ACADEMIC REGULATIONS COURSE STRUCTURE AND DETAILED SYLLABUS

XIV

INSTRUMENTATION AND CONTROL ENGINEERING

For

B.TECH. FOUR YEAR DEGREE COURSE

(Applicable for the batches admitted from 2009-2010)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
KUKATPALLY, HYDERABAD – 500 085.

Academic Regulations 2009 for B. Tech (Regular)

(Effective for the students admitted into I year from the Academic Year 2009-2010 onwards)

1. **Award of B.Tech. Degree**

A student will be declared eligible for the award of the B. Tech. Degree if he 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. Register for 200 credits and secure 200 credits

2. Students, who fail to fulfil all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech course.

3. **Courses of study**

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

Branch Code	Branch
I	Aeronautical Engineering.
II	Automobile Engineering.
III	Bio-Medical Engineering.
IV	Biotechnology.
V	Chemical Engineering.
VI	Civil Engineering.
VII	Computer Science and Engineering.
VIII	Electrical and Electronics Engineering.
IX	Electronics and Communication Engineering.
X	Electronics and Computer Engineering.
XI	Electronics and Instrumentation Engineering.
XII	Electronics and Telematics Engineering.
XIII	Information Technology.
XIV	Instrumentation and Control Engineering.
XV	Mechanical Engineering (Mechatronics).
XVI	Mechanical Engineering (Production).
XVII	Mechanical Engineering.
XVIII	Metallurgy and Material Technology.

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

4. Credits

	I Year		semester	
	Periods / Weeks	Credits	Periods / Weeks	Credits
Theory	03	06	03	03
Practical	02	04	–	–
Drawing	03	04	03 06	02 04
Mini Project	02T / 03D	04	–	02
Comprehensive Viva Voce	--- ---	--- ---	---	02
Seminar	---	---	6	02
Project	---	---	15	10

5. Distribution and Weightage of Marks

i. The performance of a student in each semester / I year shall be evaluated subject –wise with a maximum of 100 marks for theory and 75 marks for practical subject. In addition, Industry oriented mini-project, seminar and project work shall be evaluated for 50, 50 and 200 marks respectively.

ii. For theory subjects the distribution shall be 25 marks for Internal Evaluation and 75 marks for the End-Examination.

iii. For theory subjects, during the semester there shall be 2 mid term examinations. Each mid term examination consists of one objective paper, one subjective paper and one assignment. The objective paper is for 10 marks and subjective paper is for 10 marks, with a duration of 1 hour 20 minutes (20 minutes for objective and 60 minutes for subjective paper). Objective paper is set for 20 bits of – multiple choice questions, fill-in the blanks, matching type questions – for the 10 marks. Subjective paper of each semester shall contain 4 full questions (one from each unit) of which, the student has to answer 2 questions, each carrying 5 marks.

First mid term examination shall be conducted for 1-4 units of syllabus and second mid term examination shall be conducted for 5-8 units. 5 marks are allocated for Assignments (as specified by the concerned subject teacher) – first Assignment should be submitted before the conduct of the first mid, and the second Assignment should be submitted before the conduct of the second mid. The total marks secured by the student in each mid term examination are evaluated for 25 marks, and the better of the two mid term examinations shall be taken as the final marks secured by each candidate.

However, for first year, there shall be 3 mid term examinations (each for 25 marks), *along with 3 assignments* in a similar pattern as above [1st mid shall be from 1-2 units, 2nd mid from 3-5 units and 3rd mid shall be from 6-8 units], and the average marks of the best two examinations secured *(each evaluated for a total of 25 marks)* in each subject shall be considered as final marks for the internals / sessionals.

iv. For practical subjects there shall be a continuous evaluation during the semester for 25 sessional marks and 50 end examination marks. Out of the 25 marks for internal, day-to-day work in the laboratory shall be evaluated for 15 marks and internal examination for practical shall be evaluated for 10 marks conducted by the concerned laboratory teacher. The end examination shall be conducted with external examiner and laboratory teacher. The external examiner shall be appointed from the cluster of colleges as decided by the University examination branch.

v. For the subject having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and estimation, the distribution shall be 25 marks for internal evaluation (15 marks for day-to-day work and 10 marks for internal tests) and 75 marks for end examination. There shall be two internal tests in a Semester and the better of the two shall be considered for the award of marks for internal tests. However in the I year class, there shall be three tests and the average of best two will be taken into consideration.

vi. There shall be an industry-oriented mini-Project, in collaboration with an industry of their specialization, to be taken up during the vacation after III year II Semester examination. However, the mini project and its report shall be evaluated with the project work in IV year II Semester. The industry oriented mini project shall be submitted in report

form and should be presented before the committee, which shall be evaluated for 50 marks. The committee consists of an external examiner, head of the department, the supervisor of mini project and a senior faculty member of the department. There shall be no internal marks for industry oriented mini project.

vii. There shall be a seminar presentation in IV year II Semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the department, which shall be evaluated by the Departmental committee consisting of Head of the department, seminarsupervisor and a senior faculty member. The seminar report shall be evaluated for 50 marks. There shall be no external examination for seminar.

viii. There shall be a Comprehensive Viva-Voce in IV year II semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of (i) Head of the Department (ii) two Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the students' understanding in various subjects he / she studied during the B.Tech course of study. The Comprehensive Viva-Voce is evaluated for 100 marks by the Committee. There are no internal marks for the Comprehensive viva-voce.

ix. Out of a total of 200 marks for the project work, 50 marks shall be for Internal Evaluation and 150 marks for the End Semester Examination. The End Semester Examination (viva-voce) shall be conducted by the same committee appointed for industry oriented mini project. In addition the project supervisor shall also be included in the committee. The topics for industry oriented mini project, seminar and project work shall be different from each other. The evaluation of project work shall be conducted at the end of the IV year. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of his project.

x. Laboratory marks and the sessional marks awarded by the College are not final. They are subject to scrutiny and scaling by the University wherever necessary. In such cases, the sessional and laboratory marks awarded by the College will be referred to a Committee. The Committee will arrive at a scaling factor and the marks will be scaled as per the scaling factor. The recommendations of the Committee are final and binding. The laboratory records and internal test papers shall be preserved in the respective institutions as per the University norms and shall be produced to the Committees of the University as and when the same is asked for.

6. Attendance Requirements:

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

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

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

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

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

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

7. Minimum Academic Requirements:

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

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% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end 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 one regular and one supplementary examinations of I year, and one regular examination of II year

I semester irrespective of whether the candidate takes the examination or not.

iii. A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of total 62 credits from the following examinations, whether the candidate takes the examinations or not.

a. Two regular and two supplementary examinations of I year.

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

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

d. One regular examination of III year I semester.

iv. A student shall register and put up minimum attendance in all 200 credits and earn the 200 credits. Marks obtained in all 200 credits shall be considered for the calculation of percentage of marks.

v. 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 shall stand cancelled.

8. Course pattern :

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

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

When a student is detained due to lack of credits / shortage of attendance he may be re-admitted when the semester / year is offered after fulfilment of academic regulations, whereas the academic regulations hold good with the regulations he was first admitted.

9. Award of Class:

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

Class Awarded	% of marks to be secured	Class Awarded
First Class with Distinction	70% and above	From the aggregate marks secured for the best 200 Credits.
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum)

10. Minimum Instruction Days :

The minimum instruction days for each semester / I year shall be 90/ 180 clear instruction days.

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

12. There shall be no place transfer within the Constituent Colleges and Units of Jawaharlal Nehru Technological University Hyderabad.

13. General:

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

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

iii. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.

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

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

(Effective for the students getting admitted into II year from the Academic Year 2009-2010 and onwards)

1. The Students have to acquire 150 credits from II to IV year of B.Tech. Program (Regular) for the award of the degree.
   Register for **150** credits and secure **150** credits.
2. Students, who fail to fulfil the requirement for the award of the degree in 6 consecutive academic years from the year of admission, shall forfeit their seat.
3. The same attendance regulations are to be adopted as that of B. Tech. (Regular).
4. **Promotion Rule :**
   A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of 37 credits from the examinations.
   a. Two regular and one supplementary examinations of II year I semester.
   b. One regular and one supplementary examinations of II year II semester.
   c. One regular examination of III year I semester.
5. **Award of Class:**
   After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree he shall be placed in one of the following four classes :

Class Awarded	% of marks to be secured	Class Awarded
First Class with Distinction	70% and above	From the aggregate marks secured for 150 Credits. (i.e. II year to IV year)
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum)

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

MALPRACTICES RULES

DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

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

	(theory or practical) in which the candidate is appearing.	shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year.The Hall Ticket of the candidate is to be cancelled and sent to the University.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester / year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.

4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or	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 any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the 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 connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.

10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/ year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester / year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.
2. Punishment for institutions : (if the squad reports that the college is also involved in encouraging malpractices)

(i) A show cause notice shall be issued to the college.

(ii) Impose a suitable fine on the college.

