

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 APSICHE.

- (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
	Semester Break	2 weeks
Second 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
	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:

S.No.	Examination	Marks	Examination and Evaluation	Scheme of examination
1	Theory	70	Year-end / Semester-end examination (external evaluation)	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.
		30	20	<p>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.</p> <p>For I B.Tech: 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)</p> <p>For a Semester: 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).</p>

			10	Assignment Tests (Internal evaluation)	<p><u>For I B.Tech:</u> 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.</p> <p><u>For a Semester:</u> Two assignment tests each of 10 marks shall be conducted. Better of the two assignments shall be internal marks for the assignments.</p>
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 1 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)

ELECTRONICS AND INSTRUMENTATION ENGINEERING

COURSE STRUCTURE (2011-2012)

II B.Tech. I Semester

Code	Subject	Periods per week			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
10BT40404	Switching Theory and Logic Design	4	1	-	4	30	70	100
10BT31001	Thermodynamics and Fluid Mechanics	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 week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
10BT41301	Control Systems	4	1	-	4	30	70	100
10BT41001	Electrical and Electronic Measurements	4	1	-	4	30	70	100
10BT41002	Transducers in Instrumentation	4	-	-	4	30	70	100
10BT40401	Electronic Circuit Analysis	4	-	-	4	30	70	100
10BT40221	Principles of Electrical Engineering	4	1	-	4	30	70	100
10BT40402	Pulse and Digital Circuits	4	-	-	4	30	70	100
10BT40231	Electrical Engineering Lab	-	-	3	2	25	50	75
10BT40411	Electronic Circuits Lab	-	-	3	2	25	50	75
10BT4HS02	Audit Course: Advanced English Communication Skills	-	3	-	-	-	-	-
	Total	24	6	6	28	230	520	750

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(Autonomous)

ELECTRONICS AND INSTRUMENTATION ENGINEERING

COURSE STRUCTURE (2011-2012)

III B.Tech. I Semester

Code	Subject	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
10BT50421	Electromagnetic Theory	4	1	-	4	30	70	100
10BT50422	Linear and Digital IC Applications	4	1	-	4	30	70	100
10BT40501	Computer Architecture and Organization	4	1	-	4	30	70	100
10BT51001	Process Control Instrumentation	4	1	-	4	30	70	100
10BT3BS02	Environmental Sciences	4	1	-	4	30	70	100
10BT51002	Industrial Instrumentation	4	1	-	4	30	70	100
10BT50431	IC & PDC Lab	-	-	3	2	25	50	75
10BT51011	Measurements and Transducers Lab	-	-	3	2	25	50	75
	Total	24	6	6	28	230	520	750

III B.Tech. II Semester

Code	Subject	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
10BT4HS01	Managerial Economics and Principles of Accountancy	4	1	-	4	30	70	100
10BT60404	Microprocessors and Microcontrollers	4	1	-	4	30	70	100
10BT60401	Digital Signal Processing	4	1	-	4	30	70	100
10BT50423	Principles of Communications	4	1	-	4	30	70	100
10BT61001	Optoelectronic and Laser Instrumentation	4	1	-	4	30	70	100
10BT61002	Biomedical Instrumentation	4	1	-	4	30	70	100
10BT60411	Microprocessors and Microcontrollers Lab	-	-	3	2	25	50	75
10BT61011	Process Control Lab	-	-	3	2	25	50	75
10BT61012	Seminar	-	-	-	2	75	-	75
	Total	24	6	6	30	305	520	825

SREE VIDYANIKETHAN ENGINEERING COLLEGE
(Autonomous)

ELECTRONICS AND INSTRUMENTATION ENGINEERING
COURSE STRUCTURE (2011-2012)

IV B.Tech. I Semester

Code	Subject	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
10BT6HS01	Management Science	4	-	-	4	30	70	100
10BT71001	Analytical Instrumentation	4	1	-	4	30	70	100
10BT71002	Automation of Industrial Processes	4	1	-	4	30	70	100
10BT40502	Object Oriented Programming	4	1	-	4	30	70	100
Elective - I:								
10BT71003	a) Power Plant Instrumentation							
10BT71004	b) Petrochemical Plant Instrumentation	4	-	-	4	30	70	100
10BT71005	c) MEMS and Microsystems							
10BT71006	d) Virtual Instrumentation							
Elective - II:								
10BT61202	a) Computer Networks							
10BT71301	b) Neural Network and Fuzzy Systems	4	1	-	4	30	70	100
10BT71007	c) Telemetry and Tele - Control							
10BT70402	d) Digital Image Processing							
10BT71011	Analytical and Biomedical Instrumentation Lab	-	-	3	2	25	50	75
10BT71012	PLC and LabView Programming Lab	-	-	3	2	25	50	75
10BT71013	Mini-Project	-	-	-	2	25	50	75
10BT7HS01	Audit Course: Professional Ethics	-	2					
Total		24	6	6	30	255	570	825

IV B.Tech. II Semester

Code	Subject	Periods per week			C	Scheme of Examination Max. Marks		
		L	T	P		Int.	Ext.	Total
10BT81001	Industrial Electronics	4	1	-	4	30	70	100
Elective - III:								
10BT60405	a) VLSI Design							
10BT70521	b) Operating System Principles	4	1	-	4	30	70	100
10BT70405	c) Embedded and Real Time Systems							
10BT70421	d) Advanced Microprocessors and Microcontrollers							
Elective - IV:								
10BT4EC01	a) Optimization Techniques							
10BT61302	b) Robotics and Automation	4	1	-	4	30	70	100
10BT81302	c) Adaptive Control Systems							
10BT51301	d) Advanced Control Systems							
10BT81011	Comprehensive Viva-Voce	-	-	-	2	100	-	100
10BT81012	Project work	-	-		12	75	150	225
Total		12	3	12	26	265	360	625

B.Tech I Year
14BT1HS01: TECHNICAL ENGLISH
(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	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 Everyday English**, 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**, Published by 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 **Enjoying Everyday English**, Published by Sangam Books, Hyderabad
Lesson entitled **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	Ext. Marks	Total Marks	L	T	P	C
30	70	100	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 deposition 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 and K. Thyagarajan, 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	Ext. Marks	Total Marks	L	T	P	C
30	70	100	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 electrode 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 deshielding 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, units 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:

1. 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	Ext. Marks	Total Marks	L	T	P	C
30	70	100	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 $Q(x)=e^{ax}$, $\sin ax$, $\cos ax$, x^n , $e^{ax} V(x)$, $x V(x)$ and $x^n V(x)$. 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	Ext. Marks	Total Marks	L	T	P	C
30	70	100	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 4th orders 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 odd function, half-range Fourier sine and 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 SOLVING AND COMPUTER PROGRAMMING
(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	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 systems, 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 and 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 arrays, pointers 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 Private 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	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	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 OUTCOME:

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.
4. function effectively as individual and as member in a team
5. Communicate effectively both oral and written

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. Khannah, 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 Rana, Pearson Education, 2nd Edition.
3. Engineering Drawing and Graphics, K. Venugopal, New age International Publishers, 5th Edition.
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	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	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 this 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
4. function effectively as individual and as member in a team
5. Communicate effectively both oral and written

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) $2.5 \log x + \cos 32^\circ + |x^2 + y^2| + \sqrt{2xy}$
 - iii) $x^5 + 10x^4 + 8x^3 + 4x + 2$
 - iv) ae^{kt}

WEEK- 2:

- a. Mr. Gupta deposited Rs.1000 in a bank. The bank gives simple interest 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 \leq 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:
$$\text{sum} = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$$
- 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
- Write a function to store 10 employee details.
 - Write a function to implement the following rules while revising the basic pay.
If Basic pay \leq Rs. 5000 then increase it by 15%.
If Basic pay $>$ Rs. 5000 and \leq Rs.25000 then it increase by 10%
If Basic pay $>$ Rs. 25000 then there is no change in basic pay.
 - Write a function to print the details of employees who have completed 20 years of service from the date of joining.

WEEK- 17:

- Write a program which copies one text file to another.
 - 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	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	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.
- 2. Function effectively as individual and as a member in a team**
- 3. Communicate effectively both oral and written**

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 LANGUAGE AND COMMUNICATION
SKILLS LAB
(Common to BOT, CIVIL, ME, CSE, CSSE, ECE, EConE, EEE, EIE
and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	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
4. Project Presentations
5. function effectively as individual and as member in a team
6. Use and create techniques and language lab software for enhancing the language skills.
7. Communicate effectively with engineering community and society in formal and informal situations.
8. 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 with CD
- 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	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	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.
5. Function effectively as individual and as member in a team.

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. Acquire knowledge in
 - Linear partial differential equations, heat equation, wave and Laplace with boundary conditions.
 - Integrals through beta and gamma functions.
 - Analytic nature of complex functions.
 - Integration of complex functions on different types of curves.
 - Residues of complex functions.
 - Properties of complex functions through mappings.
2. Design mathematical models for
 - Fluid flow patterns.
 - Evaluation of complicated real integrals
 - Integrations through complex variable techniques
3. Develop skills in solving problems involving
 - Improper integrals through beta and gamma functions
 - Flow patterns of fluids.
 - Magnetic and electrical potential functions.
 - Evaluation of real and improper integrals through complex variable technique.
 - Integration of complex functions on complicated curves.
 - Investigating the behavior of complex function in a given region.
 - Contour integration of complex functions
 - Heat transfer and wave motions.

DETAILED 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's 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

$$\text{i) } \int_{-\infty}^{\infty} f(x)dx \quad \text{ii) } \int_0^{2\pi} f(\cos \theta, \sin \theta)d\theta \quad \text{iii) } \int_{-\infty}^{\infty} e^{imx} f(x)dx$$

UNIT-VII : Rouché's Theorem - Applications

Argument principle - Rouché's theorem - determination of number of zeros of complex polynomials - maximum modulus 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, *Mathematical 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: 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, π - 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 β , 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 Electronics*, 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

PRE REQUISITES: 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 course, the student 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 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*, Tata McGraw-Hill Company, 3rd Edition, 2007.
2. A. Chakrabarthy, *Circuits Theory*, Dhanpat Rai & Co, New Delhi, 2009.

REFERENCE BOOKS:

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

II B.Tech. I Semester

10BT40404: SWITCHING THEORY AND LOGIC DESIGN (Common to EEE, EIE & EConE)

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

PREREQUISITES: 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 the course 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. I Semester

10BT31001: THERMODYNAMICS AND FLUID MECHANICS

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

PRE-REQUISITES: Engineering Physics, Engineering Chemistry and Engineering Mathematics

COURSE DESCRIPTION:

Thermodynamic systems; Laws of Thermodynamics; Concept of entropy; Properties of gases, gas mixtures; Air-standard cycles; Air compressors; Steam boilers, mountings and accessories; Modes of heat transfer; Fluid flows and flow measurement; Energy and momentum equations; Dimensional analysis, model analysis; Refrigeration and Hydraulic machinery.

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

1. Employ the basic knowledge in choosing a suitable device for measuring the fluid flow.
2. Analyze the requirement and suggest a suitable measuring technique in a given situation through modeling and use of mathematics.
3. Design solutions to complex fluid flow problems using dimensionless numbers and model laws.

DETAILED SYLLABUS :

UNIT-I: Laws of Thermodynamics

Basic concept, Thermodynamic systems and processes, Zeroth law of Thermodynamics: Concept of temperature, First law of Thermodynamics: Concept of internal energy and enthalpy, applications to open and closed systems, Second law of Thermodynamics: Concept of entropy.

UNIT-II: Thermodynamic Air Cycles and Air Compressors

Introduction, Thermodynamic air cycles, Comparison of cycles, Concepts on properties of gases & gas mixtures.

Air compressors: Classifications, Working principles of Rotary and Positive displacement compressors, Single stage and Multistage compressors.

UNIT-III: Thermodynamic Vapour Power Cycles and Steam

Boilers: Properties of steam, Thermodynamic vapour cycles, Rankine cycle with modifications, Types of Calorimeters, Steam boilers, Boiler Mountings and Accessories.

UNIT-IV: Refrigeration and Heat Transfer

Basic concepts of refrigeration, Various methods of producing refrigerating effects, Air conditioning process.

Basic concepts of Heat Transfer, One dimensional heat conduction: Plain wall and composite walls, Basic concept of Radiation.

