF RADAR SIGNALS IN NOISE
Introduction, Matched Filter Receiver – Response Characteristics and Derivation, Correlation Function and Cross-correlation Receiver, Efficiency of Non-matched Filters, Matched Filter with Non-white Noise.

UNIT-VII: RADAR RECEIVERS
Noise Figure and Noise Temperature, Display types. Duplexers – Branch type and Balanced type, Circulators as Duplexers. Introduction to Phased Array Antennas – Basic Concepts, Radiation Pattern, Beam Steering and Beam Width changes, Series versus Parallel Feeds, Applications, Advantages and Limitations.

UNIT-VIII: SYNTHETIC APERTURE RADAR
Introduction, Resolution of the SAR, Constraint on Resolution and Swath, Equipment Considerations, Optical Processing, Digital Processing, Doppler-Frequency model, Range Resolution , other aspects of SAR, Inverse SAR, Electronic Counter-Counter Measures.

TEXT BOOKS:
1. Merrill I. Skolnik, *Introduction to Radar Systems*, 2nd Edition, TMH Special Indian Edition, 2007.

REFERENCE BOOKS:
1. Merrill I. Skolnik, *Introduction to Radar Systems*, 3rd Edition, TMH, 2001.
2. Byron Edde, *Radar Principals, Technology, Applications*, Pearson Education, 2004.
3. Peebles, *Radar Principles*, Jr., P.Z.Wiley, NewYork, 1998.

IV B.Tech. I Semester

10BT70409: DIGITAL DESIGN THROUGH VERILOG

(Elective - II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: courses on Digital IC application and VLSI Design.

COURSE DESCRIPTION: Introduction to Verilog and their constructs; Types of Verilog Modeling; Digital design with SM charts, FPGAs and CPLDs.

COURSE OUTCOMES:

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

1. Demonstrate fundamental knowledge in
   - Understanding the language constructs and conventions.
   - Design of Flip-flops with Gate Primitives.
   - Time Delays with Switch Primitives.
   - Blocking and Non blocking Assignments.
   - FSM Design (Moore and Mealy Machines
2. Perform analysis of CMOS Switch and Bi-directional Gates that realize specified digital functions.
3. Design for higher performance and lower area using FSM (Moore and Mealy Machines) and adjust for post-synthesis (backend) design of ICs for conducting research.
4. Formulate and solve technology specific problems in developing a digital circuit using HDL tools.
5. Use modern design tools to IC devices to create system-on - chip (SOC) designs in FPGAs and CPLDs.

DETAILED SYLLABUS:

UNIT-I:

INTRODUCTION TO VERILOG: 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:

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 Trireg Nets, Exercises.

UNIT-IV: 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-deassign construct, repeat construct, for loop, the disable construct, while loop, forever loop, parallel blocks, force-release construct, Event.

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).

UNIT-VI: DIGITAL DESIGN WITH SM CHARTS
State Machine Charts, Derivation of SM Charts, Realization of SM Charts, Implementation of the Dice Game, Alternative realizations for SM Charts using Microprogramming, Linked State Machines.

UNIT-VII: DESIGNING WITH PROGRAMMABLE GATE ARRAYS AND COMPLEX PROGRAMMABLE LOGIC DEVICES
Xilinx 3000 Series FPGAs, Designing with FPGAs, Using a One-Hot State Assignment, Altera Complex Programmable Logic Devices (CPLDs), Altera FLEX 10K Series CPLDs.

UNIT-VIII: VERILOG MODELS
Static RAM Memory, A simplified 486 Bus Model, Interfacing Memory to a Microprocessor Bus, UART Design, Design of Microcontroller CPU.

TEXT BOOKS:

1. T.R. Padmanabhan and B. Bala Tripura Sundari, *Design through Verilog HDL,* WSE, IEEE Press, 2004.
2. J. Bhaskar, *A Verilog Primer,* BSP, 2003.
3. Stephen. Brown and Zvonko Vranesic, *Fundamentals of Logic Design with Verilog,* TMH, 2005.

REFERENCE BOOKS:

1. Michael D. Ciletti, *Advanced Digital Design with Verilog HDL,* PHI, 2005.
2. Samir Palnithkar, *Verilog HDL,* 2nd Edition, Pearson Education.

IV B.Tech. I Semester

10BT70411: DIGITAL COMMUNICATIONS AND MICROWAVES LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Courses on Digital Communications and Microwave Engineering.

COURSE DESCRIPTION: Design and study of various Digital modulation and Demodulation circuits and schemes and characteristics of Microwave power supplies and components.

COURSE OUTCOMES:

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

1. Analyze the characteristics and working of various microwave components like attenuators, directional couplers, Horn antennas etc.
2. Design various digital modulation and demodulation circuits and study their characteristics.
3. Solve problems given in Digital and microwave communication systems.

Minimum Twelve Experiments to be conducted:

Part – A (Any 6 Experiments):

1. Pulse Amplitude Modulation and demodulation
2. Pulse Width Modulation and demodulation
3. Pulse Position Modulation and demodulation
4. Sampling Theorem – verification
5. Pulse code modulation and demodulation
6. Delta modulation and demodulation
7. FSK and PSK Modulation and demodulation
8. DPSK Modulation and demodulation

Part – B (Any 6 Experiments):

1. Reflex Klystron Characteristics
2. Gunn Diode Characteristics
3. Attenuation Measurement
4. Directional Coupler Characteristics
5. VSWR Measurement
6. Impedance Measurement
7. Waveguide parameters measurement

IV B.Tech. I Semester

10BT70412: DIGITAL SIGNAL PROCESSING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Courses on Simulation and C Programming lab.

COURSE DESCRIPTION: Implementation of Convolution, DFT and FFT. Designing Analog, FIR and IIR filters.

COURSE OUTCOMES:

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

1. Demonstrate skills in

i. Simulation and emulation of basic concepts and algorithms such as convolutio, DFT, FFT in sigal processing using CCS.

ii. Design and simulation of an Digital and Aalog filters such as IIR,FIR ad Butterworth proto type.

2. Solve engineering problems for feasible and optimal solutions in the core area of signal processing.
3. Conduct of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
4. Use MATLAB Toolboxes to complex engineering activities in the domain of Signal processing.

