ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

Electronics and Instrumentation Engineering

B.TECH. FOUR YEAR DEGREE COURSE

(Applicable for the batches admitted from 2012-2013)

VNR VIGNANA JYOTHI
INSTITUTE OF ENGINEERING AND TECHNOLOGY
An Autonomous Institute, NAAC Accredited-'A' Grade
Bachupally, Nizampet (S.O), Hyderabad – 500090
Andhra Pradesh, India

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY
HYDERABAD
An Autonomous Institute
Approved by AICTE, New Delhi and Govt. of A.P & Affiliated to JNTUH

ACADEMIC REGULATIONS FOR B.TECH. DEGREE COURSE

(Applicable for Students admitted from the academic year 2012-2013)

1. Courses of study

The following courses of study are offered at present for specialization for the B. Tech. Course:

Branch Code	Branch
01	Civil Engineering.
02	Electrical and Electronics Engineering
03	Mechanical Engineering
04	Electronics and Communication Engineering
05	Computer Science and Engineering.
10	Electronics and Instrumentation Engineering
12	Information Technology
24	Automobile Engineering

1.1 Eligibility Criteria for Admission

The eligibility criteria for admission into engineering programmes shall be as mentioned below:

The candidate shall be an Indian National / NRI

The candidate should have completed 16 years of age as on 31st December of the academic year for which the admissions are being conducted.

The Candidate should have passed the qualifying examination (10+2) or equivalent as on the date of admission.

Seats in each programme in the Institution are classified into **Category** A and **Category** B as per the G.Os.

1.1.1 Category – A Seats

These seats will be filled through counseling as per the rank at the Common Entrance Test (EAMCET) conducted by the State Government and as per other admission criteria laid down in the G.Os.

1.1.2 Category - B Seats

These seats will be filled by the institute as per the G.Os Issued by State Government from time to time.

1.1.3 Category: Lateral Entry

The candidate shall be admitted into the Third Semester, based on the rank secured by the candidate at Engineering Common Entrance Test (ECET(FDH)) by the Convener, ECET.

2. Distribution and Weightage of Marks

i. The performance of a student in each Semester shall be evaluated subject – wise with **a maximum of 100 marks for theory and 100 marks for practical subjects.** In addition, an Industry oriented mini-project, Seminar, Comprehensive viva-voce, and Project Work shall be evaluated for **50, 50, 50 and 200 marks** respectively.

ii. For theory subjects the distribution shall be **30 marks for Mid Semester Evaluation** and **70 marks for the End-Examination**.

For theory subjects, Two mid examinations will be conducted in each Semester as per the academic calendar. Each mid examination is evaluated for 25 marks. Two assignments are to be given to students covering the syllabus of first Mid and second Mid examinations and are evaluated for 5 marks each. .

The first assignment shall be submitted before first mid examinations and second Assignment should be submitted before second mid examination.

At the end of the Semester, Internal Marks (Maximum 30) for the respective subject is assigned as follows:

(a) 25 marks: 80% from the best performed Mid examination and 20% from the other Mid examination.

(b) 5 marks: Average of the two assignment marks

iii. For practical subjects there shall be a continuous evaluation during the Semester for 30 **marks and 70 marks for end examination.** Out of the 30 marks, **day-to-day work in the laboratory shall be evaluated for 10 marks**, and 10 marks for practical examination (two practical examinations will be conducted and the average of the two examinations will be taken into account) and 10 marks for laboratory record.

NOTE: A student who is absent for any assignment/Mid term examination for any reason what so ever shall be deemed to have secured 'zero' marks in the test/examination and no makeup test/examination shall be conducted.

iv For the subjects having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing, Production Drawing Practice, and Estimation etc.,) the distribution shall be 30 **marks for internal evaluation (15 marks for day-to-day work and 15 marks for Mid examination (**the average of the two examinations will be taken into account**) and 70 marks for end semester examination.** There shall be **two Mid examinations** in a Semester.

V There shall be an **industry-oriented mini-Project**, in collaboration with an industry of their specialization, to be taken up during the a summer vacation after III year II Semester examination. The **mini project shall be evaluated during the IV year I Semester.** The industry oriented mini project shall be submitted in report form and should be presented before a committee, which shall be evaluated for **50 marks.** The committee consists of Head of the Department, the supervisor of mini project and a senior faculty member of the department. There shall be **no Midterm assessment for industry oriented mini project. However, attending the shadow engineering program is a pre – requisite for evaluating industry – oriented mini project.** Students should submit a report on learning outcomes of the shadow engineering. Every student should attend shadow engineering programming an industry for a week days during second year I or II semester.

vi. There shall be a **Seminar presentation in IV year II Semester.** For the Seminar, the student shall collect the information on a specialized topic other than the project topic and prepare a technical report, showing his understanding of the topic, and submit to the department, which shall be evaluated by a Departmental committee consisting of the Head of the department, Seminar supervisor and a senior faculty member. **The seminar**

will be awarded 50 marks in which 40 marks will be evaluated for seminar report and 10 marks for MTP Record by the committee.

vii. There shall be a **Comprehensive Viva-Voce in IV year II Semester**. The Comprehensive Viva-Voce will be conducted by a Committee consisting of the Head of the Department and three Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the student's understanding in various subjects studied during the B.Tech. course of study. The Comprehensive Viva-Voce is evaluated **for 50 marks** by the Committee. There will be **no Midterm assessment for the Comprehensive viva-voce.**

viii. The Project work shall be started by the student in the beginning of the IV year I Semester. Out of a total of **200 marks** for the project work, **60 marks shall be for Midterm Evaluation** and **140 marks for the Semester end Examination.** The viva-voce shall be conducted by a committee comprising of an external examiner, Head of the Department and the project supervisor and one senior faculty. The evaluation of project work shall be conducted at the end of the IV year II Semester. **The Midterm Evaluation shall be on the basis of three Seminars conducted during the IV year II Semester for 30 marks by the committee consisting of Head of the Department, project supervisor and senior faculty member of the Department and for 30 marks by the supervisor of the project.**

3. Semester end Examination

(a) Theory Courses

Each course is evaluated for 70 marks. Examination is of 3 hours duration.

(b) Practical Courses

Each lab course is evaluated for 70 marks. The examination shall be conducted by the laboratory teacher and another senior teacher concerned with the subject of the same/other department/Industry. One examiner may be appointed by the Chief Superintendent in consultation with HOD as and when required.

(c) Supplementary Examinations

Supplementary examinations will be conducted along with regular Semester end examinations.

(During even Semester regular examinations: supplementary examinations of odd Semester

and during odd Semester regular examinations: supplementary examinations of even Semester will be conducted).

4. Attendance Requirements

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

ii. Condonation of shortage of attendance in aggregate **up to 10% (65% and bove and below 75%)** in a Semester may be granted by **Institute Academic Committee.**

A student will not be permitted to write the end examination and not promoted to the next Semester unless he satisfies the attendance requirement of the present Semester, as applicable. He may seek re-admission for that Semester when offered next.

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

iv. Students whose shortage of attendance is not condoned in any Semester are not eligible to take their end semester examination of that Semester.

v. A stipulated fee shall be payable towards condonation of shortage of attendance.

5. Minimum Academic Requirements

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item No.**4.**

i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical design or drawing subject or project, if he secures **not less than 35% (25 out of 70 marks)** of **marks in the end examination and a minimum of 40% of marks in the sum total of the Midterm evaluation and end semester examination taken together.**

ii. A student shall be **promoted from II to III year** only if he fulfils the academic requirement of **37 credits from the following examinations,**

- Two regular and one supplementary examinations of I year I Semester
- One Regular and One Supplementary exam of I year II Semester
- one regular examination of II year I Semester irrespective

iii. A student shall be **promoted from III year to IV year** only if he fulfils the academic requirements of total 62 **credits from the following examinations,**

- Three regular and Two supplementary examinations of I B Tech I Semester.

- Two regular and two Supplementary examinations for I B Tech II Semester
- Two regular and one supplementary examinations up to the end of II year I Semester.
- One regular and one supplementary examinations of II year II Semester.
- One regular examination of III year I Semester.

iv. A student shall register and put up minimum academic requirement in all 200 credits and earn the 200 credits. Marks obtained in all 200 credits shall be considered for the calculation of Cumulative Grade Point Average **(CGPA)**.

v. In addition to the above 200 credits the student must complete the non credit courses also. The non-credit courses awarded with a grade of satisfactory or not satisfactory based on the attendance of the student. Minimum attendance for the non-credit course is 75%.

vi. The student should also register and complete any two value added courses offered by the Institute.

vii. Students who fail to earn 200 credits as indicated in the course structure **within eight academic years** from the year of their admission shall **forfeit their seat** in B.Tech. course and their **admission stands cancelled.**

6. Course pattern

i. The entire course of study is of four academic years. **All the I, II, III and IV years are of Semester pattern.**

ii. A student eligible to appear for the end semester examination in a subject, but absent or has failed in the end semester examination may reappear for that subject at the supplementary examination whenever conducted.

iii. When a student is detained due to shortage of attendance in any Semester, he may be re-admitted into that Semester when it is offered next, **with the academic regulations of the batch into which he gets readmitted.**

iv. When a student is detained due to lack of credits in any year, he may be eligible to be promoted or for promotion into the next year after fulfillment of the academic requirements, **with the academic regulations of the batch into which he gets admitted**

Award of B.Tech. Degree and Class

A student will be declared eligible for the award of the B. Tech. Degree if he/she fulfils the following academic regulations:

i) Pursued **a course of study for not less than four academic years and not more than eight academic years.**

ii) Registered for **200 credits** and secured **200 credits and other Academic Requirements.**

iii) Complete the non-credit courses and value added courses as per their course structure.

NOTE: Students, who fail to fulfill all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech. Course.

7. CGPA System:

Method of awarding absolute grades and grade points:

The **absolute grading method** is followed, based on the total marks obtained in internal and external examinations. Grades and grade points are assigned as per the Table given below

B.Tech Program: The Absolute Grading Method is followed, based on the total marks obtained in internal and external examinations. Grades and Grade points are assigned as given below

Marks Obtained	Grade	Description of Grade	Grade Points(GP) Value Per Credit
>=90	O	Outstanding	10.00
>=80 and <89.99	A+	Excellent	9.00
>=70 and <79.99	A	Very Good	8.00
>=60 and <69.99	B	Good	7.00
>=50 and <59.99	C	Fair	6.00
>=40 and <49.99	D	Pass	5.00
<40	F	Remedial	
Not Appeared the Exam(s)	N	Absent	

CGPA	CLASS
>= 7.5	First Class with Distinction
>= 6.5 and <7.5	First class
>= 5.5 and < 6.5	Second Class

>=5.0 and < 5.5	**Pass class**

The student is eligible for the award of the B.Tech degree with the class as mentioned in the Table.

Calculation of Semester Grade Points Average (SGPA):

The performance of each student at the end of the each semester is indicated in terms of SGPA. The SGPA is calculated as below:

$$SGPA = \frac{Total\ Earned\ Weighted\ Grade\ Points\ for\ that\ Semester}{Total\ Credits\ for\ the\ Semester}$$

$$SGPA = \frac{\sum_{i=1}^{P} \mathrm{Ci} * \mathrm{Gi}}{\sum_{i=1}^{P} \mathrm{Ci}}$$

Where 'Ci' = Number of Credits allotted to particular subject 'I'

'Gi' = Grade Point corresponding to the letter grade awarded in that subject 'i"

'i"= 1,2,…..P represent the number of subjects for that particular semester

* **SGPA is calculated and awarded for the candidates who pass all the courses in a semester.**

Calculation of Cumulative Grade Point Average (CGPA) for Entire Programme.

The CGPA is calculated as below:

Assessment of the overall performance of a student is obtained by calculating Cumulative Grade Point Average (CGPA), which is weighted average of the grade points obtained in all subjects during the course of study.

$$CGPA = \frac{\sum_{i=1}^{m} Ci * Gi}{\sum_{i=1}^{m} Ci}$$

Where Ci= Number of credits allotted to a particular subject 'I"

Gi = Grade Point corresponding to the letter grade awarded in that subject 'i"

I= 1,2,….m represent the number of subjects of the entire program.

Grade lower than D in any subject is not considered for CGPA calculation. The CGPA is awarded only when the student acquires the required number of credits prescribed for the program.

Grade Card

The grade card issued shall contain the following:

a) The credits for each subject offered in that semester
b) The letter grade and grade point awarded in each subject
c) The **SGPA/CGPA**
d) Total number of credits earned by the student up to the end of that semester.
e) Award list indicating the marks awarded to the student.

8. Withholding of Results

If the student has not paid dues to College, or if any case of indiscipline is pending against him, the result of the candidate may be withheld and he will not be allowed to go into the next higher Semester. The award or issue of the Degree may also be withheld in such cases.

9. **Transitory Regulations**

Students who have discontinued or have been detained for want of attendance or any other academic requirements, may be considered for readmission as and when they become eligible. They have to take up Equivalent subjects, as substitute subject in place of repetition of subjects as decided by the Institute Academic Committee.

10. Minimum Instruction Days

The minimum instruction days for each Semester shall be **90 instruction days.**

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

12. The decision of the Institute Academic Committee will be final in respect of equivalent subjects for those students who are transferred from other colleges. The procedure for permitting students to transfer from other colleges will be decided by the principal / Institute Academic Committee keeping the Government Rules in view.

13. General

i. Where the words “he”, “him”, “his”, occur in the regulations, they include “she”, “her”, “hers”.

ii. The academic regulations should be read as a whole for the purpose of any interpretation.

iii. In the case of any discrepancy/ambiguity/doubt arises in the above rules and regulations, the decision of the Principal shall be final.

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

14. Academic Regulations for B.Tech. (Lateral Entry Scheme)

(Applicable for students admitted from the academic year 2013-2014)

(i) A student shall register for all 150 credits and earn all the 150 credits. Marks obtained in all 150 credits shall be considered for the calculation of the class.

(ii) A student who fails to earn 150 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.

(iii) The same attendance regulations are adopted as that of B.Tech. Four year degree course.

(iv) A student shall be promoted from third year to fourth year only on fulfilling the academic requirements of securing 37 credits from the following examinations.

- **a.** Two regular and one supplementary examination of II year I Semester
- **b.** One regular and one supplementary examination of II year II Semester
- **c.** One regular examination of III year I Semester.

  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.

(v) All other regulations as applicable to B.Tech. four year degree course will hold good for B.Tech. (Lateral Entry Scheme).

15. Malpractice Rules

Disciplinary Action for Malpractices/Improper Conduct in Examinations

	Nature of Malpractices/Improper conduct	**Punishment**
	If the candidate:	
1.	(a) Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
	(b)Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.

	outside the exam hall in respect of any matter.	
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all end semester examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles the Answer book or additional sheet or takes out or arranges to send out the question	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the

	paper during the examination or answer book or additional sheet, during or after the examination.	candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all end semester examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates are also debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.

	mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not	If the student belongs to the college, expulsion from the examination hall and cancellation of the performance in that

	connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the academic council of the Institute for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

Punishments to the candidates as per the above guidelines.

Malpractice identified at Spot center during valuation

The following procedure is to be followed in the case of malpractice cases detected during valuation, scrutiny etc. at spot center.

1) Malpractice is detected at the spot valuation. The case is to be referred to the malpractice committee. Malpractice committee will meet and discuss/question the candidate and based on the evidences, the committee will recommend suitable action on the candidate.

1) A notice is to be served to the candidate(s) involved through the Principal to his address and to the candidate(s) permanent address regarding the malpractice and seek explanations.

2) The involvement of staff who are in charge of conducting examinations, invigilators valuing examination papers and preparing / keeping records of documents relating to the examinations in such acts (inclusive of providing in correct or misleading information) that infringe upon the course of natural justice to one and all concerned at the examinations shall be viewed seriously and recommended for award of appropriate punishment after thorough enquire.

3) Based on the explanation and recommendation of the committee action may be initiated.

4) Malpractice committee:

i. Controller of Examinations
Chairman

ii. Assistant controller of Evaluation
Member

iii. Chief Examiner of the subject/subject expert
Member

iv. Concerned Head of the Department Member

Vision and Mission Statements of the Institution

VISION

To be a World Class University providing value-based education, conducting interdisciplinary research in cutting edge technologies leading to sustainable socio-economic development of the nation.

MISSION

- To produce technically competent and socially responsible engineers, managers and entrepreneurs, who will be future ready.
- To involve students and faculty in innovative research projects linked with industry, academic and research institutions in India and abroad.
- To use modern pedagogy for improving the teaching-learning process.

Vision and Mission Statements of Department of Electronics and Instrumentation Engineering

VISION

A resource center of academic excellence for imparting quality technical education through highly disciplined and dedicated faculty and staff to strive to attain the global standards, meeting the need of students at National and International levels and imbibing strong ethical values, to be able to improve the standards of the society around.

MISSION

- To impart quality education in the domain of Electronics and Instrumentation Engineering through implementing learner centric processes.
- To provide industry specific best of breed laboratory practices beyond curriculum to promote diverse collaborative research for meeting the changing societal needs.

PEO.1	Solve current and changing engineering problems with a solid foundation in Mathematics, Science and Technology.
PEO.2	Comprehend, analyze, design, and develop novel products and offer solutions for industry specific processes.
PEO.3	Adopt the learning culture needed for a successful professional career.
PEO.4	Demonstrate managerial and entrepreneurship skills essential for professional growth.
PEO.5	Observe moral values and professional ethics while developing innovative solutions to meet the industrial and societal needs.

a. Knowledge of Basic Sciences:

The students shall be able to apply the principles of Basic Sciences and Mathematical skills in learning in Basic Engineering subjects. The knowledge gained thus enables the students to apply them in learning the core branch viz. the Electronics and Instrumentation Engineering.

b. Computational Skills:

The students shall acquire Analytical Thinking; Problem solving abilities, get exposure to the modern computational procedures and apply them in the core Instrumentation Engineering.

c. Design and Development of Solutions:

The background knowledge gained, the Analytical and computational skills acquired by the students shall enable the students to apply them in the core Instrumentation Engineering to design Electronic circuits, highly sensitive sensors networks for monitoring and control of various physical, chemical, pharmaceutical and Industrial parameters and processes.

d. Conduct of Investigations into Complex Problems:

The students shall be able to apply the knowledge and adopt research methodologies for the modernization of existing designs of Instruments, design sophisticated instrumentation systems interfaced to dedicated embedded controllers or High-end computers. They shall be able to Acquire, Analyze, Interpret and Control any complex processes or problems in Industry and R&D.

e. Usage of Modern Tools:

The students gain expertise in the utilization of modern software tools like C, JAVA, Multisim, Signal and Image processing tools for applications in communications, Biomedical (ECG, EEG, MRI) etc; Hardware gadgets like the Digital Storage Oscilloscopes, Function Generators, Spectrum Analyzers; and ultra-sensitive instruments like the UV-VIS and Infra-Red Spectro-photometers, Chromatographs, Process control stations etc. for applications in Industry and R&D.

f. Engineers and Society:

The students of engineering should be motivated to utilize their Scientific, Technological, Computational and Instrumentation skills for the better addressing the societal needs. Design new sophisticated instruments for the high-end Research and Process Industries, Pharmaceutical, Bio-medical fields. They should utilize their expertise to develop indigenous technologies, instruments, gadgets, affordable by common people. Design inexpensive healthcare systems and extend the same to the remote areas through telemedical network system making use of INSAT facility.

g. Environment and Sustainability:

Instrumentation Engineering is a multi-disciplinary branch. The students shall be motivated to utilize their knowledge for design of highly sensitive and low energy consumption, low radiation emitting, lower environment polluting instruments, operating on renewable energy sources and implement all such measures to **sustain the quality of the environment.**

h. Ethics:

The students are motivated to follow a code of ethics and moral perspectives at the individual level as well as at the professional level to protect the interests of all the stakeholders, with a concern for societal responsibilities.

i. Individual and Team work:

Communication skills, Aptitude development programs, Team activities like POGIL, Seminar Presentations etc contribute greatly for the development of individual talents/skills. Involvement in Professional, Cultural, Sports activities provided in the institute shall also develop capabilities of a student to mold oneself as an Individual member, Team leader or an Organizer.

j. Communication Skills:

The intensity of inputs (Listening, Speaking, Reading and Writing Skills) inputs and trainings imparted through all these activities, the students shall acquire excellent communication skills both orally as well as writing. They shall be able to transform their innovative ideas into excellent technical reports for presentation/publication in seminars/journals.

k. Project Management and Finance:

The students shall be able to conceptualize ideas, formulate projects, visualize their execution and realized final product. The students shall demonstrate the skills required for drafting of proposals for projects with thorough understanding of the procurement plans (materials, software, hardware), project management and financial allocations and management during the execution of the project.

l. Life-Long learning:

The students shall be motivated to keep themselves in-tune with the contemporary changes in technological processes through life-long learning and also contribute their expertise for the benefit of the current stake holders and the society.

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B. TECH ELECTRONICS AND INSTRUMENTATION ENGINEERING

I YEAR I SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
MTH1101	Mathematics – I	3	1	3
MTH1102	Mathematics- II	3	1	3
PHY1101	Engineering Physics	3	1	3
ENG1101	English	3	0	3
CSE1101	Computer Programming	3	0	3
MED1105	Engineering Drawing	2	4	4
ENG1203	English Language Communication Skills Lab	0	3	2
CSE1201	Computer Programming Lab	0	3	2
MED1202	Workshop Practice	0	3	2
Total		**17**	**16**	**25**

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B. TECH ELECTRONICS AND INSTRUMENTATION ENGINEERING

I YEAR II SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
EEE1101	Circuit Theory	4	1	4
MTH1104	Numerical analysis and Linear Programming	3	1	3
PHY1103	Advanced Engineering Physics	3	1	3
CHE1101	Engineering Chemistry	3	0	3
ITD1102	Data Structures	3	0	3
ECE1101	Electronics Devices and circuits	3	1	3
ITD1202	Data Structures Lab	0	3	2
EPC1201	Engineering Physics and Engineering Chemistry Laboratory	0	3	2
ECE1201	Electronics Devices and Circuits Laboratory	0	3	2
Total		**19**	**13**	**25**

*** T/P/D: Tutorial/Practical/Drawing Practice**

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B.TECH ELECTRONICS AND INSTRUMENTATION ENGINEERING

II YEAR I SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
CED1105	Environmental Studies	3	1	3
MTH1105	Applied Mathematics	4	1	4
EEE1154	Principles of Electrical Engineering	3	1	3
EIE1101	Signals and Systems	4	1	4
EIE1102	Sensors and Signal Conditioning	3	1	3
ECE1103	Electronic Circuit Analysis	4	1	4
EEE1252	Electrical Engineering Laboratory	0	3	2
ECE1203	Electronic Circuit Analysis Laboratory	0	3	2
Total		**21**	**12**	**25**

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B. TECH ELECTRONICS AND INSTRUMENTATION ENGINEERING

II YEAR II SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
ITD1105	Object Oriented programming	3	1	3
EEE1105	Control Systems	3	1	3
EIE1103	Electronic Measurements	4	0	4
EIE1104	Pulse and Digital Circuits	3	1	3
ECE1150	Principles of Communications	4	0	4
ECE1104	Switching Theory and Logic Design	4	0	4
EIE1202	PDC Laboratory	0	3	2
EIE1201	Transducers and Measurements Laboratory	0	3	2
NCC1101	Human Values & Professional Ethics	2	**Non Credit Audit Course**	
Total		**23**	**09**	**25**

*** T/P/D: Tutorial/Practical/Drawing Practice**

VNR Vignana Jyothi Institute of Engineering and Technology

B. TECH ELECTRONICS AND INSTRUMENTATION ENGINEERING

III YEAR I SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
CMS1101	Business Economics and Financial Analysis	4	0	4
ITD1104	Computer Organization	4	0	4
EIE1106	Linear and Digital IC Applications	4	0	4
ECE1110	Digital Signal Processing	3	1	3
EIE1108	Process Control Instrumentation	4	0	4
EIE1215	Simulation Laboratory	0	3	2
EIE1204	Linear and Digital IC Applications Laboratory	0	3	2
EIE1205	Process Control Instrumentation Laboratory	0	3	2
NCC1102	Soft Skills and Personality Development	2	**Non Credit Audit Course**	
Total		**21**	**10**	**25**

VNR Vignana Jyothi Institute of Engineering and Technology

B. TECH ELECTRONICS AND INSTRUMENTATION ENGINEERING

III YEAR II SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
EIE1109	Industrial Instrumentation	4	0	4
ECE1109	Micro Processors and Micro Controllers	4	0	4
ITD1107	Operating systems	3	1	3
CMS1102	Management Science	4	0	4
EIE1111	Virtual Instrumentation	4	1	4
ECE1206	Micro Processors and Micro Controllers Laboratory	0	3	2
ENG1204	Advanced English Communication Skill Laboratory	0	3	2
EIE1206	Industrial Instrumentation Laboratory	0	3	2
Total		**19**	**11**	**25**

*** T/P/D: Tutorial/Practical/Drawing Practice**

Note: Audit courses on Human Values and Professional Ethics and Intellectual Property rights will be Offered during the I and II semesters respectively.

VNR Vignana Jyothi Institute of Engineering and Technology

B. TECH ELECTRONICS AND INSTRUMENTATION ENGINEERING

IV YEAR I SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
EIE1110	Analytical Instrumentation	4	0	4
	Open Elective			
EIE1113	Instrumentation Practices in Industries	4	0	4
CED1147	Disaster Management			
EIE1112	PC Based Instrumentation			
	Elective – II			
EIE1115	Automation of Industrial Processes	4	0	4
EIE1107	Bio-Medical Instrumentation			
ITD1106	Computer networks			
	Elective – III			
EIE1116	Power Plant Instrumentation	4	0	4
EIE1117	Telemetry and Tele Control			
CSE1130	Relational Data Base Management Systems			

ECE1112 EIE1122 ITD1125	**Elective – IV** VLSI Design Digital Control Systems Managerial Information Systems	3	0	3
EIE1207	Analytical Instrumentation Laboratory	0	3	2
EIE1208	Virtual Instrumentation Laboratory	0	3	2
EIE1301	Industry Oriented mini – Project	0	6	2
Total		**19**	**12**	**25**

***Major Project initiated in I Semester and Evaluated in II Semester**

* T/P/D: Tutorial/Practical/Drawing Practice

VNR Vignana Jyothi Institute of Engineering and Technology

B. TECH ELECTRONICS AND INSTRUMENTATION ENGINEERING

IV YEAR II SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
EIE1118	Robotics and Automation	3	0	3
EIE1119 EIE1120 CSE 1121	**Elective – V** Fiber Optic and Laser Instrumentation Micro Electromechanical Systems (MEMS) Cyber Security	3	0	3
EIE1121 ECE1113 ECE1124	**Elective – VI** Pharmaceutical Instrumentation Digital Image Processing Embedded and Real Time Operating Systems	3	0	3
EIE1302	Technical Seminar	0	3	2
EIE1303	Comprehensive Viva	0	3	2
EIE1304	Major Project	0	18	12
Total		**09**	**24**	**25**

* T/P/D: Tutorial/Practical/Drawing Practice

Note: All End Examinations (Theory and Practical/ Drawing) are of three hours duration.

VNR Vignana Jyothi Institute of Engineering & Technology

I Year B.Tech ECE,EEE, EIE – I Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(MTH1101) MATHEMATICS – I
(Advanced Calculus)

Course Objectives:

- **Understand** the Taylor's theorem and its application to maxima and minima of f(x,y)
- **Understand** the process of curve Tracing.
- **Understand** multiple integrals and its applications
- **Apply** integral theorems of vector calculus.

Course Outcomes:

After completion of the course the student is able to:

- Solve problems involving the maxima and minima of f(x,y).
- Apply the curve tracing concepts to find arc length of curves, surface area, volume of solids of revolution.
- Evaluate the multiple integrals using appropriate change of variables
- Verify the integral theorems

UNIT I

Differential Calculus

Mean value theorems - Rolle's theorem, Lagrange's theorem, Cauchy's theorem, and generalized mean value theorem (Taylor's Theorem) (statements only), Curvature and Radius of curvature, Curve tracing – Cartesian, polar and parametric curves(standard curves only)

UNIT II

Functions of Several Variables

Partial differentiation; Euler's theorem,Functional dependence; Jacobian; Maxima and Minima of functions of two variables with constraints and without constraints.

UNIT III

Improper integrals and Multiple intehgrals

Improper Integrals; Beta, Gamma, and Error integrals - Properties and simple applications. Applications of integration to lengths, volumes and surface areas in cartesian and polar coordinates. Multiple integrals - double and triple integrals, change of variables (Cylindrical and Spherical polar coordinates) and change of order of integration.

UNIT-IV

Vector calculus

Introduction to vector and scalar functions; gradient, curl, divergence, and their related properties of sums and products; Laplacian and second order operators; Vector integration - line integral, work done, potential function; Area, surface, and volume integrals; Statements of Vector integral theorems and their verification (without proofs) - Green's theorem, Stoke's theorem, and Gauss divergence theorem.

UNIT V

Elementary analysis

Sequences and series - convergence and divergence, ratio test, comparison test, integral test, Cauchy's root test, Raabe's test (statements only for the tests), and absolute and conditional convergence.

TEXT BOOKS

1. Calculus and Analytic Geometry *by* Thomas and Finney, 9th edition; *Publisher: Pearson Education*.
2. Higher Engineering Mathematics – by Dr.B. S. Grewal*, 40th edition, Publisher: Khanna Publishers.*
3. Schaum's Outline of Vector Analysis *by* Murray R. Spiegel (2011); 2nd edition; *Publisher: Tata McGraw Hill*.