UNIT-V: Basic Concepts of Fluid Mechanics

Introduction, Types of fluids, Properties, Laws of pressure, Atmospheric Pressure, Gauge Pressure. Pressure Measurement: Piezometer, Manometers and Mechanical Gauges.

UNIT-VI: Analysis of Flow of Fluids

Stream line, path line and streak lines and stream tube, classification of various fluid flows, Equation of Continuity for one dimensional flow, Euler's and Bernoulli's equations for flow along a stream line, momentum equation and its applications on force on pipe bend, Flow measuring devices and its basic problems.

UNIT-VII: Dimensional and Model Analysis

Introduction, Dimensions, Dimensional Homogeneity, Methods of Dimensional analysis, Model analysis introduction, Similitude, Dimensionless Numbers and their significance, Model or Similarity laws.

UNIT-VIII: Hydraulic machines

Pumps: Basic concepts, Classifications, Working principles of Centrifugal and Reciprocating pumps.

Turbines: Basic concepts, Classifications, Working Principles of various turbines, efficiencies, basic problems.

TEXT BOOKS:

1. P.K.Nag, *Engineering Thermodynamics*, TMH.
2. R.K.Rajput, *Fluid Mechanics and Hydraulic Machines*, Revised 2nd Edition, S.Chand and company Ltd., 2002.

REFERENCE BOOKS:

1. R.K.Rajput, *Thermal Engineering*, Laxmi Publications (P) Ltd.
2. R.K.Bansal, *Fluid Mechanics*, Laxmi Publications (P) Ltd.
3. Dr. D.S. Kumar, *Fluid Mechanics and Fluid Power Engineering*, S.K.Kataria and sons.
4. Dr. P.N.Modi and Dr. S.M.Seth, *Hydraulics and Fluid Mechanics Including Hydraulics Machines*, 18th Edition, Standard Book House, Rajsons Publications(P) Ltd, 2011.

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: 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 the 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 Publications, 2000.
2. Michel J. Robert, *Fundamentals of Signals and Systems*, MGH 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: 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.

DETAILED SYLLABUS :

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, DIAC, TRIAC, 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. Half wave Rectifier With and without filters.
6. Full wave Rectifier With and without filters.
7. FET characteristics.
8. Measurement of h parameters of transistor in CE configuration.
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

PRE-REQUISITES: 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 the course the students will be able to

1. Gain programming skills in
 - Basic Operations on Matrices.
 - Various signals and Sequences.
 - Convolution of signals and Sequences
 - Fourier Tranform ,Laplace Transform and Z-Transforms
 - 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.

DETAILED SYLLABUS :

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 Spectrum.
11. Waveform Synthesis using Laplace Transform.
12. Locating Zeros and Poles, and plotting the Pole-Zero maps in S-Plane and Z-Plane for the given 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
10BT41301: CONTROL SYSTEMS
(Common to ECE, EIE & EConE)

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

PREREQUISITE: Engineering mathematics, Circuit Theory

COURSE DESCRIPTION:

Open loop and closed loop systems; time domain and frequency domain analysis for stability; lead and lag compensation circuits; state space analysis.

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

1. Demonstrate knowledge in
 - Representation of physical systems
 - Time and frequency domain specifications for stability analysis.
 - Methods of determining the stability of the system
 - 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
 - Deducing the transfer function using block diagram reduction technique and signal flow graph.
 - Evaluating the system stability in time and frequency domains.
 - Solving the state equations of a system.
 - 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 Servo motor, 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. Nise, *Control Systems Engineering*, 3rd Edition, John wiley.
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
10BT41001: ELECTRICAL AND ELECTRONIC
MEASUREMENTS

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

PREREQUISITES: Circuit theory, Engineering Physics.

COURSE DESCRIPTION:

Construction and principle of operation of Ammeters; Voltmeters; Ohmmeters;, Potentiometers; Power Factor meter ; Energy Meters; Frequency and Time measurements; Design of Bridges, Design of series ohmmeter and shunt ohmmeter; Oscilloscopes; different types of Analyzers and Recorders.

COURSE OUTCOMES: At the end of the course students will be able to:

1. Gain knowledge in:
 - Construction and Principle of operation of different instruments used for electrical and electronic measurements.
 - The measurement of power, power factor, Energy, Frequency, Resistance and Voltage.
2. Design different bridge circuits, Series and Shunt type ohmmeter.

DETAILED SYLLABUS :

UNIT-I: Ammeters and Voltmeters

Classification of analog instruments, operating forces: deflecting, control and damping. Construction, working principle and expression of torque equation for PMMC and Moving Iron Instruments. Ammeters and Voltmeters, Range extension of ammeters and voltmeters.

UNIT-II: Ohmmeters and Potentiometers

Series ohmmeter, shunt ohmmeter, multimeters. DC Potentiometers: Basic potentiometer circuit, standardization, Compton's Potentiometers, applications. AC Potentiometers: Standardization, Polar types and Coordinate types, applications.

UNIT-III: Power, Power Factor & Energy Meters

Construction, working principle and expression of torque equation for single phase electrodynamic wattmeter, single phase electrodynamic power factor meter and single phase induction energy meter. Testing of energy meter by direct loading, Phantom loading methods.

UNIT-IV: Bridges

Measurement of Resistance: Wheatstone bridge, Kelvin bridge, Kelvin double bridge and direct deflection methods. Measurement of Inductance: Maxwell bridge, Hay's bridge and Anderson bridge. Measurement of capacitance: Desauty's bridge and Schering bridge, Q-meter.

UNIT-V: Electronic Instruments

AC voltmeter using rectifiers, true RMS reading Voltmeter, electronic multimeter, digital voltmeters: ramp DVM, staircase ramp DVM, dual slope DVM and successive approximation DVM.

UNIT-VI: Frequency and Time Measurements

Frequency counters: Basic principle, errors associated with counter. Different modes of operations: Frequency, Time, Time Period, Average time period, Totalizing. Frequency synthesizer, Wave meters, Wave Analyzers, Output power meter.

UNIT-VII: Oscilloscopes

Motion of electron in electric and magnetic fields, electrostatic and magnetic focusing, deflection sensitivity in both cases, CRO operation, CRT characteristics, CRO probes, Time base sweep modes, Trigger generator, Vertical amplifier, modes of operations, A, B, alternate & chop modes. Sampling oscilloscopes, storage oscilloscope. Standard specifications of CRO, synchronous selector circuits, Lissajous figures.

UNIT-VIII: Analyzers and Recorders

Spectrum analyzers, different types of spectrum analyzer, recorders, introduction to magnetic recording techniques & X-Y plotters. Display devices and display systems, logic analyzers.

TEXT BOOKS:

1. A.K.Sawhney, *A Course in Electrical and Electronics Measurements and Instrumentation*, Dhanpat Rai and Sons, New Delhi, 1995.
2. H.S. Kalsi, *Electronic Instrumentation*, TMH, 2002.

REFERENCE BOOKS:

1. Cooper W.D & Hlefrick A.D., *Electronic Instrumentation & Measurement Technique*, 3rd Edition, PHI, 1991.
2. Doebelin, E.O., *Measurement Systems: Applications and Design*, 4th Edition, TMH, 2003.
3. David A. Bell, *Electronic Instrumentation and Measurements*, 2nd Edition, PHI, 2003.
4. E.W. Golding & F.C. Widdis, *Electrical Measurements and Measuring Instruments*, 5th Edition, Wheeler Publishing.

II B.Tech. II Semester
10BT41002: TRANSDUCERS IN INSTRUMENTATION
(Common to EIE & EConE)

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

PRE REQUISITE: Intermediate Physics and Semiconductor Devices & Circuits

COURSE DESCRIPTION:

Performance characteristics of transducers; Types of transducers like resistive, capacitive, inductive, self-generating & digital transducers; Signal conditioning circuits for the transducers.

COURSE OUTCOMES: After completion of the course the students are able to:

1. Acquire knowledge on measuring systems and different transducers.
2. Use analytical skills in measurement of errors, transient response of the process and to measure the output of the transducer.
3. Design the signal conditioning circuit for the transducers.
4. Identify the type of transducer for the specific problem.

DETAILED SYLLABUS :

UNIT-I: Introduction to Measurement and Transducers

Block diagram of Measuring System, Units and Standards, Measurement Errors, Statistical analysis of measurement data, Probability Errors, Limiting Errors, Principle of transducer, Classification of transducers.

UNIT-II: Performance Characteristics

Static characteristics: Calibration, accuracy, precision, sensitivity, linearity, resolution, hysteresis, threshold, reproducibility, repeatability, dead space, span, range.

Dynamic characteristics: Generalized mathematical model of measurement system. Zero order, first order and second order measurement systems and their response to Step, Ramp and Impulse inputs. Frequency response of first order and second order systems.

UNIT-III: Resistive Transducers

Potentiometers, strain gauges and their types, resistance temperature detector, thermistor, light dependent resistors.

UNIT-IV: Inductive Transducers

Variable reluctance, eddy current, linear variable differential transformers, electromagnetic, synchros, resolvers & inductosyn, magnetoelastic and magnetostrictive.

UNIT-V: Capacitive Transducers

Variable and differential dielectric, variable and differential gap between the plates, variable and differential area, frequency response, measurement of humidity, liquid level, displacement and pressure.

UNIT-VI: Self-Generating Transducers

Thermoelectric transducers, Piezoelectric transducers, Pyroelectric transducers, Photovoltaic transducers, force-balance transducers.

UNIT-VII: Signal Conditioning

Block diagram of signal conditioning, balance and deflection measurement in Wheatstone bridge, measurement of reactance: Push-pull bridge and Blumein bridge. Carrier amplifier, chopper amplifier, low drift amplifier and charge amplifier

UNIT-VIII: Digital and other Transducers

Position encoders, Transducer based on semiconductor junctions: Thermometers, magnetodiodes & magnetotransistors, photodiodes & phototransistors. Fiber-optic transducers, ultrasonic transducers. MEMS and Nanosensors.

TEXT BOOKS:

1. Ramon Pallas Areny, John G. Webster, *Sensors and Signal Conditioning*, 2nd Edition, John Wiley and Sons, 2000.
2. A. K. Sawhney, *A Course in Electrical and Electronics Measurements and Instrumentation*, Dhanpat Rai and Sons, New Delhi, 1995.

REFERENCE BOOKS:

1. *Sensor Technology Handbook*, Jon Wilson, 2004.
2. Herman K.P. Neubrat, *Instrument Transducers – An Introduction to Their Performance and Design*, Oxford University Press.
3. Doebelin, E.O., *Measurement Systems: Applications and Design*, 4th Edition, TMH, 2003.
4. Bentley J.P., *Principles of Measurement Systems*, Addison Wesley Longman Ltd, 4th Edition, 2003.
5. Patranabis D, *Sensors and Transducers*, 2nd Edition, PHI, 2003.

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	1	-	4

PREREQUISITES: 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 – π 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, Tata McGraw-Hill, 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
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

PRE REQUISITES: 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 course, the students will be able to

1. Demonstrate knowledge on
 - two port network parameters, filters and attenuators
 - operation of electrical machines
 - 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*, 3rd Edition, Tata McGraw-Hill, 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 of India, New Delhi, 2009.
2. C.L. Wadhwa, *Network Analysis and Synthesis*, 3rd Edition, New Age 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, Tata McGraw-Hill, New Delhi, 2006.
5. M.S. Naidu and S. Kamakshaiah, *Introduction to Electrical Engineering*, Tata McGraw-Hill, New Delhi, 2008.

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	1	-	4

PREREQUISITES: Semiconductor Devices and Circuits.

COURSE DESCRIPTION:

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

COURSE OUTCOMES: At the end of the course 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, 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
10BT40231: ELECTRICAL ENGINEERING LAB
(Common to ECE, EIE & EConE)

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

PRE REQUISITES: 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 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..

DETAILED SYLLABUS :

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 field 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
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.