List of Experiments: (Minimum of Twelve experiments to be conducted)

1. To study the architecture of DSP chips – TMS 320C 5X/6X Instructions.
2. To verify linear convolution.
3. To verify the circular convolution.
4. To design FIR filter (LP/HP) using windowing technique
    a) Using Rectangular window
    b) Using Triangular window
    c) Using Kaiser window
5. To design FIR filter (BP/BR) using windowing technique
    a) Using Rectangular window
    b) Using Triangular window
    c) Using Kaiser window
6. To design FIR filter (LP/HP) using windowing technique
    a) Using Hamming window
    b) Using Hanning window
    c) Using Blackmann window
7. To design FIR filter (BP/BR) using windowing technique
    a) Using Hamming window
    b) Using Hanning window
    c) Using Blackmann window
8. To Implement IIR filter (LP/HP) on DSP Processors
9. To Implement IIR filter (BP/BR) on DSP Processors
10. Design of FIR filters using frequency sampling method.
11. To verify N-point DFT & IDFT.
12. N-point FFT algorithm.
13. MATLAB program to find frequency response of analog LP/HP filters.

IV B.Tech. I Semester

10BT7HS01: PROFESSIONAL ETHICS

(Common to ECE, EEE, EIE, EConE, IT, CSE & CSSE)

(AUDIT COURSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	-	-	-	2	-	-

PREREQUISITES: Nil

COURSE DESCRIPTION: Introduction to engineering ethics; Professional characteristics; Role of engineering in social experimentation; Rights and responsibilities of engineers; Global issues in ethics; Ethics for engineers in various roles.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in engineering ethics.
2. Analyze ethical issues for corrective action.
3. Develop ethical environment in public and business environment.
4. Investigate and synthesize available information to provide valid conclusions in public and business environment.
5. Apply ethical issues in day-to-day life in harmonious with the society.
6. Follow environmental ethics while conducting business.
7. Apply ethical principles and commit to professional ethics, norms and responsibilities and norms of the engineering practice.

DETAILED SYLLABUS:

UNIT-I: ENGINEERING ETHICS
Scope and aims of engineering ethics-Senses of Engineering Ethics-Variety of Moral Issues-Types of Inquiry- Moral Dilemmas- Moral Autonomy- Kohlberg's Theory, Gilligan's theory, Consensus and Controversy.

UNIT-II: PROFESSIONAL IDEALS AND VIRTUES
Theories about virtues, professional responsibility, integrity, self-respect, sense of "responsibility". Self-Interest, Customs and Religion- Self-interest and ethical egoism, customs and ethical relativism, religion and divine command ethics. Use of ethical theories- resolving moral dilemmas and Moral leadership.

UNIT-III: ENGINEERING AS SOCIAL EXPERIMENTATION
Engineering as experimentation- similarities to standard experiments, learning from the past and knowledge gained. Engineering as Responsible experiments-Conscientiousness. Moral autonomy and accountability, the challenger case.

UNIT-IV: RESPONSIBILITIES AND RIGHTS
Collegiality and Loyalty, Respect for authority, collective bargaining, confidentiality, conflict of interests, occupational crime. Rights of Engineers- Professional rights, whistle-blowing, The bart case, employee rights and discrimination.

UNIT-V: GLOBAL ISSUES
Multinational corporations-Professional ethics, environmental ethics, computer ethics, Engineers as Managers, Consultants and Leaders. Engineers as managers - Managerial ethics applied to engineering profession.

TEXT BOOKS:

1. Mike W. Martin, Roland Schinzinger, *Ethics in Engineering,* 3rd Edition, TMH, 2007.
2. Govindarajan M, Nata Govindarajan. M, Natarajan. S, Senthilkumar. V.S, *Engineering Ethics*, PHI, 2004.

REFERENCE BOOKS:

1. Dr. S. Kannan, K. Srilakshmi, *Human Values and Professional Ethics*, Taxmann Allied Services Pvt Ltd., 2009.
2. Edmund G seebauer and Robert L Barry, *Fundamental of Ethics for scientists and Engineers*, Oxford University Press, Oxford, 2001.
3. Charles F Fledderman, *Engineering Ethics*, Pearson education/ Prentice Hall, NewJercy, 2004, (Indian reprint).

IV B.Tech. I Semester

10BT70413: MINI-PROJECT

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	-	2

PREREQUISITES: All courses of the program up to III B. Tech., II Semester.

COURSE DESCRIPTION: Identification of topic for the mini-project; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the mini-project work; Preparation of thesis and presentation.

COURSE OUTCOMES:

On successful completion of project work, the students will be able to:

1. Demonstrate in-depth knowledge on the mini-project topic.
2. Identify, analyze and formulate problem chosen for mini-project work to attain substantiated conclusions.
3. Design solutions to the chosen mini-project problem.
4. Undertake investigation of mini-project problem to provide valid conclusions.
5. Use the appropriate techniques, resources and modern engineering tools necessary for mini-project work.
6. Apply mini-project results for sustainable development of the society.
7. Understand the impact of mini-project results in the context of environmental sustainability.
8. Understand professional and ethical responsibilities while executing the mini-project work.
9. Function effectively as individual and a member in the mini-project team.
10. Develop communication skills, both oral and written for preparing and presenting mini-project report.
11. Demonstrate knowledge and understanding of cost and time analysis required for carrying out the mini-project.
12. Engage in lifelong learning to improve knowledge and competence in the chosen area of the mini-project.

IV B.Tech. II Semester

10BT80401: CELLULAR AND MOBILE COMMUNICATIONS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Courses on Communication Systems, Antennas.

COURSE DESCRIPTION: Introduction to cellular systems; Frequency reuse concepts, desired C/I; Channel interference and reduction techniques; Lee-model for cellular coverage; Antennas for cell sites and mobile units; Frequency management; Handoff techniques; Digital cellular systems.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in
   - Frequency reuse concepts
   - Interference types and reduction techniques
   - Frequency management and channel assignment
   - Handoffs
   - Advanced knowledge in Digital cellular systems
2. Perform the analysis of analog and digital cellular systems.
3. Design low interference cellular systems.
4. Solve engineering problems with wide range of solutions in cellular communications.