REFERENCES

1. Elementary Analysis: The Theory of Calculus *by* Kenneth Ross; *Publisher: Springer*
2. Advanced Engineering Mathematics *by* Erwin Kreyszig, 8th edition; *Publisher: John Wiley*.

VNR Vignana Jyothi Institute of Engineering & Technology

I Year B.Tech ECE,EEE, EIE – I Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(MTH1102) MATHEMATICS – II

(Linear Algebra and Ordinary Differential Equations)

Course Objectives:

- **Understand** the methods of solving first order differential equations and learn about its applications to basic engineering problems.
- **Understand** the methods of solving higher order differential equations and learn about its applications to basic engineering problems.
- **Understand** the method of series solutions of second order ordinary differential equations.
- **Apply** the convolution theorem to evaluate Laplace Transform of the functions.

Course Outcomes:

After completion of the course the student is able to:

- Find the rank using Echolen form and Normal form.
- Solve the problems in first order and second order differential equations.
- Learn Laplace Transform as a tool.
- Evaluate the Z Transform of the given function.

UNIT I

Solution of linear systems

Matrices and linear systems of equations - elementary row transformations, Rank, row Echelon form, and normal form; Solution of linear systems - direct methods - LU decomposition, LU decomposition from Gauss elimination, and solution of Tri-diagonal systems by Thomas algorithm; Eigen values, eigen vectors, and their properties - Liner dependence and independence; Cayley-Hamilton theorem (without proof) - inverse and powers of a matrix by Cayley-Hamilton theorem, diagonalization of a matrix, calculation of powers of a matrix; Modal and spectral matrices.

UNIT II

Linear transformations

Real matrices - symmetric, skew symmetric, and orthogonal linear transformation; Complex matrices - Hermitian, Skew-Hermitian and unitary matrices; Quadratic forms - reduction of quadratic form to canonical form, rank, positive, negative definite, semi definite, index, signature, Sylvester law, and singular value decomposition.

ORDINARY DIFFERENTIAL EQUATIONS

UNIT III

Ordinary differential equations and their applications

Differential equations of first order and first degree - Linear, Bernoulli and exact differential equation; Applications of differential equations of first order and first degree - Newton's law of cooling, Law of natural growth and decay, Orthogonal trajectories, and basic circuits.

UNIT IV

Differential equations of higher order and their applications

Differential equations of higher order - homogeneous and non-homogenous type, differential equations of second order and higher order with constant coefficients with right hand side term of the type e^{ax}, sin (ax), cos (ax), polynomials in x, e^{ax} V(x), x V(x), and method of variation of parameters and Euler-Cauchy's 2nd order differential equations, applications to mechanical systems and Simple harmonic motion.

UNIT V

Laplace transform and application to ODE

Laplace transform of standard functions; Inverse transform-first shifting theorem; Dirac's delta function; Convolution theorem; Periodic function; Differentiation and integration of transforms; Application of Laplace transforms to ordinary differential equations.

TEXT BOOKS

1. Differential Equations, with Applications and Historical Notes *by* George F. Simmons and John S. Robertson (2008) 2nd Edition; *Publisher: Tata McGraw Hill*.
2. A First Course in Differential Equations *by* Dennis G. Zill; *Publisher: Brooks Cole*.
3. Advanced Engineering Mathematics by Dennis G. Zill, Warren S. Wright, and Michael R. Cullen, 4th edition; *Publisher: Jones & Bartlett Learning*.

REFERENCES

1. Advanced Engineering Mathematics *by* Erwin Kreyszig, 8th edition; *Publisher: John Wiley*.
2. Advanced Engineering Mathematics *by* Peter V. O'Neil, 9th Edition; *Publisher: Cengage Learning.*
3. Elementary Differential Equations and Boundary Value Problems *by* William E. Boyce and Richard C. Diprima; *Publisher: Wiley.*
4. Linear Algebra and its applications by David C Clay; *Publisher: Pearson Education.*

VNR Vignana Jyothi Institute of Engineering & Technology

I Year B.Tech ECE,EEE, EIE– I Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(Common for all Branches)

(PHY1101) ENGINEERING PHYSICS

Course Objectives:

- To **supplement** and enhance the knowledge of basic concepts in physics essentially required in the study of interaction of light with matter and behavior of a particle quantum mechanically.
- To **Study** and understand various phenomena of light- Interference, Diffraction, Dispersion and total internal reflection.
- To **learn** and enhance the basic concepts in physics required to deal with large number of particles and behavior of an electron in metals.
- To **understand** the basic principles and working of lasers and optical fibers.
- To **learn** simple applications of these concepts and principles in engineering and technology.

Course Outcomes:

After completion of the course the student is able to:

- Realize importance of diffraction in optical elements and interference of light in thin films.
- Work with different wave plates to obtain desired polarization and to distinguish LASER light from ordinary light.
- Describe types of crystal systems and bonds in crystals.

- Illustrate the importance of X rays in crystal studies and identify various crystal defects. Identify importance of Nano dimensional materials.

UNIT –1:

INTERFERENCE:

Superposition principle, resultant amplitude, coherence, methods to obtain coherent sources, interference, Young's double slit experiment, interference in thin films by reflection, Newton's rings Experiment

DIFFRACTION-I:

Distinguish between Fraunhofer and Fresnel diffraction, diffraction at single slit (Qualitative and Quantitative (Phasors approach)).

UNIT -2

DIFFRACTION-II

Diffraction at double slit, circular aperture, and multiple slits (grating)(Qualitative Approach), Resolution of spectral lines, Rayleigh criterion, and resolving power of grating.

POLARIZATION

Polarization phenomenon, Brewster's Law and Malus law, examples, types of polarization, double refraction, Nicol prism, Quarter and Half wave plates

UNIT -3:

LASERS:

Characteristics of Lasers – Spontaneous and Stimulated Emission of radiation, meta stable state, population inversion, lasing action, Einstein's coefficients and

relation between them — Ruby Laser – Helium-Neon Laser –Semiconductor Laser – Applications of lasers.

FIBER OPTICS:

Principle of optical fiber and properties – Acceptance angle and acceptance cone – Numerical aperture –Types of fibers and refractive index profiles – Qualitative analysis of attenuation in optical fibers –Application of optical fibers.

UNIT -4:

ELEMENTS OF STATISTICAL MECHANICS:

Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics (non-mathematical treatment); Photon gas, Planck's law of black body radiation; Deduction of Wien's law and Rayleigh-Jeans law from Plank's law.

PRINCIPLES OF QUANTUM MECHANICS:

Waves and particles – De Broglie hypothesis - Matter waves - Davisson and Germer experiment –Heisenberg's uncertainty principle - Schrodinger Wave Equation – Wave function and its Physical Significance - Particle in one dimensional potential box(wave functions, probability densities and energy states).

UNIT -5

FREE ELECTRON FERMI GAS:

Energy levels in one dimension, Effect of temperature on the Fermi-Dirac distribution, Free electron gas in three dimensions, electrical conductivity & Ohm's law, Electrical Resistivity of Metals (Qualitative).

BAND THEORY OF SOLIDS:

Electron in a periodic potential; Bloch Theorem; Kronig-Penney model (non-mathematical treatment); Origin of energy band formation in solids; Classification of materials into conductors, semiconductors & Insulators; and Concept of effective mass of an electron.

TEXT BOOKS:

(1) Physics vol.2, by Halliday, Resnick and Krane; John Wiley & Sons
(2) Concepts of Modern physics by Arthur Beiser, McGraw Hill Inc.
(3) Introduction to Solid State Physics by Charles Kittel : John Wiley & Sons

REFERENCE BOOKS:

(1) Engineering Physics by R.K.Gaur and S.L.Gupta; Dhanpat Rai and Sons
(2) Applied Physics by P.K.Mittal, IK International Publishing House (P) Ltd.
(3) Optics by Ghatak and Thyagarajan, Tata Mc Graw
(4) Engineering Physics by G Sahashra Buddhe; University Press
(5) Elements of Solid State Physics by J.P.Srivatsva, PHI Publishers
(6) Engineering Physics by Dr M Chandra Shekar and Dr P. Appala Naidu, VGS Book links.
(7) Introduction to Optical Communication by G. Keiser
(8) Quantum Mechanics by Gupta Kumar Sharma

Vignana Jyothi Institute of Engineering and Technology

I Year B.Tech ECE,EEE, EIE – I Sem **L T/P/D**

3 0 3

(ENG1101) ENGLISH

Course Objectives:

- To equip the students with all the LSRW skills for advanced writing and speaking.
- To equip the students with basic grammar, infrastructural patterns and grammatical constructions required of in technical writing.
- To acquaint the students with the writing process, beginning with paragraph writing. This would prepare them for academic and workplace writing.
- Equip the students with Oral Communication Skills.

Course Outcomes:

After completion of the course the student is able to:

- Comprehend technical writing produced in the engineering profession
- Understand the writing process and create logical paragraphs
- Use infrastructural patterns in writing and speaking
- Communicate coherently orally and in writing.

Introduction

This is the age of information and communication technologies. Engineers and technical professionals need to convey technical information in English for various purposes.

Besides learning general English as an international language, engineering students need to be equipped with adequate writing ability so that they can communicate technical information clearly on at least a basic level. A good English writing proficiency can be a contributing factor to professional recognition and career prospects. This course teaches those writing strategies that scientists, engineers, and others will need in order to write successfully on the job. It initiates the students into Technical Writing. The purposes of

technical writing are to inform and persuade. This program aims to train students in writing clear, concise and effective English.

This Syllabus is therefore, a Pragmatic English Writing Program for engineering students with intermediate proficiency. The program covers a syllabus outline and instructional approaches on basic writing skills with particular reference to technical writing.

Methodology

A Task-based, process oriented methodology will be used by the teachers to give a practical orientation to the teaching of language. An inductive approach will be used to demonstrate the use of language in context. This should enable the students to internalize the language structures and vocabulary used in context. Students will be exposed to numerous examples and ample practice will be given in the contextual use of language structures.

Syllabus Outline

Unit I : Review of Grammar

i) Common Errors
ii) Subject-Verb Agreement
iii) Adverbs
iv) Transitional elements
v) Use of Articles and Prepositions
vi) Conjunctions
vii) pronoun reference

Unit II : Prose 1

1. Heaven's Gate by Pico Iyer
2. The Connoisseur by Nergis Dalal

Unit III Reading and Writing Skills

i) Reading Comprehension -- Skimmimg & scanning
ii) Reading Comprehension -- Intensive reading
iii) Reading Comprehension -- Critical Analysis
iv) Paragraph Writing
v) Letter Writing
vi) Memo Writing

Unit IV : Prose 2

1. The Cuddalore Experience by Anu George
2. The Odds Against Us by Satyajit Ray

Unit V : Advanced Writing Skills

1. Comparison and Contrast Pattern
2. Cause and Effect Pattern
3. Classification
4. Analogy
5. Problem-Solution Pattern

Prescribed Text Books

1. **Enjoying Everyday English** by A. Ramakrishna Rao
2. **Effective Technical Communication** by Ashraf Rizvi
3. **Technical Writing Process and Product** by Gerson Sharon J. and Steven Gerson. 3rd edition, New Jersey: Prentice Hall 1999

References

1. M. Raman and S. Sharma, 2004; Technical Communication : Principles and Practices, OUP, *(Indian Edition)*
2. Blanton, L.L. 1993; Composition Practice, Book 4 ,Second Edition, Heinle & Heinle Publishers, pp. 54
3. Georges, T.M. 1996; A course in Analytical Writing for Science and Technology, http://www.mspiggy.etl.noaa.gov/write/
4. Neufeld, J.K. 1987; A Handbook for Technical Communication, Prentice-Hall, Inc. pp.20,65-68
5. Yalden, J. 1987; Principles of Course Design for Language Teaching, Cambridge University Press
6. David F. Beer and David McMurrey, Guide to Writing as an Engineer, 2nd ed., Wiley, 2004, ISBN: 0471430749.
7. Greaney, G.L. 1997; Less is More: Summary Writing and Sentence Structure in the Advanced ESL Classroom, The Internet TESL Journal,

Vol.III, No.9
http://iteslj.org/Techniques/Greaney-Writing.html
8. M. Raman and S. Sharma, 2004; Technical Communication : Principles and Practices, OUP, *(Indian Edition)*
9. Blanton, L.L. 1993; Composition Practice, Book 4 ,Second Edition, Heinle & Heinle Publishers, pp. 54
10. Georges, T.M. 1996; A course in Analytical Writing for Science and Technology,
http://www.mspiggy.etl.noaa.gov/write/
11. Neufeld, J.K. 1987; A Handbook for Technical Communication, Prentice-Hall, Inc. pp.20,65-68
12. Yalden, J. 1987; Principles of Course Design for Language Teaching, Cambridge University Press
13. David F. Beer and David McMurrey, Guide to Writing as an Engineer, 2nd ed., Wiley, 2004, ISBN: 0471430749.
14. Greaney, G.L. 1997; Less is More: Summary Writing and Sentence Structure in the Advanced ESL Classroom, The Internet TESL Journal, Vol.III, No.9
http://iteslj.org/Techniques/Greaney-Writing.html

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I Year B.Tech ECE,EEE, EIE – I Sem	**L**	**T/P/D**	**C**
	3	**0**	**3**

(CSE1101) COMPUTER PROGRAMMING

Course objectives

- **Learn** how to write modular, efficient and readable C programs
- **Declare** and manipulate single and multi-dimensional arrays of the C data types.
- **Describe** the techniques for creating program modules in C using functions and recursive functions.
- **Create** and manage derived data types and perform operations on files.
- **Utilize** pointers and dynamic memory allocation functions to efficiently solve problems

Course Outcomes

After completion of the course the student is able to:

- Understand the fundamentals of C programming.
- Choose the loops and decision making statements to solve the problem.
- Usage of different derived data types and the concepts of files
- Implement different c concepts in problem solving.

UNIT- I

Computer fundamentals-Hardware, software, computer language , translators, Program Development steps-Algorithms, Pseudo code, flow charts, Introduction to C Language – History, Simple C Program, Identifiers, Basic data types, user defined data types, Variables, Constants, type qualifiers, Managing Input /

Output, Operators, Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Simple C Programming examples.

UNIT - II

Selection Statements – if and switch statements, Repetitive statements – while, for, do-while statements, C Programming examples, other statements related to looping – break, continue, go to, C Programming examples.

Arrays – Basic concepts, one-dimensional arrays, two – dimensional arrays, multidimensional arrays, C programming examples.

UNIT - III

Introduction to Structured Programming, Functions- basics, user defined functions, inter function communication, Standard functions, Storage classes- auto, register, static, extern, scope rules, arrays to functions, recursive functions, example C programs.

Strings – Basic concepts, String Input / Output functions, arrays of strings, string handling functions, strings to functions, C programming examples.

UNIT - IV

Derived types – Structures – Basic concepts, nested structures, arrays of structures, structures and functions, unions, bit fields, C programming examples.

Pointers – Basic concepts, pointers and functions, pointers and strings, pointers and arrays, pointers and structures, self referential structures , example C programs.

UNIT – V

Preprocessor Directives, Dynamic Memory Allocation

File I/O – Basic concepts, text files and binary files, file input / output operations, file status functions (error handling), C programming examples, Command-Line Arguments.

TEXT BOOKS:

1. C programming A Problem-Solving Approach by Behrouz A.Forouzan,E.V.Prasad,Richard F.Gilberg
2. C How to Program Paul Deitel and Harvey Deitel , PH
3 Computer Programming and Data Structures by E Balagurusamy, Tata McGraw Hill.

REFERENCES:

1. Let Us C Yashavant kanetkar BPB
2. The C Programming Language by Brian W. Kernighan, Dennis M. Ritchie
3. Absolute beginner's guide to C, Greg M. Perry, Edition 2,Publisher: Sams Pub.1994

VNR Vignana Jyothi Institute of Engineering and Technology

I Year B.Tech ECE,EEE, EIE – I Sem	**L**	**T/P/D**	**C**
	2	**4**	**4**

(MED1105) ENGINEERING DRAWING

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

Course Objectives:

- **Understand** the usage of drawing instruments.
- **Understand** the construction methods for drawing conic sections.
- **Identify** the significance of curves in engineering practice like bridges, building, arches
- **Understand** first and third angle projections and methods.

Course Outcomes:

After completion of the course the student is able to:

- Interpret the concepts of curves and Solve the problems as per the drawing conventions in Auto Cad
- Solve the problems on Projections for points, lines, planes and solids in Auto CAD.
- Apply the concepts of isometric projections and solve the problems in Auto CAD
- Apply the concepts of orthographic projections and solve the problems in Auto CAD

UNIT – I

Introduction to engineering graphics – construction of ellipse, parabola and hyperbola – cycloidal curves.

UNIT – II

Orthographic projections of points, lines and planes – axis inclined to one planes and inclined to both the planes.

UNIT – III

Orthographic projections of solids:

Cylinder, cone, prism, pyramid and sphere positions and axis inclined to both the planes.

UNIT – IV

Isometric Scale, Isometric drawing and Isometric projections of lines, planes and simple solids.

UNIT – V

Conversion of orthographic views into isometric views for simple objects. Construction of orthographic projections for given isometric projections.

TEXT BOOKS :

1. Engineering drawings By N.D.Bhatt.
2 Engineering graphics By K.L. Narayana and P.Kannayya.

REFERENCES:

1. Engineering drawing and graphics: Venugopal/ New age
2. Engineering drawing : Johle / TMH

VNR Vignana Jyothi Institute of Engineering & Technology

I Year B.Tech ECE,EEE, EIE – I Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(ENG1203) ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY

The English language Communication Skills Lab aims to provide practice in all the four skills of LSRW, with a special emphasis on listening and speaking skills.

Course Objectives

- **To provide** ample practice in LSRW skills and train the students in oral presentations, public speaking, role play and situational dialogue.
- **To provide** practice in word usage, grammatical construction, structural patterns, and improve comprehension abilities in the students.
- **To train** students to use neutral pronunciation through phonetic sounds, symbols, stress and intonation.
- **To enable** students to transfer information from verbal to graphic representation and vice versa.

Course Outcomes

After completion of the course the student is able to:

- Comprehend spoken and written discourse.
- Speak fluently with neutral pronunciation and exhibit interpersonal skills.
- Write accurately, coherently and lucidly making appropriate use of words depending on context and present data clearly.
- Introduce oneself to people and be able to speak extempore.

Syllabus for Lab Sessions

Unit 1 : Multimedia Lab

1. Grammar : Nouns and Pronouns; Articles; The Present Tense
2. Vocabulary Lesson 1
3. Listening Comprehension

Communication Skills Lab: Introduction of Self and others

Unit 2 : Multimedia Lab

1. Grammar : Concord; Adjectives; The Past Tense
2. Vocabulary Lesson 2
3. Listening Skills

Communication Skills Lab: Seeking and Giving Information, Giving and Taking Instructions

Unit 3 : Multimedia Lab

1. Grammar --- adverbs, conjunctions, Prepositions; The Future Tense
2. Vocabulary Lesson 3
3. 3. Telephoning Skills

Communication Skills Lab: Role Play/ Situational Dialogues

Unit 4 : Multimedia Lab

1. Grammar ---- Active and Passive Voice; Language Analysis
2. Vocabulary : Lesson 4

3. Listening Comprehension

Communication Skills Lab: **i)** JAM/ Short Talk ii) Information Transfer a) Data Analysis b) Interpretation of Graph

Unit 5 : Multimedia Lab

1. **Introduction to Technical Writing**

A. Definition of a Technical Term
B. Description of a Mechanism

C. Description of a Technical Process

2. Vocabulary : Lesson 5

Communication Skills Lab : Presentation Skills : Oral Presentation

Multimedia Lab Requirements

The English Language Lab shall have two parts:

i) **The Computer aided Language Lab** for 60 students with 60 systems, one master console,

LAN facility and English language software for self- study by learners.

ii) **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System,

a T. V., a digital stereo –audio & video system and camcorder etc.

System Requirement (Hardware component):

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

iv) P – IV Processor

a) Speed – 2.8 GHZ
b) RAM – 512 MB Minimum
c) Hard Disk – 80 GB
v) Headphones of High quality

5. Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

Suggested Software:

- **Clarity Pronunciation Power** – part II
- **Oxford Advanced Learner's Compass**, 7th Edition
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- **Lingua TOEFL CBT Insider**, by Dreamtech
- **TOEFL & GRE** (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)

Multimedia Lab Requirements

Minimum Requirement:

The English Language Lab shall have two parts:

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VNR Vignana Jyothi Institute of Engineering and Technology

I Year B.Tech ECE,EEE, EIE – I Sem	**L**	**T/P/ D**	**C**
	0	**3**	**2**

(CSE1201) COMPUTER PROGRAMMING LABORATORY

Course objectives

- **Gain a working knowledge** of C programming to write modular, efficient and readable C programs by Identifying the structural elements and layout of C source code.
- **Declare and manipulate** single and multi-dimensional arrays of the C data types and derived data types like structures, unions.
- **Use functions** from the portable C library and to describe the techniques for creating program modules using functions and recursive functions.
- **Manipulate** character strings in C programs. Utilize pointers to efficiently solve problems

.

Course Outcomes:

After completion of the course the student is able to:

- Able to write, compile and debug programs in C language using both Linux and windows environment
- Implement appropriate decision making statements and derived data types to solve a given problem.
- Implement different concept s of files to solve real world examples.

Implement different c concepts in problem solving**Week 1**

a. Basic Linux commands
b. Simple C programs -to implement basic arithmetic operations – sum, average, product, smallest, largest of the numbers, difference, quotient and remainder of given numbers etc.

Week 2

Programs on if, else-if, nested if, else if ladder - largest and smallest of given numbers, to find the grade of a student based on marks, roots of a quadratic equation etc.

Week 3

a. Programs on switch-case – to check the type of a given character, to find the grade of a student etc.
b. Programs on while and do-while- to find factorial, Fibonacci series, GCD, sin(x), cos(x) series , to check whether a given number is an Armstrong, Palindrome, Perfect, number conversion, and Prime number etc.

Week 4

Programs on for loop- sum of n natural numbers, factorial, sin(x), to generate Pascal's triangle etc.

Week 5

a. Programs on nested loops – check for Fibonacci prime, Pyramids of numbers, generation of prime numbers in the given range, multiplication table etc.
b. programs using break, go to, continue.

Week 6

a. Programs on 1-D array-finding Minimum and maximum element, Sorting and Searching etc.
b. Programs on 2-D array – Sum, product and Multiplication of two Matrices etc.

Week 7

a. Programs on Functions-Implementation of user defined functions categories, passing of arrays to functions etc.

b. Programs on recursion - factorial of a given integer, GCD of two given integers etc.

Week 8

1. Programs on String handling functions-Copying, reverse, substring, concatenation.
2. Programs on structure and unions.

Week 9

Midterm exam

Week 10 : Programs using pointers- pointer basic operations, pointers and functions etc

Week 11 : Programs on pointers and structures, Pointers and arrays, pointers and strings.

Week 12 : Programs on files-Implementation of file handling functions.

Week 13

a. Programs on files error handling.

b. Programs on Dynamic memory allocation

Week 14 : Programs on command line arguments.

Week 15 : Programs on preprocessor directives

Week 16 : Internal Lab Exam

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I Year B.Tech ECE,EEE, EIE – I Sem	**L**	**T/P/**	**D**
	0	**3**	**2**

(MED1202) WORKSHOP PRACTICE

(Common to CE, EEE, ECE, EIE, CSE & IT)

(8 + 8 Weeks)

Course Objectives:

- To **study/demonstrate** the concepts of computer w.r.t. its hardware, operating system, assembling and disassembling.
- To **conduct** the experiments related to production engineering technology.
- To **demonstrate** the usage of power tools, CNC lathe and machine shop for different exercises

Course Outcomes:

After completion of the course the student is able to:

- Identify, assemble, dissemble, install and write commands for a given
- configuration of a computer.
- To develop components using the techniques of carpentry, tin smithy, forging,
- etc. listed in trades for exercises.
- To work out the given models in machine shop and CNC lathe.
- To develop the designs and models that are suitable to industry.

TRADES FOR EXCERCISES

Any eight exercises from the following trades (at least one exercise from each) :

1. Carpentry
2. Fitting
3. Welding
4. Electrical Wiring
5. Lathe Operations

IT WORK SHOP EXCERCISES

Any eight exercises from the following :

1. Computer Hardware: Identification of Peripherals
2. Assembling and disassembling of a PC
3. Simple diagnostic exercises – Related to hardware

4. Installation of Windows Operating System
5. Installation of Linux Operating System
6. Linux Basic Commands
7. Simple diagnostic exercises –Related to Operating System

TEXTBOOKS

1. Work shop Manual - P.Kannaiah/ K.L.Narayana, Scitech Publishers.
2. Workshop Manual by Venkat Reddy.
3. Engineering Workshop Practice – V Ramesh Babu, VRB Publishers Pvt. Ltd.
4. IT Essentials PC Hardware and Software Companion Guide Third Edition by Davis Anfinson and Ken Quamme – CISCO Press, Pearson Education.
5. PC Hardware and A+ Handbook – Kate J. Chase PHI (Microsoft)

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	4	1	4

(EEE1101) CIRCUIT THEORY

Course Objectives

- To **understand** the basic concepts of Circuit Analysis.
- To **analyze** single phase ac circuits and magnetic circuits.
- To **apply** Network Theorems for Circuit Analysis.

Course Outcomes:

After the completion of the course students will be able to

- Analyze transient response of circuits
- Evaluate two port parameters and design simple filters
- Appreciate the working of DC machines
- Understand the operation of transformers and AC machines.

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UNIT–I Introduction to Electrical Circuits

Circuit Concept – R-L-C parameters – Voltage and Current sources – Independent and dependent sources-Source transformation – Voltage – Current relationship for passive elements (for different input signals-square, ramp, saw tooth, triangular). Kirchhoff's laws – network reduction techniques – series, parallel, series parallel, star-to-delta or delta-to-star transformation.

UNIT–II Magnetic Circuits

Magnetic Circuits – Faraday's laws of electromagnetic induction – concept of self and mutual inductance – dot convention – coefficient of coupling – composite magnetic circuit - Analysis of series and parallel magnetic circuits

UNIT–III Single Phase A.C Circuits

R.M.S and Average values and form factor for different periodic wave forms, Steady state analysis of R, L and C (in series, parallel and series parallel combinations) with sinusoidal excitation – Concept of Reactance, Impedance, Susceptance and Admittance – Phase and Phase difference – concept of power factor, Real and Reactive powers – J-notation, Complex and Polar forms of representation, Complex power.

UNIT-IV Locus diagrams and Resonance

Locus diagrams – series R-L, R-C, R-L-C and parallel combination with variation of various parameters – Resonance – series, parallel circuits, concept of band width and Q factor.

UNIT–V Network topology and Network theorems

Definitions – Graph – Tree, Basic cutset and Basic Tieset matrices for planar networks – Nodal analysis, Mesh analysis, Super Node and Super Mesh analysis of Networks with Independent and Dependent voltage and current sources - Duality and Dual networks.

Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer, Tellegen's, Millman's and Compensation theorems for d.c. and a.c. excitations.

TEXT BOOKS:

1. Engineering circuit analysis - William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 6th Edition.
2. Network Analysis - A. Sudhakar, Shyammohan Palli, Mc Graw Hill Company,
3. Circuit Theory - A. Chakrabarti, Dhanipat Rai and Co., 6th Edition.

REFERENCES:

1. Network Analysis by M. E Van valkenburg, PHI.

2. Linear circuit analysis (time domain phasor, and Laplace transform approaches) by RAYMOND A.DECARLO and PEN-MIN-LIN, Oxford University Press. 2nd Edition 2004.
3. Network Theory: - N.C. Jagan and C.Lakshminarayana, B.S Publications.
4. Electrical Circuit theory by K. Rajeswaran, Pearson Education 2004.
5. Basic Circuit analysis by D.R, Cunningham and J.A Stuller, Jaico Publications.

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I Year B.Tech ECE,EEE, EIE – II Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(MTH1104) NUMERICAL ANALYSIS AND LINEAR PROGRAMMING

Course objectives:

- **Understand** the numerical methods for non linear systems, evaluating definite integrals and solving Ordinary Differential Equations.
- **Understand** various methods of interpolation and application.
- **Understand** the Echolen form and Normal form of a matrix and its applications in solving linear system of equations.
- **Solving** system of linear equations using Jacobi and Gauss-Seidal methods.

Course outcomes:

After completion of the course the student is able to

- Apply the numerical methods to find a root of algebraic and transcendental equations.
- Apply the numerical methods to find the solutions of ordinary differential equations
- Use simplex method procedure to optimize a linear function.
- Solve transportation problems.

NUMERICAL ANALYSIS

UNIT I : Solutions of non-linear systems

Introduction; Mathematical preliminaries; Solution of algebraic and transcendental equations – the bisection method, the method of false position, the iteration method,Newton - Raphson method, and their order of convergence.

UNIT II : Interpolation

Introduction; Errors in polynomial interpolation; Finite differences; Forward differences; Backward differences; Central differences; Symbolic relations and separation of symbols; Differences of a polynomial; Newton's formulae for interpolation; Central difference interpolation formulae; Gauss's central difference formulae; Lagrange and Hermite interpolation formulae; Cubic spline interpolation.

UNIT III : Numerical Integration

Trapezoidal rule, Simpson's 1/3 rule, and Simpson's 3/8 rule.