(iii) Shifting the examination centre from the college to another college for a specific period of not less than one year.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.TECH. INSTRUMENTATION &CONTROL ENGINEERING

I YEAR **COURSE STRUCTURE**

Code	Subject	L	T/P/D	C
51001	English	2	-	4
51002	Mathematics - I	3	1	6
51008	Mathematical Methods	3	1	6
51004	Engineering Physics	2	1	4
51005	Engineering Chemistry	2	-	4
51006	Computer Programming & Data Structures	3*	-	6
51007	Engineering Drawing	2	3	4
51660	Computer Programming Lab.	-	3	4
51661	Engineering Physics / Chemistry Lab.	-	3	4
51662	English Language Communication Skills Lab.	-	3	4
51663	IT Workshop / Engineering Workshop	-	3	4
	Total	**17**	**18**	**50**

II YEAR I SEMESTER **COURSE STRUCTURE**

Code	Subject	L	T/P/D	C
53007	Mathematics - III	3	1	3
53030	Fundamental of Electrical Engineering	3	1	3
53009	Electronic Devices and Circuits	4	-	4
53021	Signals and Systems	4	1	4
53031	Switching Theory and Logic Design	4	1	4
53032	Transduction of Physical Variables	3	1	3
53630	Electronic Devices and Circuits lab	-	3	2
53631	Electrical Technology Lab	1	3	2
	Total	**21**	**11**	**25**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.TECH. INSTRUMENTATION &CONTROL ENGINEERING

II YEAR II SEMESTER — COURSE STRUCTURE

Code	Subject	L	T/P/D	C
54004	Environmental studies	3	1	3
54022	Principle of Communication	4	1	4
54020	Electronic Circuits Analysis	4	-	4
54023	Structured Digital System Design	4	1	4
54025	Control Systems	3	1	3
54046	Sensors & Signal Conditions	3	1	3
54634	Transducers and Instrumentation Lab	-	3	2
54635	Control Systems Lab	-	3	2
	Total	**21**	**11**	**25**

III YEAR I SEMESTER — COURSE STRUCTURE

Code	Subject	L	T/P/D	C
55015	Managerial Economics and Financial Analysis	4	-	4
55046	Digital Signal Processing	4	1	4
55042	Pulse and Digital Circuits	4	1	4
55041	Analog and Digital IC Applications	3	1	3
55072	Instrumentation Practices in Industries	4	1	4
55631	Pulse Circuits & IC Lab	-	3	2
55632	Industrial Instrumentation Lab	-	3	2
55633	Basic Simulation Lab	-	3	2
	Total	**19**	**13**	**25**

III YEAR II SEMESTER — COURSE STRUCTURE

Code	Subject	L	T/P/D	C
56041	Management Science	3	1	3
56042	Open Elective	4	1	4
56043	Computer Organization			
56014	Biotechnology			
	Nanotechnology			
56012	Microprocessors and Microcontrollers	4	1	4
56045	Process Control Instrumentation	4	-	4
56075	Analytical Instrumentation	4	1	4
56636	Process Control Lab	-	3	2
56637	Microprocessors and Microcontrollers Lab	-	3	2
56638	Advanced English Language Communication Skills Lab	-	3	2
	Total	**19**	**13**	**25**

IV YEAR I SEMESTER — COURSE STRUCTURE

Code	Subject	L	T/P/D	C
57067	Bio medical Instrumentation	3	1	3
57125	Computer Aided Design of Control Systems	3	1	3
57035	VLSI Design	4	-	4
57126	Digital & Optimal Control Systems	4	1	4
57127	Elective – I	3	1	3
57070	Virtual Instrumentation			
57069	Optoelectronic Laser Instrumentation			
	Telemetry and Tele Control			
	Elective – II	4	1	4
570128	Instrumentation and Control in Manufacturing systems			
57037	Computer Networks			
57072	Embedded & Real Time Systems			
57631	Analytical Instrumentation Lab	-	3	2
57632	Control Systems Lab	-	3	2
	Total	21	11	25

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.TECH. INSTRUMENTATION &CONTROL ENGINEERING
IV YEAR II SEMESTER COURSE STRUCTURE

Code	Subject	L	T/P/D	C
	Elective – III	3	1	3
58052	Adaptive Control Systems			
58098	Distributed Computer Control Systems			
58099	Hydraulics & Pneumatic Control Systems			
	Elective – IV	3	1	3
58100	Power Plant Instrumentation			
58050	PC based Instrumentation			
58016	Artificial Neural Networks			
58017	Reliability Engineering	3	-	3
58661	Industry Oriented Mini Project	-	-	2
58662	Seminar	-	6	2
58663	Major Project	-	15	10
58664	Comprehensive Viva	-	-	2
	Total	**9**	**23**	**25**

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

T - Tutorial L – Theory
P – Practical/Drawing C – Credits

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

I Year B.Tech ICE.	L	T/P/D	C
	2	-/-/-	4

(5001) ENGLISH

1. INTRODUCTION:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competence of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure by the students. Hence, it is suggested that they read it on their own with topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section , as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. However, the stress in this syllabus is on skill development and practice of language skills

2. OBJECTIVES:

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

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

c. To develop the study skills and communication skills in formal and informal situations.

3. SYLLABUS:

Listening Skills:

Objectives

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that can comprehend the speech of people of different backgrounds and regions Students should be given practice in listening to the sounds of the language to be able to recognise them, to distinguish between them to mark stress and recognise and use the right intonation in sentences.

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

Speaking Skills:

Objectives

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

- Oral practice
- Describing objects/situations/people
- Role play – Individual/Group activities (Using exercises from all the nine units of the prescribed text: Learning English : A Communicative Approach.)

- Just A Minute(JAM) Sessions.

Reading Skills:

Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.
2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.

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

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

Writing Skills :

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill
2. To equip them with the components of different forms of writing, beginning with the lower order ones.

- Writing sentences
- Use of appropriate vocabulary
- Paragraph writing
- Coherence and cohesiveness
- Narration / description

- Note Making
- Formal and informal letter writing
- Editing a passage

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

For Detailed study

1. First Text book entitled "Enjoying Everyday English", Published by Sangam Books, Hyderabad

For Non-detailed study

1. Second text book "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur

A. STUDY MATERIAL:

Unit –I

1. Chapter entitled Heaven's Gate from "Enjoying Everyday English", Published by Sangam Books, Hyderabad
2. Chapter entitled Haragovind Khorana from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur

Unit –II

1. Chapter entitled Sir CV Raman: A Pathbreaker in the Saga of Indian Science from "Enjoying Everyday English", Published by Sangam Books, Hyderabad
2. Chapter entitled Sam Petroda from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur

Unit –III

1. Chapter entitled The Connoisseur from "Enjoying Everyday English", Published by Sangam Books, Hyderabad
2. Chapter entitled Mother Teresa from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur

Unit –IV

1. Chapter entitled The Cuddalore Experience from "Enjoying Everyday English", Published by Sangam Books, Hyderabad
2. Chapter entitled Dr Amartya Kumar Sen from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur

Unit –V

1. Chapter entitled Bubbling Well Road from "Enjoying Everyday English", Published by Sangam Books, Hyderabad
2. Chapter entitled I Have a Dream by Martin Luther King from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur

Unit –VI

1. Chapter entitled Odds Against Us from "Enjoying Everyday English", Published by Sangam Books, Hyderabad
2. Chapter entitled Ask Not What Your Country can do for you by John F Kennedy from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur

* Exercises from the lessons not prescribed shall also be used for classroom tasks.

Unit – VII

Exercises on	Reading and Writing Skills
Reading Comprehension	Situational dialogues
Letter writing	Essay writing

Unit – VIII

Practice Exercises on Remedial Grammar covering

Common errors in English, Subject-Verb agreement, Use of Articles and Prepositions,

Tense and aspect

Vocabulary development covering

Synonyms & Antonyms, one-word substitutes, prefixes & suffixes, Idioms & phrases, words often confused.

REFERENCES :

1. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books
2. English Grammar Practice, Raj N Bakshi, Orient Longman.
3. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson
4. Handbook of English Grammar& Usage, Mark Lester and Larry Beason,
   Tata Mc Graw –Hill.
5. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
6. Technical Communication, Meenakshi Raman, Oxford University Press
7. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
8. Grammar Games, Renuvolcuri Mario, Cambridge University Press.
9. Murphy's English Grammar with CD, Murphy, Cambridge University Press.
10. Everyday Dialogues in English, Robert J. Dixson, Prentice Hall India Pvt Ltd.,
11. ABC of Common Errors Nigel D Turton, Mac Millan Publishers.
12. Basic Vocabulary Edgar Thorpe & Showick Thorpe, Pearson Education
13. Effective Technical Communication, M Ashraf Rizvi, Tata Mc Graw –Hill.
14. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO
15. A Communicative Grammar of English, Geoffrey Leech, Jan Svartvik, Pearson Education
16. Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,
17. A Grammar Book for You And I, C. Edward Good, MacMillan Publishers.

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(51002) MATHEMATICS – I

UNIT – I Sequences – Series

Basic definitions of Sequences and series – Convergences and divergence – Ratio test – Comparison test – Integral test – Cauchy's root test – Raabe's test – Absolute and conditional convergence

UNIT – II Functions of Single Variable

Rolle's Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – Generalized Mean Value theorem (all theorems without proof) Functions of several variables – Functional dependence- Jacobian- Maxima and Minima of functions of two variables with constraints and without constraints

UNIT – III Application of Single variables

Radius, Centre and Circle of Curvature – Evolutes and Envelopes Curve tracing – Cartesian , polar and Parametric curves.

UNIT – IV Integration & its applications

Riemann Sums , Integral Representation for lengths, Areas, Volumes and Surface areas in Cartesian and polar coordinates multiple integrals - double and triple integrals – change of order of integration- change of variable

UNIT – V Differential equations of first order and their applications

Overview of differential equations- exact, linear and Bernoulli. Applications to Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories and geometrical applications

UNIT – VI Higher Order Linear differential equations and their applications

Linear differential equations of second and higher order with constant coefficients, RHS term of the type $f(X)= e^{ax}$, Sin ax, Cos ax, and x^n, eV(x), xV(x), method of variation of parameters. Applications

bending of beams, Electrical circuits, simple harmonic motion.