DETAILED SYLLABUS:

UNIT-I: CELLULAR MOBILE SYSTEMS
Introduction to Cellular Mobile System, Basic Cellular System, Performance Criteria, Uniqueness of Mobile Radio Environment, Hexagonal Shaped Cells, Planning of a Cellular Systems, Analog and Digital Cellular Systems.

UNIT-II: ELEMENTS OF CELLULAR MOBILE RADIO SYSTEM DESIGN
General description of the problem, Concept of Frequency Reuse Channels, Co-channel Interference Reduction Factor, desired C/I from a normal case in a Omnidirectional Antenna System, Cell Splitting, Consideration of the Components of Cellular System.

UNIT-III: INTERFERENCE
Introduction to Co-channel Interference, Real Time Co-channel Interference Measurement, Co-channel Measurement, Design of Antenna System for different Cell Patterns, Antenna Parameters and their effects, Diversity Receiver, types of non-Co-channel Interferences.

UNIT-IV: CELL COVERAGE FOR SIGNAL AND TRAFFIC
Signal Reflections in Flat and Hilly Terrain, Point-to-Point Model (Lee Model)- Effect of Human Made Structures, Phase Difference between Direct and Reflected Paths, Constant Standard Deviation, Straight line path loss slope, General Formula for Mobile Propagation Over Water and Flat Open Area, Foliage loss, Near-in and Long distance propagation, Path loss form a Point to Point Prediction Model.

UNIT-V: CELL SITE AND MOBILE ANTENNAS
Sum and Difference Patterns and their Synthesis, Omnidirectional Antennas, Directional Antennas for Interference Reduction, Space Diversity Antennas, Umbrella Pattern Antennas, Minimum Separation of Cell Site Antennas, High Gain Antennas.

UNIT-VI: FREQUENCY MANAGEMENT AND CHANNEL ASSIGNMENT
Numbering and Grouping, Setup, Access and Paging Channels, Channel Assignments to Cell Sites and Mobile Units, Fixed and non- Fixed Channel Assignments.

UNIT-VII: HANDOFFS AND DROPPED CALLS

Handoff, Types of Handoff-Delaying a Handoff, Forced Handoff, Mobile Assisted Handoff and Soft Handoff, Cell-site Handoff, Intersystem Handoff. Dropped Call Rates and their Evaluation. Cell Splitting and Vehicle Locating Methods.

UNIT-VIII: DIGITAL CELLULAR SYSTEMS

Introduction to 2G Cellular system, GSM architecture, GSM channels, Multiple Access Scheme-TDMA, CDMA. Introduction to 3G Cellular System.

TEXT BOOKS:

1. William C. Y. Lee, *Mobile Cellular Telecommunications,* 2nd Edition, Mc-Graw Hill, 2008.
2. Theodore. S. Rapport, *Wireless Communications,* 2nd Edition, Pearson Education, 2002.

REFERENCE BOOKS:

1. Gordon L. Stuber, *Principles of Mobile Communications,* 2nd Edition, Springer International, 2007.
2. William C. Y. Lee, *Wireless and Mobile Communications,* 3rd Edition, Mc Graw Hills, 2006.
3. Jon W.Mark and Weihua Zhqung, *Wireless Communications and Networking,* Pearson, 2005.
4. R.Blake, *Wireless Communication Technology,* Thompson, Asia Pvt. Ltd., 2004.

IV B.Tech. II Semester

10BT80402: WIRELESS COMMUNICATIONS & NETWORKS

(Elective - III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: Courses on Digital communications, Computer Networks.

COURSE DESCRIPTION: Introduction to wireless networking; Wireless data services; MAC and routing protocols in Wireless networks; introduction, architecture, services and protocols of various network standards like Wireless LAN, Bluetooth, Wireless ATM, Hiper LAN, Wi-Fi and WiMAX.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in

- Network, Transport and Security protocols of different wireless networks.
- Wireless LAN technology
- Data services of wireless networks ISDN and wireless ATM.
- Architectures of various wireless networks such as WIRELESS ATM, HIPER LAN, Wi-Fi AND WiMAX and Mobile data networks like GSM, GPRS etc.

2. Analyze the protocols for wireless networks.
3. Design and develop new protocols for wireless networks.
4. Solve problems pertaining to the wireless networking.

DETAILED SYLLABUS:

UNIT-I: MULTIPLE ACCESS TECHNIQUES FOR WIRELESS COMMUNICATION

Introduction, FDMA, TDMA, Spread Spectrum, Multiple Access, Packet Radio- Packet Radio Protocols, CSMA Protocols, Reservation Protocols, Capture Effect in Packet Radio.

UNIT-II: WIRELESS NETWORKING

Introduction, Difference between Wireless and Fixed Telephone Networks, Development of Wireless Networks, Traffic Routing in Wireless Networks.

UNIT-III: WIRELESS DATA SERVICES

CDPD, ARDIS, RMD, Common Channel Signaling, ISDN, Broadband ISDN and ATM, SS7, SS7 User Part, Signaling Traffic in SS7.

UNIT-IV: MOBILE IP AND WIRELESS APPLICATION PROTOCOL

Operation of mobile IP, Discovery, Co-located address, Registration, Tunneling, WAP Architecture, overview, WML, WML scripts.

WAP protocol stack: Wireless Application Environment, Wireless session Protocol, Wireless Transaction Protocol, Wireless Transport Layer Security Protocol and Wireless Datagram Protocol.

UNIT-V: WIRELESS LAN TECHNOLOGY

Overview, WLAN Requirements, Infrared LANs, Spread Spectrum LANs, Narrow Band Microwave LANs, IEEE 802 Protocol Architecture, IEEE802.11 Architecture and Services, 802.11 Medium Access Control, 802.11 Physical Layer.

UNIT-VI: BLUETOOTH

Overview, Radio Specification, Base band Specification, Links Manager Specification, Logical Link Control and Adaptation Protocol. Introduction to WLL Technology.

UNIT-VII: MOBILE DATA NETWORKS

Introduction, Data oriented CDPD Network, GPRS and higher Data Rates, Short Messaging Service in GSM, Mobile Application Protocol.

UNIT-VIII: WIRELESS ATM, HIPER LAN, Wi-Fi AND WiMAX
Introduction, Wireless ATM, HIPER LAN - Architecture, Physical Model, Layers and Security. Wi-Fi and Introduction to WiMAX.