Numerical solutions of ordinary differential equations

Solution of initial value problems by Taylor's series - Picard's method of successive approximations, Euler's method, and Runge - Kutta methods; Predictor Corrector methods - Adams Moulton method, and Milne's method.

UNIT IV : Numerical solutions of partial differential equations (PDE)

Introduction; Classification of second order PDE; Approximation of derivatives by finite difference method; Solution of Laplace equation - Jacobi's method, Gauss-Seidal (Leibmann's) method, Solution of parabolic equations by explicit and crank Nicolson implicit scheme method; Solution of hyperbolic equations.

LINEAR PROGRAMMING

UNIT V : Linear programming

linear programming - Basic concepts; -problem formulation, graphical method, canonical and standard forms of LPP simplex method, Artificial variables techniques- M method, Transportation problems: Balanced transportation

problem-North-West corner rule, Least cost method, Vogel's approximation method and MODI method.

TEXT BOOKS

1. Elementary Numerical Analysis – an algorithmic approach by Samuel D. Conte and Carl De Boor (2006); 3rd edition; *Publisher: Tata McGraw Hill.*

2. Elementary Numerical Analysis by Dr. B.S.Grewal, 4th edition, Publisher: Khanna Publishers

3. Operations Research: Theory and Applications by Kanthi Swaroop, 4th edition, Macmillan Publishers India Ltd.

REFERENCES

1. Advanced Engineering Mathematics *by* Erwin Kreyszig, 8th Edition; *Publisher: John Wiley and Sons.*
2. Advanced Engineering Mathematics *by* Peter V. O'Neil, 9th Edition; *Publisher: Cengage Lear*

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I Year B.Tech ECE,EEE, EIE – II Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(PHY1103) ADVANCED ENGINNERING PHYSICS

Course Objectives:

- To **learn** basic structures and classifications of solids.
- To **study** nature of dielectric, magnetic and conducting properties of materials.
- To **visualize** different kinds of materials in engineering and technology.

Course Outcomes:

After completion of the course the student is able to:

- Distinguish fermions and bosons, recognize wave nature of particles and one dimensional behavior of a particle quantum mechanically.
- Illustrate periodic motion of electrons in solids that leads to classification of solids into conductors, semiconductors and non conductors.
- Estimate the concentration of charge carriers in semiconductors and realize the importance of principle of in Pn junction which is the fundamental for many semiconductor devices.
- Distinguish magnetic materials, especially ferrites and realize the importance of super conducting materials.
- Understand the dielectric behavior of materials under application of electric field

UNIT -1

SEMICONDUCTOR PHYSICS:

Fermi level in Intrinsic and Extrinsic semiconductors - Intrinsic semiconductor and carrier concentration – Extrinsic semiconductor and carrier concentration –

Equation of continuity – Direct and indirect band gap semiconductors - Hall Effect.

PHYSICS OF SEMICONDUCTOR DEVICES:

Formation of p-n junction – open circuit p-n junction – Energy diagram of diode – i/v characteristics of p-n junction diode – p-n diode as a rectifier – Diode equation – Introduction to LED, BJT and FET.

UNIT -2

CRYSTAL STRUCTURES:

Space lattice – Unit cell – Lattice parameter – Crystal systems – Bravais lattices Atomic radius – Co-ordination number - Structures and Packing fractions of Simple Cubic – Body Centered Cubic – Face Centered Cubic crystals – Hexagonal closed packed crystals - Structures of diamond, NaCl.

BONDING IN SOLIDS:

Force and energy between two approaching atoms, primary and secondary bonds, binding energy and cohesive energy, Madelung constant, cohesive energy and Madelung constant for NaCl crystal

UNIT -3:

DIRECTIONS, PLANES AND X-RD:

Miller Indices for Crystal planes and directions – Inter planar spacing of orthogonal crystal systems –Diffraction of X-rays by crystal planes and Bragg's law– Laue method – Powder method – Applications of X-ray diffraction

DEFECTS IN SOLIDS:

Imperfections in crystals – Point defects (Vacancies, Interstitial and Impurities) Schottky and Frenkel defects – (with mathematical treatment)- Line

imperfections – Edge and Screw dislocation – Burger vector – Surface defects and volume defects (Qualitative Treatment).

UNIT -4

MAGNETIC PROPERTIES OF MATERIALS:

Permeability, Field intensity, magnetic field induction, Magnetization and Magnetic susceptibility – Origin of magnetic moment, Bohr magneton – Classification of magnetic materials (Dia, Para and Ferro)- Domain theory of ferromagnetism, Hysteresis curve – Soft and Hard magnetic materials – Ferrites and their applications.

UNIT -5

DIELECTRIC PROPERTIES:

Electric dipole, Dipole moment, Dielectric constant, Electronic, Ionic and Orientation Polarization – Calculation of Polarizibilities – Internal fields – Claussius – Mossotti equation –Piezo and Ferro electricity

SUPERCONDUCTORS:

Experimental survey and superconductivity phenomenon, – Meissner effect – Critical fields and Persistent currents, Type I and Type II superconductors - London equations- flux quantization-BCS Theory- Josephson Effect, Applications of Superconductors.

TEXT BOOKS:

1. Introduction to Solid State Physics by Charles Kittel , Publishers: John Wiley & Sons
2. Applied Physics by P.K.Mittal, IK International Publishing House (P) Ltd

3. Electronic Devices and circuits by Milliman and Halkias

References:

1. Solid State Physics by A.J.Dekker; Macmillan Publishers India Ltd.
2. Engineering Physics by Dr M Chandra Shekar and Dr P. Appala Naidu, VGS Book links.
3. Engineering Physics by G Sahashra Buddhe; University Press
4. Elements of Solid State Physics by J.P.Srivatsva, PHI Publishers
5. Engineering Physics by M.R.Srinivasan, New Age Publishers
6. Solid State Physics by M.A. Wahab.

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I Year B.Tech ECE,EEE, EIE – II Sem	L	T/P/D	C
	3	0	3

(CHE1101) ENGINEERING CHEMISTRY

Course Objectives

- **Understanding** the concept of generating electricity by batteries.
- Conceptual **knowledge** of corrosion science.
- **Acquiring** the knowledge of preparation, properties and usage of polymers.
- **Applying** the concept of hardness to analyze various boiler troubles in steam generation.
- **Familiarize** the features of carbon nanotubes, composites and self-healing materials.

Course Outcomes

After the completion of the course student will be able to

- Visualize the chemical applications of electricity.
- Prevention of corrosion of metals and applications of polymers from domestic articles to sophisticated scientific and medical instruments.
- Benefits of treated water as source in steam generation and other fields like production of steel, paper, textiles, atomic energy etc.
- The applicability and greater efficiency of using a material at nanoscale indifferent engineering fields.

UNIT I

Electrochemical cells and batteries

Conductance-factors effecting conductance, conductometric titrations; cells: types of cells, cell representation, electrode potential; Standard electrode potential; Electrochemical series; Nernst equation; Reference electrodes – hydrogen, calomel electrode; Ion selective electrodes (glass electrode & flouride electrode); Numerical problems.

Batteries

Primary and secondary cells (lead-acid cell; Ni-Cd cell; lithium cells); Applications of batteries; Fuel cells – methanol – oxygen fuel cells, advantages of fuel cells; Solar cells - principle, and applications.

UNIT II

Corrosion and its control

Introduction; Causes and effects of corrosion; Different types of corrosion; Theories of corrosion – chemical, electrochemical corrosion (reactions); Factors affecting corrosion – nature of metal (galvanic series; over voltage; purity of metal; nature of oxide film; nature of corrosion product), and nature of environment (effect of temperature; effect of pH; humidity; effect of oxidant).

Corrosion control methods – cathodic protection, sacrificial anode, and impressed current cathode;

Surface coatings – methods of application on metals (hot dipping; galvanizing; tinning; cladding; electroplating), and organic surface coatings (paints - constituents and functions).

UNIT III

III a) Polymers

Introduction**;** Types of polymerization; Plastics - thermoplastic resins, and thermoset resins; Compounding & fabrication of plastics; Preparation, properties, and engineering applications of polyethylene, PVC, PS, Teflon, bakelite, nylon.

III b) Rubber

Natural rubber- processing, vulcanization; Elastomers (Buna-s; Butyl rubber; Thiokol rubbers); Fiber reinforced plastics (FRP) and their applications.

UNIT IV

Water

Introduction; Hardness - causes, expression of hardness, units, types of hardness, estimation of temporary & permanent hardness of water, and numerical problems; Boiler troubles – scale & sludge formation, caustic embrittlement, corrosion, priming & foaming; Softening of water (Internal & external treatment - lime soda, zeolite, ion exchange process, and numerical problems); Reverse osmosis and Electro dialysis (desalination processes).

UNIT V

Nanomaterials

Introduction; Preparation and applications of nanomaterials with special reference to carbon nanotubes.

Insulators

Classification of insulators; characteristics of thermal & electrical insulators and their applications; Superconductors - Nb-Sn alloy, $YBa_2 Cu_3 O_{7-x}$; Applications of superconductors.

TEXT BOOKS

1. Text Book of Engineering Chemistry *by* Y.Bharathi Kumari, Jyotsna Cherukuri; *Publisher: VGS Book Links*.
2. Engineering Chemistry *by* P.C.Jain & Monica Jain, *Publisher: Dhanpatrai Publishing Company*.

REFERENCES

1. Text Book of Engineering Chemistry by S.S. Dhara & Mukkanti; *Publisher: S.Chand & Co*.
2. Engineering Chemistry by O G Palanna
3. Text Book of Engineering Chemistry by R.Gopalan, D.Venkappayya, Sulochana Nagarajan; *Publisher: Vikas Publishers*.
4. Engineering Chemistry by R.P.Mani, S.N. Mishra, B.Rama Devi ,Cengage Learning Publications.

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I Year B.Tech ECE,EEE, EIE – II Sem	**L**	**T/P/D**	**C**
	3	**0**	**3**

(ITD1102) DATA STRUCTURES

Course Objectives

- To **teach** efficient storage mechanisms of data using files dynamically
- To **design** and implementation of various basic and advanced data structures.
- To **introduce** various techniques for representation of the data in the real world.
- To **develop** application using data structures.
- To **improve** the logical ability

Course Outcomes

After completion of the course the student is able to:

- Explore and analyze the working of linear data structures like list, stack and variations of queue in both static and dynamic implementation.
- Relate and demonstrate the application of linear data structures.
- Illustrate and Implement basic non linear data structures like trees, graphs and their operations.
- Identify and Implement basic and advanced comparison based sorting and searching techniques.

UNIT-1

Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, circular linked list implementation, Double linked list implementation, insertion, deletion and searching operations. Applications of linked lists.

UNIT – 2

Stacks-Operations, array and linked representations of stacks, stack applications-infix to postfix conversion, postfix expression evaluation, recursion implementation.

UNIT-3

Queues-operations, array and linked representations. Circular Queue operations, Dequeues, applications of queue.

UNIT-4

Trees – Definitions, Binary tree representation, Binary search tree, binary tree traversals.

Graphs – Definitions, Graph representations, Graph traversals.

UNIT-5

Searching and Sorting – Big O Notation, Sorting- selection sort, bubble sort, insertion sort, quick sort, merge sort,

Searching-linear and binary search methods.

TEXT BOOKS:

1. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Data Structures Using C (Paperback) by Aaron M. Tenenbaum

REFERENCES:

1. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI

3. C Programming & Data Structures, E. Balagurusamy, TMH.
4. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press
5. C& Data structures – E V Prasad and N B Venkateswarlu, S. Chand&Co.

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I Year B.Tech ECE,EEE, EIE – II Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(ECE1101) ELECTRONIC DEVICES AND CIRCUITS

Course Objectives

- To learn principle of operation, construction and characteristics of various electronic devices.
- To study operation and characteristics of Rectifiers with filters.
- To understand the analysis of small signal low frequency amplifiers.
- To provide the concepts involved in design of electronic Circuits.

Course Outcomes

After going through this course the student will be able to

- Understand the operation and characteristics of various electronic devices.
- Develop few applications of devices.
- Understand the importance of biasing and stabilization.
- Analyze small signal model for BJTand FETamplifiers

UNIT I

p-n Junction Diode and Applications : Review of Semi Conductor Materials, Theory of p-n Junction, p-n Junction as a Diode, Diode Equation, Volt-Ampere Characteristics, Temperature dependence of V-I characteristic, Ideal and Practical Diode Equivalent Circuits, Static and Dynamic Resistance levels , Transition and Diffusion Capacitances.

The p-n diode as a rectifier, Half wave Rectifier, Full wave rectifier, Bridge Rectifier, Harmonic components in a Rectifier Circuit, Inductor filters, Capacitor filters, L- Section Filters, Π- section filters, Comparison of Regulation Characteristics of different Filters, Breakdown Mechanisms in Semi Conductor Diodes, Zener Diode Characteristics, Shunt Voltage Regulation using Zener Diode. Principle of series voltage regulators.

UNIT II

Transistors, Biasing and Stabilization : The Bipolar Junction Transistor(BJT), Transistor Current Components, Transistor Construction, BJT Operation, Common Base, Common Emitter and Common Collector Configurations, Limits of Operation, Transistor as an Amplifier, BJT Specifications.

The DC and AC Load lines, Quiescent operating Point, Need for Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector-Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization Factors, Stabilization against variations in $V_{BE,}$ β_1 and I_{CO}. Bias Compensation using Diodes, Thermistors and Sensistors, Thermal Runway, Thermal Stability.

UNIT III

Small signal low frequency BJT Amplifiers: Small signal low frequency transistor amplifier circuits: h-parameter representation of a transistor, Analysis of single stage transistor amplifiers CE, CC, CB configurations using h-parameters: voltage gain, current gain, Input impedance and Output impedance. Comparison of CB, CE, CC configurations in terms of A_I, R_i, A_V, R_O.

UNIT IV

FET, Biasing and Amplifiers : Construction and operation of Junction Field Effect Transistor (JFET), Volt-Ampere characteristics - Drain and transfer Characteristics, FET as Voltage Variable Resistor, Biasing FET, The JFET Small Signal Model, FET Common Source Amplifier, Common Drain Amplifier, Constructionand operation of MOSFET , MOSFET Characteristics in Enhancement and Depletion modes. Comparison of BJT and FET amplifiers.

UNIT V

Special Purpose Electronic Devices : Principle of Operation and Characteristics of Tunnel Diode (with the help of Energy Band Diagram), Varactor Diode and schotky barrier diode. Principle of Operation and Characteristics of UJT, UJT Relaxation Oscillator. Principle of Operation of SCR, Schockley diode Diac and Triac. Principle of Operation of Semiconductor Photo Diode, PIN Diode ,Photo Transistor ,LED and LCD.

TEXT BOOKS

1. Electronic Devices and Circuits – J.Millman, C.C.Halkias, and Satyabratha Jit, Tata McGraw Hill, 2nd Edition, 2007.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, 11th Edition, 2006.
3. Electronic Devices and Circuits – David A Bell, Oxford University Press, 5th edition (2008)

REFERENCES

1. Integrated Electronics - J.Millman and Christos.C.Halkias, and Satyabratha, Jit Tata McGraw Hill, 2nd Edition, 2008.
2. Electronic Devices and Circuits – T.F. Bogart Jr., J.S.Beasley and G.Rico, Pearson Education, 6th Edition, 2004.
3. Electronic Devices and Circuits- S. S Salivahanan, N. Sursh Kumar, A. Vallava Raju,2nd Edition., TMH, 2010.

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I Year B.Tech ECE,EEE, EIE – II Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(ITD1202) DATA STRUCTURES LABORATORY

Course Objectives

- To **teach** efficient storage mechanisms of data using files dynamically
- To **design** and implementation of various basic and advanced data structures.
- To **introduce** various techniques for representation of the data in the real world.
- To **develop** application using data structures.
- To **improve** the logical ability

Course Outcomes

After completion of the course the student is able to:

- Explore and analyze the working of linear data structures like list, stack and variations of queue in both static and dynamic implementation.
- Relate and demonstrate the application of linear data structures.
- Illustrate and Implement basic non linear data structures like trees, graphs and their operations.
- Identify and Implement basic and advanced comparison based sorting and searching techniques.

WEEK1:

1. Write a program for creation, Search and Traversal of Single Linked List
2. Write a program to perform insertion and deletion operations in Single Linked List
3. Write a program to merge two single linked lists

WEEK2:

1. Write a program for creation, Search and Traversal of Circular Linked List
2. Write a program to perform insertion and deletion operations in Circular Linked List

WEEK 3:

1. Write a program for creation, Search and Traversal of Double Linked List
2. Write a program to perform insertion and deletion operations in Double Linked List

WEEK 4:

1. Write a program to implement stack using Arrays
2. Write a program to implement stack using Linked List

WEEK 5:

1. Write a program to convert infix expression to postfix expression using stack
2. Write a program to evaluate postfix expression

WEEK 6:

1. Programs using recursion
2. Write a program to convert infix expression to prefix expression using stack

WEEK 7:

1. Write a program to implement Linear queue using Array
2. Write a program to implement Linear queue using Linked List

WEEK 8:

1. Write a program to implement insertions and deletions in a circular Queue
2. Write a program to perform search and count operations in a circular queue

WEEK 9:

1. Write a program to implement insertions and deletions in a Dequeue
2. Write a program to perform search and count operations in Dequeue

WEEK 10: Midterm Exam

WEEK 11:

1. Write a program to implement Linear search
2. Write a program to implement Binary Search

WEEK 12:

1. Write a program to implement Selection sort
2. Write a program to implement Bubble sort
3. Write a program to implement Insertion sort

WEEK 13:

1. Write a program to implement Merge sort
2. Write a program to implement Quick sort

WEEK 14:

1. Implementation of a binary tree representation using Arrays
2. Write a program to implement tree traversals.

WEEK 15:

1. Implementation of a Graph representation using Adjacency Matrix
2. Write a program to implement graph traversals.

WEEK 16: Final Internal Lab Exam

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	0	**3**	**2**

(EPC1201) ENGINEERING PHYSICS AND ENGINEERING CHEMISTRY LABORATORY

Course Objectives

- To practically **learn** interaction of light with matter through physical phenomena
  like interference, diffraction and dispersion.
- To **understand** the periodic motion and formation of standing waves and to know the characteristics of the capacitors and resistors.
- To **compare** the experimental results with the class room learning.
- **Familiarize** the preparation of solutions and operation of instruments
- **Conduct** of experiment, collection and analyzing the data
- **Summarizing** the data and find the applicability of the experiment to common society

Course Outcomes

After completion of the course the student is able to:

- Demonstrate the optical phenomena with formation of Newton Rings, and formation of spectra with a grating and a prism.
- Illustrate periodic motion by measuring rigidity modulus of a material and formation of standing waves by Melde's apparatus and also discharging of a capacitor.
- Correlate the experimental results with the class room learning
- Understand the extent of hardness range present in a water sample and its consequences if used for various industrial operations.
- Determination of strength of solutions, pH of various solutions, lubricants usage in machinery to prevent wear and tear.
- Understanding the composition of soap used for washings.

Any Eight Experiments from the following:

1. Dispersive Power of the material of a Prism using Spectrometer
2. Diffraction Grating (both with Laser and non-laser source)
3. Single Slit with laser light
4. Newton's Rings
5. Finding thickness of a thin wire or sheet by forming a wedgeshaped film
6. Energy gap of a Semiconductor material
7. Torsional Pendulum Expt. to determine the rigidity modulus of material of a wire
8. Melde's experiment
9. Sonometer Experiment
10. Numerical Aperture and Acceptance angle of an optical fiber cable
11. Stewart Gee's experiment
12. Characteristics of LED.
13. Photo cell/ Solar Cell
14. AC frequency of sonometer method.
15. Attenuation and bending losses in opptical fiber.

Book: Essential Practical Lab Manual of Physics - P.Raghavendra Rao

ENGINEERING CHEMISTRY LABORATORY

LIST OF EXPERIMENTS:

1. Titrimetry

a) Estimation of hardness of water by EDTA method.

2. Instrumental methods

(i) Conductometry

a) Conductometric titration of strong acid Vs Strong base

(ii) Colorimetry

a) Estimation of copper by colorimetric method

(iii) Potentiometry

a) Titration of strong acid Vs Strong base by potentiometry

3. Physical properties

a) Determination of viscosity of sample oil by Redwood viscometer.

4. Preparation of organic compounds

a) Preparation of aspirin or Thiokol rubber

TEXT BOOKS:

1. Laboratory Manual on Engineering Chemistry - S.K.Bhasin and Sudha Rani,Dhanpat Rai Publishing Company.
2. Laboratory Manual on Engineering Chemistry - Y.Bharathi Kumari, Jyotsna Cherukuri, VGS Book Links, Vijayawada.

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I Year B.Tech ECE,EEE, EIE – II Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(ECE1201) ELECTRONIC DEVICES AND CIRCUITS LABORATORY

Course Objectives

- To **learn** principle of operation, construction and characteristics of various electronic devices.
- To **study** operation and characteristics of Rectifiers with filters.
- To **understand** the analysis of small signal low frequency amplifiers.
- To **provide** the concepts involved in design of electronic Circuits.

Course Outcomes

After completion of the course the student is able to:

- Understand the operation and characteristics of various electronic devices.
- Develop few applications of devices.
- Understand the importance of biasing and stabilization.
- Analyze small signal model for BJT and FET amplifiers.

Part A: (Only for viva-voce Examination)

ELECTRONIC WORKSHOP PRACTICE(in 3 lab sessions):

1. Identification, Specification, testing of R,L,C components (color codes), Potentiometers (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Board, PCB's
1. Identification, Specification, testing of Active devices : Diodes, BJT, Low power JFET's, MOSFET's, Power Transistors, LED's, LCD's, SCR, UJT.
2. Study and operation of :
   - Multimeters (Analog and Digital)
   - Function Generator

- Regulated Power Supplies
- CRO

Part B: (For Laboratory Examination – Minimum of 10 experiments)

1. Forward and Reverse Bias V-I characteristics of PN junction Diode.
2. Zener diode V-I characteristics and Zener diode as voltage regulator.
3. Half Wave, Full wave and Bridge Rectifier with and without filters.
4. Characteristics of a BJT under CE configuration and calculation of h-parameters.
5. Characteristics of a BJT under CC configuration and calculation of h-parameters.
6. Characteristics of a BJT under CB configuration and calculation of h-parameters.
7. FET characteristics under CS configuration.
8. Frequency response of CE Amplifier.
9. Frequency response of CC Amplifier.
10. Frequency response of CS FET Amplifier.
11. SCR characteristics.
12. UJT characteristics and Relaxation Oscillator.

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II Year B.Tech EIE– I Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(CED1105) ENVIRONMENTAL STUDIES

Course Objectives

- **Recognize** the importance of environment and ecosystem
- **Identify & Analyze** human activities and its impact on environment.
- **List and understand** about the importance of natural resources, Biodiversity & effect of environment pollution
- **Understand** about environmental regulations ,economy and environment interaction

Course Outcomes

After completion of the course the student is able to:

- Acquire the knowledge on environment
- Acquire the knowledge of various Natural Resources
- Develop skills in understanding of various environmental problems
- Develop skills to protect the Environment

UNIT-I

Introduction, Definition, scope and Importance

Ecosystems: Introduction, types, Classification of Eco system, structure and functions of ecosystems.

Bio-diversity and its conservation, Value of bio-diversity Bio-geographical classification of India – India as a mega diversity habitat, Threats to bio-diversity –Hot-spots of Bio Diversity, Conservation of bio-diversity.

UNIT-II

Natural Resources: Classification of Resources, Land resources, Land degradation, Soil erosion and desertification, Food resources, Effects of modern agriculture, fertilizer pesticide problems, Food miles, organic farming, Forest resources, Use and over-exploitation, Water resources, Dams –benefits, Conflicts over Water, Energy resources-sustainable Development, and Energy Audit

UNIT III

Environmental pollution and its control :Classification of pollution and pollutants, Air pollution, causes ,Effects ,Control measures, ambient air quality standards, water pollution causes , Effects ,Control measures, water and waste water treatment methods, water quality standards, Noise pollution causes ,Effects ,Control measures, land pollution causes ,Effects ,Control measures, solid waste disposal methods ,characteristics of e-waste and management

UNIT IV

Global Environmental problems and global Efforts: Nuclear hazards, Global warming, Acid rain, hurricanes, Hazardous Waste, Overpopulation , ozone layer depletion, Clean development mechanism , Green computing ,Green Building ,carbon credits, carbon trading International conventions/protocols: Earth summit, Kyoto protocol and Montreal protocol, Stockholm Declaration

UNIT V

Environmental Impact Assessment and Environmental Management plan: Definition of impact, Classification of Impacts, Prediction of Impacts and Impact assessment Methodologies, Environmental Impact Statement, Environmental Management plan: Technological Solutions

TEXT BOOKS

1. Introduction to Environmental Science by Y.Anjaneyulu, BS Publications
2. Text book of Environmental studies by Deeksha dave, Cengage publishers
3. Text book of Environmental studies by M.Anji Reddy, BS Publications

REFERENCES

1. Text book of Environmental studies by Anuba Kaushik & C P Kaushik, Newage International Pvt.Limited
2. Text book of Environmental studies by S V S Rana, Rastogi Publications
3. Text book of Environmental studies by Dr. K Raghavan Nambiar, Scitech Publishers

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II Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
	4	**1**	**4**

(MTH1105) APPLIED MATHEMATICS
(SPECIAL FUNCTIONS AND COMPLEX ANALYSIS)

Course Objectives

- **Compute** Fourier coefficients.
- **Distinguish** between Cauchy's integral theorem and Cauchy's integral formula.
- **Apply** Taylor's Series and Laurent series to expand complex functions.
- **Understand** the idea of a conformal mapping.

Course Outcomes:

After completion of the course the student is able to:

- Solve Second order D.E's with variable coefficients.
- Use the Cauchy Riemann equations to obtain the derivative of complex functions
- Use residues to evaluate contour integrals
- Calculate the image of the given curve under the given transformation.

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SPECIAL FUNCTIONS

UNIT I

Special functions

Series solutions of second order Ordinary Differential Equations , Regular point , Regular singular point, Frobineous Method ,Bessel functions properties. Recurrence relations, Orthogonality. Legendre polynomials , Properties, Rodrigue's formula, Recurrence relations and Orthogonal properties.

COMPLEX ANALYSIS

UNIT II

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

UNIT – III

Elementary functions and Integration of complex function

Exponential, trigonometric, hyperbolic functions and their properties. z^c and Logz, principal value. Line integral, evaluation along a path and by indefinite integration. Cauchy's integral theorem ,Cauchy's integral formula.

UNIT – IV

Power series and Residues

Radius of convergence , Expansion in Taylor's series, Maclaurin's series and Laurent series. Singular point, Isolated singular point, pole of order m , essential singularity. Residues – Evaluation of residue by formula and by Laurent Series, Residue theorem, Evaluation of integrals of the type (a) Improper real integrals (b) Integrals by indentation.

UNIT – V

Conformal mapping

Transformation of e^z , Inz, z^n, (n positive integer), Sin z, cos z, z + a/z. Translation, rotation, inversion. Bilinear transformation , fixed point , cross ratio , properties , invariance of circles , determination of bilinear transformation mapping three given points.

TEXT BOOKS:

1. Complex Analysis-Lars V.Ahlfors, 1979, International Edition, McGraw Hill.
2. Complex Variables & Its Applications- Churchill and Brown, (1996), International Edition, McGraw Hill.

REFERENCES

1. Advance Engineering Mathematics - Peter O'Neil,(2000),5th Edition, Cengage Learning
2. Schaum's Outline Of Complex Variables - Murray.R.Spiegel,(2011), 2nd Edition, Tata McGraw Hill.

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II Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(EEE1154) PRINCIPLES OF ELECTRICAL ENGINEERING

Course Objectives

- To **analyze** transient response of circuits with dc excitation
- To **understand** two port network parameters, filters and attenuators
- To **know** about performance of DC machines
- To **understand** the operation of transformers and AC machines

Course Outcomes

After completion of the course the student is able to:

- Analyze transient response of circuits
- Evaluate two port parameters and design simple filters
- Appreciate the working of DC machines
- Understand the operation of transformers and AC machines

Unit – I- Transient Analysis (First and Second Order Circuits)

Transient Response of RL, RC and RLC Circuits for DC excitations, Initial Conditions, Solution using Differential Equations approach and Laplace Transform Method.

Unit – II- Two Port Networks

Impedance Parameters, Admittance Parameters, Hybrid Parameters, Transmission (ABCD) Parameters, Conversion of one Parameter to another, Conditions for Reciprocity and Symmetry, Interconnection of Two Port networks in series, Parallel and Cascaded configurations, Image Parameters, Illustrative problems.

Unit – III- Filters and Symmetrical Attenuators

Classification of Filters, Classification of Pass band and Stop band, Characteristic Impedance in the Pass and Stop Bands, Constant-k and m-derived filters-Low Pass Filter and High Pass Filters (both qualitative and quantitative treatment); Band Pass filter and Band Elimination filters (quantitative treatment only), Illustrative Problems. Symmetrical Attenuators – T-Type Attenuator, p-Type Attenuator, Bridged T-type Attenuator, Lattice Attenuator.

Unit – IV- DC Machines

DC Generators

Principles of Operation of DC Machine, construction, EMF equation, Types of Generators, Magnetization, Internal and external Characteristics of DC Generators.

DC Motors

DC Motors, Types of Dc Motors, Characteristics of Dc Motors, Losses and Efficiency, Swinburne's Test, Speed Control of Dc Shunt Motor- Flux and Armature Voltage control methods.