UNIT – VII Laplace transform and its applications to Ordinary differential equations

Laplace transform of standard functions – Inverse transform – first shifting Theorem, Transforms of derivatives and integrals – Unit step function – second shifting theorem – Dirac's delta function – Convolution theorem – Periodic function - Differentiation and integration of transforms-Application of Laplace transforms to ordinary differential equations.

UNIT – VIII Vector Calculus

Vector Calculus: Gradient- Divergence- Curl and their related properties Potential function - Laplacian and second order operators. Line integral – work done –– Surface integrals - Flux of a vector valued function.

Vector integrals theorems: Green's -Stoke's and Gauss's Divergence Theorems (Statement & their Verification) .

TEXT BOOKS:

1. Engineering Mathematics – I by P.B. Bhaskara Rao, S.K.V.S. Rama Chary, M. Bhujanga Rao.
2. Engineering Mathematics – I by C. Shankaraiah, VGS Booklinks.

REFERENCES:

1. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
2. Engineering Mathematics – I by D. S. Chandrasekhar, Prison Books Pvt. Ltd.
3. Engineering Mathematics – I by G. Shanker Rao & Others I.K. International Publications.
4. Higher Engineering Mathematics – B.S. Grewal, Khanna Publications.
5. Advance Engineering Mathematics by Jain and S.R.K. Iyengar, Narosa Publications.
6. A text Book of KREYSZIG'S Engineering Mathematics, Vol-1 Dr .A. Ramakrishna Prasad. WILEY publications

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(51008) MATHEMATICAL METHODS

UNIT – I : Solution for linear systems

Matrices and Linear systems of equations: Elementary row transformations-Rank-Echelon form, Normal form – Solution of Linear Systems – Direct Methods- LU Decomposition- LU Decomposition from Gauss Elimination –Solution of Tridiagonal Systems-Solution of Linear Systems.

UNIT – II : Eigen Values & Eigen Vectors

Eigen values, eigen vectors – properties – Condition number of rank, Cayley-Hamilton Theorem (without Proof) - Inverse and powers of a matrix by Cayley-Hamilton theorem – Diagonolization of matrix. Calculation of powers of matrix – Modal and spectral matrices.

UNIT – III : Linear Transformations

Real matrices – Symmetric, skew - symmetric, orthogonal, Linear Transformation – Orthogonal Transformation. Complex matrices: Hermitian, Skew-Hermitian and Unitary – Eigen values and eigen vectors of complex matrices and their properties. Quadratic forms-Reduction of quadratic form to canonical form – Rank - Positive, negative definite - semi definite - index - signature - Sylvester law, Singular value decomposition.

UNIT – IV : Solution of Non- linear Systems

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

Interpolation: Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences- Backward differences –Central differences – Symbolic relations and separation of symbols-Difference Equations - Differences of a polynomial-Newton's

formulae for interpolation – Central difference interpolation Formulae – Gauss Central Difference Formulae –Interpolation with unevenly spaced points-Lagrange's Interpolation formula. B. Spline interpolation - Cubic spline.

UNIT – V : Curve fitting & Numerical Integration

Curve fitting: Fitting a straight line –Second degree curve-exponentional curve-power curve by method of least squares. Numerical Differentiation – Simpson's 3/8 Rule , Gaussian Integration, Evaluation of principal value integrals, Generalized Quadrature.

UNIT – VI : Numerical solution of IVP's in ODE

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

UNIT – VII Fourier Series

Fourier Series: Determination of Fourier coefficients – Fourier series – even and odd functions – Fourier series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

UNIT – VIII Partial differential equations

Introduction and Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and nonlinear (Standard type) equations, Method of separation of variables for second order equations -Two dimensional wave equation.

TEXT BOOKS:

1. Mathematical Methods by P.B.Bhaskara Rao, S.K.V.S. Rama Chary, M.Bhujanga Rao, B.S.Publications.
2. Mathematical Methods by K.V.Suryanarayana Rao by Scitech Publications.

REFERENCES:

1. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi & Others, S. Chand.
2. Introductory Methods by Numerical Analysis by S.S. Sastry, PHI Learning Pvt. Ltd.
3. Mathematical Methods by G.Shankar Rao, I.K. International Publications, N.Delhi
4. Higher Engineering Mathematics by B.S. Grewal, Khanna Publications.
5. Mathematical Methods by V. Ravindranath, Etl, Himalaya Publications.
6. A text Book of KREYSZIG'S Mathematical Methods, Dr .A. Ramakrishna Prasad. WILEY publications.

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(51004) ENGINEERING PHYSICS

UNIT-I

1. Bonding in Solids: Ionic Bond, Covalent Bond, Metallic Bond, Hydrogen Bond, Vander-Waal's Bond, Calculation of Cohesive Energy.
2. Crystallography and Crystal Structures: Space Lattice, Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices, Miller Indices, Crystal Planes and Directions, Inter Planar Spacing of Orthogonal Crystal Systems, Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, Diamond and hcp Structures, Structures of NaCl, ZnS, CsCl.

UNIT-II

3. X-ray Diffraction: Basic Principles, Bragg's Law, Laue Method, Powder Method, Applications of X- ray Diffraction.
4. Defects in Crystals: Point Defects: Vacancies, Substitutional, Interstitial, Frenkel and Schottky Defects; Qualitative treatment of line (Edge and Screw Dislocations) Defects, Burger's Vector, Surface Defects and Volume Defects.

UNIT-III

5. Elements of Statistical Mechanics: Maxwell-Boltzman, Bose-Einstein and Fermi-Dirac Statistics (Qualitative Treatment), Photon gas , Wein's Law, Rayleigh-Jeans law,, Planck's Law of Black Body Radiation, Concept of Electron Gas, Fermi Energy, Density of States.
6. Principles of Quantum Mechanics. Waves and Particles, de Broglie Hypothesis , Matter Waves, Davisson and Germer's Experiment, G. P. Thomson Experiment, Heisenberg's Uncertainty Principle, Schrödinger's Time Independent Wave

Equation - Physical Significance of the Wave Function - Particle in One Dimensional Potential Box.

UNIT-IV

7. Band Theory of Solids: Electron in a periodic Potential, Bloch Theorem, Kronig-Penny Model (Qualitative Treatment), Origin of Energy Band Formation in Solids, Classification of Materials into Conductors, Semi Conductors & Insulators, Concept of Effective Mass of an Electron and Hole.

UNIT-V

8. Semiconductor Physics: Fermi Level in Intrinsic and Extrinsic Semiconductors, Intrinsic Semiconductors and Carrier Concentration, Extrinsic Semiconductors and Carrier Concentration, Equation of Continuity, Direct & Indirect Band Gap Semiconductors, Hall Effect.
9. Physics of Semiconductor Devices: Formation of PN Junction, Open Circuit PN Junction, Energy Diagram of PN Diode, I-V Characteristics of PN Junction, PN Diode as a Rectifier (Forward and Reverse Bias), Diode Equation, LED, LCD and Photo Diodes.

UNIT-VI

10. Dielectric Properties: Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector, Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities - Internal Fields in Solids, Clausius - Mossotti Equation, Piezo-electricity, Pyro-electricity and Ferro- electricity.
11. Magnetic Properties: Permeability, Field Intensity, Magnetic Field Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magneton, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Domain Theory of Ferro Magnetism on the basis of Hysteresis Curve, Soft and Hard Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials, Ferrites

and their Applications, Concept of Perfect Diamagnetism, Meissner Effect, Magnetic Levitation, Applications of Superconductors.

UNIT-VII

12. 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, Carbon Dioxide Laser, Semiconductor Diode Laser, Applications of Lasers.
13. Fiber Optics: Principle of Optical Fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers and Refractive Index Profiles, Attenuation in Optical Fibers, Application of Optical Fibers.

UNIT-VIII

14. Acoustics of Buildings & Acoustic Quieting: Basic Requirement of Acoustically Good Hall, Reverberation and Time of Reverberation, Sabine's Formula for Reverberation Time(Qualitative Treatment), Measurement of Absorption Coefficient of a Material, Factors Affecting The Architectural Acoustics and their Remedies. Acoustic Quieting: Aspects of Acoustic Quieting, Methods of Quieting, Quieting for Specific Observers, Mufflers, Sound-proofing.
15. Nanotechnology: Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-gel, Precipitation, Combustion Methods; Top-down Fabrication: Chemical Vapour Deposition, Physical Vapour Deposition, Pulsed Laser Vapour Deposition Methods, Characterization(XRD&TEM) and Applications.

TEXT BOOKS:

1. Applied Physics – P.K.Palanisamy (SciTech Publications (India) Pvt. Ltd., Fifth Print 2008).
2. Applied Physics – S.O. Pillai & Sivakami (New Age International (P) Ltd., Second Edition 2008).