TEXT BOOKS:

1. Theodore S. Rappaport, *Wireless Communications,* 2nd Edition, PHI, 2008.
2. William Stallings, *Wireless Communications and Networks,* 2nd Edition, Pearson Education, 2007.
3. Kaveh Pahlavan and Prashant Krishna Murthy, *Principles of Wireless Networks,* PHI, 2005.

REFERENCE BOOKS:

1. Kamilo Feher, *Wireless Digital Communications,* PHI, 2001.
2. Andreaws F. Molisch, *Wideband Wireless Digital Communications,* Pearson Education, 2002.
3. Dharma Prakash Agarwal, Qing-An Zeng, *Introduction to Wireless and Mobile Systems,* 2nd Edition, Thomson, 2006.
4. Gordon L. Stuber, *Principles of Mobile Communications,* 2nd Edition, Springer International, 2007.

IV B.Tech. II Semester

10BT71204: CRYPTOGRAPHY AND NETWORK SECURITY

(Elective - III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: A Course on Computer Networks.

COURSE DESCRIPTION: Overview of security attacks, services, and mechanisms; Encryption Principles- public and private encryption algorithms, authentication algorithms; e-mail security; IP security; Web security; Network Management security, System security- Intrusion detection techniques, Malicious software- various types of viruses and Firewalls.

COURSE OUTCOMES:

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

1. Gain knowledge on
   - Conventional Encryption
   - Public key cryptography
   - Key distribution Approaches
   - Hashing Algorithms
2. Analyze network security issues in private and public networks.
3. Apply suitable cryptographic technique for a given security problem.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION

Security Attacks - Interruption, Interception, Modification and Fabrication. Security Services - Confidentiality, Authentication, Integrity, Non-repudiation, Access control and Availability. Security Mechanisms - A model for Internetwork security, Internet Standards and RFCs, Conventional Encryption Principles, Ceaser Cipher, Hill cipher, Poly and Mono Alphabetic Cipher.

UNIT - II: ENCRYPTION PRINCIPLES

Conventional encryption algorithms: Feistal structure, DES algorithm, S-Boxes, Triple DES, Advanced Data Encryption Standard (AES),Cipher block modes of operation, location of encryption devices, Key Distribution Approaches of Message Authentication, Secure Hash Functions and HMAC.

UNIT - III: CRYPTOGRAPHY AND APPLICATIONS

Public key cryptography principles, public key cryptography algorithms, Digital signatures, RSA, Elliptic Algorithms, Digital Certificates, Certificate Authority and key management, Kerberos, X.509, Directory Authentication Service.

UNIT - IV: ELECTRONIC MAIL SECURITY

Email privacy: PGP operations, Radix-64 Conversion, Key Management for PGP, PGP Trust Model, Multipurpose Internet Mail Extension (MIME), Secure/MIME(S/MIME).

UNIT - V: IP SECURITY ARCHITECTURE AND SERVICES

IP Security Overview, IP Security Architecture, Security Association, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management: OAKELY key determination protocol, ISAKMP.

UNIT – VI: WEB SECURITY

Web Security Considerations, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

UNIT - VII: NETWORK MANAGEMENT SECURITY

Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3.

System Security: Intruders-Intrusion techniques, Intrusion Detection, Password Management, Bot nets.

Malicious Software: Viruses and related threats, Virus Counter Measures, Distributed Denial of Service Attacks.

UNIT - VIII: FIREWALLS

Firewall Design principles, Trusted Systems, Common Criteria for Information Technology Security Evolution.

TEXT BOOKS:

1. William Stallings, *Network Security Essentials* (Applications and Standards), 3rd Edition, Pearson Education.
2. Stallings, *Cryptography and network Security*, 3rd Edition, PHI/ Pearson.

REFERENCE BOOKS:

1. Eric Maiwald, *Fundamentals of Network Security*, (Dreamtech press), 2004.
2. Charlie Kaufman, Radia Perlman and Mike Speciner, *Network Security - Private Communication in a Public World*, 2nd Edition, Pearson/PHI.
3. Robert Bragg, Mark Rhodes, *Network Security: The complete reference*, TMH, 2004.
4. Buchmann, *Introduction to Cryptography*, 2nd Edition, Springer, 2004.

IV B.Tech. II Semester

10BT80403: TELEVISION ENGINEERING

(Elective - III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: Courses on Analog Communication, Electronic Circuit Analysis, Digital Signal Processing.

COURSE DESCRIPTION: Introduction to pictures, camera, television, transmitters and receivers, Signal propagation, Monochrome and color TV receiver; sync. Separation and detection; color signal encoding and decoding; advancements in television systems.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in
   - TV transmission and Receiver sections
   - Monochrome and color Camera tubes
   - Monochrome and color picture tubes
   - Digital video and audio signal transmission
2. Analyze monochrome and colour television transmitters and receivers
3. Design and develop of subsystems in TV transmitter and receiver sections.
4. Conduct investigations in to engineering problems pertaining to television transmitters and receivers.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION

TV transmitter and receiver, synchronization, Television pictures: Geometric form and aspect Ratio, image continuity, interlaced scanning, picture Resolution, composite video signal, TV standards. Camera tube types, Vidicon, Silicon diode array vidicon, Monochrome TV camera, Color camera.

UNIT-II: TV SIGNAL TRANSMISSION AND PROPAGATION

Picture signal transmission, positive and negative modulation, VSB transmission, sound signal transmission, standard channel BW, TV transmitter, TV signal propagation, Interference, TV broadcast channels, TV transmission antennas.

UNIT-III: MONOCHROME TV RECEIVER

RF tuner, IF subsystem, video amplifier, sound section, sync separation and processing, deflection circuits ,scanning circuits, AGC, Noise Cancellation, Video and Intercarrier Sound Signal detection, Vision IF subsystem of BW Receivers, Receiver Sound system: FM detection, FM Sound detectors.

UNIT-IV: SYNC. SEPARATION AND DETECTION

TV receiver tuners: tuner operation, VHF and UHF tuners, digital tuning techniques, Remote control of receiver functions. Synchronous separation.