DETAILED SYLLABUS :

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

10BT4HS02: **ADVANCED ENGLISH COMMUNICATION SKILLS** **(Audit Course)** **(Common to ECE, EEE, EIE, EConE & BOT)**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	-	-	-	3	-	-

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

1. Acquire knowledge in.
 - Vocabulary
 - Etymology
 - Idioms and Phrases
2. Analyse the functional knowledge of writing, styles and techniques for academic and professional requirements.
3. Interpret and synthesize the language functions through:
 - Role Plays
 - Group Discussions
 - 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*, Tata McGraw Hill, New Delhi, 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*, Tata Mc Graw Hill, New Delhi, 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

10BT50421: **ELECTROMAGNETIC THEORY** (Common to EIE & EConE)

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

PRE REQUISITE: Engineering Mathematics and Engineering Physics.

COURSE DESCRIPTION:

vector-calculus; Static electric and Magnetic fields; time varying electromagnetic Fields; Maxwell's equations; Wave equations and wave propagation; electromagnetic interference and compatibility.

COURSE OUTCOMES: After completion of the course the students will be able to:

1. Demonstrated Knowledge on static and time varying: electric and magnetic fields, Maxwell's equations, wave propagation, Interference and Compatibility in the field of electromagnetics.
2. Formulate and analyse problems related to electromagnetics in different mediums.
3. Apply coulombs law, Gauss's law, biot savarts law and amperes law to measure the exisistance of electric and magnetic fields.

DETAILED SYLLABUS :***Review of Coordinate Systems, Vector Calculus.*****UNIT-I: Electrostatic Fields**

Coulomb's Law, Electric Field Intensity: Fields due to different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations between E and V, Energy Density, Related Problems.

UNIT-II: Electric Fields in Material Space

Properties of Materials, Convection and Conduction Currents, conductors, Relaxation Time, Dielectrics and polarization, boundary conditions, Poisson's and Laplace's Equations; Capacitance: Parallel Plate, Coaxial, Spherical Capacitors, Related Problems.

UNIT-III: Magnetostatics

Biot-Savart Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Magnetic Scalar and Vector Potentials, Lorentz force law, Ampere's Force Law, Magnetic Energy, Self and mutual Inductances and Related Problems.

UNIT-IV: Maxwell's Equations (Time Varying Fields)

Faraday's Law and Lenz's law. Continuity Equation, Inconsistency of Ampere's Law, Maxwell's Equations in various forms. Boundary Conditions: Dielectric-Dielectric and Dielectric-Conductor Interfaces, Related 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 of wave, Related 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. Related Problems.

UNIT-VII: Introduction to EMI

Definition of EMI and EMC, Classification, Natural and man-made EMI sources, Switching transients, Electrostatic Discharge, Nuclear Electromagnetic, Pulse and High Power Electromagnetics.

UNIT-VIII: Introduction to EMC

Grounding- Principles and practice of earthing, precautions in earthing, measurement of ground resistances, system grounding for EMC, cable shielding grounding. Shielding: Theory of effectiveness, materials, integrity at discontinuities, conductive coatings, cable shielding, effectiveness measurements, electrical bonding.

TEXT BOOKS:

1. Matthew N.O. Sadiku, *Elements of Electromagnetics*, 3rd Edition, Oxford Univ. Press, 2001.
2. E.C. Jordan and K.G. Balmain, *Electromagnetic Waves and Radiating Systems*, 2nd Edition, PHI, 2000.
3. Kodali Prasad V, *Engineering Electromagnetic Compatibility*, S Chand, 2000.

REFERENCE BOOKS:

1. William H Hayt Jr, John A. Buck, *Engineering Electromagnetics*, 7th Edition, TATA Mc Graw Hill, 2006.
2. SA Nasar, Schuams solved problems series, *2000 Solved Problems in Electromagnetics*, Mc Graw Hill, 1992.
3. Christos Christopoulos, *Principles and Techniques of Electromagnetic Compatibility*, 2nd Edition, CRC Press (Taylor & Francis Group), 2007.
4. Clayton R. Paul, *Introduction to Electromagnetic Compatibility*, John Wiley & Sons, 1992.

III B.Tech. I Semester

10BT50422: **LINEAR AND DIGITAL IC APPLICATIONS** (Common to EIE & EConE)

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

PREREQUISITE : Circuit Theory, Semiconductor Devices & Circuits, Switching Theory and Logic Design, Problem solving and computer programming.

COURSE DESCRIPTION:

Fundamentals of operational amplifiers; development of linear and non linear op-amp based applications; design and development of digital IC's and its applications, modelling of digital IC's using VHDL.

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

1. Demonstrate basic knowledge in operational amplifiers, Digital IC logic families and programming of digital circuits using VHDL.
2. Use analytical skills to
 - Determination of op-amp parameters – frequency, gain, currents, voltages, resistance, CMRR, offsets.
 - Determination of voltage levels, resistances, delays, fan-in, fan-out, power consumption etc.
3. Design
 - Linear and non linear applications of op-amps for required gain, voltage, current levels,
 - bandwidth, impedance, symmetric and asymmetric waveform generators.
 - Compensation circuits for offsets, drifts.
 - Digital circuits using different IC logic families.
4. Apply techniques and IT tools for modelling of digital circuits using VHDL.

DETAILED SYLLABUS :

UNIT-I

Differential Amplifier-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 & its features, FET input. Op-Amps, Op-Amp parameters & Measurement, Input & Output Offset voltages & currents, slew rates, CMRR, PSRR, drift, Frequency Compensation technique.

UNIT-II: Linear & Non-Linear Applications of Op-Amps

Inverting and Non-inverting amplifier, Integrator and differentiator, Difference amplifier, Instrumentation amplifier, AC amplifier, V to I, I to V converters, Buffers. Non-Linear function generation, Comparators, Multivibrators, Triangular and Square wave generators, Log and Antilog amplifiers, Precision rectifiers.

UNIT-III: Timers & 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 & FSK.

UNIT-IV: CMOS Logic

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

UNIT-V: 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-VI: The VHDL Hardware Description Language

Design flow, program structure, types and constants, functions and procedures, libraries and packages. Structural design elements, data flow design elements, behavioral design elements, time dimension and simulation synthesis.

UNIT-VII: 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-VIII: Sequential Logic Design

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

TEXT BOOKS:

1. Ramakanth A. Gayakwad, *Op-Amps & Linear ICs*, 2nd Edition, PHI, 1987.
2. John F. Wakerly, *Digital Design Principles & Practices*, 3rd Edition, PHI/ Pearson Education Asia, 2005.
3. Charles H. Roth Jr., *Digital System Design Using VHDL*, 1st Edition, Cengage Publications.

REFERENCE BOOKS:

1. James M. Fiore, *Op Amps & Linear Integrated Circuits Concepts & Applications*, Cengage Publications, 2009.
2. D. Roy Chowdhury, *Linear Integrated Circuits*, 2nd Edition, New Age International (p) Ltd, 2003.
3. J. Bhasker, *VHDL Primer*, 3rd Edition, Pearson Education/ PHI, 2007.

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

PRE-REQUISITES: Fundamentals of Digital Systems and 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: After successful completion of the course, the student 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 Coherence, 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 Int. Edition, 2003.
4. John P. Hayes, *Computer Architecture and Organization*, 3rd Edition, Tata McGraw Hill, 1998.

III B.Tech. I Semester
10BT51001: PROCESS CONTROL INSTRUMENTATION

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

PREREQUISITES: Control Systems, Transducers in Instrumentation

COURSE DESCRIPTION:

Mathematical modeling of processes ;Different types of controllers; characteristics of controllers; design of controllers; Tuning of controllers; characteristics of control valves ; multi loop controllers and case studies .

COURSE OUTCOMES: At the end of the course students will be able to:

1. Demonstrate knowledge about:
 - Mathematical modeling of different process.
 - Tuning of controllers for different process
 - Selection of control valves for different operations
 - Different unit operations
 - Multi loop control

2. Design and analyze the response of controllers for different process.

DETAILED SYLLABUS :

UNIT - I Introduction to Process Control

Definitions, elements of process control, process variables, degree of freedom, characteristics of liquid system, gas system and thermal system. Mathematical model of liquid process, gas process, thermal process. Batch process and continuous process, self regulation.

UNIT-II: Basic Control Actions

Characteristics of ON-OFF, proportional, integral, derivative control modes, composite control modes, PD, PI and PID modes, two position control, single speed floating control.

UNIT-III: Controlling Elements

Self operated controllers, pneumatic proportional controllers (displacement and force type), air supply for pneumatic systems, hydraulic controllers, electrical proportional controllers, electronic proportional controllers, theory of automatic controllers circuits.

UNIT-IV: Controller Tuning

Evaluation criteria: 1/4th decay ratio, IAE, ISE, ITAE. Determination of optimum settings for mathematically described process using time response and frequency response.

Tuning Methods: Process reaction curve method, continuous oscillation method, damped oscillation method.

UNIT-V: Final Control Elements

I/P Converter, P/I converter. Pneumatic, electric and hydraulic actuators, Valve positioner.

UNIT-VI: Control Valves

Characteristics of control valves, valve body, valve types: globe, butterfly, diaphragm, ball valves. Control valve sizing, cavitations, flashing.

UNIT-VII: Control Systems With Multiple Loops

Cascade control, feed forward control, ratio control, selective control systems, split range control, adaptive and inferential control

UNIT-VIII: Selected Unit Operations

Mixing, evaporation, drying, heat exchanger, distillation process.
Case study of control schemes of binary distillation column.

TEXT BOOKS:

1. Donald P. Eckman, *Automatic Process Control*, Wiley Eastern Ltd., New Delhi, 1993.
2. G. Stephanopoulos, *Chemical Process Control*, PHI, 1990.

REFERENCE BOOKS:

1. Curtis D. Johnson, *Process Control Instrumentation Technology*, 7th Edition, Pearson Education, New Delhi, 2002.
2. F.G Shirskey, *Process Control Systems*, Mc Graw Hill Company.
3. Patranabis, *Principles of Process Control*, TMH, 1981.
4. Peter Harriot, *Process Control*, TMH.

III B.Tech. I Semester
10BT3BS02: ENVIRONMENTAL SCIENCES
(Common to EIE, EEE & EConE)

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

PREREQUISITE: 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: Environment 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/Environmentalists' 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 Publications, New Delhi, 2010.
2. Rajagopalan, *Environmental Studies*, 1st Edition, Oxford University Press, 2009.
3. Joseph Benny, *Environmental Studies*, 2nd Edition, Tata McGraw-Hill, New Delhi, 2010.

III B.Tech. I Semester

10BT51002: **INDUSTRIAL INSTRUMENTATION**

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

PREREQUISITE: --

Transducers in Instrumentation, Electrical and Electronic Measurements, Thermodynamics & Fluid Mechanics, Principles of Electrical Engineering.

COURSE DESCRIPTION:

Science of measurement; measurement of parameters like velocity, acceleration, Torque, pressure, flow, viscosity, density, temperature, level, humidity, acceleration and sound.

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

1. Demonstrate knowledge on science of measurement and measurement techniques.
2. Identify and formulate instruments to measure Force, Torque, Weight.
3. Design and develop solutions for measurement of industrial parameters like pressure, velocity and acceleration.

DETAILED SYLLABUS :

UNIT-I: Metrology

Measurement of length, Plainness, Area, Diameter, Roughness, Angle, Comparators, Gauge blocks, Optical Methods of length & distance measurements.

UNIT-II: Torque & Velocity Measurement

Measurement of torque using Strain gauge, Inductive principle, Digital methods and Magnetostrictive transducer. Measurement of velocity using Electromagnetic transducer, Moving magnet type, Moving coil type, Tachogenerator, Stroboscope.

UNIT-III: Pressure Measurement

Basics of pressure measurement, Deadweight gauges & Manometer types, Vibrating cylinder transducers, High & Low pressure measurement, McLeod Gauge, Knudsen gauge, Momentum transfer gauges, Thermal conductivity gauges, Ionization gauges, Dual gauge techniques.

UNIT-IV: Flow Measurement

Head type, Area type, Electromagnetic type, Positive displacement type, Mass flow meter, Ultrasonic type, Vertex Shedding type, Hotwire anemometer type, Laser doppler velocimeter.

UNIT-V: Viscosity & Density Measurement

Viscosity: definition, units, Industrial viscometers, laboratory viscometers. Density: definition, units, Load cell method, Buoyancy method, Air pressure balance method, Gamma ray method, Vibrating probe method.