3. Applied Physics – T. Bhima Shankaram & G. Prasad (B.S. Publications, Third Edition 2008).

REFERENCES:

1. Solid State Physics – M. Armugam (Anuradha Publications).
2. Modern Physics – R. Murugeshan & K. Siva Prasath – S. Chand & Co. (for Statistical Mechanics).
3. A Text Book of Engg Physics – M. N. Avadhanulu & P. G. Khsirsagar– S. Chand & Co. (for acoustics).
4. Modern Physics by K. Vijaya Kumar, S. Chandralingam: S. Chand & Co.Ltd
5. Nanotechnology – M.Ratner & D. Ratner (Pearson Ed.).
6. Introduction to Solid State Physics – C. Kittel (Wiley Eastern).
7. Solid State Physics – A.J. Dekker (Macmillan).
8. Applied Physics – Mani Naidu Pearson Education

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(51005) ENGINEERING CHEMISTRY

UNIT I:

Electrochemistry and Batteries: Concept of Electro Chemistry. Conductance-Electrolyte in solution, Conductance-Specific, Equivalent and molar conductance, Ionic mobilities, Kolrausch's Law. Application of conductance. EMF: Galvanic Cells, types of Electrodes, Reference Electrode (SCE, Quinhydrone electrode), Ion Selective Electrodes (Glass Electrode) Nernest equation, Concentration Cells, Galvanic series, Potentiometric titrations, Numerical problems.

Batteries: Primary and secondary cells, (lead-Acid cell, Ni-Cd cell, Lithium cells). Applications of batteries, fuel cells – Hydrogen – Oxygen fuel cells, Advantages of fuel cells.

UNIT II:

Corrosion and its corrosion control: Introduction, causes and different types of corrosion and effects of corrosion, theories of corrosion – Chemical, Electrochemical corrosion, corrosion reactions, factors affecting corrosion – Nature of metal – galvanic series, over voltage, purity of metal, nature of oxide film, nature of corrosion product. Nature of environment-effect of temperature, effect of pH, Humidity, effect of oxidant. Corrosion control methods – Cathodic protection, sacrificial anode, impressed current cathode. Surface coatings – methods of application on metals- hot dipping, galvanizing, tinning, cladding, electroplating - Organic surface coatings – paints constituents and functions.

UNIT III:

Polymers: Types of Polymerization, Mechanism (Chain growth & Step growth).Plastics. Thermoplastic resins & Thermo set resins.

Compounding & fabrication of plastics, preparation, properties, engineering applications of: polyethylene, PVC, PS, Tefion, Bakelite, Nylon. Conducting Polymers: Poly acetylene, polyaniline, conduction, doping, applications. Liquid Crystal polymers: Characteristics and uses Rubber – Natural rubber, vulcanization. Elastomers – Buna-s, Butyl rubber, Thiokol rubbers, Fibers – polyester, fiber reinforced plastics (FRP), applications

UNIT IV:

Water: Introduction, Hardness. Causes, expression of hardness – units – types of hardness, estimation of temporary & permanent hardness of water, numerical problems. Boiler troubles – Scale & sludge formation, caustic enbsittlement, corrosion, priming & foaming Softening of water (Internal & external treatment-Lime soda, Zeolite, ion exchange process and Numerical problems) Reverse osmosis, electro dialysis.

UNIT V:

Surface Chemistry: Solid surfaces, types of adsorption, Longmuir adsorption isotherm, BET adsorption equip. Calculation of surface area of solid & application adsorption, classification of colloids, Electrical & optical properties micelies, applications of colloids in industry. Nano materials: Introduction, preparation and applications of nano meterials

UNIT VI:

Energy sources: fuels, classification – conventional fuels (solid, liquid, gaseous) Solid fuels – coal – analysis – proximate and ultimate analysis and their significance Liquid fuels – primary – petroleum – refining of petroleum-cracking knocking synthetic petrol – Bergius and Fischer Tropsech's process; Gaseous fuels – natural gas, analysis of flue gas by Orsat's method Combustion – problems, Calorific value of fuel – HCV, LCV, determination of calorific value by Junker's gas calorie meter.

UNIT VII:

Phase rule: Definitions – phase, component, degree of freedom, phase rule equitation. Phase diagrams – one component system.

water system. Two component system lead- silver system, heat treatment based on iron-carbon phase diagram, hardening, annealing.

UNIT VIII:

Materials Chemistry: Cement: composition of Portland cement, manufacture of port land Cement, setting & hardening of cement (reactions). Lubricants: Criteria of a good lubricant, mechanism, properties of lubricants: Cloud point, pour point,flash & fire point,Viscocity. Refractoriess: Classification, Characteristics of a good refractory. Insulators & conductors: Classification of insulators characteristics of thermal & electrical insulators and applications of Superconductors (Nb-Sn alloy, $YBa_2 Cu_3 O_{7-x}$), applications.

TEXT BOOKS:

1. Text Books of Engineering Chemistry by C.P. Murthy, C.V. Agarwal, A. Naidu B.S. Publications, Hyderabad (2006).
2. Text of Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co,New Delhi(2006)

REFERENCE BOOKS

1. Engineering Chemistry by B. Siva Shankar Mc.Graw Hill Publishing Company Limited , New Delhi(2006)
2. Enginering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills co., New Delhi (2004)
3. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008).
4. Chemistry of Engineering Materials by CV Agarwal,C.P Murthy, A.Naidu, BS Publications.
5. Chemistry of Engineering Meterials by R.P Mani and K.N.Mishra, CENGAGE learning.
6. Applied Chemistry – A text for Engineering & Technology – Springar (2005).
7. Text Book of Engineering Chemistry – Shasi Chawla, Dhantpat Rai publishing Company, NewDelhi (2008).
8. Engineering Chemistry – R. Gopalan, D. Venkatappayya, D.V. Sulochana Nagarajan – Vikas Publishers (2008).

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51006 COMPUTER PROGRAMMING AND DATA STRUCTURES

UNIT - I

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programmes, Software Development Method, Algorithms, Pseudo code, flow charts, applying the software development method.

UNIT - II

Introduction to C Language – Background, Simple C Programme, Identifiers, Basic data types, Variables, Constants, Input / Output, Operators, Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Bit wise operators, Statements, Simple C Programming examples.

Selection Statements – if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Programming examples.

UNIT - III

Designing Structured Programmes, Functions, basics, user defined functions, inter function communication,

Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Preprocessor commands, example C programmes.

Arrays – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C programme examples.

UNIT - IV

Pointers – Introduction (Basic Concepts), Pointers for inter function

communication, pointers to pointers, compatibility, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions, command –line arguments.

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C programme examples.

UNIT - V

Derived types – Structures – Declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit fields, enumerated types, C programming examples.

UNIT - VI

Input and Output – Concept of a file, streams, standard input / output functions, formatted input / output functions, text files and binary files, file input / output operations, file status functions (error handling), C programme examples.

UNIT – VII

Searching and Sorting – Sorting- selection sort, bubble sort, insertion sort, quick sort, merge sort, Searching-linear and binary search methods.

UNIT - VIII

Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack application-infix to postfix conversion, postfix expression evaluation, recursion implementation. Queues-operations, array and linked representations.

TEXT BOOKS :

1. C Programming & Data Structures, B.A.Forouzan and R.F Gilberg, Third Edition, Cengage Learning.

2. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, Fifth Edition, Pearson education.

REFERENCES:

1. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education
3. C Programming with problem solving, J.A. Jones & K. Harrow, dreamtech Press
4. Programming in C – Stephen G. Kochan, III Edition, Pearson Eductaion.
5. C for Engineers and Scientists, H.Cheng, Mc.Graw-Hill International Edition
6. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI
7. C Programming & Data Structures, E. Balagurusamy, TMH
8. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press
9. C& Data structures – E V Prasad and N B Venkateswarlu, S. Chand&Co.

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51007 ENGINEERING DRAWING

UNIT – I

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

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

b) Cycloid, Epicycloid and Hypocycloid

c) Involute.

d) Scales: Different types of Scales, Plain scales comparative scales, scales of chords.

UNIT – II

DRAWING OF PROJECTIONS OR VIEWS ORTHOGRAPHIC PROJECTION IN FIRST ANGLE PROJECTION:

Principles of Orthographic Projections – Conventions – First and Third Angle, Projections of Points and Lines inclined to both planes, True lengths, traces.

UNIT – III

PROJECTIONS OF PLANES & SOLIDS: Projections of regular Planes, auxiliary planes and Auxiliary projection inclined to both planes. Projections of Regular Solids inclined to both planes – Auxiliary Views

UNIT – IV

SECTIONS AND SECTIONAL VIEWS: Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views.

DEVELOPMENT AND INTERPENETRATION OF SOLIDS: Development of Surfaces of Right, Regular Solids – Prisms, Cylinder, Pyramid Cone and their parts. Interpenetration of Right Regular Solids

UNIT – V

INTERSECTION OF SOLIDS: Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

UNIT - VI

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

UNIT –VII

TRANSFORMATION OF PROJECTIONS : Conversion of Isometric Views to Orthographic Views – Conventions.

UNIT – VIII

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

TEXT BOOK :

1. Engineering Drawing, N.D. Bhat / Charotar
2. Engineering Drawing and Graphics, Venugopal / New age.
3. Engineering Drawing – Basant Agrawal, TMH

REFERENCES :

1. Engineering drawing – P.J. Shah.S.Chand.
2. Engineering Drawing, Narayana and Kannaiah / Scitech publishers.
3. Engineering Drawing- Johle/Tata Macgraw Hill.
4. Computer Aided Engineering Drawing- Trymbaka Murthy- I.K. International.
5. Engineering Drawing – Grower.
6. Engineering Graphics for Degree – K.C. John.

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51660 COMPUTER PROGRAMMING LAB

Objectives:

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

Recommended Systems/Software Requirements:

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

Week 1.

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

b) A Fibonacci Sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

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

Week 2.

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

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

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

Week 3.

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

i) To find the factorial of a given integer.

ii) To find the GCD (greatest common divisor) of two given integers.

iii) To solve Towers of Hanoi problem.