AFC and Deflection Oscillators: Sync Separation, K Noise in sync Pulses, separation of frame and line sync Pulses. AFC, single ended AFC circuit, Deflection oscillators, deflection drive IC's, Picture tubes.

UNIT-V: COLOR TELEVISION

Color signal Generation, Additive color mixing, Video signals for colors, Color difference Signals, Encoding, Perception of brightness and colors luminance signal, Encoding of color difference signals, formation of chrominance signals, color cameras, Color Picture tubes, Color Specifications.

UNIT-VI: COLOR SIGNAL ENCODING AND DECODING
NTSC color system, PAL color system, PAL encoder, PAL-D decoder, chroma signal amplifiers, separation of U & V signals, color Burst separation, Burst phase discriminator, ACC amplifier, Reference Oscillator, Indent and color killer circuits, RO phase shift and 180^0 PAL-switch circuitry, U & V demodulators, color signal mixing.

UNIT-VII: COLOR RECEIVER
Introduction to color receiver, Electron tuners, IF subsystem, Y-signal channel, Chroma decoder, Separation of U & V color, Phasors, synchronous demodulators, Sub carrier generation, raster circuits.

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

TEXT BOOKS:

1. R.R. Gulati, *Modern Television Practice-Principles, Technology and Service,* New Age International publication, 2004.
2. R.R Gulati, *Monochrome and color TV,* New Age International publication, 2003.

REFERENCE BOOKS:

1. S.P.Bali, *Color Television Theory and practice,* TMH, 1994.
2. A.M. Dhake, *Television and Video Engineering,* 2nd Edition, TMH, 2003.
3. B.Grob and C.E.Herndon, *Basic Television and Video Systems,* McGraw Hill, 1999.

IV B.Tech. II Semester

0BT80404: ADVANCED DIGITAL SIGNAL PROCESSING

(Elective - III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: A course on Digital Signal Processing.

COURSE DESCRIPTION: Design of Multirate filters; Estimation of Power spectrum; DSP Algorithms; Applications of DSP.

COURSE OUTCOMES: On successful completion of this course, the students will be able to:

1. Demonstrate fundamental knowledge in
   - Filter banks
   - Digital filter design
   - Efficient power Spectral Estimation Techniques
   - Multirate signal processing
2. Perform analysis of filter banks, LTI systems and digital filters.
3. Design and develop DSP algorithms and power spectral estimation methods.
4. Solve engineering problems in frequency domain and with advanced DSP algorithms.

DETAILED SYLLABUS:

UNIT-I: MULTIRATE SIGNAL PROCESSING

Introduction to Multirate Signal Processing, Applications of multirate signal processing - Design of phase shifters, interfacing of digital systems with different sampling rates, implementation of narrow band low pass filters. Digital filter banks, two channel quadrature mirror filter bank, M-channel QMF bank.

UNIT-II: LTI DISCRETE-TIME SYSTEMS IN THE TRANSFORM DOMAIN

Types of Linear-Phase transfer functions, Simple Digital Filters, Complementary Transfer Function, Inverse Systems, System Identification, Digital Two-Pairs, Algebraic Stability Test.

UNIT-III: DIGITAL FILTER SRTUCTURE AND DESIGN

All Pass Filters, Tunable IIR Digital Filter, IIR Tapped Cascade Lattice Structures, FIR Cascaded Lattice Structures, Parallel All Pass Realization of IIR Transfer Functions, State Space Structures, Polyphase Structures, Digital Sine-Cosine Generator, Computational Complexity of Digital Filter Structures, Design of IIR Filter using pade' approximation, Least Square Design Methods, Design of Computationally Efficient FIR Filters.

UNIT-IV: DSP ALGORITHMS

Fast DFT algorithms based on Index mapping, Sliding Discrete Fourier Transform, DFT Computation Over a narrow Frequency Band, Split Radix FFT, Linear filtering approach to Computation of DFT using Chirp Z-Transform.

UNIT-V: POWER SPECTRAL ESTIMATION

Estimation of spectra from finite duration observation of signals, **Non-parametric methods:** Bartlett, Welch & Blackmann & Turkey methods.

UNIT-VI: PARAMETRIC METHODS FOR POWER SPECTRUM ESTIMATION

Relation between Auto correlation & model parameters, Yule-Waker & Burg Methods, MA & ARMA models for power spectrum estimation.

UNIT-VII: ANALYSIS OF FINITE WORDLENGTH EFFECTS IN FIXED-POINT DSP SYSTEMS

Fixed, Floating Point Arithmetic- ADC quantization noise &signal quality-Finite Wordlength effect in IIR digital Filters-Finite wordlength effects in FFT algorithms.

UNIT-VIII: APPLICATIONS OF DIGITAL SIGNAL PROCESSING

Dual Tone Multi-frequency Signal Detection, Spectral Analysis of Sinusoidal Signals, Spectral Analysis of Non stationary Signals, Musial Sound Processing, Over Sampling A/D Converter, Over Sampling D/A Converter, Discrete-Time Analytic Signal Generation.

TEXT BOOKS:

1. Sanjit K Mitra, *Digital Signal Processing,* 3rd Edition, TMH, 2009.
2. J G Proakis, D G Manolokis, *Digital Signal Processing Principles, Algorithms and Applications,* 4th Edition, PHI, 2007.

REFERENCE BOOKS:

1. A V Oppenhiem, R W Schafer, *Discrete-Time Signal Processing,* 2nd Edition, Pearson Education, 2002.
2. Emmanuel C Ifeacher Barrie. W. Jervis, *DSP-A Practical Approach,* Pearson Education.
3. S. M .Kay, *Modern Spectral Estimation Techniques,* PHI, 1997.

IV B.Tech. II Semester

10BT80405: LOW POWER VLSI DESIGN

(Elective - IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: A course on VLSI design.

COURSE DESCRIPTION: Characterization of MOSFET and BJT; BICMOS fabrication process; considerations; Deep submicron process; low power logic and sequential circuits; special low power techniques.

COURSE OUTCOMES: On successful completion of this course, the students will be able to:

1. Demonstrate knowledge in

· Limitations of Low Power Design.

· SOI Technology.

· BiCMOS Processes.

· MOSFET and BJT Behavior and Modeling.

· BiCMOS Logic Gates Design.

· Special low power techniques.