Unit – V Transformers and AC Machines

Transformers and Their Performance

Principle of Operation of Single Phase transformer, Types, Constructional Features, Phasor Diagram on No Load and Load, Equivalent Circuit, Losses, Efficiency and Regulation of Transformer, OC and SC Tests, Predetermination of Efficiency and Regulation, Simple Problems.

AC Machines

Three Phase Induction Motor

Principle of operation of three phase induction motors - Slip ring and Squirrel cage motors – Slip-Torque characteristics.

Alternators

Principle of operation –Types - EMF Equation.

Text Books

1. Principles of Electrical Engineering- A.Sudhakar, Shyammohan S.Palli, TMH publications
2. Introduction to Electrical Engineering – M.S.Naidu and S. Kamakshaiah, TMH publications.
3. Network analysis and Synthesis- C L Wadhwa, New Age International Publishers.

Reference Books

1. Networks, Lines, and Fields – John.D.Ryder, PHI publications.
2. Engineering Circuit Analysis – W.H.Hayt and J.E Kemmerly and S.M.Durbin, TMH publications.
3. Circuit Theory by Chakrabarti, Dhanpat Rai and Co.
4. Network Analysis – N.C.Jagan and C.Lakshmi Narayana, BS publications.
5. Network Analysis – A.Sudhakar, Shyammohan S.Palli, TMH publications.

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II Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
	4	**1**	**4**

(EIE1101) SIGNALS AND SYSTEMS

Course Objectives

Student will be able to

- **Understand** various fundamental characteristics of signals and systems.
- **Study** the importance of transform domain.
- **Analyze** and design various systems.
- **Study** the effects of sampling.

Course Outcomes

After completion of the course the student is able to:

- Design solutions for complex input signals
- Analyze statistical parameters of a given signal.
- Apply the knowledge in modeling of LTI systems
- Create new systems

UNIT – I

Representation of Signals: Continuous signals, Classification of Signals – Periodic and aperiodic, even and odd, energy and power signals, deterministic and random signals, complex exponential and sinusoidal signals. Concepts of Impulse function, Unit step function, Signum function. Various Operations on Signals.

Signal Analysis : Analogy between vectors and signals, Orthogonal signal space, Signal approximation using orthogonal functions, Mean square error,

Closed or complete set of orthogonal functions, Orthogonality in complex functions

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, Gibb's Phenomenon.

Fourier Transforms : Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signals, Fourier transform of standard signals, Fourier transform of periodic signals, properties of Fourier transforms, Fourier transforms involving impulse function and Signum function.

UNIT – III

Laplace Transforms: Concept of region of convergence (ROC) for Laplace transforms. Properties of ROC. Relation between Laplace Transforms and Fourier transform of a signal. Introduction to Hilbert Transform.

Signal Transmission through Linear Systems: Classification of Continuous time and discrete time Systems, impulse response, Response of a linear 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 Paley -Wiener criterion for physical realization, relationship between bandwidth and rise time.

UNIT – IV

Convolution and Correlation of Signals : Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Properties of Convolution, Concepts of correlation, properties of correlation.

Relation between convolution and correlation, Detection of periodic signals in the presence of noise by correlation, Extraction of signal from noise by filtering.

UNIT – V

Representation of discrete time signals. Classification of Signals, Properties of discrete time complex exponential signals

Sampling Theorem: Representation of continuous time signals by its samples - Sampling theorem – Reconstruction of a Signal from its samples, aliasing – discrete time processing of continuous time signals, sampling of band pass signals.

Z –Transforms: Basic principles of z-transform, region of convergence, properties of ROC, Properties of z-transform ,Poles and Zeros. Inverse z-transform using Contour integration, Residue Theorem, Power Series expansion and Partial fraction expansion. Distinction among Fourier transform, Laplace Transform and Z - Transforms.

TEXT BOOKS

1. Signals, Systems and Communications - B.P. Lathi, BS Publications, 2009.
2. Signals and Systems – Alan V.Oppenheim, Alan S.Willsky and S.Hamid Nawab,2nd Edition, PHI.

REFERENCES

1. Signals and Systems- A.Anand Kumar, 2nd Edition, PHI ,2012
2. Signals and Systems -Simon Haykin and Barry Van Veen, 2nd Edition, John Wiley.
3. Signals and Systems- Cengage Learning, Narayana Iyer, 2011.
4. Signals, Systems and Transforms –C.L.Philips,J.M Parr and Eve A. Riskin,3rd Edition, Pearson, 2004 .
5. Signals and Systems Schaum's Outlines - HWEI P. HSU , Tata Mc Graw Hill, 2004.

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II Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(EIE1102) Sensors and Signal Conditioning

Course Objectives

- To **provide** basic knowledge in transduction principles, sensors and transducer technology and measurement systems.
- To **provide** better familiarity with the Theoretical and Practical concepts of Transducers.
- To **provide** familiarity with different sensors and their application in real life.
- To **provide** the knowledge of various measurement methods of physical parameters like velocity, acceleration, torque, pressure, flow, temperature etc. and their relevance to Industry.

Course Outcomes

After completion of the course the student is able to:

- Able to identify suitable sensors and transducers for real time applications.
- Able to translate theoretical concepts into working models.
- Able to design the experimental applications to engineering modules and practices.
- Design engineering solution to the Industry/Society needs and develop products.

Unit I :

Introduction to measurement systems: general concepts and terminology, measurement systems, sensor classifications, general input-output configuration, methods of correction, **performance characteristics:** static characteristics of measurement systems, accuracy, precision, sensitivity, other characteristics: linearity, measurement resolution, systematic errors, random

errors, dynamic characteristics of measurement systems: zero-order, first-order, and second-order measurement systems and response.

Unit II :

Resistive Sensors : Potentiometers, Strain Gages, Resistive Temperature Detectors (RTDs) Thermistors, Light-dependent Resistors (LDRs), Resistive Hygrometers, **Capacitive Sensors:** Variable capacitor, Differential capacitor, Proximity sensor and its application in homeland security system. Introduction to touch screen sensors: Capacitive and Resistive. **Inductive Sensors:** Reluctance variation sensors, Eddy current sensors, Linear variable differential transformers (LVDTs), **Variable transformers :** Synchros, resolvers, inductosync, magneto elastic sensors, electromagnetic sensors-sensors based on faraday's law, hall effect sensors.

Unit III :

Self-generating sensors: Thermoelectric sensors-Thermocouples, thermo electric effects, common thermocouples, practical thermocouple laws, cold junction compensation in thermocouples circuits, **piezoelectric-sensors-**the piezoelectric effect, piezoelectric materials, applications, **pyroelectric sensors-** the pyroelectric effect, pyroelectric materials, radiation laws: Plank, wein and Stefan-Boltzmann, Applications, **photovoltaic sensors-**The photovoltaic effect, materials and applications, electrochemical sensors, electrochemical sensors.

Unit IV :

Digital and other Sensors: Position Encoders, Incremental position encoders, absoluted position encoders, Variable frequency sensors-Quartz digital thermometers, vibrating wire strain gages, vibrating cylinder sensors, SAW sensors, Digital flowmeters. Sensors based on MOSFET Transistors, Charge coupled Sensors, Ultrasonic based Sensors, Fiber Optic Sensors. pH sensor, conductivity sensor, dissolved oxygen sensor, fiber optic sensor.

Unit V:

Signal conditioning: Voltage dividers: Potentiometers, Wheatstone Bridge and linearization of resistive bridge sensor, Electrostatic shield, Transistorized

chopper, Capacitive Modulator, Noise elimination: HPF, LPF, B.P, B.E using RC Components.

Introduction to Resolver-to-digital Converters and Digital-to-resolver converters- Synchro-to-resolver converters, Digital-to-resolver converters, Resolver-to-digital Converters.

Text Books:

1. Sensors and Signal Conditioning, Ramon Pallas-Areny, John G.Webster,2nd Edition
2. Sensors and Transducers: D.Patranabis, TMH 2003

Reference:

1. Sensor Technology Hand Book – Jon Wilson, Newne 2004.
2. Instrument Transducers – An Introduction to their Performance and design – by Herman K.P.Neubrat, Oxford University Press.
3. Measurement system: Applications and Design – by E.O.Doeblin, McGraw Hill Publications.
4. Process Control Instrumentation Technology – D. Johnson, John Wiley and sons.
5. Electronic Instrumentation by H.S.Kalsi.

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II Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
	4	**1**	**4**

(ECE1103) ELECTRONIC CIRCUIT ANALYSIS

Course Objectives

- **To explain** the operation, design and Analysis of multistage amplifiersusing BJT and MOSFET.
- **To design** high frequency BJT amplifiers and analysis of MOS amplifiers.
- **To understand** the concepts of feedback amplifiers and Oscillators
- **To design** large signal and tuned amplifiers.

Course Outcomes

After completion of the course the student is able to:

- Apply the knowledge of BJTs to design and analyze practical amplifier circuits
- Design and analyze electronic subsystems such as feedback amplifiers and oscillators
- Design and analyze Class A or B power amplifiers for specific applications
- Design and analyze tuned amplifiers to design practical amplifier circuits

UNIT I

Multistage Amplifiers

Introduction, Methods of inter-stage coupling, *n*-stage cascaded amplifier, Equivalent circuits, Miller's Theorem, Frequency effects, Amplifier analysis, High input resistance Transistor Circuits, Darlington Pair, CE- CC amplifier, Cascode amplifier, Two-stage RC-coupled JFET amplifier (in Common Source configuration), Difference Amplifier.

UNIT II

BJT Frequency Response of Amplifiers

Frequency response of BJT amplifier, Analysis at low and high frequencies, Effect of coupling and bypass capacitors, Hybrid-π Common Emitter transistor model, CE short circuit gain, CE current gain with resistive load, Single-stage CE transistor amplifier response, Gain-Bandwidth Product, Emitter follower at higher frequencies.

MOS Amplifiers

Basic Concepts, MOS 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 III

Feedback Amplifiers and Oscillators

Concept of feedback, Classification of feedback amplifiers, general characteristics of negative feedback amplifiers, Effect of feedback on amplifier characteristics, voltage series, voltage shunt, current series and current shunt feedback configurations, Illustrative problems.

Classification of oscillators, Conditions for oscillations, RC phase shift oscillator, Wien bridge oscillator, Generalized analysis of LC oscillators – Hartley and Colpitts oscillators, Piezoelectric crystal oscillator, Stability of oscillators.

UNIT IV

Power Amplifiers

Classification of power amplifiers, Class A large-signal amplifiers, Series-fed and transformer-coupled Class A audio power amplifier, Efficiency of Class A

amplifier , Class B amplifier, Transformer-coupled Class B push-pull amplifier, Complementary-symmetry Class B push-pull amplifier, Efficiency of Class B amplifier, Distortion in power amplifiers, Thermal stability and Heat sinks

UNIT V

Tuned Amplifiers

Introduction, Small signal single tuned amplifiers, Double-tuned amplifiers , Effect of cascading single and double tuned amplifiers on bandwidth, Stagger-tuned amplifiers, Class-C tuned amplifiers.

Power supply requirements, Introduction and classification of Power Supplies.

TEXT BOOKS

1. **Integrated Electronics** - Jacob Millman and Christos C. Halkias, , *Tata McGraw-Hill Education*, 2008.

2. **Electronic Circuit Analysis** - S. Salivahanan, N. Suresh Kumar, , Tata McGraw-Hill Education, 2nd edition, 2012.

3. **Design of Analog CMOS Integrated Circuits** - Behzad Razavi, Tata McGraw-Hill Education , 2008.

REFERENCE BOOKS

1. **Electronic Devices and Circuit Theory -** Robert L.Boysted , Louis Nashelisky, *Pearson Education* , 9th edition, 2008. (ISBN: 978-81-219-2450-4)
2. **Introductory Electronic Devices and Circuits**, Robert T. Paynter, *Pearson Education*, 7th edition, 2010.

3. **Micro Electronic Circuits** – Sedra and Smith, Oxford University Press, 5th edition, 2009.

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II Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(EEE1252) ELECTRICAL ENGINEERING LABORATORY

Course Objectives

- To verify the theoretical concepts of KVL and KCL experimentally
- To study the transient behavior of RLC networks practically
- To verify the network theorems experimentally
- To determine the performance and efficiency / regulation of electrical machines experimentally (under various operating conditions)

Course Outcomes

After completion of the course the student is able to:

- Analyze transient response of circuits
- Evaluate two port parameters and design simple filters
- Appreciate the working of DC machines
- Understand the operation of transformers and AC machines.

PART- A

1. Verification of KVL and KCL.
2. Series and Parallel Resonance – Timing, Resonant frequency, Bandwidth and Q-factor determination for RLC network.
3. Time response of first order RC/RL network for periodic non-sinusoidal inputs time constant and steady state error determination.
4. Two port network parameters –Z and Y-parameters
5. Two port network parameters – ABCD and h-parameters

6. Verification of Superposition and Reciprocity theorems.
7. Verification of maximum power transfer theorem. Verification on DC and AC Excitation with resistive and Reactive loads.
8. Experimental determination of Thevenin's and Norton's equivalent circuits and verification by direct test.
9. Constant –k Low Pass Filter and High Pass Filter- Design and Test.

PART- B

1. Magnetization characteristics of D.C 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. OC and Sc tests on Single-phase transformer (Predetermination of efficiency and regulation at given power factors and determination of equivalent circuit).
5. Load Test on single Phase Transformer.
6. Speed Control of DC shunt Motor – flux and armature voltage control methods.

Note: Any 10 of the above experiments 5 from each part to be conducted.

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II Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(ECE1203) ELECTRONIC CIRCUIT ANALYSIS LABORATORY

Course Objectives:

- To **design and simulate** various BJT and FET Voltage and Power amplifiers.
- To **design and simulate** various BJT Feedback amplifiers.
- To **design and simulate** various BJT Oscillators.

Course Outcomes:

After completion of the course the student is able to:

- Apply the concepts of amplifiers in the design of Public Addressing System
- Generate Sinusoidal wave forms
- Design stable system using feedback concepts.
- Design Class C tuned amplifier.

Design and simulation of the following circuits using simulation software and implementation through hardware.

1. Common Emitter Amplifier with & without emitter bypass capacitor.
2. Common source Amplifier.
3. Two stage RC coupled BJT Amplifier.
4. Darlington pair.
5. Current shunt and voltage series feedback amplifier.
6. Cascode amplifier.
7. Wien bridge Oscillator using transistors
8. RC phase shift Oscillator using transistors.

9. Hartley and colpitt'sOscillator using transistors .
10. Class A power Amplifier(Transformer less and with transformer load).
11. Class B Complementary Symmetry Amplifier.
12. Class C power Amplifier.
13. MOS Amplifier.

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II Year B.Tech EIE – II SEM	**L**	**T/P/D**	**C**
	3	**1**	**3**

(ITD1105) OBJECT ORIENTED PROGRAMMING

Course Objectives:

- **Understand** fundamental concepts and constructs of Java
- **Implement** Different object-oriented Concepts in Java.
- **Develop** the concepts of Multi-Threading and IO-Streams
- **Construct** GUI models.

Course Outcomes:

After completion of the course the student is able to:

- Understand the concept and underlying principles of Object Oriented Programming
- Discuss how object oriented concepts are incorporated into the Java programming
- Design and develop UI applications using AWT and to understand the event based GUI handling principles
- Relate JDBC APIs to Java applications for operations on database

UNIT I

Introduction to Java

Introduction: Creation of Java, Java buzzwords, OOP Principles, Encapsulation, Inheritance and Polymorphism,

Classes and Objects: Creatingand usage objects, introducing methods,constructors, usage of static with data and methods, usage of final with data, access control, this key word, garbage collection, overloading methods and constructors, parameter passing, recursion, nested classes and inner classes, String Handling

UNIT-II

Inheritance, Packages and Interfaces

Basic concepts, member access rules, usage of super key word, forms of inheritance, method overriding, abstract classes, dynamic method dispatch, using final with inheritance, the Object class.

Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT-III

Exception Handling and Multithreading

Concepts of Exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, Built-in exceptions, creating own exception sub classes, Concepts of Multithreading, differences between process and thread, thread life cycle,creating multiple threads using Thread class, Runnable interface, Synchronization, thread priorities, inter thread communication, daemon threads,deadlocks, thread groups.

UNIT-IV

Event Handling, AWT Controls

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

AWT : Concepts of components, container, panel, window, frame, canvas, Font class, Color class and Graphics, AWT Controls.

Applets - Concepts of Applets, differences between applets and applications,life cycle of an applet, types of applets, creating applets, passing parameters to applets.

UNIT-V

Networking, Java Library, JDBC

Networking: Inetaddress, TCP/IP sockets, Datagrams, URL, URL connection, String handling, java.util, java.io and java.net packages.
JDBC: Different type of Drivers, Connection establishment, Retrieving and manipulation data from client and storing in data base.

Java Library: explore io, util, net, lang, sql, awt packages.

Introduction to Java APIs: what is API, discuss APIs in Java SS, Java EE, Java ME

TEXT BOOKS

1. The Complete Reference Java J2SE 5th Edition, Herbert Schildt, TMH Publishing Company Ltd, NewDelhi.
2. Big Java 2nd Edition, Cay Horstmann, John Wiley and Sons.

REFERENCES

1. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI
2. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
3. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
4. Beginning in Java 2, Iver Horton, Wrox Publications.
5. Java, Somasundaram, Jaico.
6. Java Networking and AWT API Super Bible, Natraj Nagaratnam, Brian Masco, Arvind Srinivasan, White Group Press

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II Year B.Tech EIE – II Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(EEE1105) CONTROL SYSTEMS

Course Objectives

- To **understand** the different ways of system representations such as Transfer function representation and state space representations and Should able to assess the system dynamic response
- To **assess** the system performance using time domain analysis and should know how to improve it
- To **assess** the system performance using frequency domain analysis and should know how to improve it
- To **design** various controllers and compensators to improve system performance

Course outcomes

After completion of the course the student is able to:

- know how to improve the system performance by selecting a suitable controller and/or compensator for a specific application
- Apply various time domain and frequency domain techniques to assess the system performance
- Apply various control strategies to different applications (example: Power systems, electrical drives etc…)

Test system Controllability and Observability using state space representation and applications of state space representation to various systems**UNIT – I**

INTRODUCTION

Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback.

Mathematical models – Differential equations, Impulse Response and transfer functions - Translational and Rotational mechanical systems

UNIT II

TRANSFER FUNCTION REPRESENTATION AND TIME RESPONSE ANALYSIS

Transfer Function of DC Servo motor - AC Servo motor- Synchro transmitter and Receiver, Block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by Signal flow graph - Reduction using Mason's gain formula.

Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems.

UNIT –III

STABILITY ANALYSIS IN S-DOMAIN

The concept of stability – Routh's stability criterion – qualitative stability and conditional stability – limitations of Routh's stability.

ROOT LOCUS TECHNIQUE

The root locus concept - construction of root loci-effects of adding poles and zeros to G(s) H(s) on the root loci.

UNIT – IV

FREQUENCY RESPONSE AND STABILITY ANALYSIS IN FREQUENCY DOMAIN

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. Polar Plots-Nyquist Plots-Stability Analysis.

UNIT – V

CLASSICAL CONTROL DESIGN TECHNIQUES AND STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS

Compensation techniques – Lag, Lead, Lead-Lag Controllers design in frequency Domain, PID Controllers.

Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and it's Properties – Concepts of Controllability and Observability.

TEXT BOOKS

1. Control Systems Engineering by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.
2. Automatic Control Systems 8th edition by B. C. Kuo 2003– John wiley and son's.,

REFERENCES

1. Modern Control Engineering by Katsuhiko Ogata, Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.
2. Control Systems by N.K.Sinha, New Age International (P) Limited Publishers, 3rd Edition, 1998.
3. Control Systems Engineering. by NISE, John wiley, 3rd Edition.

4. Modelling and Control Of Dynamic Systems by Narciso F. Macia George J. Thaler, Thomson Publishers.
5. Modern control system theory by M.Gopal, New age international publishers, Revised second edition.

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II Year B.Tech EIE – II Sem	**L**	**T/P/D**	**C**
	4	**0**	**4**

(EIE1103) Electronic Measurements

Course Outcomes:

Course Objectives

- **Understand** different measurement methods and errors associated with them.
- **Know** the different standards and calibration methodologies adopted in the measurement systems
- **Know** different AC and DC bridges for the measurement of R, L and C.
- **Know** different types of Oscilloscopes and Analyzers (Analog and Digital).
- **Acquire** clear concepts about the DC and AC voltage and current measurements

Course Outcomes

After completion of the course the student is able to:

- The students will be able to understand the different methods of measurement.
- The students will be able to calibrate different instruments.
- The students are able to know the unknown values of R,L and C through bridge circuits.
- The students are able to display the waveforms in an oscilloscope and measure the parameters of any input signal.

UNIT – I

Introduction to measurements. Physical measurement. Forms and methods of measurements. Measurement errors. Statistical analysis of measurement data. Probability of errors. Limiting errors.

Standards. Definition of standard units. International standards. Primary standards. Secondary standards. Working standards. Voltage standard. Resistance standard. Current standard. Capacitance standard. Time and frequency standards.

UNIT – II

Testing and calibration. Traceability. Measurement reliability. Calibration experiment and evaluation of results. Primary calibration. Secondary calibration. Direct calibration. Indirect calibration. Routine calibration. Calibration of a voltmeter, ammeter and an oscilloscope: case study.

UNIT – III

Voltage and current measurements: DC & AC voltage measurements using Rectifier, Thermocouple & Electronic voltmeters, Ohm meter, Digital Voltmeters, Range Extension of Ammeters & Voltmeter

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 – IV

Bridges: AC Bridges – measurement of inductance:- Maxwell's bridge, Anderson bridge, Hays Bridge measurement of capacitance:-Schering bridge, measurement of impedance: – Kelvin's bridge, Wheat Stone bridge, HF bridges, problems of shielding, and grounding, Q-meter.

UNIT – V

Oscilloscopes: CRO operation, CRT characteristics, probes, Time base sweep modes, Trigger generator, Vertical amplifier, modes of operation, A, B, alternate & chop modes, sampling oscilloscopes, storage oscilloscope, Standard specifications of CRO, Synchronous selector circuits.

Analyzers: Spectrum analyzers, Different types of spectrum analyzer, Recorders. Display Devices and Display Systems, Logic Analyzers – State & time referenced data capture. Scalar and Vector network analyzers.

Text Books

1. Electronic Instrumentation – HS Kalsi, Tata Mc Graw Hill, 2004..
2. Electronic Instrumentation and measurements techniques by Helfrick and W.D.Cooper.,PHI publications.

References

1. Principles of measurement systems, John P. Bentley: 3rd edition, Addison Wesley Longman, 2000.
2. Measuring Systems, Application and Design : E.O. Doebelin, McGraw Hill.
3. Electrical and Electronic Measurements : Shawney, Khanna Publ.
4. Electronic Instrumentation and measurements : David A. Bell, 2nd Edition,PHI, 2003.
5. Electronic instruments and instrumentation Technology, M.M.S. Anand: Prentice-Hall of India,2004.

Subject Practice: EDA tools.

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II Year B.Tech EIE – II Sem	**L**	**T/P/D**	**C**
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(EIE1104) PULSE AND DIGITAL CIRCUITS

Course Objectives

- To **provide** knowledge of Pulse and Wave shaping circuits.
- To **analyze** and **design** BJT switching circuits
- To **Analyze** and **Design** the Sweep generators for various applications.
- To **Analyze** and **Design** of the logic gates and sampling gates using discrete components.

Course Outcomes

After completion of the course the student is able to:

- Design linear and nonlinear wave shaping circuits.
- Apply the fundamental concepts of wave shaping circuits for various switching and logic circuits
- Design the time base circuits for various applications
- Design the sampling gates for various applications

UNIT I

LINEAR WAVESHAPING

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

UNIT II

NON-LINEAR WAVE SHAPING

Diode clippers, Transistor clippers, clipping at two independent levels, Transfer characteristics of clippers, Emitter coupled clipper, Comparators, applications of voltage comparators, clamping operation, clamping circuits using diode with different inputs, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage.

UNITIII

SWITCHING CHARACTERISTICS OF DEVICES

Diode as a switch, piecewise linear diode characteristics, Transistor as a switch, Break down voltage consideration of transistor, saturation parameters of Transistor and their variation with temperature, transistor-switching times.

MULTIVIBRATORS

Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using transistors.

UNIT IV

TIME BASE GENERATORS

General features of a time base signal, methods of generating time base waveform, Miller and Bootstrap time base generators – basic principles, Transistor miller time base generator, Transistor Bootstrap time base generator, Current time base generators.

SYNCHRONIZATION AND FREQUENCY DIVISION

Principles of Synchronization, Pulse synchronization of Relaxation devices, Frequency division in sweep circuits, astable relaxation circuits, Synchronization of a sweep circuit with symmetrical signals.

UNIT V

SAMPLING GATES

Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates, Reduction of pedestal in gate circuits, Applications of sampling gates.

LOGIC GATES

Relaxation of logic gates Using Diodes and Transistors: AND, OR and NOT gates using Diodes, Resistor, Transistor Logic and Diode Transistor Logic.

TEXT BOOKS

1. Pulse, Digital and Switching Waveforms J. Millman and H. Taub, McGraw-Hill, 1991.
2. Pulse and Digital Circuits – A. Anand Kumar, PHI.

REFERENCES

1. Pulse and Digital circuits – M.S. Prakash Rao, Mc. Graw Hill

2. Solid State Pulse circuits - David A. Bell, PHI, 4th Edn.., 2002 .
3. Wave Generation and Shaping L. Strauss.
4. Pulse, Digital Circuits and Computer Fundamentals - R.Venkataraman.

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II Year B.Tech EIE – II Sem	**L**	**T/P/D**	**C**
	4	**0**	**4**

(ECE1150) PRINCIPLES OF COMMUNICATIONS

Course Objective:

- To make students **understand** different types of communication.
- To make students **understand** different modulation technique
- To make students **understand** basics of wireless communications.
- To make students **understand** basics of cellular communications.

Course Outcome:

After completion of the course the student is able to:

- Appreciate the techniques used for signal manipulation and communications
- Appreciate the need for PPM,PWM, Multiplexing
- Appreciate different modulation and coding techniques.

UNIT I

Introduction : Block diagram of Electrical communication system, Radio communication : Typesof communications, Analog, pulse and digital Types of signals, Fourier Transform for various signals, Fourier Spectrum, Power spectral density, Autocorrelation, correlation, convolution.

UNIT II

Amplitude Modulation : Need for modulation, Types of Amplitude modulation, AM, DSB SC,SSB SC, Power and BW requirements, generation of AM, DSB SC, SSB SC, Demodulation of AM : Diode detector, Product demodulation for DSB SC & SSB SC.

Angle Modulation : Frequency & Phase modulations, advantages of FM over AM, Bandwidth consideration, Narrow band and Wide band FM, Comparison of FM & PM.

UNIT III

Pulse Modulations : Sampling, Nyquist rate of sampling, Sampling theorem for Band limited signals, PAM, regeneration of base band signal, PWM and PPM, Time Divison Multiplexing, Frequency Divison Multiplexing, Asynchronous Multiplexing.

UNIT IV

Digital Communication : Advantages, Block diagram of PCM, Quantization, effect of quantization, quantization error, Base band digital signal, DM, ADM, ADPCM and comparison.

Digital Modulation : ASK, FSK, PSK, DPSK, QPSK demodulation, offset and non-offset QPSK, coherent and incoherent reception, Modems.

UNIT V

Information Theory : Concept of information, rate of information and entropy, Source coding for optimum rate of information, Coding efficiency, Shanon-Fano and Huffman coding.

Error control coding : Introduction, Error detection and correction codes, block codes, convolution codes,Error measurements for Channel efficiency-Bit Error Rates(BER)

Text Books

1. Communication Systems Analog and Digital – R.P. Singh and SD Sapre, TMH, 20th reprint, 2004.
2. Principles of Communications – H. Taub and D. Schilling, TMH, 2003.

References

1. Electronic Communication Systems – Kennedy and Davis, TMH, 4th edition, 2004.
2. Communication Systems Engineering – John. G. Proakis and Masoud Salehi, PHI, 2ndEd. 2004.

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	4	**0**	**4**

(ECE1104) SWITCHING THEORY AND LOGIC DESIGN

Course Objectives

- To **understand** the concepts of number systems, codes and design of various combinational and synchronous sequential circuits
- To **learn** various methods to minimize the Boolean expressions for reducing the number of gates and cost
- To **realize** logic networks, digital computers using PROM, PLA, PAL devices.
- To **design** state machines and ASM charts

Course Outcomes

After completion of the course the student is able to:

- Use the concepts of Boolean Algebra for the analysis and various number systems for digital data representations
- Design combinational and sequential circuits
- Implement designs on PLDs
- Design ASM charts for digital systems

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.

BOOLEAN ALGEBRA: Fundamental postulates of Boolean Algebra - Basic theorems and properties

UNIT II

SWITCHING FUNCTIONS: Canonical and Standard forms-Algebraic simplification , Digital logic gates, properties of XOR gates –universal gates-Multilevel NAND/NOR realizations.

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 III

COMBINATIONAL LOGIC DESIGN: Design using conventional logic gates, Encoder, Decoder, Multiplexer, De-Multiplexer, Modular design using IC chips, MUX Realization of switching functions Parity bit generator, Code-converters, Hazards and hazard free realizations.

PROGRAMMABLE LOGIC DEVICES: Basic PLD's-ROM, PROM, PLA, PLD Realization of Switching functions using PLD's.

UNIT IV

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 modulo-N Ring & Shift counters, Serial binary adder,sequence detector.