UNIT-VI: Temperature Measurement

Temperature standards, fixed points, filled-system thermometers, Bimetallic thermometer, Thermocouple: Laws of thermocouple, Cold junction compensation. Measuring circuits, Speed of response, linearization, Resistance thermometer: 3 lead and 4 lead connections, thermistors, IC temperature sensors. Radiation pyrometer, optical pyrometer. Installation, maintenance and calibration of thermometers and thermocouples.

UNIT-VII: Level Measurement

Electrical methods, Resistance type, Capacitance type, Ultrasonic level gauging, float gauge, torque tube, bubbler tube, Slight glass, Displacer.

UNIT-VIII: Other Measurements

Accelerometer of different types, Gyroscopes, Humidity, Sound level meter, Microphones.

TEXT BOOKS:

1. Doebelin, E.O., *Measurement Systems: Applications and Design*, 4th Edition, TMH, 2003.
2. Patranabis D, *Principles of Industrial Instrumentation*, TMH, 1997.

REFERENCE BOOKS:

1. Considine D M, *Process Instruments & Control handbook*, 4th Edition, McGraw Hill International, 1993.
2. RK Jain, *Mechanical & Industrial Measurements*, Khanna Publishers, 1986.
3. Jones EB, *Instrument Technology*, Volume-I, Butterworths, 1981.

III B.Tech. I Semester
10BT50431: IC & PDC LAB
(Common to EIE & EConE)

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

PRE REQUISITE:

Semiconductor Devices and Circuits, Pulse and Digital Circuits, Switching Theory and Logic Design.

COURSE DESCRIPTION:

Linear and Non linear wave shaping circuits; transistor as a switch; sampling gates; Multivibrators; logic gates and flip-flops.

COURSE OUTCOMES: At the end of the course students will be able to:

1. Analyze simple electronic circuits in terms of theoretical and practical performance.
2. Design and develop circuits using discrete components and Ics.

DETAILED SYLLABUS :

List of Experiments:

PART – A:

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

PART – B: (Design Aspects to be Included)

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

III B.Tech. I Semester

10BT51011: MEASUREMENTS AND TRANSDUCERS LAB

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

PREREQUISITE: Transducers in Instrumentation, Electrical and Electronic Measurements.

COURSE DESCRIPTION:

Measurements of parameters: voltage, resistance, inductance, capacitance, displacement, pressure, force and temperature.

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

1. Carry out analysis of instrument in terms of accuracy, Linearity and Calibration.
2. Design and develop measuring circuits for voltage, current and resistance.

DETAILED SYLLABUS :

Minimum of **12** Experiments to be conducted

1. Measurement of AC parameters (Voltage & Current) using D'Arsonval Galvanometers
2. Conversion of D'Arsonval Galvanometer into ohmmeter (Series & Shunt)
3. Measurement of unknown resistance, inductance and capacitance using bridge circuits
4. Study of Spectrum Analyzer
5. Measurement of resistance, inductance, capacitance and quality factor of the coil using Q meter
6. Calibration and testing of single phase energy meter
7. Linear displacement measurement using LVDT
8. Temperature measurement using RTD
9. Strain measurement using Strain Gauges
10. Angular displacement using Capacitive transducer
11. Transfer characteristics of thermocouple
12. Level measurement using Fibre-optic sensor
13. Pressure measurement using Bourdon tube
14. Study of Piezoelectric Transducer

III B.Tech. II Semester
10BT4HS01: MANAGERIAL ECONOMICS
AND PRINCIPLES OF ACCOUNTANCY
(Common to EEE, EIE & EConE)

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

PREREQUISITE: —

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

1. Acquire Knowledge in
 - Tools and concepts of Micro Economics.
 - Basic Principles and concepts of Accountancy.
 - Provides life skills for effective utilization of scarce resources.
 - Financial Accounting.
 - Using advanced tools like tally and SAP.
 - Significance of Economics and Accountancy
2. Develop skills in providing solutions for
 - Managerial decisions of an organization.
 - Demand & Supply, Production & Cost and Markets & Price through Economic theories.
 - 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, Tata MC-Graw Hill, New Delhi, 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, 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. II Semester
10BT60404: MICROPROCESSORS AND MICROCONTROLLERS
(Common to EEE, ECE, EIE & EConE)

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

PREREQUISITES: 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: After completion of the course, students will be able to:

1. Demonstrate potential 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, Tata McGraw-Hill.
2. Mazidi and Mazidi, *The 8051 Microcontroller and Embedded Systems*, Prentice Hall of India, 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, *Advanced Microprocessors and Peripherals- Architecture, Programming and Interfacing*, Tata McGraw-Hill, 2002.
3. Yu-cheng Liu, Glenn A. Gibson, *Microcomputer Systems: The 8086 /8088 Family Architecture, Programming and Design*, Prentice Hall of India, 2006.

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

PRE REQUISITE: 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 in-depth 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 filter in suppressing unnecessary frequency components and smoothing 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 system 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, Tata Mcgraw Hill, 2009.

REFERENCE BOOKS:

1. S Salivahana, A Vallavaraj, C Gnanapriya, *Digital Signal Processing*, TATA McGraw Hill, 2005.
2. Andreas Antoniou, *Digital Signal Processing*, TATA McGraw Hill, 2006.

III B.Tech. II Semester
10BT50423: PRINCIPLES OF COMMUNICATIONS

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

PRE REQUISITE: Signals and Systems

COURSE DESCRIPTION:

Communication systems; analog and digital: Modulation and Demodulation Techniques; Coding efficiency and error control coding.

COURSE OUTCOMES: After completion of the course the students will be able to:

1. Demonstrate knowledge on functional blocks of analog and digital communication systems.
2. Analyze and synthesis analog and digital transceivers.

DETAILED SYLLABUS :

UNIT-I: Introduction

Block diagram of Electrical Communication System, Radio Communication: Types of Communications, Analog, Pulse and Digital types of Signals, Fourier Transform for various Signals, Fourier Spectrum, Power Spectral Density, Autocorrelation, Cross Correlation, Convolution.

UNIT-II: Amplitude Modulation

Need for Modulation, Types of Amplitude Modulation, AM, DSBSC, SSBSC, Power and BW requirements, generation of AM, DSBSC, SSBSC, demodulation of AM: Diode detector, Product demodulation for DSBSC & SSBSC.

UNIT-III: Angle Modulation

Frequency & Phase Modulations, advantages of FM over AM, Bandwidth consideration, Narrowband and Wideband FM, generation and demodulation of FM, Comparison of FM & PM.

UNIT-IV: Pulse Modulations

Sampling, Nyquist rate of Sampling, Sampling theorem for Band limited Signals, PAM, regeneration of Base band Signal, PWM and PPM, Time Division Multiplexing, Frequency Division Multiplexing, Asynchronous Multiplexing.

UNIT-V: PCM Schemes

Advantages, Block diagram of PCM, Quantization, effect of Quantization, Quantization error, Base band Digital Signal, DM, ADM, ADPCM and Comparison.

UNIT-VI: Digital Modulation

ASK, FSK, PSK, QPSK, DPSK, QAM, Modulation and Demodulation- Coherent and Incoherent, Modems.

UNIT-VII: Information Theory

Concept of Information, Rate of Information and Entropy, Source Coding for optimum rate of Information, Coding efficiency, Shannon-Fano and Huffman Coding.

UNIT-VIII: Error Control Coding

Introduction, Error Detection and Correction Codes, Block Codes, Convolutional Codes.

TEXT BOOKS:

1. Simon Haykin, *Communication Systems*, 2nd Edition, John Wiley Publishers, 2008.
2. R.P. Singh and S D Sapre, *Communication Systems Analog and Digital*, 3rd Edition, TMH, 2006.
3. H. Taub and D. Schilling, *Principles of Communication Systems*, 2nd Edition, TMH, 2003.

REFERENCE BOOKS:

1. Kennedy and Davis, *Electronic Communication Systems*, 4th Edition, TMH, 2004.
2. John. G. Proakis and Masoud Salehi, *Communication Systems Engineering*, 2nd Edition, PHI, 2004.

III B.Tech. II Semester

10BT61001: OPTOELECTRONIC & LASER INSTRUMENTATION

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

PREREQUISITES: Engineering Physics, Industrial Instrumentation

COURSE DESCRIPTION:

Different types of optical fibre; components of optical fibre; fibre optic sensors; properties and types of LASER; Industrial and biomedical applications of LASER.

COURSE OUTCOMES: At the end of the course students will be able to:

1. Demonstrate about:
 - types of optical fibre, components of optical fibre.
 - Measurement of temperature, pressure, strain using fibre optic sensors and LASER.
2. Analyze losses in optical fibre.

DETAILED SYLLABUS :

UNIT-I: Optical Fibers

Introduction to optical fibers, Laws of reflection, critical angle, Light guidance, Numerical aperture, Dispersion, Losses, Different types of fibers, Modes of operation and their properties transmission characteristics.

UNIT-II: Components of Optical Fiber

Light Sources for fiber optics, Photo detectors, source coupling, Fiber termination, Splicing and connectors.

UNIT-III: Fiber Optic Sensors

Fiber optic instrumentation system, Interferometer method of measurement of length, Moire fringes, Measurement of pressure, Temperature, Current, Voltage, Liquid level and strain, fiber optic Gyroscope, Polarization maintaining fibers, Applications.

UNIT-IV: Laser Fundamentals

Fundamental characteristics of lasers, Three level and four level lasers, Properties of laser, Laser modes, Resonator configuration, Q-switching and mode locking, Cavity damping, Types of lasers, Gas lasers, solid lasers, liquid lasers, semiconductor lasers.

UNIT-V: Laser Instrumentation

Industrial applications of lasers, Laser heating Material processing, Laser welding, melting and trimming of material, Laser Doppler velocity meter.

UNIT-VI: Medical Applications

Lasers and tissue interaction, Laser instruments for surgery, removal tumors of vocal cords, plastic surgery, dermatology, gynecology and oncology.

UNIT-VII: Holography

Principle, Methods, Holographic Interferometers Holography for non-destructive testing, Holographic components, and applications.

UNIT-VIII: Optoelectronic Modulators

Electro-optic, Magneto-optic and Acousto-optic Modulators.

TEXT BOOKS:

1. Das P., *Lasers and Optical Engineering*, Springer International Students Edition, 1991.
2. A.K. Ghatak, *Optics*, 2nd Edition, TMH, 1992.

REFERENCE BOOKS:

1. Ghatak A.K. and Thyagarajan K, *Optical Electronics*, Foundation Books, 1991.
2. Thyagarajan K. and Ghatak A.K., *Lasers: Theory and Applications*, Plenum Press, 1981.
3. Gerd Keiser, *Optical Fiber Communication*, 3rd Edition, TMH, 2000.

III B.Tech. II Semester
10BT61002: BIOMEDICAL INSTRUMENTATION

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

PREREQUISITES: Fundamentals of Sensors and Transducers.

COURSE DESCRIPTION:

Human Anatomy & Physiology; Bio-signals; Cardiovascular and Neuro-muscular Instrumentation; Therapeutic Equipment; Advanced Imaging techniques.

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

1. Demonstrate knowledge on human anatomy 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-electrolyte interface, electrode-electrolyte skin interface, motion artifacts, external and internal electrodes, biochemical 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, Pneumotachograph 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 BOOKS:

1. R.S. Khandpur, *Hand-book of Biomedical Instrumentation*, 2nd Edition, TMH, 2007.

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

1. Analyze various programming alternatives & interfacing methods to build a typical Micro computer 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.

DETAILED SYLLABUS :

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
10BT61011: PROCESS CONTROL LAB

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

PREREQUISITES: Control Systems, Process Control Instrumentation.

COURSE DESCRIPTION:

Tuning methods, Characteristics of control valve, Response of controllers for different processes like flow, temperature, level etc.

COURSE OUTCOMES: After completion of the course the student will be able to

1. Analyze the characteristics of control valve and evaluate the performance of controllers for different process like flow, temperature, level etc.
2. Design the controller parameters using various tuning methods.

DETAILED SYLLABUS :

Minimum **10** experiments should be conducted

1. Response of Interacting and Non-interacting Systems.
2. Servo and regulator operation.
3. Realization of control actions: Pneumatic controllers.
4. Realization of control actions: Electronic controllers.
5. Response of Flow process.
6. Response of Level Process.
7. Response of Temperature Process.s
8. Process tuning - Process reaction curve method.
9. Process tuning - continuous and damped oscillation method.
10. Pneumatic Actuator.
11. Control valve characteristics (ON-OFF & LINEAR).
12. Multi loop control systems - Ratio Control.
13. Multi loop control systems - Cascade Control.