2. Analyze the low power CMOS circuits effects of devices and judge independently the best suited device for fabrication of smart devices for conducting research in ULSI design.
3. Design and develop digital circuits to maximize performance with minimum cost.
4. Solve problems of Low power design challenges, tradeoff between area, speed and power requirements.

DETAILED SYLLABUS:

UNIT-I: LOW POWER DESIGN, AN OVER VIEW

Review of MOSFET- Regions of operation, Second order effects, static and dynamic characteristics of MOSFET and BJT, Introduction to low- voltage low power design, limitations, Silicon-on-Insulator.

UNIT-II: MOS/BiCMOS PROCESSES

BiCMOS processes, Integrated Analog/Digital CMOS Process.

UNIT-III: INTEGRATION AND ISOLATION CONSIDERATIONS

BiCMOS manufacturing and Integration considerations, process considerations for Bipolar transistors, Isolation in Bipolar and MOS transistors.

UNIT-IV: LOW-VOLTAGE/LOW POWER CMOS/ BICMOS PROCESSES

Deep submicron process flow, SOI CMOS, lateral BJT on SOI, future trends and directions of CMOS/BiCMOS processes.

UNIT-V: CMOS AND BiCMOS LOGIC GATES

Basic Driver configurations, Conventional CMOS and BiCMOS logic gates, Performance Evaluation.

UNIT-VI: LOW- VOLTAGE LOW POWER LOGIC CIRCUITS

Comparison of advanced BiCMOS Digital circuits- Merged BiCMOS circuit, Full Swing Multi drain/ Multi Collector Complementary BiCMOS Buffers, BiNMOS Digital circuits, Boot strapped type BiCMOS Digital Circuits, ESD-free BiCMOS digital circuit- operation and comparative Evaluation.

UNIT-VII: LOW POWER LATCHES AND FLIP FLOPS

Evolution of Latches and Flip flops, Quality measures for latches and Flip flops, Design perspective.

UNIT-VIII: SPECIAL TECHNIQUES

Power Reduction in Clock Networks, CMOS Floating Node, Adiabatic circuits, Low Power Bus, Delay Balancing, Low Power Techniques for SRAM.

TEXT BOOKS:

1. Yeo, Rofail and Gohl, *CMOS/Bi-CMOS ULSI low voltage, low power,* 1st Indian reprint, Pearson Education Asia, 2002.
2. Gary K. Yeap, *Practical Low Power Digital VLSI Design,* KAP, 2002.

REFERENCE BOOKS:

1. Douglas A. Pucknell & Kamran Eshraghian, *Basic VLSI Design,* 3rd Edition, PHI.
2. J.Rabaey, *Digital Integrated circuits,* PH. N.J 1996.
3. Sung-mo Kang & Yusuf Leblebici, *CMOS Digital ICs,* 3rd Edition, TMH, 2003.
4. IEEE Trans on Electron Devices, IEEE J. Solid State Circuits, and other National and International Conferences and Symposia.

IV B.Tech. II Semester

10BT80406: SATELLITE COMMUNICATIONS

(Elective - IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: A Course on Analog Communications and Digital Communications.

COURSE DESCRIPTION: Introduction to satellite communications; Orbital Aspects; Satellite Subsystems; Satellite Link Design Overview; Multiple Access-Frequency Assignments; Antennas and Earth Station Technology; Orbit Considerations; Specific Applications of Satellite-Global Positioning System;

COURSE OUTCOMES: On successful completion of this course, the students will be able to:

1. Demonstrate knowledge in
   - Basic concepts of satellite communications
   - Satellite Orbits and Sub-Systems
   - Satellite link design
   - FDMA,TDMA,CDMA
   - Earth station subsystems
   - Geostationary satellite systems
   - Satellite navigation and global positioning system.
2. Perform analysis of complex engineering problems pertaining to satellite systems.
3. Design and develop satellite links and communications systems.
4. Solve engineering problems with feasible and economical solutions in satellite communications.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION

Origin of Satellite Communications, Historical Background, Basic Concepts of Satellite Communications, Frequency Allocations for Satellite Services, Applications, Future Trends of Satellite Communications.

UNIT-II: ORBITAL MECHANICS AND LAUNCHERS

Orbital Mechanics, Look Angle Determination, Orbital Perturbations, Orbit Determination, Launches and Launch Vehicles, Orbital Effects in Communication Systems Performance.

UNIT-III: SATELLITE SUBSYSTEMS

Satellite Subsystems - Attitude and Orbital Control System, Telemetry, Tracking, Command and Monitoring, Power Systems, Communication Subsystems, Satellite Antenna, Equipment Reliability and Space Qualification.

UNIT-IV: SATELLITE LINK DESIGN

Basic Transmission Theory, System Noise Temperature and G/T ratio, Design of Down Links, Uplink Design, Design of Satellite Links for specified C/N, System Design example.

UNIT-V: MULTIPLE ACCESS

Frequency Division Multiple Access (FDMA), Intermodulation, Calculation of C/N, Time Division Multiple Access (TDMA) Frame Structure, examples. Satellite Switched TDMA Onboard Processing, DAMA, Code Division Multiple Access (CDMA), Spread Spectrum Transmission and Reception.

UNIT-VI: EARTH STATION SUBSYSTEMS

Introduction, Transmitters, Receivers, Antennas, Tracking Systems, Terrestrial Interface, Primary Power and Test Methods.

UNIT-VII: LOW EARTH ORBIT AND GEOSTATIONARY SATELLITE SYSTEMS

Orbit Consideration, Coverage and Frequency Considerations, Delay and Throughput Considerations, System Considerations, Operational NGSO Constellation Designs.

UNIT-VIII: SATELLITE NAVIGATION & THE GLOBAL POSITIONING SYSTEM

Radio and Satellite Navigation, GPS Position Location Principles, GPS Receivers and Codes, Satellite Signal Acquisition, GPS Navigation Message, GPS Signal Levels, Timing Accuracy, GPS Receiver Operation, GPS C/A Code Accuracy, Differential GPS.

TEXT BOOKS:

1. Timothy Pratt, Charles W Bostian and Jeremy E Allnutt, WSE, *Satellite Communications,* 2nd Edition, Wiley publications, 2007.
2. Wilbur L.Pritchard, Henri G.Suyderhoud and Robert A. Nelson, *Satellite Communications Engineering,* 2nd Edition, Pearson Publications, 2008.