Week 4

a) The total distance travelled by vehicle in 't' seconds is given by distance = $ut+1/2at^2$ where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec^2). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

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

Week 5

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

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

i) Addition of Two Matrices

ii) Multiplication of Two Matrices

Week 6

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

i) To insert a sub-string in to a given main string from a given position.

ii) To delete n Characters from a given position in a given string.

b) Write a C program to determine if the given string is a palindrome or not

Week 7

a) Write a C program that displays the position or index in the

string S where the string T begins, or – 1 if S doesn't contain T.

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

Week 8

a) Write a C program to generate Pascal's triangle.

b) Write a C program to construct a pyramid of numbers.

Week 9

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

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

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

Print x, n, the sum

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

Week 10

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

b) Write a C program to convert a Roman numeral to its decimal equivalent.

Week 11

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

i) Reading a complex number

ii) Writing a complex number

iii) Addition of two complex numbers

iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

Week 12

a) Write a C program which copies one file to another.

b) Write a C program to reverse the first n characters in a file.

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

Week 13

a) Write a C programme to display the contents of a file.

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

Week 14

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

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

Week 15

Write C programs that implement stack (its operations) using

i) Arrays ii) Pointers

Week 16

Write C programs that implement Queue (its operations) using

i) Arrays ii) Pointers

Week 17

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

i) Converting infix expression into postfix expression

ii) Evaluating the postfix expression

Week 18

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

i) Bubble sort ii) Selection sort

Week 19

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

i) Linear search,ii) Binary search

Week 20

Write C program that implements the following sorting method to sort a given list of integers in ascending order: i) Quick sort

Week 21

Write C program that implement the following sorting method to sort a given list of integers in ascending order: i) Merge sort

Week 22

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

Week 23

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

Week 24

Write C programs to implement Trapezoidal and Simpson methods.

Text Books

1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications
2. Mastering C, K.R.Venugopal & S.R.Prasad, TMH Publications.
3. The Spirit of C, an Introduction to modern programming, M.Cooper, Jaico Publishing House.
4. Practical C Programming,Steve Oualline,O'Reilly,SPD. TMH publications.
5. Computer Basics and C Programming, V. Rajaraman, PHI Publications.
6. Data structures and Program Design in C,R.Kruse, C.L.Tondo,B.P.Leung,M.Shashi,Pearson Education.

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I Year B.Tech. CSE.	L	T/P/D	C
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51661 ENGINEERING PHYSICS / ENGINEERING CHEMISTRY LAB

ENGINEERING PHYSICS LAB

(Any twelve experiments compulsory)

1. Dispersive power of the material of a prism – Spectrometer
2. Determination of wavelength of a source – Diffraction Grating.
3. Newton's Rings - Radius of curvature of plano convex lens.
4. Melde's experiment – Transverse and longitudinal modes.
5. Time constant of an R-C circuit.
6. L-C-R circuit.
7. Magnetic field along the axis of current carrying coil – Stewart and Gees method.
8. Study the characteristics of LED and LASER sources.
9. Study the characteristics of p-i-n and avalanche photodiode detectors.
10. Bending losses of fibres.
11. Evaluation of numerical aperture of given fibre.
12. Energy gap of a material of p-n junction.
13. Thermo electric effect – Seebeck effect and Peltier effect.
14. Torsional pendulum.
15. Single slit diffraction using laser.

ENGINEERING CHEMISTRY LAB

List of Experiments (Any 12 of the following):

Titrimetry:

1. Estimation of hardness of water by EDTA method (or)
   Estimation of calcium in limestone by Permanganometry.

Mineral Analysis:

2. Determination of percentage of copper in brass
3. Estimation of manganese dioxide in pyrolusite.

Instrumental Methods:

4. **Colorimetry:**

   Determination of ferrous iron in cement by colorimetric method.

   (Or) Estimation of Copper by Colorimetric method.

5. **Conductometry:**

   Conductometric titration of strong acid Vs strong base.

   (or) Conductometric titration of mixture of acids Vs strong base.

6. **Potentiometry:**

   Titration of strong acid Vs strong base by potentiometry.

   (or) Titration of weak acid Vs strong base by potentiometry.

Physical Properties:

7. Determination of viscosity of sample oil by redwood/oswald's viscometer
8. Determination Surface Tension of lubricants.

Identification and Preparations:

9. Identification of functional groups present in organic compounds.
10. Preparation of organic compounds

    Asprin (or) Benzimidazole

Kinetics:

11. To determine the rate constant of hydrolysis of methyl acetate catalysed by an acid and also the energy of activation. (or) To study the kinetics of reaction between $K_2S_2O_8$ and KI.
12. Demonstration Experiments (Any One of the following) :

a. Determination of dissociation constant of weak acid-by PH metry

b. Preparation of Thiokol rubber
c. Adsorption on Charcoal
d. Heat of reaction

TEXT BOOKS:

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Inorganic quantitative analysis, Vogel.

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R. N. Goyal and Harrmendra Goel.
2. A text book on experiments and calculation Engg. S.S. Dara.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

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I Year B.Tech. CSE.	L	T/P/D	C
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(51662) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

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

Objectives:

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

SYLLABUS :

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

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Situational Dialogues / Role Play.
4. Oral Presentations- Prepared and Extempore.
5. 'Just A Minute' Sessions (JAM).

6. Describing Objects / Situations / People.
7. Information Transfer.
8. Debate.
9. Telephoning Skills.
10. Giving Directions.

Minimum Requirement:

The English Language Lab shall have two parts:

i) The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.

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

System Requirement (Hardware component):

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

i) P – IV Processor
a) Speed – 2.8 GHZ
b) RAM – 512 MB Minimum
c) Hard Disk – 80 GB
ii) Headphones of High quality

Suggested Software:

- Cambridge Advanced Learners' English Dictionary with CD.
- The Rosetta Stone English Library.
- Clarity Pronunciation Power – Part I.
- Mastering English in Vocabulary, Grammar, Spellings, Composition
- Dorling Kindersley series of Grammar, Punctuation, Composition etc.
- Language in Use, Foundation Books Pvt Ltd with CD.

- Oxford Advanced Learner's Compass, 7th Edition.
- Learning to Speak English - 4 CDs.
- Vocabulary in Use, Michael McCarthy, Felicity O'Den, Cambridge.
- Murphy's English Grammar, Cambridge with CD.
- English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

1. A Handbook for English Language Laboratories – Prof. E. Suresh Kumar, P. Sreehari, Foundation Books.
2. Effective Communication & Public Speaking by S. K. Mandal, Jaico Publishing House.
3. English Conversation Practice by Grant Taylor, Tata McGraw Hill.
4. Speaking English effectively by Krishna Mohan, N. P. Singh, Mac Millan Publishers.
5. Communicate or Collapse: A Handbook of Efffective Public Speaking, Group Discussions and Interviews, by Pushpa Lata & Kumar, Prentice-Hall of India.
6. Learn Correct English, Grammar, Usage and Composition by Shiv. K. Kumar & Hemalatha Nagarajan, Pearson Longman
7. Spoken English by R. K. Bansal & J. B. Harrison, Orient Longman.
8. English Language Communication: A Reader cum Lab Manual Dr A Ramakrishna Rao, Dr. G. Natanam & Prof. S. A. Sankaranarayanan, Anuradha Publications, Chennai.
9. Effective Technical Communication, M. Ashraf Rizvi, Tata McGraw-Hill.
10. A Practical Course in English Pronunciation, (with two Audio

cassettes) by J. Sethi, Kamlesh Sadanand & D.V. Jindal, Prentice-Hall of India Pvt. Ltd., New Delhi.

11. A text book of English Phonetics for Indian Students by T. Balasubramanian, Mac Millan
12. Spoken English: A foundation Course, Parts 1 & 2, Kamalesh Sadanand and Susheela punitha, Orient Longman

DISTRIBUTION AND WEIGHTAGE OF MARKS

English Language Laboratory Practical Paper:

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year-end Examination shall be conducted by an external examiner/ or the teacher concerned with the help of another member of the staff of the same department of the same institution.

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I Year B.Tech. CSE.	L	T/P/D	C
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(51663)IT WORKSHOP/ ENGINEERING WORKSHOP

Objectives :

The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel and Power Point

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

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

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

PC Hardware

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

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

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

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

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

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

Internet & World Wide Web

Week 7 - Task 1 : Orientation & Connectivity Boot Camp. Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations

need to be made by the instructors to simulate the WWW on the LAN.

Week 8 - Task 2 : Web Browsers, Surfing the Web : Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Week 9 - Task 3 : Search Engines & Netiquette : Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Week 10 - Task 4 : Cyber Hygiene : Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install an anti virus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

Productivity tools

LaTeX and Word

Week 11 – Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that would be covered in each, using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

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

Week 12 - Task 2 : Creating project abstract Features to be

covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Week 13 - Task 3 : Creating a Newsletter : Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Excel

Week 14 - Excel Orientation: The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the two tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

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

Week 15 - Task 2 : Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting

LaTeX and MS/equivalent (FOSS) tool Power Point

Week 16 - Task1 : Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Power point. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Week 17- Task 2 : Second week helps students in making their presentations interactive. Topic covered during this week includes : Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts

Week 18 - Task 3 : Concentrating on the in and out of Microsoft

power point and presentations in LaTeX. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes :- Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides.