III B.Tech. II Semester

10BT61012: SEMINAR

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
75	-	75	-	-	-	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 thesis and presentation.

COURSE OUTCOMES: On completion of seminar work the student will be able to:

1. Analyze critically chosen seminar topic for substantiated conclusions.
2. Undertake investigation of seminar output providing valid conclusions.
3. Function effectively as individual on the chosen seminar topic.
4. Express effectively on both oral and written for preparing and presenting seminar topic.
5. Engage in lifelong learning to improve knowledge and competence in the chosen field of seminar.

IV B.Tech. I Semester
10BT6HS01: MANAGEMENT SCIENCE
(Common to EEE, EIE & EConE)

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

PRE-REQUISITES: 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 completion of this course, a successful student 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.

IV B.Tech. I Semester

10BT71001: ANALYTICAL INSTRUMENTATION

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

PREREQUISITES: Industrial instrumentation, Transducers in Instrumentation

COURSE DESCRIPTION:

Gas analyzers; spectrometers; nuclear radiation detectors; Dissolved component analyzers; Analysis of structure of different chemical components.

COURSE OUTCOMES: At the end of the course students will be able to:

1. Demonstrate knowledge in:
 - Analyzing the characteristics of pH meters and dissolved oxygen analyzers.
 - Analyzing of different gas analyzers and radiation detectors.
 - Analyzing of different chromatography techniques.
 - Analyzing of different Spectrometers with different excitations.
2. Analyze complex engineering problems critically in the area of analytical instruments and chemical component analysis.
3. Apply contextual knowledge to the structural and functional analysis of chemical components.

DETAILED SYLLABUS :

UNIT-I: pH and Conductivity & Dissolved Component Analyzer

Conductivity meters, pH meters, dissolved oxygen analyzer, hydrogen analyzer, sodium analyzer, silica analyzer and sampling systems.

UNIT-II: Gas Analyzers

Thermal conductivity types, CO monitor, NO_x analyzer, H₂S analyzer system and sampling, industrial analyzer circuits, analysis based on ionization of gases, sulphur dioxide, hydro carbons estimation.

UNIT-III: Chromatography

Introduction, basic definitions. Gas chromatography: Principle, detection systems and applications, Liquid chromatography: Principle, types, detection system, and applications.

UNIT-IV: Oxygen Analyzer

Principles of oxygen analyzer, paramagnetic type, magnetic wind type, medical oxygen analyzer, detectors, sampling system.

UNIT-V: Spectrophotometers – I

Special methods of analysis, Beer-Lambert law, colorimeters, UV-VIS spectrophotometers, single and double beam instruments, sources and detectors. IR spectrophotometers and their types.

UNIT-VI: Spectrophotometers – II

FTIR spectrophotometer, flame emission and atomic absorption spectrophotometer, atomic emission spectrophotometer, flame photometers, calorific value measurements.

UNIT-VII: Principle of Nuclear Magnetic Resonance

Instrumentation associated with NMR spectrometer, introduction to mass spectrometer, electron spin resonance principle, X-ray spectrometer principle, X-ray detectors, X-ray diffractometers.

UNIT-VIII: Applications

Nuclear radiation detectors, ionization chamber, GM counter, proportional counter, solid state detectors, gamma detector.

TEXT BOOKS:

1. Khandpur, *Handbook of Analytical Instruments*, 2nd Edition, TMH.
2. Jain R.K., *Mechanical and Industrial Measurements*, 2nd Edition, Khanna Publishing, New Delhi, 1992.

REFERENCE BOOKS:

1. Willard H.H., Merrit L.L., Dean J.A.. and Seattle F.L., *Instrumental Methods of Analysis*, 6th Edition, CBS Publishing and Distributors, 1995.
2. Skoog D.A. and West D.M., *Principles of Instrumental Analysis*, Holt Sounder Publication, Philadelphia, 1985.

IV B.Tech. I Semester

10BT71002: AUTOMATION OF INDUSTRIAL PROCESSES

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

PREREQUISITE: Control Systems, Signals and Systems, Process control instrumentation

COURSE DESCRIPTION:

various Data Networks; advanced control strategies used in industries; design of digital controller; exposure to PLCs and DCS Integration with PLCs.

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

1. Demonstrate knowledge on
 - Types of Processes and Architecture of Computer Control Systems.
 - Process control requirements of computers
 - Process related variables and Computer Networks.
2. Develop skills in
 - Design of Control systems
 - Controller tuning methods
 - Design of controllers using various algorithms
3. Use PLC and DCS to automate the given process.

DETAILED SYLLABUS :

UNIT-I: Introduction to Computer Control

Role of computers in the control of Industrial processes. Elements of Computer Controlled Process. Classification, Batch Process, Types of Batch process, Continuous, Supervisory and Direct Digital Controls. Architecture, Centralized, Distributed and Hierarchical Systems. Man Machine Interface.

UNIT-II: Building Blocks

Process Control Requirements of Computers. Process related variables. Computer Networks, Communications in Distributed control Systems. Smart Sensors and Field bus.

UNIT-III: Control System Design - I

Control System Design using heuristics and models. Controller Design: Regulator design and other design considerations. Controller Tuning - P, PI, PID, and Ziegler-Nicholas method.

UNIT-IV: Control System Design - II

Computer control loop, Modified Z - Transform, Zero-order hold equivalence, First order system with time delay, Converting continuous time controller to discrete time domain, Design of controllers based on discrete time model: Deadbeat and Dahlin's algorithms.

UNIT-V: Design of Feed Forward Controller

Block Diagram, Feed Forward control algorithms: dynamic, static, deadbeat.

UNIT-VI: Advanced Strategies

Cascade Control: Dynamic response, Types, Implementation, Predictive Control: Model based and Multivariable System, Statistical Process Control. Algorithms for Processes with deadtime: Smith Predictor (SP), Analytical Predictor (AP).

UNIT-VII: Programmable Logic Controllers: Architecture, Basic PLC Programming, Creating Ladder diagrams for Digital Logic gates, Timer/counter functions. Skip and MCR functions, Sequencer functions, Networking of PLCs.

UNIT-VIII: Distributed Control System

Overview of Distributed Control System (DCS). DCS Software configuration, DCS Communication, DCS Supervisory Computer tasks, DCS Integration with PLCs and Computers.

TEXT BOOKS:

1. S.K.Singh, *Computer Aided Process Control*, PHI, 2009.
2. M.Chidambaram, *Computer Control of Processes*, 2nd Edition, Narosa Publications, 2003.

REFERENCE BOOKS:

1. Krishna Kanth, *Computer-based Industrial Control*, PHI, 1997.
2. S.Bennett, *Real Time Control: An Introduction*, 2nd Edition, Pearson Education, 2003.
3. John W.Webb and Ronald A.Reis, *Programmable Logic Controllers- Principles and Applications*, 5th Edition, Pearson Education.

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

PRE-REQUISITES: 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: After successful completion of the course, the student will be able to:

1. Demonstrate knowledge on object oriented programming principles - Object, Class, Inheritance, Polymorphism, encapsulation, Abstraction, message passing.
2. Analyze and solve Problem 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, datatypes, 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: Exceptional 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 multi threading 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, menubar, 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 Edition, TMH, 2008.

REFERENCES:

1. Y. Daniel Liang, *Introduction to Java Programming*, 6th Edition, Pearson Education.
2. Cay.S.Horstmann and Gary Cornell, *Core Java 2 Fundamentals*, 7th Edition, Vol I, 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
10BT71003: POWER PLANT INSTRUMENTATION
(ELECTIVE - I)

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

PRE REQUISITE: Industrial Instrumentation, Electrical and Electronic Measurements.

COURSE DESCRIPTION:

Different methods of power generation; Electrical and Non electrical Parameters measurement; Combustion control in boiler; Turbine Monitoring and control; Analyzers in power plant.

COURSE OUTCOMES: After completion of the course the students are able to:

1. Demonstrate Knowledge about:
 - Different methods of power generation ,measurement of different electrical and non electrical parameters in power plant.
 - Advanced controls in boiler and turbine.
2. Use modern tools for pollution monitoring in power plants.

DETAILED SYLLABUS:

UNIT-I: An Overview of Power Generation

Brief survey of methods of power generation: Hydroelectric, Nuclear, Solar, Wind etc. Importance of Instrumentation for power generation, Thermal power plants: Building blocks, PI diagram of Boiler, Cogeneration.

UNIT-II: Parameters and Measurements - I

Instrument Transformers, Measurement of power-one wattmeter method, Reactive power measurement, single phase and three phase electro-dynamometer power factor meter, Frequency meters: Mechanical resonance type, electrical resonance type, electro-dynamometer type and ratio meter type, Trivector meter.

UNIT-III: Parameters and Measurements - II

Non electrical parameters, flow of feed water, temperature, level radiation detectors, smoke density measurements, dust monitor.

UNIT-IV: Combustion Control in Boilers

Basic building blocks of a boiler, types of boilers, Combustion control, control of Main header Pressure, air fuel ratio control, drum level (three element control), main and reheat steam temperature control.

UNIT-V: Draught and Other Controls

Introduction, Natural draught, mechanical draught control, gas recirculation control, deaerator level control, pulverizer control.

UNIT-VI: Turbine Monitoring and Control

Condenser vacuum control, gland steam exhaust pressure control, Shell temperature monitoring and control, Lubricating oil temperature control, Hydrogen generator cooling system.

UNIT-VII: Analyzers in Power Plants - I

Thermal conductivity type, paramagnetic type oxygen analyzer, infrared type and trim analyzer, hydrogen purity meter.

UNIT-VIII: Analyzers in Power Plants - II

Chromatography, pH meter, Conductivity cell, fuel analyzer, brief survey of pollution monitoring and control equipment.

TEXT BOOKS:

1. *Modern Power Stations Practice, vol. 6, Instrumentation, Controls and Testing*, Pergamon Press, Oxford, 1971.
2. Krishnaswamy & Ponni Bala, *Power Plant Instrumentation*, PHI, 2011.

REFERENCE BOOKS:

1. Elonka S.M., and Kohal A.L., *Standard Boiler Operations*, TMH, 1994.
2. Wakil M.M., *Power Plant Technology*, McGraw Hill, 1984.

IV B. Tech. I Semester

10BT71004: PETROCHEMICAL PLANT INSTRUMENTATION (ELECTIVE - I)

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

PREREQUISITES: A course on Engineering Chemistry and Process control & Instrumentation.

COURSE DESCRIPTION:

Brief survey of methods of power generation: Hydroelectric, Nuclear, Solar, Wind and its Importance of Instrumentation; PI diagram of Boiler, Cogeneration; Parameters and Measurements; Combustion Control in Boilers; Introduction of Draught and Other Controls; Turbine Monitoring and Control; Analyzers in Power Plants.

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

1. Demonstrate fundamental knowledge on
 - Methods of power generation
 - Thermal power plants
 - Measurement in Petrochemical plant
2. Analyzer's in different types of power plant to solve problems in
 - Thermal conductivity type,
 - Paramagnetic type of oxygen analyzer,
 - Infrared type and trim analyzer,
 - Hydrogen purity meter.
 - Fuel analyzer.
3. Design PI Diagram of the Instrumentation and control in
 - Boiler, Cogeneration
 - mechanical draught control
 - Gas recirculation control
 - deaerator level control
 - pulverizer control
 - Turbine Monitoring and Control

DETAILED SYLLABUS:**UNIT-I: Petroleum Processing**

Petroleum exploration, characteristics of petroleum, chemicals manufacture, sources of refinery gases, applications of refinery gases, raw materials.

UNIT-II: Chemicals from Petroleum Products

Chemicals from petroleum, methane derivatives, acetylene derivatives, ethylene derivatives, propylene derivatives, derivatives of higher olefins.

UNIT-III: Products from Miscellaneous Petroleum Sources

Derivatives of synthesis gas, ammonia-methyl alcohol oxoprocess, fischer-tropsch reaction, carbon monoxide reactions.