UNIT V

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. Introduction to ASM charts, simple examples, system Design using data path and control subsystems , ASM charts for Flip Flops and Binary multiplier

TEXTBOOKS

1. Switching & Finite Automata theory – Zvi Kohavi, TMH,2nd Edition.
2. Digital Design – Morris Mano, PHI, 3rd Edition, 2006.

REFERENCES

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

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II Year B.Tech EIE – II Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(EIE1202) PULSE AND DIGITAL CIRCUITS LABORATORY

Course Objectives

- To **demonstrate** the various wave shaping circuits
- To **demonstrate** generation of various non-sinusoidal waveforms.
- To **demonstrate** functionality of various logic gates.
- To **analyze** dynamic response of electronic switch

Course Outcomes

After completion of the course the student is able to:

- Design linear and non linear wave shaping circuits .
- Generate various wave forms such as Square, Pulse and Sweep
- Design electronic switch.
- Design simple applications such as counters of flipflops

List of Experiments:

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

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II Year B.Tech EIE – II Sem	L	T/P/D	C
	0	3	2

(EIE1201) Transducers and Measurements Laboratory

Course Objectives

- To make student **acquire** hands on experience in active and passive sensors/transducers.
- To make students **understand** different signal conditioners
- To make students **design** basic measuring devices like bridges

Course Outcomes

After completion of the course the student is able to:

- Appreciate the use of sensors
- Identify the sensors required for any specific application.
- Design and develop a simple measuring devices employing appropriate sensors.
- Able to measure Resistance, Capacitance and Inductance values using various devices.

1. Measurement of Load using Strain Gauge bridge
2. Measurement of Temperature using Thermistor, RTD and Thermocouple
3. Measurement of Displacement using LVDT, use of LVDT for Capacitance measurement
4. Measurement of L,C and R using Bridges and comparing them with Q-Meter
5. Extension of range of DC Ammeter, converting it into Voltmeter
6. Extension of range of AC Voltmeter, converting it into Ammeter
7. Construction of Series and Shunt type Ohm meters using PMMC

8. Measurement of Resistance using Wheatstone Bridge / Kelvin Bridge
9. Measurement of Capacitance using Schering's Bridge
10. Measurement of Inductance using Maxwell's Bridge
11. Characteristics of Opto-Electric Transducers (Photo Transistor, Photo Diode and LDR)
12. Pressure measurement through Bourdon Tube
13. Radiation and optical Pyrometers
14. Characteristics of pH sensors
15. Characteristics of Conductivity sensors.
16. Characteristics of DO sensors

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II Year B.Tech EIE – II Sem

(NCC1101) HUMAN VALUES & PROFESSIONAL ETHICS

Course Objectives:

1. To create an awareness on Engineering Ethics and Human Values.
2. To study the moral issues and decisions confronting individuals and organizations engaged in engineering profession.
3. To study the related issues about the moral ideals, character, policies, and relationships of people and corporations involved in technological activity.

Course Outcomes:

1. Students learn the moral issues and problems in engineering; find the solution to those problems.
2. Students learn the need for professional ethics, codes of ethics and roles, concept of safety, risk assessment.
3. Students gain exposure to Environment Ethics & computer ethics; know their responsibilities and rights
4. Student create products that has societal impact

Syllabus

1. Self-confidence
2. Peer Pressure-Irregular life style
3. The Power of Self- determination
4. Human relationship—trust and respect- resolving conflict
5. Anger-A sign of helplessness
6. Interaction and ragging
7. Right Utilization of physical facilities
8. Unhappiness -Unfulfilled expectations
9. Setting goals- long term and short term goals-handling responsibilities
10. Dealing with people while coordinating work
11. Coping with stress-Identifying one's interests and strengths

12. Time Management-Planning and aligning with one's goals
13. Skills and Values
14. The role of values in Society

Course Book

The resource material that has been prepared by IIIT can be used apart from material that is available in the websites. Later text books can be identified for the facility of the students.

Evaluation

This course would only have a pass/ fail grade. Participation in discussions, submission of assignments and weekly reports and a final report will be used in evaluation.

TEXT BOOKS

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

REFERENCES

1. Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall, New Jersey, 2004 (Indian Reprint now available).
2. Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics–Concepts and Cases", Wadsworth Thompson Leatning, United States, 2000 (Indian Reprint now available)
3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003.

4. Edmund G Seebauer and Robert L Barry, “Fundamentals of Ethics for Scientists and Engineers”, Oxford University Press, Oxford, 2001.
5. Naagarazan, R.S. ‘A Textbook on Professional Ethics and Human Values’ 2006.
4. Edmund G Seebauer and Robert L Barry, “Fundamentals of Ethics for Scientists and Engineers”, Oxford University Press, Oxford, 2001.
5. Naagarazan, R.S. ‘A Textbook on Professional Ethics and Human Values’ 2006.

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III Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
	4	**0**	**4**

(CMS1101) BUSINESS ECONOMICS AND FINANCIAL ANALYSIS

Course Objectives

- To **explain** different forms of organizing private and public sector business enterprises and to analyze the significance of Business Economics in solving the problems of business enterprise. Also to define and analyze the concepts of Demand, Elasticity of Demand and Demand Forecasting Methods.
- To **analyze** the various types of costs and to determine the level of output at which there is neither profit nor loss. To estimate capital requirements and to describe various sources of mobilizing funds. Also to identify least cost combinations of inputs produce desired quantity of output.
- To **describe** the features of different market structure and pricing strategies.
- To **explain** the basic accounting concepts and conventions. To elaborate the importance of finance function for evaluating the economic status of a business unit.

Course Outcomes

After completion of the course the student is able to:

- Select the suitable form of business organization which meets the requirement of selected business also perform decision – making function effectively in an uncertain frame work by applying concepts of Managerial Economics. Meet and manipulate the demand efficiently and plan the future course of action.
- Apply right kind cost to reduce cost by paying attention towards the costs which can be reduced. Take decision whether to buy or

produce? Reduce the cost of capital by selecting best source of fund mobilization and select best investment opportunity which yields higher rate of return.

- Fix the right price which can best meets the predetermined objectives of the business firm under different market conditions. Able to select best combination of inputs to produce required quantity of output.
- Prepare books of accounts and know over all financial position of the business enterprise which enables the concerned to take appropriate measures to improve the situation. Also interpret the financial position from difference angles and initiates the measures/ efforts in that direction.

UNIT-I

Business & New–Economic environment:

Characteristic features of Business, features and evaluation of sole proprietorship, partnership, joint stock company, Public enterprises and their types. Changing Business Environment in post–liberalization scenario

UNIT II

Introduction to business economics, and demand analysis, Elasticity of demand and demand forecasting

Definition; Nature and scope of managerial economics - demand analysis determinants; Law of demand and its exceptions.

Elasticity of demand and demand forecasting

Definition; Types; Measurement and significance of elasticity of demand; Demand forecasting; Factors governing demand forecasting; Methods of demand forecasting - survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, and judgmental approach to demand forecasting.

UNIT III

Cost analysis: Theory of production and market structures.

Cost analysis:

Cost concepts - opportunity cost, fixed vs. variable costs, explicit costs vs. implicit costs, and out of pocket costs vs. imputed costs; Break-even analysis (BEA) - determination of break-even point (simple problems), managerial significance, and limitations of BEA.

Capital and capital budgeting

Capital and its significance; Types of capital; Estimation of fixed and working capital requirements; Methods and sources of raising finance.

Nature and scope of capital budgeting; Features of capital budgeting proposals; Methods of capital budgeting - payback method, accounting rate of return (ARR), and net present value method (simple problems)

UNIT-IV

Theory of production

Production function - isoquants and isocosts, least cost combination of inputs, and laws of returns; Internal and external economics of scale.

Market structures

Types of competition; Features of perfect competition, monopoly, and monopolistic competition; Price-output determination in case of perfect competition and monopoly.

Pricing policies and methods

Cost plus pricing; Marginal cost pricing; Sealed bid pricing; Going rate pricing, Limit pricing, Market skimming pricing, Penetration pricing, Two-part pricing, Block pricing, Bundling pricing, Peak load pricing, Cross subsidization.

UNIT V

Introduction to financial accounting

Double-entry book keeping; Journal; Ledger; Trial balance; Final accounts - trading account, profit and loss account, and balance sheet with simple adjustments.

Financial analysis through ratios

Computation; Analysis and interpretation of liquidity ratios - current ratio, and quick ratio; Activity ratios - inventory turnover ratio, and debtor turnover ratio; Capital structure ratios – debt-equity ratio, and interest coverage ratio; Profitability ratios - gross profit ratio, net profit ratio, operating ratio, P/E ratio, and EPs.

TEXT BOOKS

1) Varshney & Maheswari: Managerial Economics , Sultan Chand, 2009.
2) Aryasri: Managerial; Economics and Financial Analysis, TMH, 2009.

REFERENCE BOOKS

1) Ambriah Gupta, Financial Accou8nting for Management, Pearson Education, New Delhi, 2010.
2) H.Craig Peterson & W. Cris Lewis, Managerial Economics PHI, 2010.

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III Year B.Tech EIE –I Sem

L	T/P/D	C
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(ITD1104) COMPUTER ORGANIZATION

Course Outcomes:

Course Objectives

- **Learn** basic hardware and software of computer organization.
- **Know** the instructions codes, formats and addressing modes of a computer.
- **Learn** micro programmed control unit and memory organization of a computer.
- **Understand** computer arithmetic, IO organization and parallel processing.

Course Outcomes

After completion of the course the student is able to:

- Analyze the concepts of computer organization for several engineering applications.
- Use the fundamentals of computer organization as a tool in digital systems.
- Identify, formulate, and solve hardware and software computer engineering problems.
- Analyze IO, memory, Stack organization and parallel processing of a computer.

UNIT I

BASIC STRUCTURE OF COMPUTERS: Computer types, functional unit, basic operational concepts, bus structures, multi processors and multi computers, multi tasking.

Register Transfer Language and Micro operations: Register Transfer language, Regiser Transfer, Arithmetic Micro operations, Logic Micro operations, Shift Micro operations
, Arithmetic logic shift unit.

UNIT II

BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction Codes, Computer Registers, computer instructions – instruction Cycle, memory reference instructions, input-output and interrupt. Central Processing Unit: Stack organization, instruction formats, addressing modes, data transfer and manipulation, program control, CISC and RISC.

UNIT III

MICROPROGRAMMED CONTROL: Control memory, address sequencing, micro program example, design of control unit, hardwired control, micro programmed control.

THE MEMORY ORGANIZATION: Memory hierarchy, Main Memory, Cache memory, performance considerations, virtual memory, secondary storage.

UNIT IV

COMPUTER ARITHMETIC: Addition and subtraction, multiplication algorithms, Division algorithms, floating-point arithmetic operations, Decimal arithmetic unit, Decimal arithmetic operations.

INPUT-OUTPUT ORGANIZATION: Peripheral devices, input-output interface, asynchronous data transfer, modes of transfer, priority interrupt, direct memory access.

UNIT V

PIPELINE AND VECTOR PROCESSING: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction pipeline, RISC pipeline Vector Processing, Array Processors.

TEXT BOOKS

1. Computer System Architecture – M. Morris Mano, III edition, Pearson/PHI
2. Computer organization – Carl Hamacher, Zvonks Vranesic, Safeazaky, V edition, Mc Graw Hill

REFERENCES

1. Computer Organization and Architecture – William Stallings Sixth edition, Pearson/PHI
2. Fundamentals of Computer Organization and Design, Sivarama Dandamudi
3. Computer Architecture a Quantitative approach, John L. Hennessy and David A Patterson, Fourth edition Elsevier.
4. Computer Architecture Fundamentals and Principles of Computer Design, Joseph D/ Dumas II,
   BS Publication

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III Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
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(EIE1106) LINEAR AND DIGITAL IC APPLICATIONS

Course Objectives

- **To study** about electrical properties of analog ICs like Op-Amps, IC 555 timer, PLL.
- **To analyze** and know the design concepts of various applications of ICs.
- **To study** the design concepts Digital circuits using ICs.

Course Outcomes

After completion of the course the student is able to:

- Analyze electrical properties of OpAmps and design various linear and nonlinear applications using OpAmps.
- Design various applications of 555 timer, IC 565, voltage regulators.
- Understand and compare TTL and CMOS IC logic families.

Design various combinational and sequential logic circuits using digital ICs.

UNIT I

INTEGRATED CIRCUITS : Classification, chip size and circuit complexity, basic information of Op-amp, ideal and practical Op-amp, internal circuits, Op-amp characteristics, DC and AC characteristics, 741 op-amp and its features, modes of operation-inverting, non-inverting, differential.

OP-AMP APPLICATIONS : Basic application of Op-amp, instrumentation amplifier, ac amplifier, V to I and I to V converters, sample and hold circuits, Instrumentation amplifier, Log and antilog amplifier, Precision rectifiers, Differentiators, Integrators, and comparators, sample and hold circuits

UNIT II

ACTIVE FILTERS and OSCILLATORS : Introduction, 1st order LPF, HPF filters. Band pass, Band reject and all pass filters. Oscillator types and principle

of operation – RC and Wien bridge, waveform generators – triangular, square wave and VCO. Comparators.

UNIT III

SPECIAL ICs: Introduction to 555 timer, functional diagram, monostable and astable operations and applications, Schmitt Trigger. PLL - introduction, block schematic, principles and description of individual blocks of 565, introduction to voltage regulators.

D-A AND A- D CONVERTERS : Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, and IC 1408 DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC. DAC and ADC specifications.

UNIT IV

LOGIC FAMILIES : Classification of Integrated circuits, comparision of TTL and CMOS logic families, standard TTL NAND Gate- Analysis and characteristics, TTL open collector O/Ps, Tristate TTL, MOS and CMOS open drain and tristate outputs, CMOS transmission gate, IC interfacing- TTL driving CMOS and CMOS driving TTL .

UNIT V

COMBINATIONAL CIRCUIT DESIGN : Design using TTL-74XX series ICs - Code Converters, Decoders, De-multiplexers, Encoders, priority Encoders, multiplexers and their applications, Priority Generators. Arithmetic circuit ICs- parallel binary Adder/Subtractor circuits using 2's-Complement system. Digital comparator circuits.

SEQUENTIAL CIRCUITS : Commonly available 74XX series ICs-RS, JK, JK Master Slave, D and T Type Flip-Flops & their conversions, Design of Synchronous and Asynchronous counters, Decade counter, shift registers and applications using TTL-74XX series ICs.

TEXT BOOKS

1. Linear Integrated Circuits –D. Roy Chowdhury, New Age International (p) Ltd, 2nd Edition, 2008..
2. Digital Fundamentals – Floyd and Jain, Pearson Education, 8th Edition, 2005.
3. Op-Amps and Linear ICs – Ramakanth A. Gayakwad, PHI, 1987

REFERENCES

1. Operational Amplifiers and Linear Integrated Circuits – R.F. Coughlin and Fredrick F. Driscoll, PHI, 1977.
2 .Operational Amplifiers and Linear Integrated Circuits:4/e William D Stanley PEI 2009.
3. Op Amps and Linear Integrated Circuits: Concepts and Applications by James M. Fiore, Cengage/ Jaico ,2/e, 2009.
4. Operational Amplifiers and Linear Integrated Circuits by K.Lal Kishore - Pearson education, 2008.
5. Mordern Digital Electronics RP Jain 4/e TMH 2010.

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III Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(ECE1104) DIGITAL SIGNAL PROCESSING

Course Objectives

- **Understand** characteristics of discrete time signals and systems
- **Analyze and Process** signals using various transform techniques
- **Understand** various factors involved in design of digital filters and role of multi rate signal processing.
- **Understand** the effects of finite word length implementation.

Course Outcomes

After completion of the course the student is able to:

- Analyze and process signals in the discrete domain and their transformation
- Design filters to suit specific applications
- Design multi rate signal processing of signals through systems.

Analyze binary fixed point and floating point representation of numbers and arithmetic operations

UNIT I

Introduction: Introduction to Digital Signal Processing. Applications of Z-Transforms : Solution of Linear constant coefficient difference equations, Block diagram representation of LCCD equations. System function, Frequency domain representation of discrete time signals and systems.

Discrete Fourier series: DFS representation of periodic sequences, Relation between Z-transform and DFS.

UNIT II

Discrete Fourier Transforms: Properties of DFT, linear convolution of sequences using DFT, Computation of DFT.

Fast Fourier Transforms: Radix-2 decimation in time and decimation in frequency FFT Algorithms, Inverse FFT. Composite algorithm.

UNIT III

IIR Digital Filters: Analog filter approximations- Butterworth and Chebyshev , comparison of Butterworth and Chebyshev filters. Design of IIR Digital filters from analog filters, Step and Impulse invariance transformation techniques, Bilinear transformation method. Spectral transformations (Analog to Analog).

Realization of IIR Filters: Direct, Canonic, Cascade, Parallel, Lattice and Ladder forms.

UNIT IV

FIR Digital Filters : Characteristics of linear phase FIR filters and its frequency response. Comparison of IIR and FIR filters.

Design of FIR filters : Fourier Method, Frequency Sampling method and windowing methods: Rectangular window, Hanning window, Hamming window, Bartlett window and Kaiser window.,

Realization of FIR Filters: Direct form, cascade realization and Linear phase Realization.

UNIT V

Multirate Digital Signal Processing: Introduction, Down sampling, Decimation, Up sampling, Interpolation, sampling rate conversion, Implementation of sampling rate conversion, Applications of Multirate Signal Processing.

Finite Word Length Effects: Limit cycles, Overflow oscillations, Round-off noise in IIR digital filters , Computational output round off noise, Methods to prevent overflow, Tradeoff between round off and overflow noise, Measurement of coefficient quantization effects through pole-zero movement, Dead band effects.

TEXT BOOKS

1. Digital Signal Processing : Principles, Algorithms and Applications – John G.Proakis, D.G.Manolakis, 4th Edition, Perason/PHI, 2009.
2. Digital Signal Processing – A Pratical Approach – Emmanuel C.Ifeacher, Barrie. W. Jervis, 2nd Edition, Pearson Education, 2009.

REFERENCES

1. Discrete Time Signal Processing – A.V.Oppenheim and R.W. Schaffer, PHI, 2009
2. Digital Signal Processing- Fundamentals and Applications – Li Tan, Elsevier, 2008.
3. Fundamentals of Digital signal Processing using MatLab- Robert J.Schilling, Sandra L.Harris,Thomson , 2007.
4. Digital Signal Processing – S.Salivahanan, A.Vallavaraj, C.Gnanapriya,TMH, 2009.
5. Fundamentals of Digital Signal Processing - Loney Ludeman, John Wiley,2009.

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III Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
	4	**0**	**4**

(EIE1108) Process Control Instrumentation

Course Objectives

- **To identify** and monitor process parameters of various processes.
- To u**nderstand** the principles of controllers, degrees of freedom, and control valves.
- **To recognize** these principles written in form of mathematical equations for various control applications.
- To a**pply** these equations to analyze problems by making good assumptions and learn systematic engineering method to solve practical process control problems.

Course Outcomes

After completion of the course the student is able to:

- Apply fundamental knowledge of mathematics to modeling CO2: analysis of fluid flow, level, pressure, temperature problems.
- Conduct experiments in pipe flows and open channel flows and interpreting
- data from model studies to prototype cases. Documenting them in engineering reports.
- Understand the possible disasters caused by an incorrect Design/Analysis in hydraulic, pneumatic engineering system.

UNIT – I

Process Dynamics

Process variables – Load variables – Dynamics of simple pressure, flow, level and temperature process – interacting and non-interacting systems –

continuous and batch process – self-regulation – Servo and Regulator operation - problems.

UNIT – II

Control Actions and Controllers and Types of Controllers

Basic control actions – characteristics of two position, three position, Proportional, Single speed floating, Integral and Derivative control modes – PI, PD, PID control modes – Problems -types of controllers -Pneumatic, Hydraulic and Electronic Controllers t o realize various control actions.

UNIT – III

Controller Settings and Tuning of Controllers

Evaluation criteria – 1/4th decay ratio, I AE, ISE,ITSE, ITAE - determination of optimum settings for mathematically described process using time response and frequency response-tuning of controllers- process curve reaction method – continuous oscillation method – damped oscillation method – problems.

UNIT – IV

Final Control Elements and Control Valves

I/P Converter , P/I converter - pneumatic, electric and hydraulic actuators – valve Positioned -Control valves – characteristic of control valves – valve body – Globe, Butterfly, diaphragm, Ball valves – Control valve sizing – Cavitations, flashing - problems.

UNIT – V

Multiloop Control System

Feed forward control – Ratio control – Cascade control – Split range – Multivariable control and examples from distillation column, Boiler system and heat exchanger.

Text Books

1. Chemical Process Control : An introduction to Theory and Practice – by Stephanopoulos, Prentice Hall, New Delhi, 1999.
2. Process Control – Harriott P. , TMH, 1991
3. Process Control Instrumentation technology by Curtis.D.Johnson,Edition 8,PHI Publishers

References

1. Process Control, Third Edition – Liptak B.G., Chilton Book Company, Pennsylvania, 1995
2. Process control – by Pollard A., Heinemann Educational Books, London, 1971.
3. Automatic Process Control – by Eckman D.P. , Wiley Eastern Ltd., New Delhi, 1993.
4. Process Control – by Patranabis.
5. Process System Analysis and Control – Coughanowr, McGraw Hill, Singapore, 1991

Practice: Subject practice through lab view software.

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III Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(EIE1215) Simulation Laboratory

Course Objectives

- To learn basic Operations on Matrices
- To model generation of various signals
- To simulate operations on signals and systems.
- To simulate various random variables' generation and processes

Course Outcomes

After going through this course the student will be able to

- Apply signal generation in different areas.
- Apply the knowledge of random variables and processes in fields of communications.
- Analyze the systems for various properties.
- Create or design various systems and analyze sampling effects

(Minimum 25 experiments should be completed)

PART I : Signal Processing Using MATLAB

1. Basic Operations on Matrices
2. Generation of Various Signals and Sequences (periodic & Aperiodic), Such as Unit Impluse,
3. Units step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc function

4. Operations on signals and Sequences such as Addition, Multiplication, Scaling, Shifting, Folding,
5. Computation of energy and Average Power.
6. Finding Even and Odd Parts of Signal or Sequence and Real And Imaginary Parts of A Signal/Sequence
7. Convolution between signals and Sequences.
8. Auto Correlation and Cross Correlation between signals and Sequences.
9. Computation of Unit Sample, Unit Step, Sinusoidal Responses of given LTI System and verifying its physical reliability and Stability properties.
10. Finding the Fourier Transform of given signal and plotting its magnitude and phase spectrum.
11. Wave form synthesis using Laplace Transform
12. Locating Poles and Zeros, and plotting the pole zero maps in s-plane and Z-plane for a given Transfer Function
13. Finding the DFT and FFT of given signal and plotting its magnitude and phase spectrum
14. Demonstration of Gibb's Phenomenon
15. Sampling Theorm verification
16. Removal of noise by autocorrelation/ cross correlation in a given signal corrupted by noise.
17. Impulse Response of Raised Cosine Filter
18. Checking a Random Process for Stationary in Wide Sense

PART II: Control systems

19. Using MATLAB for Control Systems
20. Introduction to MATLAB
21. Polynomials in MATLAB
22. Scripts, Functions & Flow Control in MATLAB

Mathematical Modeling of Physical Systems

23. Mass-Spring System Model
24. Block Diagram Reduction
25. Transfer Function
26. Linear Time-Invariant Systems in MATLAB

27. Examples of Creating LTI Models (Field and Armature-controlled DC motor)
28. Simulation of LTI systems to different inputs
29. Model Simulation using Simulink
30. Effect of Feedback on disturbance & Control System Design

Controller design and implementation

31. Introduction to PID controller
32. PID Controller Design for Two Tank System and DC motor
33. Design of Proportional Control in the PID Controller
34. Design of Integral Part in the PID Controller

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III Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(EIE1204) LINEAR AND DIGITAL IC APPLICATIONS LABORATARY

Course Objectives

- **To demonstrate** functionalities of analog and digital ics
- **To demonstrate** applications of analog and digital ics
- **To explore** usage of ASLKV2010 Starter Kit

Course Outcomes

After completion of the course the student is able to:

- Analyse various types of ICs
- Design various analog applications using analog ICs and ASLKV2010 Starter Kit.
- Design digital circuits using digital ICs.
- Design Digital Ics for different combinations.

Note: Minimum of 12 experiments have to be conducted (Four from each part).

List of Experiments:

PART 1: To Verify the following Functions.

1. Adder, Subtractor, Comparator using IC 741 OP-AMP.
2. Square Wave Generator and Triangular Wave Generator using OP-AMP.
3. RC Phase Shift & Wien Bridge Oscillators using IC 741 OP-AMP.
4. 4.bit Digital to Analog converter.
5. Schmitt Trigger circuits using IC 741 & IC 555.
6. Voltage Regulator using IC 723, Three terminal voltage regulators-7805, 7809, 7912.

PART -2: T0 Verify the Functionality of the following 74 Series TTL ICs.

7. D-Flip- Flop – (74LS74) and JK Master-Slave Flip- Flop (74LS73).
8. Decade Counter (74LS90) and UP-DOWN Counter (74LS192).
9. Universal Shift registers – 74LS194/195.
10. 3- 8 Decoder – 74LS138.
11. 4-bit COMPARATOR -74LS85.
12. 8X1 Multiplexer– 74151 and 2X4 De-multiplexer- 74155.

PART - 3: Design of the Analog Systems using Analog System Lab Starter Kit (ASLKV2010 Starter Kit).

13. Negative Feedback Amplifier and Instrumentation Amplifier.
14. Regenerative Feedback system, Astable and Monostable Multivibrator.
15. Integrators and Differentiators
16. Analog Filters
17. Low Dropout (LDO)/Linear Regulator.

PRATICE:

Simulation through Workbench/ Multisim software, Xilinx /Altera tool boxes.

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III Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(EIE1205) Process Control Instrumentation Laboratory

Course Objectives

- **Identify** and obtain process parameters of various processes in the prototype model.
- **Understand** the principles and appreciate the working of controllers, degrees of freedom, control valves.
- **Understand** the working of DAQ devices
- **Learn** systematic engineering methodologies to solve practical process control problems.

Course Outcomes

After completion of the course the student is able to:

- Apply fundamental knowledge of mathematics to modeling and analysis of fluid flow, level, pressure, temperature problems.
- Conduct experiments in pipe flows and openchannel flows CO3:
- Interpreting data from model studies to prototype cases. Documenting them in engineering reports.
- Understand the possible disasters caused by an incorrect Design/Analysis in hydraulic, pneumatic engineering system.

(Minimum 12 experiments should be conducted)

1. Realization of control actions: Electronic controllers.
2. Flow level control unit.
3. Temperature level control unit.
4. Servo and regulator operation.

5. Realization of control actions: Pneumatic controllers. Hydraulic controllers.
6. Process tuning – Process reaction curve method.
7. Process tuning – continuous and damped oscillation method.
8. Operation of flow loop in plant.
9. Input convertor – Pneumatic actuator.
10. Input convertor – Hydraulic actuator.
11. Control valve characteristics (Different types).
12. Feed forward control systems
13. Multi loop control systems – Ratio Control.
14. Multi loop control systems – Cascade Control.
15. Interacting and non interacting system

PRATICE:

Simulation through Lab view software.

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III Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
	2	**0**	**0**

(NCC1102) Soft Skills and Personality Development

Objectives

- Enable students to convert the conceptual understanding of communication into everyday
- Practice
- Train students to ground concepts/ideas in their own experience enable students to exercise control over language use
- Sensitise students to the nuances of the four basic communication skills – listening, speaking, reading and writing
- Enable students to understand the concept and components of personality, so as to apply the
- Acquired knowledge and march towards excellence in their academic careers.
- Train students to become aware of their thinking styles and to enable them to convert thinking
- Into performance
- Prepare students to evolve mental models for intra-personal and inter-personal transactions
- Make students reflect and improve their use of body language – posture, gesture, facial expression, tone
- Sharpen memory skills and other study skills, which are vital for academic excellence.
- Bring outthe creativity and latent talents of students through goal setting
- Train students for positive thinking to keep them in good stead at the time of crisis.

Introduction

In an era of Technological advances and competition in the job market, it is necessary for students to possess soft skills and effective personal skills in addition to technical skills. It is essential that students possess the ability to convey technical ideas in a sound and simple manner. Planning and execution are the two important activities required for them. It is the execution that requires the soft skills as it most of the times deals with people. This course on "Soft Skills and Personality Development" is aimed at enhancing students' career prospects.

This course uncovers the principles of soft skills and personality skills, the ways to integrate them in different phases of career that require personal and interpersonal skills. It focuses on transforming the way of one's thinking and reacting to the environment. It equips the students with self analysis and gain self- control through stress management and conflict management. It also helps students with study skills. It helps students overcome their barriers and achieve excellence in performance and succeed in their chosen field of work.