REFERENCES :

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

ENGINEERING WORKSHOP

1. TRADES FOR EXERCISES :

At least two exercises from each trade:

1. House Wiring
2. Carpentry
3. Tin-Smithy and Development of jobs carried out and soldering.
4. Fitting

2. TRADES FOR DEMONSTRATION & EXPOSURE:

1. Metal Cutting (Water Plasma)
2. Power Tools in Construction, wood working, Electrical Engineering and Mechanical Engineering

TEXT BOOK:

1. Work shop Manual - P.Kannaiah/ K.L.Narayana, Scitech Publishers.
2. Workshop Manual by Venkat Reddy

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II Year B.Tech. ECE-I Sem	L	T/P/D	C
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(53007) MATHEMATICS – III

UNIT – I: Special Functions I

Review of Taylor's series for a real many valued functions, Series solutions to differential equations,, Gamma and Beta Functions – Their properties – evaluation of improper integrals. Bessel functions – properties – Recurrence relations – Orthogonality.

UNIT-II: Special Functions II

Legendre polynomials – Properties – Rodrigue's formula – Recurrence relations – Orthogonality. Chebycher's polynomials – properties – recurrence relations - Orthogonality

UNIT-III: Functions of a complex variable

Continuity – Differentiability – Analyticity – Properties – Cauchy-Riemann conditions, Maxima – Minima principle, Harmonic and conjugate harmonic functions – Milne – Thompson method. Elementary functions, general power Z principal value Logarithmic function.

UNIT-IV: Complex integration

Line integral – evaluation along a path and by indefinite integration – Caucny's integral theorem – Cauchy's integral formula – Generalized integral formula.

UNIT-V: Complex power series

Radius of convergence – Expansion in Taylor's series, Maclaurin's series and Laurent series. Singular point –Isolated singular point – pole of order m – essential singularity. (Distinction between the real analyticity and complex analyticity)

UNIT-VI: Contour Integration

Residue – Evaluation of residue by formula and by Laurent series - Residue theorem.

Evaluation of integrals of the type

(a) Improper real integrals $\int_{-\infty}^{\infty} f(x)dx$

(b) $\int_{0}^{c+2\pi} f(\cos\theta,\sin\theta)d\theta$

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

UNIT-VII: Conformal mapping

Transformation by , Imz, z^2, z(n positive integer), Sin z, cos z, z + a/z. Translation, rotation, inversion and bilinear transformation – fixed point – cross ratio – properties – invariance of circles and cross ratio – determination of bilinear transformation mapping 3 given points .

UNIT –VIII: Elementary Graph theory

Graphs, Representation by matrices Adjacent matrix – Incident matrix –Simple, Multiple, Regular, complete Bipartite & Planar graphs – Hamiltonian and Eulerian Circuits- Trees Spanning tree - minimum spanning tree

TEXT BOOKS:

1. Engineering Mathematics – III by P.B. Bhaskara Rao, S.K.V.S.Rama Chary, M.Bhujanga Rao & Others.
2. Engineering Mathematics – III by C. Shankaraiah, V.G.S. Book Links.

REFERENCES:

1. Engineering Mathematics – III by T.K.V. Iyengar, B.Krishna Gandhi and Others – S.Chand.
2. Higher Engineering Mathematics by B.S. Grewal Khanna Publications.
3. Advance Engineering Mathematics by Jain & S.R.K. Iyengar, Narasa Publications.
4. Complex Variables by R.V. Churchill.
5. Advanced Engineering Mathematics by Allen Jaffrey Academic Press.

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II Year B.Tech ICE I-Sem	L	T/P/D	C
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53030-FUNDAMENTALS OF ELECTRICAL ENGINEERING

Objective:

This course introduces the basic concepts of circuit analysis which is the foundation for all subjects of the Electrical Engineering discipline. The emphasis of this course is laid on the basic analysis of circuits which includes Single phase circuits, magnetic circuits, theorems.

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 – Kirchhoff's laws – network reduction techniques – series, parallel, series parallel, star-to-delta or delta-to-star transformation.

UNIT – II Magnetic CircuitsMagnetic 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 – 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 – IV Three Phase Circuits

Three phase circuits: Phase sequence – Star and delta connection – *Relation between line and phase voltages and currents in balanced systems – Analysis of balanced and Unbalanced 3 phase circuits – Measurement of active and reactive power.*

UNIT – V Network theorems (without proofs)

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

UNIT – VI DC MACHINES

Dc Machine- Principle & operation of DC Generators , Different types of DC generators EMF equation of DC machine, OCC characteristics of DC shunt generator principle of operation Dc motor, back emf and torque equation of DC shunt motor torque speed characteristic of dc shunt motor , simple problems.

UNIT – VII AC MACHINES -I

Principle, construction and operation if 1-phase transformer, emf equation operation of transformer on no load and load, equivalent circuit, OC & SC tests on 1-phasetransformer, transformer regulation, Principle of operation of three phase induction motor, concept of rotating magnetic field torque expression and torque slip characteristic

UNIT – VIII AC MACHINES -II

Synchronous generator, construction, principle of operation, emf equation, synchronous impedance concept determination of voltage regulation using synchronous impedance method. . Principle operation of single -phase induction motor, torque slip characteristics. Starting of single phase induction motors.

TEXT BOOKS:

1. Electrical Engineering Fundamental by Vincent Deltoro. PHI.
2. Electrical Circuits by Chakravathi, Dhanapat Rai & son.
3. Basic Electrical Engg. Nagasarkar Sukhija, Oxford Publishers 2/e

REFERENCE BOOKS:

1. Basic Electrical Engineering - By M.S.Naidu and S. Kamakshiah – TMH.

2. Network Analysis GK Mithal, Khanna Publishers

3. Higher Electrical Technology, Smith, Pearson.

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II Year B.Tech ICE I-Sem	L	T/P/D	C
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(53009) ELECTRONIC DEVICES AND CIRCUITS

Unit- I: p-n Junction Diode

Qualitative Theory of p-n Junction, p-n Junction as a Diode, Diode Equation, Volt-Ampere Characteristics, Temperature dependence of VI characteristic, Ideal versus Practical – Resistance levels (Static and Dynamic), Transition and Diffusion Capacitances, Diode Equivalent Circuits, Load Line Analysis, Breakdown Mechanisms in Semi Conductor Diodes, Zener Diode Characteristics.

Unit- II: Rectifiers and Filters

The p-n junction 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, Comparision of Filters, Voltage Regulation using Zener Diode.

Unit- III: Bipolar Junction Transistor

The Junction Transistor, Transistor Current Components, Transistor as an Amplifier, Transistor Construction, BJT Operation, BJT Symbol, Common Base, Common Emitter and Common Collector Configurations, Limits of Operation , BJT Specifications.

Unit- IV: Transistor Biasing and Stabilization

Operating Point, The DC and AC Load lines, 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} and β, Bias Compensation using Diodes and Transistors, Thermal Runaway, Thermal Stability.

Unit- V: Small Signal Low Frequency BJT Models

BJT Hybrid Model, Determination of h-parameters from Transistor

Characteristics, Analysis of a Transistor Amplifier Circuit using h-Parameters, Comparison of CB, CE, and CC Amplifier Configurations.

Unit-VI: Field Effect Transistor

The Junction Field Effect Transistor (Construction, principle of operation, symbol) – Pinch-off Voltage - Volt-Ampere characteristics, The JFET Small Signal Model, MOSFET (Construction, principle of operation, symbol), MOSFET Characteristics in Enhancement and Depletion modes.

Unit VII: FET Amplifiers

FET Common Source Amplifier, Common Drain Amplifier, Generalized FET Amplifier, Biasing FET, FET as Voltage Variable Resistor, Comparison of BJT and FET, The Uni Junction Transistor.

Unit VIII: Special Purpose Electronic Devices

Principle of Operation and Characteristics of Tunnel Diode (with the help of Energy Band Diagram) and Varactor Diode. Principle of Operation of Schottky Barrier Diode, SCR, and Semiconductor Photo Diode.

Text Books

1. Millman's Electronic Devices and Circuits – J. Millman, C.C.Halkias, and Satyabrata Jit, 2ed., 1998, TMH.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 ed., 2006, PEI/PHI.
3. Introduction to Electronic Devices and Circuits - Rober T. Paynter, PE.

References

1. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 ed., 2008, TMH.
2. Electronic Devices and Circuits -- K. Lal Kishore, 2 ed., 2005, BSP.
3. Electronic Devices and Circuits – Anil K. Maini, Varsha Agarwal, 1 ed., 2009, Wiley India Pvt. Ltd.
4. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, 2 ed., 2008, TMH.

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II Year B.Tech ICE I-Sem	L	T/P/D	C
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(53021) SIGNALS AND SYSTEMS

Unit I : 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, Exponential and Sinusoidal signals, Concepts of Impulse function, Unit Step function, Signum function.

Unit II : Fourier Series Representation of Periodic Signals

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

Unit III : Fourier Transforms

Deriving Fourier Transform from Fourier Series, Fourier Transform of arbitrary signal, Fourier Transform of standard signals, Fourier Transform of Periodic Signals, Properties of Fourier Transform, Fourier Transforms involving Impulse function and Signum function, Introduction to Hilbert Transform.

Unit IV : Signal Transmission Through Linear Systems

Linear System, Impulse response, Response of a Linear System, Linear Time Invariant (LTI) System, Linear Time Variant (LTV) System, Transfer function of a LTI system, Filter characteristics of Linear Systems, Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Paley-Wiener criterion for physical realization, Relationship between Bandwidth and Rise time.

Unit V : Convolution and Correlation of Signals

Concept of convolution in Time domain and Frequency domain,

Graphical representation of Convolution, Convolution property of Fourier Transforms, Cross Correlation and Auto Correlation of functions, Properties of Correlation function, Energy density spectrum, Parseval's Theorem, Power density spectrum, Relation between Auto Correlation function and Energy/Power spectral density function, Relation between Convolution and Correlation, Detection of periodic signals in the presence of Noise by Correlation, Extraction of signal from noise by filtering.