UNIT-IV: Overview of Binary Distillation Concepts

Binary equilibrium flash calculations, graphical methods for binary distillation, an analytical method for distillation, other design parameters in distillation.

UNIT-V: Control Loops in Petrochemical Industry

Process control in refinery and petrochemical industry, control of distillation column, control of catalytic crackers and pyrolysis unit, automatic control of polyethylene.

UNIT-VI: Process Identification and Frequency Response

Controller tuning deadtime compensation, Smith and analytical predictors. Feed forward, cascade and parallel cascade control for distillation columns.

UNIT-VII: Dynamic Modeling and Simulation

Pairing and Interaction in distillation, Proper pairing in single and dual composition control, Relative Gain Analysis, Decoupling for non-interacting control.

UNIT-VIII: Inferential Control Schemes for Distillation

Model Algorithmic Control, DMC control strategy, comparison of MAC with classical feedback design. Adaptive control.

TEXT BOOKS:

1. Waddams A.L, *Butter and Chemical from Petroleum*, Janner Ltd., 1968.
2. P.B. Deshpande, *Distillation Dynamics and Control*, ISA, 1985.

REFERENCE BOOKS:

1. Austin G.T.Shreeves, *Chemical Process Industries*, McGraw Hill International Student Edition, Singapore, 1985.
2. Balchan.J.G. and Mumme K.I., Van, *Process Control Structures and Applications*, Nostrand Reinhold Company, New York, 1988.
3. Liptak B.G., *Instrumentation in Process Industries*, Chilton Book Company, 1994.
4. F.G. Shinskey, *Distillation Control*, McGraw Hill, 1977.
5. W.L. McCabe, J.C.Smith and P. Harriott, *Operations of Chemical Engineering*, 5th Edition, McGraw Hill, 1993.

IV B.Tech. I Semester
10BT71005: MEMS AND MICROSYSTEMS
(ELECTIVE - I)

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

PRE-REQUISITES: Basic knowledge in Physics, Sensors and Transducers.

COURSE DESCRIPTION:

The course gives the overview of MEMS, working principles of micro sensors and micro actuators, scaling laws that are used in the conceptual design of micro devices, materials used, micro fabrication processes for micro manufacturing and packaging of Microsystems.

COURSE OUTCOMES: After completion of the course the student will be able to

1. Demonstrate knowledge on MEMS and Microsystems.
2. Identify the suitable materials, fabrication tech devices.
3. Design and develop various micro sensors and micro actuators that meet desired specifications and requirements.
4. Use advanced techniques to design microstructures that find applications in the field of biomedical, automobile and in communication engineering.

DETAILED SYLLABUS:

UNIT-I: Overview of MEMS & Microsystems

Basics of MEMS & microsystems, products, evolution of microfabrication, microsystems & microelectronics, miniaturization, microsystem design & manufacture, applications.

UNIT-II: Working Principles of Microsystems

Introduction, microsensors, microactuation, MEMS with microactuators, microaccelerometers, microfluidics.

UNIT-III: Engineering Mechanics for Microsystems Design

Introduction, static bending of thin plates, mechanical vibration, thermomechanics, fracture mechanics.

UNIT-IV: Scaling Laws in Miniaturization

Introduction to scaling, scaling in geometry, rigid body dynamics, electrostatic forces, electromagnetic forces, fluid mechanics, electricity, heat transfer.

UNIT-V: Materials For MEMS & Microsystems

Substrates & wafers, active substrate materials, silicon as a substrate material, silicon compounds, silicon piezoresistors, gallium arsenide, quartz, piezoelectric crystals, polymers, packaging materials.

UNIT-VI: Microsystem Fabrication Processes

Photolithography, ion implantation, diffusion, oxidation, chemical vapor deposition, physical vapor deposition, deposition by epitaxy, etching.

UNIT-VII: Overview of Micromanufacturing & Microsystems Design

Bulk micromanufacturing, surface micromanufacturing, LIGA process, design consideration, process design, mechanical design.

UNIT-VIII: Microsystems Packaging

Overview of mechanical packaging of microelectronics, Microsystem packaging, essential packaging technologies, three-dimensional packaging, signal mapping and transduction, design case: Pressure sensor packaging.

TEXT BOOKS:

1. HSU, TAI RAN, *MEMS and Microsystems Design and Manufacture*, TMH, 2002.

REFERENCE BOOKS:

1. Rai-Choudhury, *MEMS and MOEMS Technology and Applications*, PHI, 2011.

IV B.Tech. I Semester
10BT71006: VIRTUAL INSTRUMENTATION
(ELECTIVE - I)

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

PRE REQUISITE: C Programming

COURSE DESCRIPTION:

Concept of Virtual Instrumentation; Programming Techniques in VI; Data Acquisition and Networking using VI; Simulation and Real time applications.

COURSE OUTCOMES: After completion of the course the students are able to:

1. Demonstrate knowledge in Programming techniques of Virtual Instrumentation.
2. Analyze the real time situations and requirements to design an appropriate Virtual Instrumentation system for measurement of various real time parameters.
3. Design an VI system to Automate the industrial process.
4. Select and apply appropriate VI programming techniques for a specific problem.

DETAILED SYLLABUS:

UNIT-I: Virtual Instrumentation

Historical perspective, advantages, block diagram and architecture of a virtual instrument, data flow techniques, graphical programming in data flow, comparison with conventional programming. Development of Virtual Instrument using GUI, Real-time systems, Embedded Controller, OPC, HMI / SCADA software, Active-X programming.

UNIT-II: VI Programming Techniques

VIS and sub-VIS, loops and charts, arrays, clusters and graphs, case and sequence structures, formula nodes, local and global variables, string and file I/O, Instrument Drivers, Publishing measurement data in the web.

UNIT-III: Basics of Data Acquisition

Introduction to data acquisition on PC, Sampling fundamentals, I/O techniques and buses. ADC, DAC, Digital I/O, counters and timers, DMA, Software and hardware installation, Calibration, Resolution, Data acquisition interface requirements.

UNIT-IV: VI Chassis requirements

Common Instrument Interfaces, Current loop, RS 232C/ RS485, GPIB.

UNIT-V: BUS Interfaces

USB, PCMCIA, VXI, SCSI, PCI, PXI, Firewire. PXI system controllers, Ethernet control of PXI. Networking basics for office & Industrial applications, VISA and IVI.

UNIT-VI: Networking

Networking Basics for office and Industrial applications, VISA and IVI, Distributed I/O modules.

UNIT-VII: Mathematics and Simulation in LabVIEW

Fourier Transforms, power spectrum, correlation methods, windowing & filtering.

UNIT-VIII: VI Applications

Development of Control system, Industrial Communication, Image acquisition and processing, Motion control, LabVIEW based fuzzy logic and genetic algorithm.

TEXT BOOKS:

1. Gary Johnson, *LabVIEW Graphical Programming*, 2nd Edition, McGraw Hill New York, 1997.
2. Lisa K. wells & Jeffrey Travis, *LabVIEW for everyone*, Prentice Hall, New Jersey, 1997.

REFERENCE BOOKS:

1. Kevin James, *PC Interfacing and Data Acquisition: Techniques for Measurement, Instrumentation and Control*, Newnes, 2000.

IV B.Tech. I Semester
10BT61202: COMPUTER NETWORKS
(ELECTIVE - II)

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

PREREQUISITES: 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: After completion of the course, students will be able to:

1. Demonstrate potential 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 Network: Novell Networks, 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.
4. Leon-Garcia and Widjaja, *Communication Networks*, 2nd Edition, TMH.
5. S.Keshay, *An Engineering Approach to Computer Networking*, Addison Wesley, 1997.

IV B.Tech. I Semester

10BT71301: NEURAL NETWORKS AND FUZZY SYSTEMS (ELECTIVE - II)

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

PREREQUISITE: 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: After successful completion of the 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.

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, Kohonen 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 Publication, 2004.
2. Timothy J. Ross, *Fuzzy Logic with Engineering Applications*, McGraw-Hill Inc. 1997.

REFERENCE BOOKS:

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. I Semester
10BT71007: TELEMETRY AND TELECONTROL
(ELECTIVE - II)

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

PRE REQUISITE: Principles of communication, optoelectronics and Laser Instrumentation.

COURSE DESCRIPTION:

Different Telemetry Principles; Symbols and codes; Frequency and Time-division Multiplexed Systems; Satellite Telemetry; Optical Telemetry; Microwave Telemetry and Telecontrol Methods.

COURSE OUTCOMES: After completion of the course the students are able to:

1. Demonstrate knowledge on different Telemetry Principles, Satellite Telemetry, Optical Telemetry, and Microwave Telemetry.
2. Analyze and solve errors during transmission.
3. Design transmitter and receiver circuits for data transmission.
4. Apply appropriate telemetry principles for data transmission in real time.

DETAILED SYLLABUS:

UNIT-I: Telemetry Principles

Introduction, Functional blocks of Telemetry system, Methods of Telemetry: Non Electrical, Electrical, Pneumatic, Frequency, Power Line Carrier Communication.

UNIT-II: Symbols and Codes

Bits and Symbols, Time function pulses, Line and Channel Coding, Modulation Codes. Intersymbol Interference.

UNIT-III: Frequency Division Multiplexed Systems

FDM, IRIG Standard, FM and PM Circuits, Receiving end, PLL.

UNIT-IV: Time Division Multiplexed Systems

TDM, PAM, PAM /PM and TDM, PCM Systems. PCM reception. Differential PCM. Introduction to QAM, Protocols.

UNIT-V: Satellite Telemetry

General considerations, TT&C Service, Digital Transmission systems, TT&C Subsystems, Telemetry and Communications.

UNIT-VI: Optical Telemetry

Optical fiber cable, sources and detectors. Transmitter and Receiving Circuits, Coherent Optical Fiber Communication System.

UNIT-VII: Microwave Telemetry

Introduction, microwave spectrum and bands, rectangular Waveguides, microwave transmitter, microwave receiver, Applications of Microwave telemetry.

UNIT-VIII: Telecontrol Methods

Analog and Digital techniques in Telecontrol, Telecontrol apparatus, Remote adjustment, Guidance and regulation, Telecontrol using information theory, Applications of Telecontrol System.

TEXT BOOKS:

1. D. Patranabis, *Telemetry Principles*, TMH.
2. Swoboda G., *Telecontrol Methods and Applications of Telemetry and Remote Control*, Reinhold Publishing Corp., London, 1991.

REFERENCE BOOKS:

1. M. Kulakarni, *Microwave and Radar Engineering*, 9th Edition, Umesh Publications, 1998.
2. Gruenberg L., *Handbook of Telemetry and Remote Control*, McGraw Hill, New York, 1987.
3. Young R.E., *Telemetry Engineering*, Little Books Ltd., London, 1988.
4. Housley T., *Data Communication and Teleprocessing System*, Prentice Hall International, Englewood Cliffs, New Jersey, 1987.

IV B.Tech. I Semester
10BT70402: DIGITAL IMAGE PROCESSING
(ELECTIVE - II)

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

1. Demonstrate in-depth 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*, Tata McGraw Hill, 2010.
2. S jayaraman, S Esakkirajan, T Veerakumar, *Digital Image Processing*, Tata McGraw Hill.
3. A .K. Jain, *Fundamentals of Digital Image Processing*, PHI.

IV B.Tech. I Semester
10BT71011: ANALYTICAL & BIOMEDICAL
INSTRUMENTATION LAB

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

PREREQUISITES: Analytical instrumentation, biomedical instrumentation

COURSE DESCRIPTION:

Measurements of parameters: calorific value, blood pressure, respiration rate and heart sounds; characteristics of spectrometer; gas chromatography, and flame photometer.

COURSE OUTCOMES: At the end of the course students will be able to:

1. Measure heart sounds, respiration rate, pH Value and calorific value of the sample.
2. Analyze the sample using spectrophotometer, flame photometer, gas chromatograph and Geiger Muller counter.

DETAILED SYLLABUS:

Minimum **10** experiments to be conducted

1. pH measurement.
2. Spectrometer: UV and VIS spectrometer
3. Flame Photometer
4. Geiger Muller Counter
5. Gas chromatography
6. Measurement of calorific value
7. Thermal conductivity detector
8. Blood pressure measurement
9. Measurement of blood flow
10. Study of ECG
11. Design of Instrumentation Amplifier for bioelectrical Signals
12. Measurement of Respiration rate
13. Measurement of heart sounds

IV B.Tech. I Semester

10BT71012: PLC AND LABVIEW PROGRAMMING LAB

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

PRE-REQUISITES: Automation of Industrial Processes

COURSE DESCRIPTION:

This course is aimed to know the automation concepts of a process using PLCs and (or) LabVIEW.