SYLLABUS

Unit I: Introduction to Personality Development

1. Definition and Basics of personality
    - Determinants of Personality- biological, psychological and socio- cultural factors
    - Need for personality Development
2. Analyzing strengths and Weaknesses
3. Corporate theories on Personality development
4. Increasing vocabulary
5. Body Language
6. Preparation of Self Introduction
7. Motivation
    - Self-analysis through SWOT
    - Techniques and strategies for self-motivation

Unit II : Techniques in Personality Development Stage I

1. Communication Skills
2. Listening
3. Communication Barriers
4. Overcoming these Barriers
5. Importance of Self Esteem -- Building Self-esteem& Self Confidence
6. Working on attitudes – aggressive, assertive and submissive
7. Goal Setting
8. Leadership and Team Building Skills
9. Group Discussion

Unit III: Techniques in Personality Development Stage II

1. Interpersonal relationships
- Analysis of ego states, Transactions, Strokes and Life Positions
2. Stress Management
- Concept, Nature and Dimensions of Stress
- Causes, Impact and Managing Stress
- Relaxation Techniques
3. The Power of positive thinking
    - Nurturing creativity, decision-making and problem solving
    - Goals and techniques for positive thinking
    - Enhancement of concentration through positive thinking
4. Projecting a Positive Social Image
    - Grooming & Social Etiquette
    - Voice Modulation
    - Public Speaking

Unit IV: Techniques in Personality Development Stage III

- Conflict Management
- Introduction to Conflict Management

- Levels of Conflict
- Managing Conflict
- Time Management
    - Concept
    - Importance and Need
    - Steps towards better Time Management

Unit V:Memory and Study Skills

- Definition and importance of memory
- Causes of forgetting
- How to forget (thought stopping), how to remember (techniques for improving memory)
- The technique of passing exams-Management of examination fear.

PRACTICAL TRAINING

The course would include the following practical exercises.

- Ice- breaking. Brainstorming and simulation exercises. Thought stopping. Memory and study skills training
- Role play and record work

REFERENCES

1. Mile, D.J (2004). Power of positive thinking. Delhi: Rohan Book Company.
2. Pravesh Kumar (2005). All about self- Motivation. New Delhi: Goodwill Publishing House.
3. Dudley, G.A. (2004). Double your learning power. Delhi: Konark Press. Thomas Publishing Group Ltd.
4. Lorayne, H. (2004). How to develop a super power memory. Delhi: Konark Press. Thomas Publishing Group Ltd.

5. Hurlock, E.B (2006). Personality Development, 28th Reprint. New Delhi: Tata Mc Graw Hill.

6. Windshuttle, Keith and Elizabeth Elliot.1999. *Writing, Researching and Communicating: Communication Skills for the Information Age.* 3rd Reprint. Tata McGraw-Hill. Australia
7. Dignen, Flinders and Sweeney. *English 365*. Cambridge University Press
8. Goleman, Daniel. 1998. *Working with Emotional Intelligence*. Bantam Books. New York
9. Jones, Leo and Richard Alexander. 2003. *New International Business English*. Cambridge University Press
10. Lucas, Stephen.2001. Art of Public Speaking. Mc-Graw Hill.
11. Tamblyn, Doni and Sharyn Weiss. 2000. *The Big Book OF Humorous Training Games*. 2004 Edition. Tata McGraw-Hill. New Delhi
12. Personality Development by Rajiv K. Mishra. Rupa & Co.
13. Powell. *In Company*. Macmillan
14. Cotton, et al. *Market Leader.* Longman
15. Pease, Allan. 1998. *Body Language: How to Read Others Thoughts by their Gestures*. Sudha Publications. New Delhi
16. Gardner, Howard. 1993. *Multiple Intelligences: The Theory in Practice: A* R*eader.* Basic Books. New York
17. De Bono, Edward. 2000. *Six Thinking Hats*. 2nd Edition. Penguin Books.
18. De Bono, Edward. 1993. *Serious Creativity*. Reprint. Harper Business.
19. Mohan, Krishna and Meera Bannerji, 2001, Developing Communication Skills. Macmillan.
20. V. Syamala, 2002. Effective English Communication for you. Emerald Publishers, Chennai.

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III Year B.Tech EIE – II Sem	**L**	**T/P/D**	**C**
	4	**0**	**4**

(EIE1109) Industrial Instrumentation

Course Objectives

- **To understand** the basic knowledge of the physical parameters like Pressure, Temperature, flow, level, density and viscosity employed in different Industries.
- **To grasp** sound knowledge about various techniques used for the measurement of industrial parameters.
- **To understand** the construction and working of measuring instruments.
- **To analyze** need and necessity of measuring instruments.

Course Outcomes

After completion of the course the student is able to:

- To have an adequate knowledge about process transducers like pressure etc.
- To have an idea about the temperature standards, thermocouples and pyrometry techniques.
- To study about area flow meters, mass flow meters and calibration.
- To know about various types of level measurements adopted in industry environment.

UNIT – I

METROLOGY

Measurement of length – Plainness – Area – Diameter – Roughness – Angle – Comparators – Gauge blocks. Optical Methods for length and distance measurements.

VELOCITY AND ACCELERATION MEASUREMENT

Relative velocity – Translational and Rotational velocity measurements – Revolution counters and Timers - Magnetic and Photoelectric pulse counting stroboscopic methods.

Accelerometers-different types, Gyroscopes-applications.

UNIT – II

FORCE MEASUREMENT

Force measurement – Different methods –Gyroscopic Force Measurement – Vibrating wire Force transducer.

PRESSURE MEASUREMENT

Basics of Pressure measurement –Manometer types – Force-Balance and Vibrating Cylinder Transducers – High and Low Pressure measurement – McLeod Gauge, Knudsen Gauge, Momentum Transfer Gauge, Thermal Conductivity Gauge, Ionization Gauge, Dual Gauge Techniques, Deadweight Gauges.

UNIT – III

FLOW MEASUREMENT

Flow Meters- Head type, Area type (Rota meter), electromagnetic type, Positive displacement type, mass flow meter, ultrasonic type, vertex shedding type, Hotwire anemometer type, Laser Doppler Velocity-meter.

UNIT – IV

DENSITY AND VISCOSITY MEASUREMENT

Density measurements – Strain Gauge load cell method – Buoyancy method - Air pressure balance method – Gamma ray method – Vibrating probe method.

Units of Viscosity, specific gravity scales used in Petroleum Industries, Different Methods of measuring consistency and Viscosity –Two float viscorator – Industrial consistency meter.

UNIT – V

OTHER MEASUREMENTS

Sound-Level Meters, Microphones, Basic Level measurements, Humidity Measurement, Chemical Composition. Particle Instruments and Clean-Room.

TEXT BOOKS

1. Measurement Systems – Applications and Design – by Doeblin E.O., 4/e, McGraw Hill International, 1990.
2. Principles of Industrial Instrumentation – Patranabis D. TMH. End edition 1997

REFERENCES

1. Process Instruments and Control Handbook – by Considine D.M., 4/e, McGraw Hill International, 1993.
2. Mechanical and Industrial Measurements – by Jain R.K., Khanna Publishers, 1986.
3. Instrument Technology, vol. I – by Jones E.B., Butterworths, 1981.

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III Year B.Tech EIE – II Sem	**L**	**T/P/D**	**C**
	4	**0**	**4**

(ECE1109) MICROPROCESSORS AND MICROCONTROLLERS

Course Objectives

- To **understand** characteristics and architectures of various microprocessors and microcontrollers.
- **Understand** basic programming concepts and software tools
- **Learn** various interfacing circuits necessary for various applications
- To **learn** various interfacing concepts.

Course Outcomes

After completion of the course the student is able to:

- Demonstrate the ability to design system, component or a process as per needs and specifications
- Select the proper architecture for the implementation of digital designs
- Write various assembly language programs for a given task using 8086, 8051 and ARM processors.
- Design and implement microprocessor and microcontroller based systems.

UNIT I

Introduction to 8085 Microprocessor, Architecture of 8086 Microprocessor, Addressing modes of 8086, Instruction set of 8086, Assembler directives, simple assembly language programs, procedures, and macros. Pin diagram of 8086-Minimum mode and maximum mode of operation.

UNIT II

Memory and I/O organization of 8086, 8255 PPI – various modes of operation and interfacing to 8086, D/A and A/D converter to 8086 using 8255, memory interfacing to 8086.

UNIT III

Serial Communication standards, serial data transfer schemes, 8251 USART architecture and interfacing, RS-232, IEEE 488 standards. Interrupt structure of 8086, Interrupt Vector Table. Need for 8259 Programmable Interrupt Controller.

UNIT IV

Introduction to Microcontrollers, 8051 Microcontroller Architecture, I/O ports, memory organization, counters and Timers, Serial data Input/Output, Interrupts. Addressing modes, Instruction set of 8051, Simple programs.

Timer, serial port and Interrupts programming: Programming 8051 timers/counters, 8051 serial port programming, programming timer interrupts, programming External hardware interrupts, programming serial communication interrupts.

UNIT V

Interfacing to 8051: A/D and D/A Converter, Stepper Motor Interface, Key Board Interfacing, LCD Interfacing.

ARM Processor: Fundamentals, Registers, current program status register, pipeline, Exceptions, Interrupt and the vector table.

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TEXT BOOKS

1. Microprocessors and interfacing – Douglas V. Hall, TMH, 2nd Edition, 1999.
2. The 8051 microcontrollers and Embedded systems- Mazidi and mazidi, PHI, 2000.
3. ARM System Developer's Guide: Designing and Optimizing System Software- Andrew N. Sloss, Dominic Symes, Chris Wright, Elsevier Inc., 2007

REFERENCES

1. Micro computer systems, The 8086/8088 Family Architecture, Programming and Design – Y.Liu and G.A. Gibson, PHI, 2nd edition.

2. Advanced microprocessors and Peripherals – A.K.Ray and K.M.Bhurchandi, TMH, 2000.
3. Micro Computer System 8086/8088 Family Architecture Programming and Design – By Liu and GA Gibson PHI, 2nd Edition
4. Microcontrollers and Applications, Ajay . V. Deshmukh, TMGH,2005.
5. The 8085 Microprocessor : Architecture Programming and Interfacing – K.Uday Kumar, B.S Umashankar, Pearson , 2008.

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III Year B.Tech EIE – II Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(ITD1107) OPERATING SYSTEMS

Course Objectives

- **To analyze** the tradeoffs inherent in operating system design.
- **To summarize** the various approaches to solving the problem of mutual exclusion in an operating system.
- **To evaluate** the trade-offs in terms of memory size (main memory, auxiliary memory) and processor speed.
- **To demonstrate** Main memory, disk storage strategies, file strategies and Implementation
- **To analyze** the system security with different cryptographical models.

Course Outcomes

After completion of the course the student is able to:

- Identify the System calls, interrupts and process scheduling of any GOS.
- Write application keeping Concurrency and synchronization Semaphores/monitors, shared memory in mind
- Design new deadlock free and efficient memory management schemes for a GOS.
- Explain RAID, file systems facilities and protection and security of any GOS.

UNIT I

Computer System and Operating System Overview: Overview of computer operating systems operating systems functions protection and security

distributed systems special purpose systems operating systems structures and systems calls operating systems generation.
Process Management – Process concepts threads, scheduling-criteria algorithms, their evaluation, Thread scheduling.

UNIT II:

Concurrency : Process synchronization, the critical- section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Synchronization examples, atomic transactions.
Memory Management : Swapping, contiguous memory allocation, paging, structure of the page table , segmentation, virtual memory, demand paging, page-Replacement, algorithms.

UNIT III:

Principles of deadlock – system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock.
File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

UNIT IV :

File System implementation- File system structure, file system implementation, directory implementation, directory implementation, allocation methods, free-space management, efficiency and performance, case studies. UNIX, Linux, Windows.
Mass-storage structure overview of Mass-storage structure, Disk structure, disk attachment disk scheduling, swap-space management, RAID structure, stable-storage implementation, Tertiary storage structure.

UNIT V :

Protection : Protection, Goals of Protection, Principles of Protection, Domain of protection Access Matrix, Implementation of Access Matrix, Access control,

Revocation of Access Rights, Capability- Based systems, Language – Based Protection.
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, computer –security classifications, case studies UNIX, Linux, Windows.

TEXT BOOKS :

1. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Operating systems- A Concept based Approach-D.M.Dhamdhere, 2nd Edition, TMH

REFERENCES :

1. Operating Systems' – Internal and Design Principles Stallings, Fifth Edition–2005, Pearson education/PHI
2. Operating System A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum 2nd edition Pearson/PHI.

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III Year B.Tech EIE – II Sem	**L**	**T/P/D**	**C**
	4	**0**	**4**

(CMS1102) MANAGEMENT SCIENCE

Course Objectives

- **Understand** the principles, functions, theories and practices of different management areas and to provide them with practical exposure to cases of success/failure in business.
- **Expose** with a systematic and critical understanding of organizational theory, structures and design.
- **Comprehend** conceptual models of strategic management and to familiarize with the tools of operations and project management.
- **Understand** the role of human relations in the management of operations and to provide basic insights into contemporary management practices.

Course outcomes

After completion of the course the student is able to:

- Function effectively in multidisciplinary teams to accomplish a common goal of organizations.
- Apply theories to improve the practice of management.
- Appreciate the management challenges associated with high levels of change in the organizations.
- Develop global vision and management skills at both a strategic level and interpersonal level.

UNIT I

Introduction to management

Concepts of management - nature, importance, and functions of management; Taylor's scientific management theory; Fayol's principles of management;

Mayo's Hawthorne experiments; Maslow's theory of human needs; Douglas McGregor's theory X and theory Y; Herzberg's two-factor theory of motivation; System and contingency approach to management; Planning – meaning, significance, and types of plans; Decision making and steps in decision making process; Leadership styles; Social responsibilities of management.

Organizing - Meaning, and features; Process of organization; Principles of organization; Elements of organization; Organization chart; Span of control - Graicunas formulae; Centralisation and decentralization; Types of mechanistic and organic structures of organisation - line organization, line and staff organization, functional organization, committee organization, matrix organization, virtual organisation, cellular organisation, team structure, boundaryless organization, inverted pyramid structure, and lean and flat organization structure; Their merits, demerits and suitability.

UNIT II

Human resources management

Concepts of HRM;

Basic functions of HR manager - human resource planning (definition; objectives; process), recruitment (definition; sources; techniques), selection (definition; process), induction and orientation, training and development (definition; need; methods), employee exit process, employee relations management, employee compensation and benefits administration, job evaluation (objectives; process; methods), and performance appraisals (objectives; process; methods).

UNIT III

Strategic management

Mission; Goals; Objectives; Policy; Strategy; Programmes; Elements of corporate planning process - environmental scanning; value chain analysis, BCG matrix, generic strategy alternatives, SWOT analysis, and steps in strategy formulation and implementation; Balance score card; Capability maturity model (CMM)/ People capability maturity model (PCMM).

UNIT IV

Operations management

Plant location; Types of plant layout; Methods of production – job, batch, and mass production; Work study-basic procedure involved in method study and work measurement.

Materials management

Objectives; Need for inventory control; EOQ, ABC Analysis; Purchase procedure; Value analysis; JIT, Six sigma; TQM; Supply chain management; Stores management and stores records.

Marketing

Functions of marketing; Marketing mix, and marketing strategies based on product life cycle; Channels of distribution.

UNIT V

Project management – network analysis

Network analysis; Programme evaluation review technique - PERT (probability of completing the project within given time); Critical path method - CPM (Identifying critical path); Project cost analysis; Project crashing; Simple problems.

TEXT BOOK

1. Management Science *by* Aryasri; *Publisher: Tata McGraw Hill, 2009.*
2. Management *by* James Arthur, Finch Stoner, R. Edward Freeman, and Daniel R. Gilbert 6th Ed; *Publisher: Pearson Education/Prentice Hall.*
3. Principles and Practice of Management - L.M. Prasad; *Publisher: Sultan Chand Publications, New Delhi.*

REFERENCES

1. Principles of Marketing: A South Asian Perspective *by* Kotler Philip, Gary Armstrong, Prafulla Y. Agnihotri, and Eshan ul Haque , 2010, 13th Edition, *Publisher: Pearson Education/ Prentice Hall of India*.
2. A Handbook of Human Resource Management Practice *by* Michael Armstrong, 2010; *Publisher: Kogan Page Publishers*.

3. Quantitative Techniques in Management *by* N.D. Vohra, 4th edition, 2010; *Publisher: Tata McGraw Hill*.
4. Operations Management: Theory and Practice *by* B. Mahadevan, 2010; *Publisher: Pearson Education*.
5. Strategic Management *by* V.S.P. Rao and V. Hari Krishna, 2010; *Publisher: Excel Books*.

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III Year B.Tech EIE – II Sem	**L**	**T/P/D**	**C**
	4	**1**	**4**

(EIE1111) Virtual Instrumentation

Course Objectives

- **To develop** virtual instruments to specific application using LabVIEW software.
- To easy the programming required to make computer interact with real world.
- To **acquire**, **analyze** and **display** the throughput of any compactible system.
- To gain Knowledge to **connect** with third party software and hardware

Course Outcomes

After completion of the course the student is able to:

- To create virtual instruments using loops, charts, arrays, clusters in LabVIEW.
- To interface sensor output with a DAQ device and create applications, based on those readings
- To use different interface buses, to achieve easy connectivity among popular engineering instruments.
- To develop some basic image processing application using LabVIEW.

UNIT I

Virtual Instrumentation: An introduction

Historical perspective, advantages, blocks 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, 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

Data acquisition basics:

Introduction to data acquisition on PC, Sampling fundamentals, Input/Output 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 Interface requirements:

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

VI toolsets:

Distributed I/O modules. Application of Virtual Instrumentation: Instrument Control, Development of process database management system, Simulation of systems using VI, Development of Control system, Industrial Communication, Image acquisition and processing, Motion control.

TEXTBOOKS

1. LabVIEW Graphical Programming, Gary Johnson, Second edition, McGraw Hill, Newyork, 1997.
2. LabVIEW for everyone, Lisa K. wells & Jeffrey Travis Prentice Hall, New Jersey, 1997.

REFERENCES

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

WEB RESOURCES: www.ni.com , www.ltrpub.com

PRATICE:

Subject practice through labview software.

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III Year B.Tech EIE – II Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(ECE1206) MICROPROCESSORS AND MICROCONTROLLERS LABORATORY

Course Objectives

- Devices and circuits to microprocessors and microcontrollers.
- **Design** and develop both the hardware and software for microprocessor /microcontroller based systems.
- To **provide** practical introduction to microcontrollers and microprocessors, assembly language programming techniques and interfacing
- **Connect** peripheral
- **Interpret** specifications for any microprocessor or peripheral chip

Course Outcomes

After completion of the course the student is able to:

- Develop the basic skills on hardware and software/programming of microprocessor
- Enhance assembly language programming skills for simple and complex calculations used in various engineering disciplines.
- Capable to innovative and design intelligent systems, called embedded systems, using microprocessor for special purpose.
- Involve in verification of functionality, speed and power of microprocessor based system.

1. Programs for 16 bit arithmetic operations for 8086 (using Various Addressing Modes).
2. Program for sorting an array for 8086.
3. Program for searching for a number or character in a string for 8086.
4. Program for string manipulations for 8086.
5. Program for digital clock design using 8086.

6. Interfacing ADC and DAC to 8086 / 8051.
7. Interfacing stepper motor to 8086 / 8051.
8. Programming using arithmetic, logical and bit manipulation instructions of 8051.
9. Program and verify Timer/ Counter in 8051.
10. Program and verify Interrupt handling in 8051
11. UART Operation in 8051.
12. Communication between 8051 kit and PC.
13. Interfacing LCD to 8051.
14. Interfacing Matrix / Keyboard to 8051.

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III Year B.Tech EIE – II Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(ENG 1204) ADVANCED ENGLISH COMMUNICATION SKILLS LABORATORY

Course Objectives

- Expose students to workplace writing
- Initiate them into the process of technical communication
- To enable the students to create clear, accurate, and succinct content
- Enable students to produce documents reflecting different types of technical communication such as abstracts, proposals and technical reports through ample practice
- Enable students to adjust technical content to meet the needs of a specific target audience
- Groom students in behavioral skills

Course Outcomes

After completion of the course the student is able to:

- Summarize and synthesize information and produce technical writing that is required in academics as well as in the engineering profession
- Write covering letters, resume, sop, project proposals and technical reports, speak fluently and address a large group of audience and participate in debates and discussions.
- Negotiate terms, manage complex situations through interpersonal skills,
- Persuade people and make quick decisions.

Introduction

This course aims to offer students a practical approach to Technical Writing, and provide a relevant, contemporary and authoritative introduction to the

dynamic field of technical communication that prepares them for Workplace Communication. Each unit in the syllabus is devised so as to include a writing component as well as an oral component.

The objectives of this course are to

i) expose students to workplace writing
ii) initiate them into the Process of Technical Communication
iii) enable the students to create clear, accurate, and succinct content
iv) enable students to produce documents reflecting different types of technical communication such as Abstracts, Proposals and Technical Reports through ample practice
v) enable students to adjust technical content to meet the needs of a specific target audience
vi) groom students in behavioral skills

Methodology

Written Communication Component

A Process- Genre methodology will be used in teaching the technical genres. This method would enable students to understand the use of particular lexico-grammatical patterns required of in the context of technical writing. They would learn to use language to express the particular communicative intent that is required of in the context of writing these genres.

Objectives of Writing Component

i) enable students to write clearly and succintly

ii) equip students with the ability to write technical genres

Oral Communication Component

The objective of including Oral Communication is to impart behavioral skills and prepare students to speak to a large group or team, keeping in mind the audience, context and purpose of communication. This Oral Communication component must enable students to speak in an organized and mature way, without any inhibitions. They will be groomed to relate their speech to their audience.

Objectives of Oral Communication Component

i) equip students with Behavioral skills
ii) prepare them for Oral presentations, and Group Discussions
iii) equip them with Interview skills

Syllabus Outline

Unit I

Writing Skills 1

1. Applications and Covering letters
2. Resume Writing
3. Verbal Ability
4. **Oral Communication** :Talking About Yourself

Unit II

1. Writing an SOP
2. Summarizing and Synthesizing Information
3. Oral Communication: Making Presentations

Unit III

1. Writing Project Proposals
2. Oral Communication: Group Discussions

Unit IV

1. Writing Project Reports
2. Oral Communication: Interview Skills

Unit V.

Behavioral Skills and Personality Development

1. Building a positive attitude, building a positive personality, Motivation, goal setting & values & vision
2. Problem Solving and Decision Making; Negotiation Skills through Role Play
3. Team Building and Leadership Abilities
4. Social Etiquette

REQUIRED TEXT AND MATERIALS

1. Ashraf Rizvi, M (2005). Effective Technical Communication, Tata Mc Graw Hill Publishing Company Limited, New Delhi.
2. Anderson, Paul V. (2003). Reports. In Paul V. Anderson's Technical Communication: A Reader-Centered Approach (5th ed..) (pp. 457-473). Boston: Heinle.
3. William S. Pfeiffer, (2010) Technical Communication: A Practical Approach (7th ed.). Prentice Hall

References

1. Burnett, Rebecca. Technical Communication. 5th Ed., Heinle, 2001
2. Bolter, Jay David. (2001). The late age of print. In Robert P. Yagelski's (Ed.) Literacies and

Technologies: A Reader for Contemporary Writers (135-145). New York: Longman.

3. Brandt, Deborah. (1998). Sponsors of literacy. College Composition and Communication 49.2, 165-185.
4. Gerson Sharon J. and Steven Gerson : Technical Writing Process and Product. 3rd edition, New Jersey: Prentice Hall 1999
5. Johnson-Sheehan, Richard. (2007). Starting Your Career. In Richard Johnson-Sheehan's Technical Communication Today (2nd ed.) (pp. 388-402). New York: Longman.
6. Markel, Mike. Technical Communication: Situations and Strategies (8th EDITION (2006-2007)
7. R. C. Sharma and K. Mohan, Business Correspondence and Report Writing, Third Edition, TMH, 2002. (Indian Edition)
8. M. Raman and S. Sharma, Technical Communication : Principles and Practices, OUP, 2004. (Indian Edition)

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III Year B.Tech EIE – II Sem	L	T/P/D	C
	0	3	2

(EIE1206) Industrial Instrumentation Laboratory

Course Objectives

- **To understand** the basic knowledge of measurement of Velocity, Acceleration, Vibration, Humidity, Density, Viscosity, Sound Level and Intensity of Light.
- **To understand** the construction, working and calibration of measuring instruments
- **To understand** various Industrial Bus Protocols

Course Outcomes

After completion of the course the student is able to:

- To have an adequate knowledge about various transducers.
- To have an idea about the standards of measuring device.
- To study about Speed, Precision Angular Velocity and calibration.
- To know about various types of measurements adopted in industry environment.

(Minimum 14 experiments should be completed)

1. Design and simulation of analog circuits using CAD Package.
2. Design of PCB's using Ultiboard Package and Fabrication of PCB
3. Linearization of Thermistor interfacing with a PC
4. Study of level/temperature/pressure/flow monitoring instrumentation using PLC
5. Measurement of Blood Pressure
6. Calibration of Pneumatic pressure to Current (P to I) and Current to Pneumatic Pressure (I to P) Converters
7. Measurement of RP using opto-coupler and comparing it with stroboscope
8. Measurement of precision Angular Velocity and RPM of a rotating Disk

9. Measurement of Velocity of liquid using Ultrasonic (Doppler Effect) method and also flow measurement
10. Measurement of Level using Capacitive Method
11. Displacement measurement using Inductive pickup and capacitive pickup
12. Measurement of Velocity, Acceleration and Vibration using Piezo-electric transducer
13. Measurement of Humidity
14. Measurement of intensity of Light
15. Measurement of Sound Level.
16. Measurement of Viscosity of Edible Oil using Redwood Viscometer
17. Measurement of Viscosity of Crude Oil using Saybolt Viscometer
18. ECG/EEG Monitor

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IV Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
	4	**0**	**4**

(EIE1110) Analytical Instrumentation

Course Outcomes:

Course Objectives

- Students will be introduced to a whole array of modern analytical instruments with the goal of providing them with the tools.
- The emphasis will be a "hands-on" approach with sample preparation, application, method development, data analysis and interpretation being key elements.
- **Interpret** data derived from any analytical instruments.
- **Appreciate** the basic concept, principles and terms of chromatography

Course Outcomes

After completion of the course the student is able to:

- Apply basic lab safety rules while working in analytical chemistry laboratories
- Apply basic analytical processes and sampling procedures and perform them in the lab.
- Apply the basic principles of spectroscopy and work in real time with it.
- Perform simple analytical procedures on given samples using Ultraviolet or Infrared Spectrophotometers leading to applied research.

UNIT I

Electrochemical Instruments

Basic concepts of Analytical Instrumentation, Electro chemical instruments- pH meter, Conductivity meter, Dissolved oxygen analyzers, sodium analyzers, silica analyzers

UNIT II

Spectrophotometers-I (Absorption)

Concepts of Spectrometry, Beer- Lambert's law-Derivation of Beer Lamberts Law- Problems associated with the Law. UV, VIS spectrophotometers – single beam and double beam instruments – Instrumentation associated with the above spectrophotometers – sources and detectors.

IR Spectrometers – sources and detector, Instrumentation associated with the above spectrophotometers, FTIR.

Spectrophotometers-II (Emission)

Flame emission and Atomic emission spectrophotometers – Sources for Flame Photometers, Online calorific value measurements.

UNIT III

Gas and Liquid Chromatographs

Chromatography – types- Basic principles of gas chromatography, liquid chromatography (HPLC) ---- different types of columns, detectors, recorders and associated equipment for Gas and Liquid Chromatographs and their applications

Principles of Nuclear Magnetic Resonance

Instrumentation associated with NMR spectrophotometer – Introduction to mass spectrophotometers, Introduction and Working Principle of Electron Spin Resonance (ESR)

UNIT IV

Gas Analyzers-I

Analysis using thermal conductivity principle, Katharometer – oxygen analyzers using paramagnetic principle, H_2S analyzer system.

Gas Analyzers-II

CO monitors, NO_x analyzers, Industrial analyzer circuits, Pollution Monitoring systems

UNIT V

Thermal Analyzers

Differential Scanning Calorimetry (DSC), Derivative Thermo Gravimetric Analyzers(DTGA).

Nuclear Radiation Detectors

Gas filled Detectors- GM counters, Scintillation counter, Ionization chamber, Proportional counter, solid state detector.

TEXT BOOKS

1. Handbook of Analytical Instrumentation, R.S. Khandpur, TMH.
2. Instrumental Method of Analysis- by Willard.H.H, Merrit L.L,Dean, D.VanNostrand, CBS publishing and Distributors, 6/e, 1995.
3. Principles of Instrumental Analysis- by Skoog D.A and West D.M, Holt Sounder publication,Philadelphia,1985.

REFERENCES

1. Process Measurement and Analysis- by B.G. Liptak, CRC Press
2. Instrument Technology- by Jones B.E, Butterworth Scientific Publications, London, 1987.

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IV Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
Open Elective	**4**	**0**	**4**

(EIE1113) Instrumentation Practices in Industries

Course Objectives

- **Identify** and quantitatively estimate different materials required for the manufacturing of Cement, Pulp, Paper, food, Power and pharmacy.
- **Understand** the principles of different manufacturing processes.
- **Recognize** these principles written in form of mathematical & chemical equations.
- **Apply** these equations to analyze problems by making good assumptions and learn systematic engineering method to solve practical industrial problems.

Course Outcomes

After completion of the course the student is able to:

- Apply fundamental knowledge of chemistry & instrumentation for modeling industrial engineering.
- Analysis of different Industrial engineering.
- Conduct experiments on pH, ORP, Distillation Column and interpreting data simulation model studies to prototype cases, as well as documenting them in engineering reports.
- Understand disasters caused by an incorrect nalysis/design in different Industrial engineering system.

UNIT I

Cement Industries

Corrosion Analyzer Porositester Compressive strength measurement, Blast Furnace Temperature Measurement using Radiation Pyrometers.

UNIT II

Pulp and Paper Industries

Manufacture of pulp: Raw materials, Pulping processes, Craft pulping, Soda pulping, Sulfite pulping, Semi chemical pulping, Mechanical and Thermo mechanical Pulping.