REFERENCE BOOKS:

1. M. Richharia, *Satellite Communication Systems Design Principles,* 2nd Edition, Mc Millan Publications, 1999.
2. D.C.Agarwal, *Satellite communications,* 7th Edition, Khanna Publications, 2009.
3. K.N.Raja Rao, *Fundamentals of Satellite communications,* PHI, 2009.
4. Dennis Roddy, *Satellite communications,* 4th Edition, McGraw Hill, 2006.

IV B.Tech. II Semester

10BT61002: BIOMEDICAL INSTRUMENTATION

(Elective - IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: Fundamentals of Sensors and Transducers.

COURSE DESCRIPTION: Human Anatomy & Physiology; Bio-signals; Cardiovascular and Neuro-muscular Instrumentation; Therapeutic Equipment; Advanced Imaging techniques.

COURSE OUTCOMES:

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

1. Demonstrate knowledge on human anotomy and physiology, ECE, EMG and EEG measuring systems, Medical imaging and therapeutic equipment.
2. Analyze the performance of Bio-signals.

DETAILED SYLLABUS:

UNIT-I

Components of medical instrumentation system, static and dynamic characteristics of medical instruments, biosignals and characteristics, bioamplifier. Problems encountered with measurements from human beings.

UNIT-II: ELECTRO PHYSIOLOGY

Review of Physiology and anatomy. Structure of cell,sources of bioelectric potentials, resting and action potentials, propagation of action potentials, conduction through nerve to neuromuscular junction.

UNIT-III: ELECTRODE THEORY

Electrode-electrolye interface, electrode-electrolyte-skin interface, motion artifacts, external and internal electrodes, bio chemical electrodes, transducers for biomedical applications.

UNIT-IV: CARDIOVASCULAR INSTRUMENTATION

Physiology of cardiovascular system, electrical conduction system of the heart, interpretation of ECG waveform, standard 12-lead configurations, Einthoven triangle, specifications of ECG Machine. Blood pressure, blood flow and heart sound measurements. Relation between electrical and mechanical activities of the heart.

UNIT-V: NEURO-MUSCULAR INSTRUMENTATION

Physiology of nervous system, electrode placement for EEG and EMG recording. Specification of EEG and EMG machines, Interpretation of EEG and EMG.

UNIT-VI: THERAPEUTIC EQUIPMENT

Pacemaker, Defibrillator, cardio vector, Diathermy: Shortwave and microwave. Hemodialysis machine.

UNIT-VII: RESPIRATORY INSTRUMENTATION

Mechanism of respiration, Spirometry, Pnemuotachograph Ventilators.

UNIT-VIII: MEDICAL IMAGING SYSTEM

Radiography, computed radiography, computed tomography, magnetic resonance imaging, ultrasonography.

TEXT BOOKS:

1. Leslie Cromwell, F.J. Weibell, E.A. Pfeiffer, *Biomedical Instrumentation and Measurements,* 2nd Edition, PHI, 2009.
2. John G. Webster, *Medical Instrumentation, Application and Design*, John Wiley, 2007.

REFERENCE BOOK:

1. R.S. Khandpur, *Hand-book of Biomedical Instrumentation*, 2nd Edition, TMH, 2007.

IV B.Tech. II Semester

10BT71301: NEURAL NETWORKS AND FUZZY SYSTEMS

(Elective - IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: Principles of electrical engineering.

COURSE DESCRIPTION: Architectures of feed forward and feedback artificial neural networks; Supervised, un-supervised and reinforced learning strategies; Associative memories; Fuzzy set theory; Fuzzy systems design; Applications of neural networks and fuzzy systems.

COURSE OUTCOMES:

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

1. Demonstrate knowledge in learning strategies of an artificial neural network and components of fuzzy logic system.
2. Design fuzzy systems and neural networks for real time problems.
3. Apply neural networks for load forecasting, process identification and fault diagnosis and fuzzy systems for arriving at accurate control system solutions.

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DETAILED SYLLABUS:

UNIT I: INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS
Introduction, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Characteristics of ANN, McCulloch-Pitts Model, Types of Neuron Activation Function, ANN Architectures, Supervised, Unsupervised, Reinforced Learning, Potential applications to ANN.

UNIT II: FEED FORWARD NETWORKS
Perceptron Models, Learning Rules, Hebbian Learning Rule, Perceptron Learning Rule, Delta Learning Rule, Back propagation, Architecture, Calculation of error, Training algorithm, Applications, Kohenen Self organizing Feature map, Architecture, Training, Learning Vector Quantizer (LVQ).

UNIT III: FEEDBACK AND COUNTER PROPAGATION NETWORKS
Hopfield network, Architecture, Training algorithm, Application. Full Counter Propagation Network (Full CPN), Architecture, Training Phases of Full CPN, Training Algorithm, Application.

UNIT IV: ASSOCIATIVE MEMORIES
General Concepts of Associative Memory, Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms, Basic architecture BAM Energy Function, Adaptive resonant Theory, ART1, ART2, Architecture, Algorithm, Applications.

UNIT V: CLASSICAL & FUZZY SETS
Introduction to classical sets, properties, Fuzzy sets, Membership functions, Classical Relations and Fuzzy Relations, Composition.

UNIT VI: FUZZY LOGIC SYSTEM COMPONENTS
Properties of Membership Functions, Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification, methods, α-cuts for Fuzzy Relations, Extension principle.

UNIT VII: FUZZY SYSTEMS
Natural Language, Linguistic Hedges, Fuzzy (Rule-Based) Systems, Graphical Techniques of Inference, Fuzzy Control Systems, Control System Design Problem, Simple Fuzzy Logic Controllers-Examples.

UNIT VIII: NEURAL NETWORK AND FUZZY APPLICATIONS

Neural network applications: Load forecasting, Process identification, control and fault diagnosis (Image Processing).

Fuzzy logic applications: Temperature control, Cruise control application, Air conditioner control, DC motor speed control.

TEXT BOOKS:

1. S. Rajasekharan and G. A. Vijayalakshmi pai, *Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications*, PHI, 2004.
2. Timothy J. Ross, *Fuzzy Logic with Engineering Applications*, McGraw-Hill International, 1997.