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

1. Design and develop solutions for automation that meet desired specifications and requirements.
2. Use modern tools in the field of instrumentation.

DETAILED SYLLABUS:

Minimum **10** experiments to be conducted

Part A: PLC

1. Implementation of Logic gates, timer and counters.
2. Level control.
3. Pressure control.
4. Motor speed control.
5. Bottle filling system.
6. Temperature control.

Part B: LabVIEW

1. Study of functional blocks.
2. Experiments using Boolean and numeric functional blocks.
3. Experiments using string and array functional blocks.
4. Convert Centigrade to Fahrenheit.
5. Creation of Sub VI.
6. Analyzing and logging of data.
7. Cluster and Error handling.

IV B.Tech. I Semester
10BT71013: 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 project work; Preparation of thesis and presentation.

COURSE OUTCOMES: On completion of project work the student will be able to

1. Demonstrate in-depth knowledge in the areas of interest of mini- project topic.
2. Analyze critically chosen mini-project topic for substantiated conclusions.
3. Design solutions for the mini-project topic chosen.
4. Undertake investigation of mini-project results providing valid conclusions.
5. Use the appropriate techniques, resources and modern engineering tools necessary for mini-project work.
6. Understand professional and ethical responsibilities for sustainable development of society in the chosen field of mini-project.
7. Function effectively as individual and a member in the mini-project team.
8. Develop communication skills, both oral and written for preparing and presenting mini-project reports.

IV B.Tech. I Semester
10BT7HS01: PROFESSIONAL ETHICS
(Audit Course)
(Common to ECE, EEE, EIE, EConE, CSE, IT & CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	-	-	-	2	-	-

PREREQUISITES: —

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 the 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. II Semester
10BT81001: INDUSTRIAL ELECTRONICS
(Common to EIE & EConE)

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

PRE-REQUISITES: Semiconductor Devices and Circuits, Electronic Circuit Analysis.

COURSE DESCRIPTION:

DC amplifiers and their importance; Design of regulated power supplies; SCRs and their applications in power control; Computer numeric control; timers used in industries, types of welding, electric heating and ultrasonic generation and its applications.

COURSE OUTCOMES: After completion of the course the student will be able to

1. Demonstrate knowledge on the importance and need for DC amplifiers and its applications, Silicon controlled rectifiers and their application in power control, types of industrial timers, electric welding, electric heating, ultrasonic generation and applications.
2. Design Regulated power supplies that meet desired specifications.
3. Use modern tools like CNCs to provide effective solution for electronics and instrumentation problems.

DETAILED SYLLABUS:

UNIT-I: DC Amplifiers

Need for DC amplifiers, DC amplifiers: drift, causes, compensation techniques, darlington emitter follower, cascode amplifier, stabilization, chopper stabilization.

UNIT-II: Regulated Power Supplies

Design of series and shunt voltage regulators, protection techniques, switching mode voltage regulators, servo voltage stabilizer, monolithic voltage regulators.

UNIT-III: Silicon Controlled Rectifier

Principle of operation, characteristics of SCR, methods of turn on and turn off mechanism, gate characteristics, triggering modes of SCR: R, RL, RC.

UNIT-IV: Applications of SCR in Power Control

Static circuit breaker, protection of SCR, inverters: classification, single phase inverters, converters: single phase half wave and full wave.

UNIT-V: DIAC, TRIAC and SCR Applications

Chopper circuits, principle, methods and configurations, Cycloconverters, Single phase and Three phase, DIAC, TRIAC.

UNIT-VI: Numeric Control

Basic concept of numerical control, driving devices, hydraulic systems, DC motors, stepping motors, data processing unit characteristics of N/C system, CNC / DNC - CNC typical system, block diagram, interfacing of CNC Machines, adaptive control systems.

UNIT-VII: Industrial Applications - I

Industrial Timers: classification, types, electronic timers: classification, RC and digital timers, time base generators, electric welding: classification, types and methods of resistance and arc welding.

UNIT-VIII: Industrial Applications - II

High frequency heating: principle, merits, applications, high frequency source for induction heating, dielectric heating: principle, material properties, electrodes and their coupling to RF generator, thermal losses and applications. Ultrasonics: generation and applications.

TEXT BOOKS:

1. G K Mithal and Dr Maneesh Gupta, *Industrial and Power Electronics*, 19th Edition, Khanna Publications, 2003.
2. Yoram Korean and Joseph Ben, *Numerical Control of Machine tools*, Khanna Publishers, New Delhi, 1998.

REFERENCE BOOKS:

1. D Roy Chowduary, *Linear Integrated Circuits*, 2nd Edition, New age International (p) Ltd, 2003.

IV B.Tech. II Semester
10BT60405: VLSI DESIGN
(Elective-III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	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 the course, the students will be able to

1. Acquire fundamental 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 m 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.

IV B.Tech. II Semester
10BT70521: OPERATING SYSTEM PRINCIPLES
(ELECTIVE - III)

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

PREREQUISITES: Computer architecture and Organization

COURSE DESCRIPTION:

Operating Systems generation and structures; Process Scheduling; process synchronization; Deadlock Detection and recovery Strategies; efficient utilization of memory management; file and I/O structures; Protection and Security.

COURSE OUTCOMES:

1. Gain knowledge on operating system operations and services, structures, generations, security and protection.
2. Analyze
 - CPU scheduling algorithms
 - DISK scheduling Algorithms
 - Memory Allocations
 - Page Replacement Algorithms
 - File and Directory maintenance
 - Protection and Security

DETAILED SYLLABUS:

UNIT-I: Operating Systems Overview

What Operating Systems do, operating systems operations, process management, memory management, storage management, protection and security, distributed systems, special purpose systems, Operating Systems Structures: operating system services and systems calls.

UNIT-II: Process Management

Process concepts and scheduling operations on processes, threads and inter process communication, scheduling criteria, scheduling algorithms.

UNIT-III: Concurrency and Synchronization

Process synchronization, critical-section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors.

UNIT-IV: Deadlocks

System model, deadlock characterization, methods for handling deadlock, deadlock prevention, detection and avoidance, recovery from deadlock, Bankers algorithm.

UNIT-V: Memory Management

Logical versus physical address space, Swapping, contiguous memory allocation, paging, segmentation, demand paging, performance of demand paging, page-replacement algorithms, Thrashing.

UNIT-VI: File System

File System Interface: 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.

UNIT-VII: I/O System

Mass-storage structure: Overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling algorithms, swap-space management, RAID structure, stable-storage implementation, Tertiary storage structure.

UNIT-VIII: Security

The Security problem, program threats, system and network threats cryptography as a security tool, user authentication, implementing security defenses, firewalling to protect systems and networks.

TEXT BOOK:

1. Abraham Silberchatz, 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, 2008.
2. Andrew S. Tanenbaum, *Modern Operating Systems*, 2nd Edition, PHI.
3. Crowley, *Operating System A Design Approach*, 2nd Edition, TMH.
4. Dhamdhare, *Operating Systems*, TMH, 2006.

IV B.Tech. II Semester
10BT70405: EMBEDDED AND REALTIME SYSTEMS
(Elective - III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	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; Kernel objects; Target Architectures; Design Technology.

COURSE OUTCOMES: After completion of the course, students should be able to:

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

1. Demonstrate fundamental knowledge on
 - Communication Interfacing Models
 - Kernel 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, I²C 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 Architectures

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 Chattopadhyay, *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. II Semester

10BT70421: **ADVANCED MICROPROCESSORS AND MICROCONTROLLERS** (Elective - III)

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

PREREQUISITES: Courses on Digital Logic Design, Computer Organization, Microprocessors and Microcontrollers.

COURSE DESCRIPTION:

Architecture, Memory Management, Instruction set for Intel family of Processors from 80286 to Dual core processors; Intel 80C31/51- Architecture, Instruction set, Real time control; Intel 80196, ARM Processors-on chip resources, Programming.

COURSE OUTCOMES: After completion of the course, students will be able to:

1. Demonstrate knowledge on
 - Internal hardware details of Intel family of processors
 - 8/16/32 bit Microcontrollers on chip resources and their usage
 - Interfacing various peripherals to build stand alone systems.
2. Critically analyze various memory management techniques.
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.

DETAILED SYLLABUS:

UNIT-I: The 80286 Microprocessors

Architecture, Register Organization, Addressing Modes and overview on instruction set of 80286.

UNIT-II: The 80386 and 80486 Microprocessors

Architectural features, Register Organization, Memory management, Virtual 8086 mode, The Memory Paging Mechanism.

UNIT-III: The Pentium and Pentiumpro Processors

The Memory System, Input/output system, Branch Prediction Logic, Cache Structure, Pentium Registers, Serial Pentium pro features.

UNIT-IV: The Pentium IV and Dualcore Microprocessors

Architecture, Special Registers and Pin Structures (brief treatment only)

UNIT-V: Overview of Architecture and Microcontroller Resources

Architecture of a typical micro controller – Microcontroller resources – Resources in advanced and next generation microcontrollers. 8051 microcontroller – Internal and External memories – Counters and Timers – Synchronous serial-cum asynchronous serial communication - Interrupts.

UNIT-VI: 8051 Family Microcontrollers Instruction Set

Basic assembly language programming – Data transfer instructions – Data and Bit-manipulation instructions – Arithmetic instructions – Instructions for Logical operations on the test among the Registers, Internal RAM, and SFRs– Program flow control instructions – Interrupt control flow.

UNIT-VII: Real Time Control

INTERRUPTS: Interrupt handling structure of an MCU – Interrupt Latency and Interrupt deadline – Multiple sources of the interrupts – Non-mask able interrupt sources – Enabling or disabling of the sources – Polling to determine the interrupt source and assignment of the priorities among them – Interrupt structure in Intel 8051.

TIMERS: Programmable Timers in the MCU's – Free running counter and real time control – Interrupt interval and density constraints.

UNIT-VIII: 16/32 Bit Microcontrollers

16 bit Microcontrollers: Hardware – Memory map in Intel 80196 family MCU system – IO ports – Programmable Timers and High-speed outputs and input captures – Interrupts

ARM 32 Bit Microcontrollers: Introduction to 16/32 Bit processors – ARM architecture and organization – ARM / Thumb programming model – ARM / Thumb instruction set

TEXT BOOKS:

1. Barry B. Brey, *The Intel Microprocessors*, 8th Edition, Pearson Education, 2009.
2. A.K.Ray and K.M.Bhurchandi, *Advanced Microprocessor and Peripherals*, TMH, 2000.
3. Raj Kamal, *Microcontrollers Architecture, Programming, Interfacing and System Design*, Pearson Education, 2005.
4. Mazidi and Mazidi, *The 8051 Microcontroller and Embedded Systems*, PHI, 2000.

REFERENCE BOOKS:

1. YU-Chang, Glenn A. Gibson, *Micro Computer Systems: The 8086/8088 Family Architecture, Programming and Design*, 2nd Edition, Pearson Education, 2007.
2. Douglas V. Hall, *Microprocessors and Interfacing*, Special Indian Edition, 2006.
3. A.V. Deshmuk, *Microcontrollers (Theory & Applications)*, WTMH, 2005.
4. John B. Peatman, *Design with PIC Microcontrollers*, Pearson Education, 2005.

IV B.Tech. II Semester
10BT4EC01: OPTIMIZATION TECHNIQUES
(ELECTIVE - IV)

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

PRE-REQUISITES: Mathematics

COURSE DESCRIPTION:

Statement of an optimization problem - design vector ,design constraints, objective function, single variable optimization, multivariable optimization; ,method of Lagrange multipliers; Kuhn-Tucker conditions; Linear programming problem; Assignment problems; Branch and bound Technique; Fibonacci method; unconstrained optimization techniques- steepest descent method; Basic approaches of interior penalty function method; Dynamic programming.