Manufacture of paper: Wet Processing, Fourdrinier Machine, Coated Papers, Speciality Papers.

Wet-end Instrumentation: Pressure, vacuum, temperature, liquid density, specific gravity, level, flow, consistency measurement, pH, Oxidation Reduction Potential (ORP) measurement, freeness measurement of the Pulp.

Dry-end Instrumentation: Moisture, basis weight, caliper, coat thickness, measurement of optical variables Brightness, Whiteness and Color.

UNIT III

Petroleum Industries

Unit Operations: Distillation, Drying Separation Measurements in refineries petrochemical industries – Differential pressure transmitter, Thermocouples Infrared Pyrometer, Mass flow meters, Potentiometric level Transmitter, Vacuum Measurement, Near Infrared Analyzer, Hydro Carbon Dew point meter IR Spectrometry, Mass Spectrometry, Flame Ionization Detectors, Chromatography.

UNIT IV

Nuclear Power Plant:

Introduction, The power plant scheme, Pressure, flow and level measurement, Vibration and expansion measurements, Analysis of impurities in cooling water, Flue Gas analysis, Ultrasonic Thermometry, Radiation Pyrometry, Emittance measurement.

UNIT V

Food Processing Industries:

Chromatography, Spectrometry – Mass Spectrometer, Toxicity meter.

Text Books

1. Chemical Process Industries, Austin G.T. Shreeves, McGraw-Hill International student edition, Singapore, 1985
2. Process measurement and analysis, Liptak B.G., Third edition, Chilton book Company, 1996.
3. Pulp and Paper Industry Technology & Instrumentation, Sankaranarayana, P.E., Kothari's Deskbook.
4. Principles of Industrial Instrumentation, D. Patranabis, Mc Graw Hill.

References

1. An Introduction to Paper Industry Instrumentation, John R Lavigne, Miller Freeman Publications, Califirnia, 1985 Series.
2. Mearsurement and Control in Papermaking, Robert J. McGill, Adam Hilger Limited, Bristol, 1980.
3. Process/ industrial instruments and controls hand book, Gregory K. McMillan, Doig;as M. Considine.
4. Instrumentation in process industries, Liptak B.G., Chilton book Company, 1994.

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IV Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
Open Elective	**4**	**0**	**4**

(CED1147) DISASTER MANAGEMENT

Course Objectives

- Understand the difference between a hazard and disaster
- Know about various disasters and their impacts
- Understand Different approaches of disaster risk reduction
- Understand Disaster risks in India

Course Outcomes

After going through this course the student will be able to

- Acquire the knowledge disaster Management
- Understand the vulnerability of ecosystem and infrastructure due to a disaster
- Acquire the knowledge of Disaster Management Phases
- Understand the hazard and vulnerability profile of India

UNIT-1

Introduction to disaster

Concepts and definitions (Disaster, Hazard, Vulnerability, Resilience, Risks)

UNIT-II

Disasters: Classifications, Causes, Impacts (including social, economic, political, environment, health, psychosocial, etc.)

Differential impacts-in terms of caste, class, gender, age, location, disability Global trends

in disasters. Urban disaster, pandemics, complex emergencies, Climate change

UNIT-III

Approaches to disaster Risk reduction

Disaster cycle-its analysis, phase, Culture of safety, prevention, mitigation and preparedness, community based DRR, Structural measures, roles and responsibilities of community. Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), states, center and other stake-holders.

UNIT-IV

Inter-relationship between Disaster and Development

Factors affecting Vulnerabilities, differential impacts, impact of development projects such as dams, embankments, change in land-use etc. Climate change Adaption. Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT-V

Disaster Risk Management in India

Hazard and vulnerability profile of India

Components of Disaster relief: Water, food, sanitation, shelter, health, waste management

Institutional arrangements (Mitigation, Response and Preparedness, DM Act Policy, Other related polices, plan, programmes and legislation)

Project Work :(Field Work, Case Studies)

The project/fieldwork is meant for students to understand vulnerabilities and to work on reducing disaster risks and to build a culture of safety. Projects must be conceived creatively based on the geographic location and hazard.

Suggested Reading list:

Alexander David, Introduction in 'Confronting Catastrophe', oxford University press, 2000

Andharia J. Vulnerability in disaster Discourse, JTCDM, Tata Institute of Social Sciences working paper no.8, 2008

Blaikie, P, Cannon T, Davis I, Wisner B 1997. At Risk Natural Hazards, Peoples' Vulnerability and Disaster, Rutledge.

Coppola P Damon, 2007. Introduction to International Disaster Management.

Carter, Nick 1991.Disaster Management: A Disaster Manager's Handbook. Asian Development Bank, Manila Philippines.

Cuny,F.1983. Development and Disasters, Oxford University Press

Govt.of India; Disaster Management Act 2005,Government of India, New Delhi.

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IV Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
Open Elective	**4**	**0**	**4**

(EIE1112) PC BASED INSTRUMENTATION

Course Objectives

- To **provide** and **ensure** a comprehensive understanding of using personal computers in measurement and control instrumentation.
- **To Learn** the process of collecting information/ data through PC from real world sources.
- **To Learn** remote and networked data acquisition and operating system.
- **To Learn** programmable logic controllers, and its application.

Course Outcomes

After completion of the course the student is able to:

- Complete knowledge of plc and their architecture And Applications in industry
- Student able to get knowledge of DCS and Applications in industry
- Student able to get Programming knowledge Of PLC/DCS.
- Various PLC's and DCS Architecture and its Hardware.

UNIT –I

Introduction to Computer Instrument Communication:

Personal Computer, Overview of operating System, I/O Ports, Plug-in-slots, PCI bus, Operators Interface. Computer Interfacing for Data Acquisition and Control – Interfacing Input Signals, Output system with continuous actuators. Data Acquisition and Control using Standard Cards: PC expansion systems, Plug-in Data Acquisition Boards; Transducer to Control room, Backplane bus – VXI.

UNIT –II

Programmable logic controller (PLC) basics:

Definition, Overview of PLC systems, input/output modules, Power supplies and Isolators.

Basic PLC programming:

Programming On-Off inputs/ outputs. Creating Ladder diagrams, Basic PLC functions, PLC Basic Functions, register basics, timer functions, counter functions.

UNIT – III

PLC intermediate and advanced functions:

Arithmetic functions, Number comparison functions, Skip and MCR functions, data move systems. Utilizing digital bits, sequencer functions, Matrix functions. PLC Advanced functions: Analog PLC operation, Networking of PLC,

UNIT –IV

Application of PLC:

Controlling of Robot using PLC, PID control of continuous processes, Continuous Bottle-filling system, Batch mixing system, 3-stage air conditioning system, Automatic frequency control of Induction heating

UNIT – V

Related Topics:

Alternate programming languages. Auxiliary commands and functions. PLC installation, troubleshooting and maintenance. Field bus: Introduction, concept. HART protocol: Method of operation, structure, and applications. Smart transmitters, smart valves and smart actuators.

Text Books

1. Programmable Logic Controllers – Principles and Applications, John. W .Webb Ronald A Reis , Fourth edition, Prentice Hall Inc., New Jersey, 1998.

2. Computer Control of Processes – M.Chidambaram. Narosa 2003

References

1. PC Based Instrumentation and Control Third Edition by Mike Tooley ; Elsevier.

2. PC Interfacing and Data Acquisition Techniques for Measurement, Instrumentation and Control. By Kevin James; Elsevier.

3. Practical Data Acquisition for Instrumentation and Control Systems by John Park and Steve Mackay.

4. Distributed Control Systems, Lukcas M.P, Van Nostrand Reinhold Co., New York, 1986.

5. Programmable Logic Controllers, Second edition, Frank D. Petruzella, Mc Graw Hill, Newyork, 1997.

6. Programmable Logic Controllers Programming methods and applications- Prentice Hall by
John R. Hackworth and Frederick D. Hackworth, Jr.

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IV Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
Elective -II	**4**	**0**	**4**

(EIE1115)AUTOMATION OF INDUSTRIAL PROCESSES

Course Objectives

- To make students understand the application of PC and other controllers.
- To make students understand different control system design.
- To make students understand the need for application of different controller to different processes

Course Outcomes

After completion of the course the student is able to:

- Understand the role of computer control in industrial process
- Appreciate the need of automatic control.
- Appreciate the need for Feed forward and adaptive controllers.
- Appreciate the working of PLC,SCADA and DCS.

UNIT – I

Introduction To Computer Control

Role of computers in the control of Industrial processes (plants). Elements of Computer Controlled Process / Plant. Classification – Batch, Continuous, Supervisory and Direct Digital Controls. Architecture – Centralized, Distributed and Hierarchical Systems. Man Machine or Human Computer Interface (HCI).Process Control Requirements of Computers. Process related variables.. Communications in Distributed control Systems.

UNIT – II

Control System Design

Control System Design – Heuristics, Structural Controllability and Relative Gain Array. Controller Design – Regulator design and other design considerations. Controller Tuning – P, PI, PID, and Ziegler-Nicholas method. Computer aided Control System Design.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 – III

Design of Feed Forward Controller

Block Diagram, Plant based Feed Forward, Delaying the command signal, Tuning and clamping the feed forward, Feed forward for double integrating plant.

UNIT – IV

Cascade, Predictive and Adaptive Control

Cascade Control – Dynamic response, Types, Implementation. Predictive Control – Model based and Multivariable System. Adaptive Control – Adjustment, Schemes, and Techniques.advanced strategies-Inferential Control. Intelligent Control. Statistical Process Control. Algorithms for Processes with Dead Time – Smith Predictor (SP), Analytical Predictor (AP). Optimal Control

UNIT – V

Distributed Digital Control

Programmable logic controllers (PLC)- Architecture , Selection. Overview of Distributed Digital Control System (DCS). DCS Software configuration. DCS Communication – Data Highway. DCS Supervisory computer Tasks. DCS Integration with PLCs and Computers. Applications-SCADA, Dataloggers, Data acquisition system

Text Books

1. Computer Aided Process Control – S.K.Singh. PHI 2004
2. Computer Control of Processes – M.Chidambaram. Narosa 2003.

References

1. Computer-based Industrial Control by Krishna Kanth. PHI 1997

2. Real Time Control: An Introduction – second edition - S.Bennett, Pearson Education India 2003.

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IV Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
Elective -II	**4**	**0**	**4**

(EIE1107) BIO-MEDICAL INSTRUMENTATION

Course Objectives

- **To identify** and obtain biological parameters and relationship between them.
- To u**nderstand** the principles involved in acquiring different bio-signals.
- **To represent** these principles in form of mathematical equations.

Course Outcomes

After completion of the course the student is able to:

- Apply fundamental knowledge of mathematics coupled with electronics.
- Use it for designing bio amplifiers for different applications.
- Understand or become aware of artifacts caused by an incorrect diagnosis of the symptoms through sample data.
- Apply these equations to analyze real time problems by making good assumptions and learn systematic engineering method design robust amplifiers.

UNIT – I:

Components of Medical Instrumentation System. Bio signals and their characteristics, Bio amplifier. Characteristics of Medical Instruments. Problems encountered with measurements from human beings.

Organization of cell. Nernst equation for membrane. Resting and Action Potential.

UNIT – II:

Bio Electrodes – Bio potential Electrodes and their classifications-External electrodes, Internal Electrodes-Biochemical Electrodes.

UNIT – III:

The Heart and Cardiovascular system- Heart Sounds- Mechanical function, Electrical Conduction system of the heart. Cardiac cycle. Relation between electrical and mechanical activities of the heart. Interpretation of ECG waveform with respect to electro mechanical activity of the heart.

UNIT – IV:

Cardiac Instrumentation: Blood pressure and Blood flow measurement. Specifications of ECG machine. Einthoven triangle, Standard 12-lead configurations, EEG and EMG- Neuro-Muscular Instrumentation: Specification of EEG and EMG machines. Electrode Placement for EEG and EMG recording, Interpretation of EEG and EMG.

UNIT – V:

Therapeutic equipment.: Pacemaker, Defibrillator, Shortwave diathermy. Hemodialysis machine.

Respiratory Instrumentation: Mechanism of respiration, Spirometry, Pneumotachograph Ventilators.

TEXT BOOKS:

1. Biomedical Instrumentation and Measurements – by Leslie Cromwell, F.J. Weibell, E.A. Pfeiffer, PHI.

2. Medical Instrumentation, Application and Design – by John G. Webster, John Wiley.

REFERENCES:

1. Principles of Applied Biomedical Instrumentation – by L.A. Geoddes and L.E. Baker, John Wiley and Sons.

2. Hand-book of Biomedical Instrumentation – by R.S. Khandpur, McGraw-Hill, 2003.

3. Introduction to Biomedical equipment technology-by Joseph Carr and Brown,

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IV Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
Elective - II	**4**	**0**	**4**

(ITD1106) COMPUTER NETWORKS

Course Objectives

- **Build** an understanding of the fundamental concepts of computer networking.
- **Familiarize** the student with the basic taxonomy and terminology of the computer networking area.
- **Introduce** the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
- **Allow** the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

Course Outcomes

After completion of the course the student is able to:

- Understand the Layered Architecture of Computer Networks.
- Learn various datalink protocols and algorithms
- Learn various routing protocols and algorithms.
- Apply TCP and UDP in real time applications.

UNIT I

DATA COMMUNICATIONS: Components – Direction of Data flow – networks – Components and Categories – types of Connections – Topologies –Protocols and Standards – ISO / OSI model

Physical layer: Digital transmission, multiplexing, transmission media, circuit switched networks, Datagram networks, virtual circuit networks, switch and Telephone networks.

UNIT II

Data link layer: Introduction, framing, Error – detection and correction – Parity – LRC – CRC – Hamming code, flow and error control, Noiseless channels, noisy channels, HDLC, point to point protocols. LAN - Ethernet IEEE 802.3 - IEEE 802.4 - IEEE 802.5 - IEEE 802.11

Medium Access sub layer: Random access, Controlled access, Channalization

UNIT III

Network layer: Logical addressing, internetworking, tunneling, address mapping, ICMP, IGMP, forwarding, Uni-cast routing protocols, multicast routing protocols.

UNIT iV

Transport Layer: Process to process delivery, UDP and TCP protocols, SCTP, Data traffic, congestion, congestion control, Qos, integrated services, differentiated services,QoS in switched networks.

UNIT-V

Application Layer: Domain name space, DNS in internet, electronic mail, SMTP,, FTP, WWW, HTTP, SNMP,network security, Cryptography.

TEXT BOOKS

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

REFERENCES

1. Data communications and computer Networks, P.C .Gupta, PHI.
2. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
3. Understanding communications and Networks, 3rd Edition, W.A. Shay, Cengage Learning.

4. *Computer Networking: A Top-Down Approach Featuring the Internet*. *James F*. *Kurose* & *Keith W*. *Ross*,3rd Edition, Pearson Education.
5. Larry L.Peterson and Peter S. Davie, “Computer Networks”, Harcourt Asia Pvt. Ltd., Second Edition.
6. William Stallings, “Data and Computer Communication”, Sixth Edition, Pearson Education, 2000.

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IV Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
Elective - III	**4**	**0**	**4**

(EIE1116) POWER PLANT INSTRUMENTATION

Course Objective:

- **To Understand** the working model of power plant
- **To Understand** the necessity of an instrumentation engineer in a power plant
- **To Understand** different components and their control in power plants.

Course Outcome:

After completion of the course the student is able to:

- Appreciate the power generation technique used in different types of power plants
- Appreciate different parameters and their control in the power plant
- Should understand and standby the saying “one watt saved = two watts generated”.
- Use suitable instruments to measure process variables in the plant

UNIT – I

An Overview of Power Generation

Brief survey of methods of power generation – hydro, thermal, nuclear, solar, wind and tidal etc.

Thermal power plants – building blocks – details of Boiler Processes – PI diagram of Boiler – Cogeneration.

UNIT – II

Parameters and Measurements

Electrical measurements – current – voltage – power – frequency - power factor – Tri-vector meter.

Non electrical measurements – flow of feed water, fuel, air and steam with correction factors for temperature – pressure – temperature – level – radiation detectors – smoke density measurement – dust monitor.

UNIT – III

Control Loops and Interlocks in Boiler

Combustion control – control of main header pressure – air fuel ratio control – furnace draft and excessive air control – drum level (three element control) – main and reheat steam temperature control – burner tilting up, bypass damper, super-heater, spray and gas recirculation control – B F P recirculation control – hot-well and de-aerator level control – pulverizer control – computers in power plants.

UNIT – IV

Turbine Monitoring and Control

Condenser vacuum control – gland steam exhaust pressure control – speed control – vibration control - shell temperature monitoring and control – lubricating oil temperature control – hydrogen generator cooling system.

UNIT – V

Analyzers in Power Plants

Thermal conductive analyzer – paramagnetic oxygen analyzer – infrared analyzer –spectrum analyzer – hydrogen purity meter – chromatography – pH meter – conductivity cell – fuel analyzer – brief survey of pollution monitoring and control equipment.

TEXT BOOKS

1. Modern Power Station Practice, Volume.6, Instrumentation, Controls and Testing, Pergamon Press, Oxford, 1971.

2. Power Plant Technology, Wakil M.M., McGraw Hill.
3. Standard Boiler operations-Questions and Answers., Elonka S.M and Kohal A.L.,– Tata McGraw Hill, New Delhi, 1994.

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IV Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
Elective - III	**4**	**0**	**4**

(EIE1117) TELEMETRY AND TELECONTROL

Course Objectives

- To study the concepts of classical telemetry systems
- To get an exposure to radio and satellite telemetry systems
- To learn the fundamentals of optical telemetering systems
- To understand the essential principles of telecontrol systems and installation.

Course Outcomes

After completion of the course the student is able to:

- Students will be able to apply techniques of telemetry and telecontrol.
- Applications of Telemetry and Telecontrol from a remote location.
- Use different communication technique to assist telemetry and telecontrol
- Able to design projects using Telecontrol and Telemetry concepts

UNIT – I

Telemetry Principles

Introduction, Functional blocks of Telemetry system, Methods of Telemetry – Non Electrical, Electrical, Pneumatic, Frequency

Symbols and Codes

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

UNIT – II

Frequency& Time Division Multiplexed Systems

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

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

UNIT – III

Satellite Telemetry

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

Modern Telemetry

Zigbee, Ethernet.

UNIT – IV

Optical Telemetry

Optical fibers Cable – Sources and detectors – Transmitter and Receiving Circuits, Coherent Optical Fiber Communication System.

UNIT – V

Telecontrol Methods

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

Text Books

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

References

1. Handbook of Telemetry and Remote Control – by Gruenberg L., McGraw Hill, New York, 1987.
2. Telemetry Engineering – by Young R.E., Little Books Ltd., London, 1988.
3. Data Communication and Teleprocessing System – by Housley T., PH Intl.,Englewood Cliffs, New Jersey, 1987.

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IV Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
Elective - III	**4**	**0**	**4**

(CSE1130) RELATIONAL DATA BASE MANAGEMENT SYSTEMS

Course Objectives

- To present an introduction to database management systems (DBMS) and relational data model.
- To provide an emphasis on how to organize, maintain and retrieve information efficiently and effectively from a DBMS.
- To introduce the concepts of transactions and transaction processing
- To present the issues and techniques relating to concurrency in multi-user database environments.

Course Outcomes

After going through this course the student will be able to

- Understand the fundamental concepts of database management. These concepts include aspects of database design, database languages, and database-system implementation.
- The students will be able to design and query databases, as well as understand the internals of databases.
- Define basic functions of DBMS & RDBMS.
- Describe database development process.

UNIT I

Introduction to Databases and Database Management System - Database system Applications - Advantages of DBMS over File System - Data Models – Instances and schema - View of Data - Database Languages -DDL-DML - Database Users and Administrator - Database System Structure.

UNIT II

Database Design and ER diagrams – Attributes and Entity Sets – Relationships and Relationship Sets – Constraints - Keys - Design Issues -

Entity-Relationship Diagram- Weak Entity Sets - Extended E-R Features - Database Design with ER model - Database Design for Banking Enterprise

UNIT III

Introduction to the Relational Model – Structure of RDBMS - Integrity Constraints over Relations – Enforcing Integrity Constraints – Querying Relational Data - Relational Algebra and Calculus.

Introduction to SQL- Data Definition commands, Data Manipulation Commands, Basic Structure, Set operations Aggregate Operations - Join operations - Sub queries and correlated queries, SQL functions , views ,Triggers.

UNIT IV

Functional Dependencies– Introduction , Basic Definitions, Trivial and Non trivial dependencies, closure of a set of dependencies, closure of attributes, irreducible set of dependencies- Schema Refinement in Database Design- Problems Caused by Redundancy – Decompositions – Problem Related to Decomposition –- Lossless Join Decomposition – Dependency Preserving Decomposition - FIRST, SECOND, THIRD Normal Forms – BCNF.

UNIT V

Transaction concept- Transaction state- Implementation of atomicity and Durability- Concurrent executions – Serializability, Recoverability

File Organization – Organization of records in file - Data Dictionary Storage – Indexing and Hashing – Basic Concepts , Ordered Indices, B^+Tree Index files.

TEXTBOOKS

1. Database System Concepts, Silberschatz, Korth , Fifth Edition, McGraw hill (1,2,3 & 5 Units)

2. Database Management Systems, Raghuramakrishnan, Johannes Gehrke, TATA Mc Graw Hill(1,2,3 & 5 Units)

3. Introduction to Database Systems, C.J.Date, Pearson Education (4th Unit)

REFERENCES

1. Fundamentals of Database Systems, Elmasri Navrate Pearson Education

2. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.

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IV Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
Elective – IV	**3**	**0**	**3**

(ECE1112) VLSI DESIGN

Course Objectives

- To **learn** the various fabrication steps of IC and come across basic electrical properties of MOSFET.
- To **study** the concepts of stick diagrams and layouts with the knowledge of MOS layers through design rules.
- To **study** gate level design of subsystems, integrated circuits
- To **learn** concepts of PLD's, design capture tools and CMOS testing.

Course Outcomes

After completion of the course the student is able to:

- Learn IC Fabrication process steps required for PMOS, NMOS, CMOS, BiCMOS and IdsVds relationship.
- Understand VLSI Design flow for fabrication of a chip , layout design rules, stick diagrams and scaling of MOS transistor.
- Learn the time delays, driving large capacitive loads, wiring capacitance, and design of different subsystems.
- Understand concepts of PLD's, CMOS testing, Design Strategies, verification, and CMOS Testing.

UNIT I

INTRODUCTION: Introduction to MOS Technology – MOS, PMOS, NMOS, CMOS and BiCMOS technologies, fabrication fundamentals: Oxidation, Lithography, Diffusion, Ion implantation, Metallization and Encapsulation.

BASIC ELECTRICAL PROPERTIES : Basic Electrical Properties of MOS ,CMOS and BiCMOS Circuits: Ids-Vds relationships, MOS transistor threshold Voltage, gm, gds, figure of merit w_o, Pass transistor, NMOS inverter, Various

pull ups, Determination of pull-up to pull-down ratio(Z_{pu} / Z_{pd}) , CMOS Inverter analysis and design, BiCMOS inverters, Latch-up in CMOS circuits.

UNIT II

VLSI CIRCUIT DESIGN PROCESSES : VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layouts, Lambda based design rules, Contact cuts , CMOS Lambda based design rules, Layout Diagrams for logic gates, Transistor structures, wires and vias, Scaling of MOS circuits- Scaling models, scaling factors, scaling factors for device parameters, Limitations of Scaling.

UNIT III

GATE LEVEL DESIGN AND LAYOUT: Architectural issues, Switch logic networks: Gate logic, Alternate gate circuit: Pseudo-NMOS , Dynamic CMOS logic. Basic circuit concepts, Sheet Resistance R_S and its concept to MOS, Area Capacitance Units, Calculations, The delay unit T, Inverter Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out, Choice of layers.

UNIT IV

SUBSYSTEM DESIGN: Subsystem Design, Shifters, Adders, ALUs, Multipliers: Array multiplier, Serial-Parallel multiplier, Parity generator, Comparators, Zero/One Detectors, Up/Down Counter, Memory elements.

SEMICONDUCTOR INTEGRATED CIRCUIT DESIGN: PLDs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, Design Approach.

UNIT V

VHDL SYNTHESIS: VHDL Synthesis, Circuit Design Flow, Circuit Synthesis, Simulation, Layout, Design capture tools, Design Verification Tools.

CMOS TESTING : CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Over view of Chip level Test Techniques and System-level Test Techniques, Layout Design for Improved Testability.

TEXTBOOKS

1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Dougles and A. Pucknell, PHI, Edition, 2005.
2. Moderan VLSI Design –Wayne Wolf, Pearson Education , 3rd Edition, 1997.
3. CMOS VLSI Design – A circuits and systems perspective, Neil H.E Weste , David Harris , Ayan Banerjee, pearson ,2009.

REFERENCES

1. CMOS logic circuit Design – John P. Uyemura , Springer , 2007
2. VLSI DESIGN – K.Lal Kishore , VSV Prabhakar – I.K..International ,2009
3. VLSI Design – A.Albert Raj, Latha PHI, 2008.
4. .Introduction to VLSI Design- Mead and Convey , BS Publcations, 2010.
5. VLSI Design – M. Michal Vai, CRC Press, 2009.

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IV Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
Elective – IV	**3**	**0**	**3**

(EIE1122) DIGITAL CONTROL SYSTEMS

Course Objectives

- To facilitate the knowledge of basic of digital control system for the real time analysis
- To analyze and design the controllers for digital sytems.
- To provide comprehensive knowledge of concepts of stability analysis and design of discrete time systems.
- To expose the students to the concepts of optimal control for discrete domain

Course Outcomes

After completion of the course the student is able to:

- Apply the modeling concepts to real time systems
- Do the stability analysis of a given systems
- Develop the control matrix to quantify the controller's performance.
- Develop suitable controllers for nonlinear systems.

UNIT-I

Z-PLANE Analysis of Discrete-Time Control System

Introduction to Digital Control System, Review of Z-Transforms, Z-Transform method for solving difference equations; Pulse transforms function, block diagram analysis of sampled – data systems, mapping between s-plane and z-plane. Modified Z- Transforms.

UNIT – II

State Space Analysis

State Space Representation of discrete time systems, Pulse Transfer Function Matrix solving discrete time state space equations, State transition matrix and it's Properties, Methods for Computation of State Transition Matrix, Discretization of continuous time state – space equations

UNIT – III

Controllability and Observability

Concepts of Controllability and Observability, Tests for controllability and Observability. Duality between Controllability and Observability, Controllability and Observability conditions for Pulse Transfer Function.

Stability analysis-Primary strips and Complementary Strips – Constant frequency loci, Constant damping ratio loci, Stability Analysis of closed loop systems in the Z-Plane. Jury stablility test – Stability Analysis by use of the Bilinear Transformation with Routh Stability criterion.

UNIT – IV

Design of Discrete Time Control System by Conventional Methods

Transient and steady – State response Analysis – Design based on the frequency response method –Bilinear Transformation and Design procedure in the w-plane, Lead, Lag and Lead-Lag compensators and digital PID controllers.

UNIT – V State Feedback Controllers and Observers

Design of state feedback controller through pole placement – Necessary and sufficient conditions, Ackerman's formula. State Observers – Full order, minimum order and Reduced order observers.

Text Books:

1. Discrete-Time Control systems - K. Ogata, Pearson Education/PHI, 2nd Edition
2. Digital Control and State Variable Methods by M.Gopal, TMH

References:

1. Digital Control Systems, Kuo, Oxford University Press, 2nd Edition, 2003.
2. Digital Control Engineering, M.Gopal

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IV Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
Elective - IV	**3**	**0**	**3**

(ITD1125) MANAGERIAL INFORMATION SYSTEMS

Course Objectives

- To understand the principles, functions, theories and practices of different management areas.
- To expose with a systematic and critical understanding of organizational theory, structures and design
- To comprehend conceptual models of strategic management and to familiarize with the tools of operations and project management.
- To understand the role of human relations in the management of operations.

Course Outcomes

After completion of the course the student is able to:

- Understand the principles, functions, theories and practices of different management areas and to provide them with practical exposure to cases of success/failure in business.
- Expose with a systematic and critical understanding of organizational theory, structures and design.
- Comprehend conceptual models of strategic management and to familiarize with the tools of operations and project management.
- Understand the role of human relations in the management of operations and to provide basic insights into contemporary management practices.

UNIT- I

Information systems in the enterprise: Why information systems, perspectives on information systems, contemporary approaches to information

systems, four major types of systems in organizations transaction processing systems, management information systems, decision support systems

Systems from a functional perspective: Sales and Marketing Systems, Human Resources Systems. Integrating functions and business processes.

UNIT- II

The Digital Firm, Electronic Business and Electronic Commerce : Internet technology and the digital firm, categories of electronic commerce, customer centered retailing, business-to-business electronic commerce, commerce payments, electronic business, management opportunities, challenges and solutions.

UNIT- III

The wireless revolution: business value of wireless networking, wireless transmission media and devices, cellular network standards and generations, wireless computer networks and internet access, wireless technology in the enterprise.

Security and control: system vulnerability and abuse, business value of security and control, establishing a management framework for security and control, technologies and tools for security and control.

UNIT IV

Enterprise Applications and Business Process Systems: What are enterprise systems, How enterprise systems work, supply chain management systems, customer relationship management systems, enterprise integration trends.

Redesigning the organizations with information systems : systems as planned organizational change, business process reengineering and process improvement, overview of system development, alternative systems building approaches – traditional systems life cycle, prototyping, end user development, application software package and outsourcing.