Unit VI : Sampling

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

Unit VII : Laplace Transforms

Review of Laplace Transforms (L.T), Partial fraction expansion, Inverse Laplace Transform, Concept of Region of Convergence (ROC) for Laplace Transforms, Constraints on ROC for various classes of signals, Properties of L.T, Relation between L.T and F.T of a signal, Laplace Transform of certain signals using waveform synthesis.

Unit VIII : Z–Transforms

Fundamental difference between Continuous and Discrete time signals, Discrete time signal representation using Complex exponential and Sinusoidal components, Periodicity of Discrete time signal using complex exponential signal, Concept of Z-Transform of a Discrete Sequence, Distinction between Laplace, Fourier and Z Transforms, Region of Convergence in Z-Transform, Constraints on ROC for various classes of signals, inverse Z-transform, Properties of Z-transforms.

TEXT BOOKS:

1. Signals, Systems & Communications - B.P. Lathi, 2009, BSP.
2. Signals and Systems – A.Rama Krishna Rao – 2008, TMH.

2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, 2 ed., PHI.

REFERENCES:

1. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2 ed.
2. Introduction to Signal and System Analysis – K.Gopalan 2009, CENGAGE Learning.
3. Fundamentals of Signals and Systems - Michel J. Robert, 2008, MGH International Edition.
4. Signals, Systems and Transforms - C. L. Philips, J.M.Parr and Eve A.Riskin, 3 ed., 2004, PE.

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II Year B.Tech ICE I-Sem	L	T/P/D	C
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(53031) SWITCHING THEORY AND LOGIC DESIGN

UNIT I

Number Systems & Codes : Philosophy of Number Systems, Complement Representation of Negative Numbers, Binary Arithmetic, Binary Codes, Error Detecting & Error Correcting Codes, Hamming codes.

UNIT II

Boolean Algebra and Switching Functions : Fundamental Postulates of Boolean Algebra, Basic theorems and Properties, Switching Functions, Canonical and Standard forms, Algebraic simplification Digital Logic Gates, Properties of XOR gates, Universal Gates, Multilevel NAND/NOR Realizations.

UNIT III

Minimization of Switching Functions : Map method, Prime implicants, Don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime –Implicant chart, Simplification rules.

UNIT IV

Combinational Logic Design : Design using conventional logic gates, 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.

UNIT V

Programmable Logic Devices & Threshold Logic : Basic PLD's-ROM, PROM, PLA, PAL, Realization of Switching functions using PLD's, Capabilities and Limitations of Threshold gate, Synthesis of Threshold functions, Multigate Synthesis.

UNIT VI

Sequential Circuits - I : Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples), Basic Flip-Flops, Triggering and Excitation tables, Steps in Synchronous Sequential Circuit Design, Design of modulo-N Ring & Shift counters, Serial binary adder, Sequence detector.

UNIT VII

Sequential Circuits - II : Finite State Machine-Capabilities and Limitations, Mealy and Moore models, Minimization of Completely Sspecified and Incompletely Specified Sequential Machines, Partition Techniques and Merger chart methods, Concept of Minimal cover table.

UNIT VIII

Algorithmic State Machines : Salient features of the ASM chart, Simple examples, System design using data path and control subsystems, Control implementations, Examples of Weighing Machine and Binary multiplier.

TEXTBOOKS :

1. Switching & Finite Automata theory – Zvi Kohavi, 2 ed., TMH.
2. Digital Design – Morris Mano, 3 ed., 2006, PHI.
3. Switching Theory and Logic Design – A. Anand Kumar, 2008, PHI.

REFERENCES :

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

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II Year B.Tech ICE I-Sem	L	T/P/D	C
	3	1/-/-	3

(53032) TRANSDUCTION OF PHYSICAL VARIABLES

UNIT1:

Introduction to measurement systems: general concepts and terminology, measurement systems, sensor classification, general input-output configuration, methods of correction, static characteristics of measurement systems- accuracy, linearity, resolution, precision and sensitivity etc. estimation of errors.

UNIT2:

Dynamic characteristics: Transfer function, dynamic characteristics of measurement systems: zero-order, first-order, and second-order measurement systems and response

UNIT3:

Measuring devices: Temperature : Thermal expansion methods, Thermo electric, electrical resistance and semiconductor sensors. Radiation methods- thermal and photon detectors based thermometers

UNIT4:

Measuring devices: Pressure : Methods of pressure measurement: Dead weight gauges and manometers, elastic transducers, vibrating cylinder and other resonant transducers. Testing of pressure measuring system. High pressure measurement.

UNIT5:

Measuring devices: Vacuum and sound : Diaphragm, McLeod, Knudsen, viscosity, thermal conductivity and ionization gauges. Dual gauge techniques. Sound measurement.

UNIT6:

Measuring devices: Local Flow : Flow Visualization from Pitot – Static Tube, Yaw Tube, Pivoted Vane and Servoed Sphere, wind vector indicator, Anemometers, Velocity sensors

UNIT-7:

Measuring devices: Gross Volume Flow : Obstruction meters, averaging Pitot tubes, Rotameters, Turbine and Positive Displacement meters, electromagnetic, Drag force, Vortex shedding, Ultrasonic Flow meters

UNIT8:

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.

TEXT BOOK:

1. Measurement System : Applications and Design – by E.O. Doeblin, D.N.Manik,5th ed. McGraw Hill Publications.
2. Sensors and Signal Conditioning : Ramon Pallás Areny, John G. Webster, 2nd edition, John Wiley and Sons, 2000.

REFERENCES:

1. Sensor Technology Handbook – Jon Wilson, Newne 2004.
2. Introduction to measurements and Instrumentation– by Arun. K. Ghoshl, 2nd Edition, PHI, 2007
3. Sensors and Transducers – D.Patranabis, TMH 2003

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II Year B.Tech ICE I-Sem	L	T/P/D	C
	0	-/3/-	2

(53630) ELECTRONIC DEVICES AND CIRCUITS LAB

PART A: (Only for Viva-voce Examination)

ELECTRONIC WORKSHOP PRACTICE (In 3 lab sessions) :

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB's
2. Identification, Specifications and Testing of Active Devices, Diodes, BJT's, Low power JFET's, MOSFET's, Power Transistors, LED's, LCD's, SCR, UJT.
3. 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 & Reverse Bias Characteristics of PN Junction Diode.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Input & Output Characteristics of Transistor in CB Configuration.
4. Input & Output Characteristics of Transistor in CE Configuration.
5. Half Wave Rectifier with & without filters
6. Full Wave Rectifier with & without filters
7. FET characteristics
8. Measurement of h parameters of transistor in CB, CE, CC configurations
9. Frequency Response of CC Amplifier.

10. Frequency Response of CE Amplifier.
11. Frequency Response of Common Source FET amplifier
12. SCR characteristics.
13. UJT Characteristics

PART C: Equipment required for Laboratories:

1.	Regulated Power supplies (RPS)	- 0-30 V
2.	CRO's	- 0-20 MHz.
3.	Function Generators	- 0-1 MHz.
4.	Multimeters	
5.	Decade Resistance Boxes/Rheostats	
6.	Decade Capacitance Boxes	
7.	Ammeters (Analog or Digital)	- 0-20 μA, 0-50μA, 0-100μA, 0-200μA, 0-10 mA.
8.	Voltmeters (Analog or Digital)	- 0-50V, 0-100V, 0-250V
9.	Electronic Components	- Resistors, Capacitors, BJTs, LCDs, SCRs, UJTs, FETs, LEDs, MOSFETs, diodes Ge& Si type, Transistors – npn,pnp type)

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II Year B.Tech ICE I-Sem	L	T/P/D	C
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(53631) ELECTRICAL TECHNOLOGY LAB

PART – A

1. Serial and Parallel Resonance – Timing, Resonant frequency, Bandwidth and Q-factor determination for RLC network.
2. Time response of first order RC/RL network for periodic non-sinusoidal inputs – time constant and steady state error determination.
3. Two port network parameters – Z-Y Parameters, chain matrix and analytical verification.
4. Verification of Superposition and Reciprocity theorems.
5. Verification of maximum power transfer theorem. Verification on DC, verification on AC with Resistive and Reactive loads.
6. Experimental determination of Thevenin's and Norton's equivalent circuits and verification by direct 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 & SC tests on Single-phase transformer (Predetermination of efficiency and regulation at given power factors and determination of equivalent circuit).
5. Brake test on 3-phase Induction motor (performance characteristics).
6. Regulation of alternator by synchronous impedance method.

Note: Any TEN of the above experiments are to be conducted

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II Year B.Tech ICE II-Sem	L	T/P/D	C
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(54004) ENVIRONMENTAL STUDIES

UNIT-I :

ECOSYSTEMS: Definition, Scope and Importance of ecosystem, Concept of ecosystem, Classification of ecosystems, Structure and Structural Components of an ecosystem, Functions of ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Homeostasis / Cybernetics, Food chain concentration, Biomagnification, ecosystems value, services and carrying capacity.

UNIT-II:

NATURAL RESOURCES: Classification of Resources: Living and Non-Living resources, Renewable and non-renewable resources. Water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources – case studies. Energy resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy sources – case studies. Land resources: land as a resource, land degradation, man induced landslides and land use / land cover mapping.

UNIT-III:

BIODIVERSITY AND BIOTIC RESOURCES: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and intrinsic values. Hot spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, conservation of biodiversity: In-Situ and Ex-situ conservation. Food and fodder resources. Timber and non-timber forest products.