COURSE OUTCOMES: On completion of this course, a successful student will be able to:

1. Identify independent and dependent variables and identify an objective function to optimize.
2. Analyze the requirements and select a technique of optimization most suitable to the problem at hand.
3. Interpret the results of optimization and identify the feasible solutions.
4. Subdivide a complex system in to smaller disciplinary models, manage their interfaces and reintegrate them in to an overall system model.

DETAILED SYLLABUS:

UNIT-I: Introduction to Optimization Techniques

Statement of an Optimization problem, design vector, design constraints, constraint surface, objective function, objective function surfaces, classification of Optimization problems.

UNIT-II: Classical Optimization Techniques

Single variable Optimization, multi variable Optimization without constraints, necessary and sufficient conditions for minimum/maximum, multivariable Optimization with equality constraints, Solution by method of Lagrange multipliers, multivariable Optimization with inequality constraints, Kuhn - Tucker conditions.

UNIT-III: Introduction to Linear Programming

Standard form of a linear programming problem, geometry of linear programming problems, definitions and theorems, solution of a system of linear simultaneous equations, pivotal reduction of a general system of equations, motivation to the simplex method, simplex algorithm, big M-method, dual simplex algorithm.

UNIT-IV: Transportation Problem and Convex Programming

Finding initial basic feasible solution by North-West corner rule, least cost method and Vogel's approximation method, Assignment problems, variants, Integer Programming, Branch and bound technique, Convex programming.

UNIT-V: Unconstrained Nonlinear Programming

One-dimensional minimization methods: Classification, Fibonacci method, Problems and Quadratic interpolation method, Problems.

UNIT-VI: Unconstrained Optimization Techniques

Univariate method, Problems, Powell's Method, Conjugate directions, Algorithms, Problems, Steepest Descent (Cauchy) Method, Problems.

UNIT-VII: Constrained Nonlinear Programming

Characteristics of a constrained problem, Classification, Basic approach of Penalty Function method; Basic approaches of Interior and Exterior penalty function methods.

UNIT-VIII: Dynamic Programming

Dynamic programming, multistage decision processes, types, concept of sub optimization and the principle of optimality, computational procedure in dynamic programming, examples illustrating the calculus method of solution, examples illustrating the tabular method of solution.

TEXT BOOKS:

1. S. S.Rao, *Engineering optimization: Theory and Practice*, 3rd Edition, New Age International (P) Limited, 1998.
2. Dr. S.D. Sharma, *Operations Research*, Kedarnath Ram Nath and Co. Publications, Meerut.

REFERENCE BOOKS:

1. H.A. Taha, *Operations Research: An Introduction*, 6th Edition, PHI.
2. Kanthi Swaroop, Gupta and Mohan, *Introduction to Operations Research*, 2006.

IV B.Tech. II Semester
10BT61302: ROBOTICS AND AUTOMATION
(ELECTIVE - IV)

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

PREREQUISITES: Physics and control systems.

COURSE DESCRIPTION:

Automatic production and assembly; sensors, actuators and drives; mechanization of part handling, industrial robots, and vision systems; Emphasis will be on the planning, design and implementation of automation systems.

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

1. Explain the basic principles of Robotic technology, configurations, control and programming of Robots.
2. Design an industrial robot which can meet kinematic and dynamic constraints.
3. Select the appropriate Sensor and Machine vision system for a given application.

DETAILED SYLLABUS:

UNIT-I: Fundamentals of Manufacturing and Automation

Automation, Types of Automation, Arguments for and against automating, manufacturing industries, manufacturing functions and automation strategies, fundamentals of CAD/CAM.

UNIT-II: Introduction to Robotics

Human factors in automated factories, An overview of Robotics, Laws of robotics, Industrial Robotics - classification by coordinate system and control system, Electronic and Pneumatic manipulators, Present and Future applications.

UNIT-III: Power Sources and Sensors

Hydraulic, Pneumatic and electric drivers, Motor HP determination and gearing ratio, variable speed arrangements, Path Determination, Machinery Vision, Ranging, Laser, Acoustic, Magnetic Fiber Optic and Tactile Sensor.

UNIT-IV: Actuators and Grippers

Pneumatic, Hydraulic Actuators, Stepper Motor Control Circuits, End Effector, Various types of Grippers, Design consideration.

UNIT-V: Kinematics and Dynamics

Differential transformation and manipulators, Jacobians-problems. Dynamics : Lagrange-Euler and Newton-Euler formations-Problems, Forward and Inverse Kinematics Problems, Solutions of Inverse Kinematic problems, Multiple Solution, Jacobian Work Envelop.

UNIT-VI: Robot Programming

Robot programming- Lead through methods, textual robot languages, position specification, motion interpolation, Basic programming languages.

UNIT-VII: Flexible Manufacturing Systems and Automated Material Handling

Automated material handling and storage systems, conveyor systems and automated guided vehicle systems, FMS workstations, applications and benefits.

UNIT-VIII: Robot Applications in Manufacturing

Multiple Robots, Artificial intelligence and Robotics, Robots in Manufacturing and Non-Manufacturing applications – Robot Cell Design and control.

TEXT BOOKS:

1. Groover, M.P., Mitchell Weiss, Nagel, R.N., Nicholas G. Odrey, *Industrial Robotics Technology, Programming and Applications*, McGraw Hill International Edition, 1986.
2. S. R. Deb, *Robotics Technology and Flexible Automation*, TMH.

REFERENCE BOOKS:

1. R. K. Mittal, I. J. Nagrath, *Robotics and Control*, TMH, 2003.
2. R.D. Klafter, T.A. Chimielewski and M. Negin, *Robotic Engineering An Integrated Approach*, PHI, 1989.
3. K. S. Fu., R. C. Gonzalez, C. S. G. Lee, *International Edition, Robotics: Control Sensing, Vision and Intelligence*, McGraw Hill Company.
4. Mikell P. Grover. *Automation, Production Systems and CIM*, PHI, 1987.
5. Jhon J Craig, *Introduction to Robotics Mechanics and Control*, 2nd Edition, Pearson Education.

IV B.Tech. II Semester
10BT81302: ADAPTIVE CONTROL SYSTEMS
(ELECTIVE - IV)

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

PRE REQUISITE: Control Systems

COURSE DESCRIPTION:

Concepts of adaptive control; Real-time parameter estimation; deterministic and stochastic self tuning regulators; Model reference adaptive system; Tuning

COURSE OUTCOMES: After completion of the course the students will be able to:

1. Demonstrate knowledge on different types of adaptive control systems and tuning process.
2. Apply analytical skills to estimate the unknown parameters for adaptive process.
3. Design an adaptive controller to meet the specified conditions of the system.
4. Analyze and interpret the complex problems.
5. Select and apply appropriate adaptive techniques for a specific problem.

DETAILED SYLLABUS:

UNIT-I: Introduction

Concept of adaptive control, definitions, types of adaptivity, effects of process variation, adaptive systems, adaptive control problem, learning in adaptive systems.

UNIT-II: Real Time Parameter Estimation

Introduction to parameter estimation, least squares and regression models, least squares estimation, recursive computation, continuous time models. Estimation parameters in dynamical systems, finite impulse response models, transfer function models. Experimental conditions.

UNIT-III: Deterministic Self Tuning Regulators

Introduction, block diagram, pole placement design, indirect self tuning regulators, continuous time self tuners, direct self tuning regulators.

UNIT-IV: Stochastic Self Tuning Regulators

Design of minimum variance and moving average controllers - minimum variance control, non-minimum phase system, moving average controller, LQG control, stochastic self tuning regulators, unification of direct self tuning regulators, linear quadratic STR.

UNIT-V: Stability Analysis

Introduction to stability, definitions, theorems, lyapunov theory on stability, bounded input - bounded output stability.

UNIT-VI: Model Reference Adaptive Systems

Introduction - The MIT rules, Determination of Adaptation Gain, Design of MRAS using Lyapunov Theory, Output Feedback, Relations between MRAS and STR.

UNIT-VII: Auto-Tuning

Introduction, PID control, auto-tuning techniques, transient response methods, methods based on relay feedback, relay oscillations.

UNIT-VIII: Gain Scheduling

Introduction, principle, design of gain, scheduling controllers, nonlinear transformations, applications, ship steering, pH control

TEXT BOOKS:

1. Karl.J.Astrom and Bjorn Wittenmark, *Adaptive Control*, Pearson Education, 2003.

REFERENCE BOOKS:

1. Mithkin and Braun, *Adaptive Control Systems*, McGraw Hill.

IV B.Tech. II Semester
10BT51301: ADVANCED CONTROL SYSTEMS
(ELECTIVE - IV)

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

PRE REQUISITES: Control systems, Engineering mathematics

COURSE DESCRIPTION:

State space analysis; controllability and observability; non linear systems; phase plane analysis; stability analysis; modal control; optimal control problems; calculus of variations

COURSE OUTCOMES: After completion of the course the students will be able to:

1. Demonstrate knowledge on
 - Nonlinear systems and their behavior
 - Controllability and observability
 - Modal and Optimal control
2. Perform Phase-plane Analysis and Stability Analysis of Linear and nonlinear.
3. Design state feedback controllers, state observers and control system models.

DETAILED SYLLABUS:

UNIT-I: State Space Analysis

State Space Representation using phase variables, Solution of State Equation, State Transition Matrix, Diagonalization, Canonical Forms, Controllable Canonical Form, Observable Canonical Form, Jordan Canonical Form.

UNIT-II: Controllability and Observability

Tests for controllability and observability for continuous time systems, Necessary and sufficient conditions for controllability and observability, Principle of Duality, Controllability and observability form, Jordan canonical form and other canonical forms.

UNIT-III: Describing Function Analysis

Introduction to nonlinear systems, Different physical nonlinearities, describing functions, describing function analysis of nonlinear control systems.

UNIT-IV: Phase-Plane Analysis

Introduction to phase-plane analysis, Method of Isoclines for Constructing Trajectories, singular points, phase-plane analysis of nonlinear control systems, Delta method.

UNIT-V: Stability Analysis

Stability in the sense of Lyapunov, Lyapunov's stability and Lyapunov's instability theorems, Graphical representation, Sylvester principle, Definiteness, Direct method of Lyapunov for the Linear and Nonlinear continuous time autonomous systems.

UNIT-VI: Modal Control

Effect of state feedback on controllability and observability, Design of State Feedback Control through Pole placement. Full order observer and reduced order observer.

UNIT-VII: Optimal Control

Formulation of optimal control problem. Minimum time, Minimum energy, minimum fuel problems, State regulator problem, Output regulator problem, Tracking problem, Continuous-Time Linear Regulators.

UNIT-VIII: Calculus of Variations

Minimization of functionals of single function, Euler Lagrange Equation, Constrained minimization, Minimum principle, Control variable inequality constraints, Control and state variable inequality constraints.

TEXT BOOKS:

1. M. Gopal, *Modern Control System Theory*, 2nd Edition, New Age International Publishers, 1996.
2. A.Nagoor kani, *Advanced Control Theory*, 2nd Edition, RBA Publications, 2009.

REFERENCE BOOKS:

1. K. Ogata, *Modern Control Engineering*, 3rd Edition, Prentice Hall of India, 1998.
2. I.J. Nagarath and M.Gopal, *Control Systems Engineering*, New Age International (P) Ltd.
3. A. Ananda Kumar, *Control Systems*, PHI, 2007.

IV B.Tech. II Semester
10BT81011: 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 all the courses of the program from view point of knowledge, skills, applications and attitude.

COURSE OUTCOMES: On successful completion of the course, the student will be able to

1. Demonstrate knowledge in the field of Electronics and Instrumentation.
2. Function effectively as an individual.
3. Express the knowledge effectively in oral form.

IV B.Tech. II Semester
10BT81012: 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 project work the

1. Demonstrate in-depth knowledge in the areas of project topic.
2. Analyze critically chosen project topic for substantiated conclusions.
3. Design solutions for the project topic chosen.
4. Undertake investigation of project results providing valid conclusions.
5. Use the appropriate techniques, resources and modern engineering tools necessary for project work.
6. Understand professional and ethical responsibilities for sustainable development of society in chosen field of project.
7. Function effectively as individual and a member in the project team.
8. Develop communication skills, both oral and written for preparing and presenting project reports.
9. Demonstrate knowledge and understanding of cost and time analysis required for carrying out 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 performance 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 examination 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.