UNIT V

Managing change and international information systems: The importance of change management in information systems success and failure, managing implementation, the growth of international systems, organizing international

information systems, managing global systems, technology issues and opportunities for global value chains.

TEXT BOOK

1. Management Information Systems Kenneth - C. Laudon, Jane P. Laudon & VM Prasad, 9/e, Pearson
Education, 2005.

REFERENCES

1. Management Information Systems - Effy Oz, Third Edition, Thomson, 2002.
2. Information Technology-Strategic Decision Making for Managers - M Henry C.Lucas, Jr., John Wiley & Sons, Inc, 2005.
3. Information Systems Today - Jessup &Velacich, PHI, 2004.
4. Management Information Systems - Sadagopan, PHI, 2004.
5. Information Systems, Pearson Education - Steven Alter, Fourth Edition, 2004.
6. Management Information Systems - W S Jawadekar, TMH, Second Edition, 2002.

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IV Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(EIE1207) ANALYTICAL INSTRUMENTATION LABORATORY

Course Objectives

- Students will be introduced to a whole array of modern analytical instruments with the goal of providing them with the tools.
- The emphasis will be a "hands-on" approach with sample preparation, application, method development, data analysis and interpretation being key elements.
- **Interpret** data derived from any analytical instruments.
- **Appreciate** the basic concept, principles and terms of chromatography

Course Outcomes

After completion of the course the student is able to:

- Apply basic lab safety rules while working in analytical chemistry laboratories
- Apply basic analytical processes and sampling procedures and perform them in the lab.
- Apply the basic principles of spectroscopy and work in real time with it.
- Perform simple analytical procedures on given samples using Ultraviolet or Infrared Spectrophotometers leading to applied research.

(minimum 14 experiments should be completed)

1. Gas analyzers.
2. Gas and liquid chromatography.
3. Spectrometer: UV and VIS spectrometer.
4. Spectrometer: IR and FT IR Spectrometer.
5. Flame photometer.
6. Measurement of calorific value.

7. Mass spectrometer.
8. pH measurement.
9. Interfacing of ADC to PC and observe the data.
10. Interfacing of DAC to PC and generate various types of signals.
11. Serial communication through RS-232C between μCs / PCs.
12. Data transfer through IEEE-1394 (fireware) interface.
13. Data Acquisition System
14. Nuclear radiation detector.
15. Water Purity meter
16. Digital Conductivity meter
17. Digital Turbidity meter

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IV Year B.Tech EIE – I Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(EIE1208) Virtual Instrumentation Laboratory

Course Objectives

- **To acquire** the concepts towards measurement and automation through LabVIEW.
- **To acquire** knowledge about how to control an external measuring device by interfacing a computer.
- To be **competent** in data acquisition and instrument control.
- **To provide** knowledge on developing different applications in Digital image processing ,control system, signal processing, and in simulation.

Course Outcomes

After completion of the course the student is able to:

- To create virtual instruments using LabVIEW software and implement controllers to control prototyped real time process.
- To acquire signals using DAQ devices, and rig up circuits using NI ELVIS and interface them with LabVIEW.
- To develop digital signal processing applications using SPEEDY 33
- To Create and edit image processing applications using IMAQ and vision assistant.

(minimum 14 experiments should be completed)

1 Introduction to LabVIEW
   I. Front Panel, Block Diagram, Icon and Connector Pane
   II. Getting Started with DAQ
2 Channels and Tasks in NI-DAQmx

I. Launch the DAQ Assistant Express VI
II. Create the Task
III. Configure the Task
IV. Test the Task
V. Edit the Task
VI. Generate Code

3 Configuring Front Panel Objects
4 Using X Controls
5 Configuring Front Panel Objects
6 Implementing book and real time examples using control system tool box
7 Implementing book and real time examples using PID tool box
8 Implementing book and real time examples using image processing tool box.
9. Implementing book and real time examples using signal processing tool box
10 Implementation of remote process control using CFP
11 Implementing real time process control using cDAQ
12 Real time image acquisition using IMAQ
13 Real time signal processing and control using Speedy 33
14 Implementation and testing of electronic circuits using NI ELVIS
15 Implementation of Inverted pendulum concept using NI ELVIS and LabVIEW

Pratice: Simulation through LabVIEW software.

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IV Year B.Tech EIE – I Sem	L	T/P/D	C
	0	6	2

(EIE1301) INDUSTRY ORIENTED MINI PROJECT

Course Objectives:

- Train the students to analyse, design, and develop novel products and offer solutions for simple engineering problems.
- Write a technical report on the product or engineering problem solved
- Orally present the technical report in a stipulated time

Course Outcomes:

- Acquaint with the basic principles.
- Translate the basic principles of Instrumentation into a design
- Develop a small module based on this design.
- Communicate the relevance of the product to the end user.

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IV Year B.Tech EIE – II Sem	**L**	**T/P/D**	**C**
	3	**0**	**3**

(EIE1118) ROBOTICS AND AUTOMATION

Course Objectives

- Classification by coordinate system and control system
- Different types Power Sources and Sensors
- Classification of Manipulators, Actuators And Grippers
- Knowledge on kinematics and Applications of different Robots

Course Outcomes

After completion of the course the student is able to:

- The students will be able to acquire knowledge on different types of Power Sources (actuators) and Sensors, Classification of Manipulators, Actuators and Grippers.
- The students will be able to analyze the direct and the inverse kinematic problems and calculate the manipulator dynamics
- The students will be able to able to plan trajectory of a robot arm.
- The students will be able to acquire knowledge on different applications of various types of robots.

UNIT I

Basic Concepts & Power Sources

Fundamentals:

An over view of Robotics, classification of Robots, Robot Components, Robot degrees of freedom, Robot Joints, Robot Coordinates, Robot reference frames, Programming modes, Robot Characteristics.

Actuators:

Characteristics of activating system, comparison of activating system Hydraulic devices, Pneumatic devices, electric motors, magnetostrictive actuators.

UNIT II

Sensors, **Manipulators and Grippers**

Sensors: Sensors characteristics, Position sensors, velocity sensors, acceleration sensors, torque sensors, micro switches, lighten infrared sensors, touch and tactile sensors, proximity sensors, range finders.

Manipulators: Construction of Manipulators, Manipulator Dynamic and Force Control, Electronic and Pneumatic manipulators.

Grippers: Robot end effectors

Classification, drive system for Gripper, Mechanical Grippers, Magnetic Grippers, Vacuum Grippers, Adhesive Grippers, Hooks, Scoops and other Miscellaneous Devices, Gripper force Analysis and Gripper Design, Active and passive Grippers.

UNIT III

Kinematics & Path Planning

Robots as mechanisms, matrix representation, homogeneous transformation matrices, inverse of transformation of matrices, forward and inverse kinematics of robots, denavit-hartenberg representation of forward kinematics equations of robots, the inverse kinematic solution of robots, inverse kinematic programming of Robots, Jacobian, Differential motions of a frame, interpretation of the differential change, differential changes between frames, differential motions of a robot and its handframe, lagrangian mechanics, effective moments of a inertia, dynamic equations for multiple degree of freedom robot, static force analysis of robots.

UNIT IV

Low level and high level vision

Image acquisition, Illumination Techniques, Imaging Geometry, Some Basic Relationships between Pixels, Segmentation, Description, Segmentation and Description of 3-D Structures, Recognition, Interpretation.

UNIT V

Robot Applications

Material Transfer and Machine loading/unloading: General Considerations in Robot Material Handling, Material Transfer application, Machine loading and unloading. Liquid handling and pumping.

Processing operations: Spot welding, Continuous Arc Welding, Spray Coating, other processing operations using Robots,

Assembly and Inspection: Assembly and Robot Assembly automation, Parts Presentation methods, AsSembly operations, compliance and the Remote Center Compliance (RCC) Device, Assembly system configuration, Adaptable-Programmable assembly system, Designing for Robotic Assembly, Inspection Automation.

Text Books

1. Introduction to Robotics, Analysis, System, Applications by Saeed B. Niku.-PHI
2. Robotics / Fu K S/ McGraw Hill.
3. Industrial Robotics / Groover M P /Pearson Edu.

References

1. Fundamentals of Robotics Analysis and control. By Robert J.Schelling, PHI
2. I Robotics Technology and Flexible Automation / SR Deb
3. Robotic Engineering / Richard D. Klafter, Prentice Hall

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IV Year B.Tech EIE – II Sem	**L**	**T/P/D**	**C**
Elective – V	**3**	**0**	**3**

(EIE1119) FIBER OPTIC AND LASER INSTRUMENTATION

Course Objectives

- **To understand** the principles of optics and lasing action, Design of lasers.
- To a**pply** the knowledge of Optics to fibers and understand the different industrial applications of Optical Fibers.
- **To Learn** the various applications of Lasers in Instrumentation.
- **To understand** the Opto-Electronic devices and their principles of operation along with their applications.

Course Outcomes

After completion of the course the student is able to:

- Apply fundamental knowledge of Optics and lasers to design application specific optical fiber.
- Develop different optical source
- Apply Lasers in Instrumentation for the measurement of Industrial parameters like Pressure, temperature, Level and find the solutions for the errors.
- Understand the advantages of using Lasers in the measurements.

UNIT – I

Optical Fibers and Their Properties

Introduction to optical fiber - fiber characteristics - principles of light propagation through a fiber - Different types of fibers and their properties - Losses in the optical fiber - Dispersion - advantages and disadvantages of optical fibers.

UNIT – II

Opto-Electronic Components

Optical sources: LED, LD - Optical detectors: PIN, APD - Electro-optic, Magneto optic and Acousto-optic Modulators.

UNIT – III

Industrial Applications of Optical Fibers

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

Introduction to lasers - Laser characteristics – Laser configuration – Three level and four level lasers – Q-switching – Mode locking – Types of lasers: Gas lasers, Solid lasers, Liquid lasers and Semiconductor lasers

UNIT–V

Laser instrumentation

Industrial applications of lasers – Lasers for measurement of distance, length, velocity, acceleration, current, voltage and atmospheric effect - Bio-medical applications - Holography: Principle, Methods, Holographic Interferometers and applications.

TEXT BOOKS

1. 'Optical Fiber Communication – Principles and Practice', J.M. Senior, , Prentice Hall of India, 1985.

2. 'Introduction to Opto Electronics', J. Wilson and J.F.B. Hawkes, Prentice Hall of India, 2001.

3. Lasers: Theory and Applications – by Thyagarajan K. and Ghatak A.K., Plenum Press

REFERENCES

1. Understanding Fiber Optics, 4th or 5th edition; Jeff Hecht; Prentice Hall publishers

2. 'Optical Fibre Communication and Sensors', M. Arumugam, Anuradha Agencies, 2002.

3. 'Optical Fibre Communication', G. Keiser, 'McGraw Hill, 1995.

4. Monte Ross, 'Laser Applications', McGraw Hill, 1968

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IV Year B.Tech EIE – II Sem	**L**	**T/P/D**	**C**
Elective – V	**3**	**0**	**3**

(EIE1120) MICRO ELECTROMECHANICAL SYSTEMS (MEMS)

Course Objectives:

- **Acquire** knowledge about MEMS devices and their applications in various domains.
- **Understand** the techniques to fabricate MEMS devices.
- **Learn** the design considerations for MEMS devices and Microsystems.
- **Learning** to characterize Microsystems using optical and electron microscopy and other techniques.

Course Outcomes

After completion of the course the student is able to:

- Complete knowledge of smart sensors/Actuators and their Applications in industry
- Student able to get knowledge about Fabrication of Micro Chips
- Student able to understand Lithography, LIGA Process, Microstereolithography fabric techniques.
- Bulk Micromachining and Surface Micromachining of MEMS Devices

UNIT I

Fundamentals of MEMS

Overview of MEMS and Microsystems, Materials for MEMS and Microsystems: silicon, Silicon compounds, silicon piezoresistors, polymers, packaging materials, material characterization techniques - SEM, optical microscopy, XRD, IR, ESCA, SIMS.

UNIT II

MEMS Technology

Surface micromachining, Bulk micromachining, Deep Reactive Ion Etching, Bending of thin plates, mechanical vibrations, thermomechanics, fracture mechanics, thin film mechanics.

UNIT III

Scaling and Stress Analysis

Overview of finite element stress analysis scaling laws in miniaturization: scaling in geometry, scaling in

Electrostatic forces, scaling in electromagnetic forces, scaling in electricity.

UNIT IV

Materials for MEMS & Microsystems and their fabrication

Substrates and Wafers, Active substrate materials, Silicon as a substrate material, Silicon compounds, Silicon Piezoresistors, Gallium Arsenide, Quartz, Piezoelectric Crystals and Polymers, Photolithography, Ion implantation, Diffusion and oxidation, Chemical and Physical vapor deposition, etching, Surface Micromachining, The LIGA Process.

UNIT V

Process modeling and Applications of MEMS

Device layout, cross-section viewing, photomask generation

Design examples (any two in details): accelerometers, gyroscopes, infrared sensing array, RF MEMS, and Optical MEMS. Reliability Overview Design Rules and DRC

Text / Reference books:

1. An Introduction to Microelectromechanical Systems Engineering, by Nadim Maluf

2. The Micromachined TransducersSourcebook, by Gregory T.A. Kovacs, McGraw-Hill, Inc., 1998.

3. Microsystem Design, by Stephen D. Senturia, Kluwer Publishers, 2001

4. Fundamentals of Microfabrication, by Marc Madou

5. MEMS and Microsystems Design and Manufacture by Tai-Ran Hsu, Tata McGraw-Hill

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IV Year B.Tech EIE – II Sem	**L**	**T/P/D**	**C**
Elective – V	**3**	**0**	**3**

(CSE1121) CYBER SECURITY

Course Objectives

- Understand security concepts, Ethics in Network Security.Analyze the tradeoffs inherent in security, Understand the basic categories of threats to computers and networks and Comprehend security services and mechanisms in the network protocol stack
- Discuss issues for creating security policy for a large organization, Defend the need for protection and security, and the role of ethical considerations in computer use
- Describe efficient basic number-theoretic algorithms, including greatest common divisor, multiplicative inverse mod n, and raising to powers mod n.
- Describe at least one public-key cryptosystem, including a necessary complexity-theoretic assumption for its security.

Course Outcomes

After completing this course the student will be able to

- Design a security solution for a given application.
- Analyse a given system with respect to security of the system.
- Should be able to identify network security threats and determine efforts to counter them
- Should be able to write code for relevant cryptographic algorithms, Should be able to write a secure access client for access to a server

UNIT I.

INTRODUCTION: Introduction and Overview of Cyber Crime, Nature and Scope of Cyber Crime, Types of Cyber Crime: Social Engineering, Categories of Cyber Crime, Property Cyber Crime. CYBER CRIME ISSUES: Unauthorized

Access to Computers, Computer Intrusions, White collar Crimes, Viruses and Malicious Code, Internet Hacking and Cracking, Virus Attacks, Pornography, Software Piracy, Intellectual Property, Mail Bombs, Exploitation ,Stalking and Obscenity in Internet, Digital laws and legislation, Law Enforcement Roles and Responses. Security Policy Design, Designing Security Procedures, Risk Assessment Techniques, Security standards, Biba Model, Chinese wall, Bell La Pedula Model.

UNIT II:

SERVICE DELIVERY PROCESS- Service Delivery Process, Service Level Management, Financial Management, Service Management, Capacity Management, Availability Management.

SERVICE SUPPORT PROCESS- Service Support Process, Configuration Management, Incident Management, Problem Management, Change Management, Release Management.

UNIT III:

STORAGE MANAGEMENT- Backup & Storage, Archive & Retrieve, Disaster Recovery, Space Management, Database & Application Protection, Bare Machine Recovery, Data Retention

SECURITY MANAGEMENT- Security, Computer and internet Security, Physical Security,Identity Management, Access Management. Intrusion Detection, Security Information Management.

UNIT IV:

Cyber Forensics- Introduction to Digital Forensics, Forensic Software and Hardware, Analysis and Advanced Tools, Forensic Technology and Practices, Forensic Ballistics and Photography, Face, Iris and Fingerprint Recognition, Audio Video Analysis, Windows System Forensics, Linux System Forensics, Network Forensics Evaluation of crime scene and evidence collection ,Usage of tools for disk imaging and recovery processes.

UNIT V

Introduction to Information Security Standards , Laws and Acts: Laws and Ethics, Digital Evidence Controls, Evidence Handling Procedures, Basics of Indian Evidence ACT IPC and CrPC , Electronic Communication Privacy ACT, Legal Policies,ISO 27001,PCI DSS,IT Act, Copy Right Act.

Textbooks:

1. Nelson Phillips and Enfinger Steuart, “Computer Forensics and Investigations”, Cengage Learning, New Delhi, 2009.
2."Management of Information Security", M. E. Whitman, H. J. Mattord, Nelson Education / CENGAGE Learning, 2011, 3rd Edition.
3. "Guide to Computer Forensics and Investigations", B. Nelson, A. Phillips, F. Enfinger, C. Steuart, Nelson Education / CENGAGE Learning, 2010, 4th Edition.
4. Goel Ritendra*, Computer Application in Management*, New Age International Publishers, New Delhi.
5. Chowdhury G.G.*, Text Retrieval Systems in information Management*, New Age International Publishers, New Delhi.

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IV Year B.Tech EIE – II Sem	**L**	**T/P/D**	**C**
Elective – VI	**3**	**0**	**3**

(EIE1121) Pharmaceutical Instrumentation

Course Objectives

- **To understand** the working pharmaceutical industry
- **To understand** the necessity of a instrumentation engineer pharmaceutical industry
- **To understand** different components and their control in pharmaceutical industry.

Course Outcomes

After completion of the course the student is able to:

- Appreciate the concept of analytical instrumentation learned during previous semester.
- Appreciate the necessity of homogenization of mixture and size reduction.
- Apply instrumentation technique to different process involved
- Appreciate evaporation, distillation and filtration process involved in pharma industries.

UNIT-I

Introduction: Pharma Industries Basic Processors and Instrumentation Techniques, Process Analysis Technology(PAT).

Filtration:

Classification of Filtration, Mechanism of Filtration, Filter media, Filter Aids, Pre treatment of materials, small scale filtration methods, filtration equipment, filter presses, Leaf filters, stacked disc filters, meta filters, Rotary continuous filters, other methods, ceramic filters, seitz filters, sintered (fritted) Glass filters, Membrane filters, factors affecting the rate of filtration, filter operation, theory of filtration, Limitations of filter theory.

Centrifugation:

General principles, theoretical aspects, classification, Laboratory equipment, Large scale equipment, Semicontinuous centrifuge, equipment with non-

perforated basket, de laval clarifier, vertical solid bowl centrifuges, continuous centrifuges.

Theory of filtration, filter aids, filter media, industrial filters including filter press, rotary filter, edge filter, etc. Factors affecting filtration, mathematical problems on filtration, optimum-cleaning cycle in batch filters. Principles of centrifugation, industrial centrifugal filters, centrifugal filters, and centrifugal sedimeters.

UNIT-II

Crystallization

Introduction, Crystal forms and crystal Habit, classification of crystallizers, tank crystallizers, agitated batch crystallizers, Swenson Walker Crystallizer, others, Krystal Crystallizer, Vacuum Crystallizer without External Classifying seed Bed, theoretical aspects of Crystallization, Calculation of yields, theory of **Crystallization. The miers super saturation theory, limitations of the miers theory, rate of crystal growth,** Caking of crystals.

Characteristics of crystals like; purity, size, shape, geometry, habit, forms, size and factors affecting it. Solubility curves and calculation of yields, Material and heat balances around Swenson Walker Crystallizer. Super saturation theory and its limitations, Nucleation mechanisms, crystal growth. Study of various types of crystallizers, tanks, agitated batch, single vacuum, circulating magma and crystal crystallizers. Caking of crystals and its prevention. Numerical problems on yields.

UNIT-III

Humidity control and Refrigeration

Basic concepts and definition, wet bulb temperature, adiabatic cooling lines, use of Humidity chart, determination of humidity, air conditioning, humidification and humidifying equipment, dehumidifiers. Introduction, refrigeration equipment, coefficient of performance and refrigerants, Brine systems, refrigeration load, absorption systems.

Evaporation and Distillation Heat Processes :

Factors affecting evaporation, study of evaporating stills and evaporating pans, heat transferring evaporators, vapor compression evaporators and evaporation

under reduced pressure. Distillation: Importance of distillation in Pharmacy, methods of distillation. Brief introduction to freeze drying, sublimation, desiccation and exsiccation, efflorescence and its importance.

Unit- IV

Size Reduction and Separation

Introduction, mechanism and principles of size reduction, classification of size reduction equipment, law of size reduction, large equipment, mills using impact force for size reduction, cage mills, pin mills, fluid energy or jet mills, attrition and grinding mills tumbling mills. Ball mills and tube mills, practical size classifiers used with grinding mills, wet classifiers, non-rotary ball and bead mills, dry vs wet grinding, end runner mill, edge runner mills, disc attrition mills, dispersion and colloid mills, roller mills, size reduction combined with other operations, factors influencing choice of size reduction machinery, changes resulting in the material due to size reduction.

size separation sieving, Screening equipment, sedimentation, screen analysis Definition, objectives of size reduction, factors affecting size reduction, laws governing energy and power requirements of a mill, types of mills including ball mill, hammer mill, fluid energy mill etc. Various methods and equipments employed for **size separation**, centrifugal elutriation, microscopic methods.

UNIT-V

Mixing and Homogenization

Introduction, equipment for4 mixing of miscible liquids, mixing of a soluble solid with a low viscon liquid etc., mixing solids with solids, equipment, consideration while choosing solids mixing equipment, theory of mixing, mixing solids with liquids, mixing miscible liquids, mixing viscous masses, mixing of immiscible liquids, equipment for emulsification.

Theory of mixing, solid solid, solid liquid and liquid liquid mixing equipment, double cone, twin-shell, silverson mixer, colloid mill, sigma blade mixer, planetary mixer, propeller mixer and turbine mixer.Semi solid mixing, Triple roller mill.

Text books:

1 Pharmaceutical Engineering . K. Samba Murthy,

2. Pharmaceutical Engineering CVS Subhramanyam,.

3. Tutorial Pharmacy, S.J. Carter, Cooper and Gunn's, 6th ed., CBS publisher, Delhi.

Reference Books:

1. Perry's Handbook of Chemical Engineering.

2. Unit Operations by Mc Cabe & Smith.

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IV Year B.Tech EIE – II Sem	**L**	**T/P/D**	**C**
Elective – VI	**3**	**0**	**3**

(ECE1113) DIGITAL IMAGE PROCESSING

Course Objectives

- To **introduce** fundamentals of digital image processing and study image transforms
- To **demonstrate** digital image processing techniques in spatial and frequency domains
- To **study** and **compare** various image compression algorithms
- To **study** advanced image analysis methods: image segmentation, morphological image processing, & image restoration

Course Outcomes

After completion of the course the student is able to:

- Understand the basic principles of digital image processing and perform image transforms
- Understand and perform basic image processing methods such as Image filtering operations, Image enhancement
- Analyze and compare various image compression techniques and their applications
- Design and implement various algorithms for image analysis

UNIT I

Fundamentals of Image Processing: Digital Image Fundamentals, Basic steps of Image Processing System, Sampling and Quantization of an image, relationship between pixels, Imaging Geometry.

Image Transforms: 2 D- Discrete Fourier Transform, Discrete Cosine Transform (DCT), Haar Transform, Hadmard Transform, Hotelling Transform and slant transform.

UNIT II

Image Enhancement: Spatial domain methods: Histogram processing, Fundamentals of Spatial filtering, Smoothing spatial filters, Sharpening spatial filters.

Frequency domain methods: Basics of filtering in frequency domain, image smoothing, image sharpening, Selective filtering.

UNIT III

Image Segmentation: Segmentation concepts, Point, Line and Edge Detection, Edge Linking using Hough Transform, Thresholding, Region Based segmentation.

Wavelet based Image Processing: Introduction to wavelet Transform, Continuous wavelet Transform, Discrete wavelet Transform, Filter banks, Wavelet based image compression

UNIT IV

Image Compression: Image compression fundamentals - Coding Redundancy, Spatial and Temporal redundancy, Compression models: Lossy and Lossless, Huffman coding, Arithmetic coding, LZW coding, Run length coding, Bit plane coding, Transform coding, Predictive coding, JPEG Standards.

UNIT V

Image Restoration: Image Restoration Degradation model, Algebraic approach to restoration, Inverse Filtering, Least Mean square filters.

Morphological Image Processing: Dilation and Erosion, Opening and closing, the hit or miss Transformation, Overview of Digital Image Watermarking Methods

TEXT BOOKS:

1. Digital Image Processing- Rafael C. Gonzalez and Richard E.Woods, 3rd Edition, Pearson, 2008.
2. Digital Image Processing- S.Jayaraman, S Esakkirajan, T Veerakumar, TMH, 2010.

REFERENCES:

1. Digital Image Processing-William K.Pratt,3rd Edition, John Willey, 2004.
2. Fundamentals of Digital Image Processing-A.K.Jain, PHI, 1989.
3. Digital Image Processing using MATLAB - Rafael C. Gonzalez, Richard E.Woods and Steven L.Edding 2nd , TMH. 2010.
4. Digital Image Processing and Computer Vision – Somka, Hlavac, Boyl, Cengage Learning, 2008.
5. Introduction to image Processing and Analysis – John C. Russ, J. Christian Russ, CRC Press, 2010

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IV Year B.Tech EIE – II Sem	**L**	**T/P/D**	**C**
Elective - VI	**3**	**0**	**3**

(ECE1124) EMBEDDED REAL TIME OPERATING SYSTEMS

Course Objectives

- Learn the general embedded system concepts
- Understand design of embedded hardware and software development tools
- Learn the basics of OS and RTOS
- Describe key issues such as CPU scheduling, memory management, task synchronization, and file system in the context of real-time embedded systems.

Course Outcomes

After completing this course the student will be able to

- Understand and design real time and non real time embedded systems
- Define the unique design challenges of real-time systems and program them.
- Understand unique characteristics of RTOS and use RTOS to build an embedded real-time system

Gain knowledge and skills necessary to design and develop embedded applications based on real-time operating systems

UNIT I

FUNDAMENTALS OF EMBEDDED SYSTEMS

Definition – Classification of Embedded Systems - Processors in the system - Other Hardware units. Software components - Examples for embedded systems, Design issues and trends

UNIT II

EMBEDDED HARDWARE DEVELOPMENT ENVIRONMENT

Processor Architecture- Structured units of a processor - Processor selection factors. Common memory devices - Memory selection - Memory map - Internal

devices & I/O devices, Serial devices - Parallel port devices, Timer and Counting devices - Direct memory access, Communication Interface Standards,.

UNIT III

EMBEDDED SOFTWARE DEVELOPMENT ENVIRONMENT '

Embedded System Development Process, Embedded Operating systems, Types of Embedded Operating systems, Host and Target machines, Linkers/Locators for embedded software, getting embedded software into the target system, Testing on host machine.

UNIT IV

REAL TIME OPERATING SYSTEMS CONCEPTS -I

Typical OS structure - RTOS structure - The context of its use - Schedule management for multiple tasks - Scheduling in real time - RTOS task scheduling models – Round Robin, Round Robin with Interrupts, Priority driven-Preemptive and Non-preemptive scheduling

UNIT V

REAL TIME OPERATING SYSTEMS CONCEPTS -II

Tasks and Task states, Tasks and Data, Semaphores and shared data, Message queues, Mailboxes and Pipes, Timer functions, events, Memory management, Interrupt routines in an RTOS environment.

Case study of RTOS using MUCOS. Case study for RTOS based programming - Coding for Automatic Chocolate vending machine using MUCOS.

TEXT BOOKS

1. An Embedded Software Primer – David E. Simon, Pearson Ed., 2005.
2. Embedded systems - architecture, programming and design - Raj Kamal; Tata McGraw Hill

REFERENCES

1. Real time Systems", J. W. S. Liu, Pearson
2. The 8051 Microcontroller & Embedded Systems using Assembly and C by Ayala & Gadre, Cengage Publications

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IV Year B.Tech EIE – II Sem	L	T/P/D	C
	0	3	2

(EIE1302) TECHNICAL SEMINAR

Course Objective:

- Prepare students to acquire the learning culture to get knowledge various technical topics
- Prepare a document of latest technological development
- Orally present the study report in stipulated time

Course Outcomes:

At the end of the seminar presentation, student is able to

- get knowledge of various Technical topics
- increase their oratory skills
- Learn how to address a group
- Present a technical report

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IV Year B.Tech EIE – II Sem	L	T/P/D	C
	0	3	2

(EIE1303) COMPREHENSIVE VIVA

Course Objectives:

- Review technical knowledge acquired through the program to face technical competitions and interviews.

Course Outcomes:

At the end of the comprehensive viva, student is able to

- Review the technical knowledge obtained in the subjects related to core engineering program.
- Review the technical knowledge obtained in the subjects related to interdisciplinary subjects of the program.
- Orally present the practical knowledge obtained from Lab courses.
- Present the skills required to face any technical interview.

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IV Year B.Tech EIE – II Sem	**L**	**T/P/D**	**C**
	6	**12**	**12**

(EIE1304) MAJOR PROJECT

Course Objectives:

- Train the students in engineering practices to analyze, design, and develop novel products and offer solutions for society and industry specific processes.
- Acquire the skills to work and lead a team
- Develop a technical document for the product developed
- Orally present the study report in stipulated time

Course Outcomes:

- Identify and formulate real world problems
- Analyse and design using contemporary technologies
- Develop a prototype for the model
- Present technical report