REFERENCE:

1. Simon Haykin, *Neural Networks- A comprehensive foundation,* Pearson Education, 2001.
2. S.N.Sivanandam, S.Sumathi,S. N. Deepa, *Introduction to Neural Networks using MATLAB 6.0,* TMH, 2006.
3. Philip D.Wasserman, *Neural computing*, Wiley Publications.

IV B.Tech. II Semester

10BT80411: COMPREHENSIVE VIVA-VOCE

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
100	-	100	-	-	-	2

PREREQUISITES: All courses of the program.

COURSE DESCRIPTION: Assessment of student learning outcomes.

COURSE OUTCOMES:

Comprehensive Viva-Voce enables a successful student to:

1. Demonstrate knowledge in the program domain.
2. Present views cogently and precisely.
3. Exhibit professional etiquette suitable for career progression.

IV B.Tech. II Semester

10BT80412:PROJECT WORK

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
75	150	225	-	-	12	12

PREREQUISITES: All the courses of the program up to IV B. Tech. - I Semester.

COURSE DESCRIPTION: Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Preparation of thesis and presentation.

COURSE OUTCOMES:

On completion of the Project work, the student will be able to:

1. Demonstrate in-depth knowledge on the project topic.
2. Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.
3. Design solutions to the chosen project problem.
4. Undertake investigation of project problem to provide valid conclusions.
5. Use the appropriate techniques, resources and modern engineering tools necessary for project work.
6. Apply project results for sustainable development of the society.
7. Understand the impact of project results in the context of environmental sustainability.
8. Understand professional and ethical responsibilities while executing the project work.
9. Function effectively as individual and a member in the project team.
10. Develop communication skills, both oral and written for preparing and presenting project report.
11. Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.
12. Engage in lifelong learning to improve knowledge and competence in the chosen area of the project.

Rules of Disciplinary Action for Malpractice/Improper conduct in Examinations

S. No.	Nature of Malpractice / Improper Conduct	Rule No.	Punishment
1.	Possession of unauthorised material in printed or handwritten form or electronic devices	Rules 1(a), 1(b)	Expulsion from the examination hall and cancellation of examination in that subject. If any outside person involves and helps the candidate for malpractice, the outside person is handed over to the police and a case is registered.
2.	If the candidate copies evidently from various sources like, hand written material, typewritten or Photostat material, writing on body arms or clothes, writing with pen/pencil on calculators, scales, hall ticket, rubber etc.	Rule 2	Expulsion from the examination hall and cancellation of exam in that subject and all other subjects the candidate has appeared, including practical examinations and project work. He/she shall not be permitted to appear for the remaining examinations.
3.	If any person impersonates the other candidate in the examination.	Rule 3	If the person is a student of the College he shall be expelled from examination and debarred. He shall forfeit the seat. The performance of the original candidate is cancelled for that series of examination and debarred for two semesters. If the person is an outsider, he/she shall be handed over to the police and a case is registered.
4.	If the candidate attempts to steal/mutilate/damage (or) tries to send out the answer book (or) Takes out (or) arranges to send out the question paper during the examination.	Rule 4	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. He/she shall not be permitted for the remaining examinations of the courses in that semester/year. The candidate is also debarred for two consecutive semesters. **This matter shall be reported to police and a case is registered**

5.	If the candidate uses objectionable, abusive or offensive language in the answer paper, or writes to the examiner requesting him to award pass marks.	Rule 5	Cancellation of the perfor-mance in that course.
6.	If the candidate refuses to obey the examination authorities (or) misbehaves (or) creates disturbance of any kind in and around the examina-tion hall (or) organizes a walk out, (or) threatens (or) assaults the invigilator and indulges in the act of misconduct, destruction of property on the campus.	Rule 6	In case of students of the college, they shall be expelled from examination and their examination performance stands cancelled. In case of outsiders, they will be handed over to the police and a case is registered against them.
7.	If the candidate possesses any lethal weapon or firearm in the examination hall.	Rule 7	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 of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. **This matter shall be reported to police and a case is registered**
8.	If a student of the College, who is not a candidate for the particular exam or any person not connected with the College indulges in any malpractice or improper conduct mentioned in clauses 6 and 7.	Rule 8	For student of the College expulsion from the examination hall and cancellation of the performance in that series of examination. The candidate is also debarred and forfeits the seat. For persons who do not belong to the college will be handed over to the police and a case is registered.

9.	If the candidate comes in an intoxicated/inebriated condition to the examination hall.	Rule 9	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
10.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Rule 10	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.
11.	If any malpractice is detected which is not covered in the clauses 1 to 10 above, shall be brought to the notice of the Chief Controller of Examinations.		

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(AUTONOMOUS)

Sree Sainath Nagar, A.Rangampet, Near Tirupati - 517 102. A.P.

Salient Features of Prohibition of Ragging in Educational Institutions Act 26 of 1997

- Ragging within or outside the College is prohibited.
- Ragging means doing an act which causes or is likely to cause insult or annoyance or fear or apprehension or threat or intimidation or outrage of modesty or injury to a student

Nature of Ragging	Punishment
Teasing, Embarrassing and humiliating	Imprisonment up to 6 months or fine up to Rs. 1,000/- or Both
Assaulting or using criminal force or criminal intimidation	Imprisonment up to 1 year or fine up to Rs. 2,000/- or Both
Wrongfully restraining or confining or causing hurt	Imprisonment up to 2 years or fine up to Rs. 5,000/- or Both
Causing grievous hurt, Kidnapping or rape or committing unnatural offence	Imprisonment up to 5 years or fine up to Rs. 10,000/-
Causing death or abetting suicide	Imprisonment up to 10 years or fine up to Rs. 50,000/-

Note:

1. A student convicted of any of the above offences, will be expelled from the College.
2. A student imprisoned for more than six months for any of the above offences will not be admitted in any other College.
3. A student against whom there is prima facie evidence of ragging in any form will be suspended from the College immediately.
4. The full text of Act 26 of 1997 **and** UGC Regulations on Curbing the Menace of Ragging in Higher Educational Institutions, 2009 **(Dated 17th June, 2009) are placed in the College library for reference.**