UNIT-IV:

ENVIRONMENTAL POLLUTION AND CONTROL: Classification of pollution and pollutants, causes, effects and control technologies. Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. Water pollution: Point and non-point sources of pollution, Major pollutant of water and their sources, drinking water quality standards, Waste water treatment methods: effluent treatment plants (ETP), Sewage treatment plants (STP), common and combined effluent treatment plants (CETP).Soil Pollution: Soil as sink for pollutants, Impact of modern agriculture on soil, degradation of soil. Marine Pollution: Misuse of International water for dumping of hazardous waste, coastal pollution due to sewage and marine disposal of industrial effluents. Noise Pollution: Sources, Industrial Noise- Occupational Health hazards, standards, Methods of control of Noise. Thermal Pollution: Thermal Comforts, Heat Island effect, Radiation effects. Nuclear Pollution: Nuclear power plants, nuclear radiation, disasters and impacts, genetical disorders. Solid waste: types, Collection processing and disposal of industrial and municipal solid wastes composition and characteristics of e-Waste and its management.

UNIT-V:

GLOBAL ENVIRONMENTAL PROBLEMS AND GLOBAL EFFORTS : Green house effect, Green House Gases (GHG), Global Warming, Sea level rise, climate change and their impacts on human environment. Ozone depletion and Ozone depleting substances (ODS).Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol.

UNIT-VI:

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) AND ENVIRONMENTAL MANAGEMENT PLAN: Definition of Impact, classification of impacts, Positive and Negative, Reversible and irreversible, light, moderate and severe, methods of baseline data acquisition. Impacts on different components: such as human health resources, air, water, flora, fauna and society. Prediction of impacts

and impact assessment methodologies. Environmental Impact Statement (EIS). Environmental Management Plan (EMP): Technological Solutions, preventive methods, Control technologies, treatment technologies: green-belt-development, rain water harvesting, Remote sensing and GIS methods.

UNIT-VII:

ENVIRONMENTAL POLICY, LEGISLATION, RULES AND REGULATIONS : National Environmental Policy, Environmental Protection act, Legal aspects Air (Prevention and Control of pollution) Act- 1981, Water(Prevention and Control of pollution) Act-1974, Water pollution Cess Act-1977, Forest Conservation Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules .

UNIT: VIII

TOWARDS SUSTAINABLE FUTURE : Concept of Sustainable Development, Threats to Sustainability, Population and its explosion, Crazy Consumerism, Over-exploitation of resources, Strategies for Achieving Sustainable development, Environmental Education, Conservation of Resources, Urban Sprawl, Sustainable Cities and Sustainable Communities, Human health, Role of IT in Environment, Environmental Ethics, Environmental Economics, Concept of Green Building, Clean Development Mechanism (CDM).

SUGGESTED TEXT BOOKS:

1. Environmental studies , From crisis to cure by R.Rajagopalan, 2005
2. Text book of Environmental Science and Technology by M.Anji Reddy 2007
3. Environmental studies by Erach Bharucha 2005, University Grants Commission, University Press

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela .2008 PHI Learning Pvt. Ltd.

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(54022) PRINCIPLES OF COMMUNICATIONS

UNIT I

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

UNIT III

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

UNIT IV

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

UNIT V

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

UNIT VI

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

UNIT VII

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

UNIT VIII

Error control coding : Introduction, Error detection and correction codes, block codes, convolution codes.

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, 2nd Ed. 2004.

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II Year B.Tech ICE II-Sem	L	T/P/D	C
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(54020) ELECTRONIC CIRCUIT ANALYSIS

Unit – I:

Single Stage Amplifiers : Classification of Amplifiers – Distortion in Amplifiers, Analysis of CE, CC, and CB Configurations with simplified Hybrid Model, Analysis of CE amplifier with Emitter Resistance and Emitter follower, Miller's Theorem and its dual, Design of Single Stage RC Coupled Amplifier using BJT.

Unit – II:

Multi Stage Amplifiers : Analysis of Cascaded RC Coupled BJT amplifiers, Cascode Amplifier, Darlington Pair, Different Coupling Schemes used in Amplifiers - RC Coupled Amplifier, Transformer Coupled Amplifier, Direct Coupled Amplifier.

Unit – III:

BJT Amplifiers - Frequency Response : Logarithms, Decibles, General frequency considerations, Frequency response of BJT Amplifier, Analysis at Low and High frequencies, Effect of coupling and bypass Capacitors, The Hybrid- pi (π) - Common Emitter Transistor Model, CE Short Circuit Current Gain, Current Gain with Resistive Load, Single Stage CE Transistor Amplifier Response, Gain-Bandwidth Product, Emitter follower at higher frequencies.

Unit –IV :

MOS Amplifiers [3] : 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 – V:

Feedback Amplifiers : Concepts of Feedback, Classification of Feedback Amplifiers, General characteristics of Negative Feedback Amplifiers, Effect of Feedback on Amplifier Characteristics, Voltage

Series, Voltage Shunt, Current Series and Current Shunt Feedback Configurations, Illustrative Problems.

Unit – VI:

Oscillators : Classification of Oscillators, Conditions for Oscillations, RC Phase Shift Oscillator, Generalized analysis of LC oscillators - Hartley, and Colpitts Oscillators, Wien-Bridge & Crystal Oscillators, Stability of Oscillators.

Unit – VII:

Large Signal Amplifiers : Classification, Class A Large Signal Amplifiers, Transformer Coupled Class A Audio Power Amplifier, Efficiency of Class A Amplifier, Class B Amplifier, Efficiency of Class B Amplifier, Class-B Push-Pull Amplifier, Complementary Symmetry Class B Push-Pull Amplifier, Distortion in Power Amplifiers, Thermal Stability and Heat Sinks.

Unit – VIII:

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

TEXT BOOKS:

1. Integrated Electronics - Jacob Millman and Christos C Halkias, 1991 ed., 2008, TMH.
2. Electronic Devices and Circuits - S. Salivahanan, N.Suresh Kumar, A Vallavaraj, 2 ed., 2009, TMH.
3. Design of Analog CMOS Integrated Circuits – Behzad Razavi, 2008, TMH.

REFERENCES:

1. Electronic Devices and Circuit Theory - Robert L.Boylestad, Louis Nashelsky, 9 ed., 2008 PE.
2. Introductory Electronic Devices and Circuits– Robert T. Paynter, 7 ed., 2009, PEI
3. Electronic Circuit Analysis – K. Lal Kishore, 2004, BSP
4. Electronic Devices and Circuits, David A. Bell – 5 ed.; Oxford University Press.
5. Microelectric Circuits – Sedra and Smith – 5 ed., 2009, Oxford University Press.

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II Year B.Tech ICE II-Sem	L	T/P/D	C
	4	1/-/-	4

(54023) STRUCTURED DIGITAL SYSTEM DESIGN

UNIT I

Introduction, Concepts of digital design, the logic operators, Hardware Aspects related to asserted and not-asserted conditions, Mechanical switches for signal sources, Concept of inverter, General Implementation procedures, Arithmetic circuits, comparators, multiplexers, Code converters.

UNIT II

Wired logic, Practical aspects of Wired logic and Bus-oriented Structures, Tristate Bus Systems, Practical aspects related to Combinational Logic Design, Fan-in Fan-out, Propagation Delay.

UNIT III

Introduction Sequential Machine Design, The need for sequential Circuits, Basic Architectural Distinctions between Combinational and Sequential Circuits, Fundamental differences between Sequential machines, Fundamentals of Sequential Machine operation, Clock and Oscillators, The design of a Clocked Flip-Flop, Flip-Flop conversion from one type to another, Practical clocking Aspects Concerning Flip-Flops, Timing and Triggering Considerations, Clock Skew

UNIT IV

Introduction Sequential Analysis and Design, The State Diagram, Analysis of Synchronous Sequential Circuits, A Synchronous Analysis Process, Approaches to the Design of Synchronous Sequential Finite State machines, Design steps For Traditional Synchroncus sequential circuits, State Reduction, Minimizing the next door Decoders with JK or T Flip-Flop, Output Decoder Design.

UNIT V

Counters, Design of Single-Mode Counters, Design of Specialized Multi-mode Counters, Ripple Counters, Shift Register, Shift Registers and Memory.

UNIT VI

Introduction Multi- Input System controller design, System Controllers, Controller Design Phases and System Documentation, Defining the purpose and Role of the system, Defining the Basic Operational Characteristic of the system, The controlling Systems and the controlled system, Timing and Frequency considerations, Functional Partition and detailed Flow Diagram Development, System Controller state Specification(MDS diagram Generation),

UNIT VII

Synchronizing two Systems and choosing Controller Architecture.The State Assignment, The next state decoder, Next State Decoder Maps, The output decoder, Clock Frequency Determination, Power Supply requirements, Control and Display, Concepts related to the use of conditional Outputs.

UNIT VIII

Introduction, Using MSI decoder in System Controllers, Using MSI Multiplexers in System Controllers, System Controllers with more Complexity Indirect Addressed Multiplexers configuration, Read Only Memories, ROM's, PROM's and Applications, Using a PROM for Random Logic, Programmed Logic Arrays, Applications of PLA's and FPLA's.

TEXT BOOK:

1. An Engineering Approach to Digital Design – by William I. Fletcher, Prentice-Hall of India Pvt. Ltd.
2. Logic designs Theory- N.N. Biswas. PHI.

REFERENCES:

1. Digital Systems Testing & Testable Design –Miron Abramoviu, Melvin A. Breuer and Arthur D.Friedman-Jaico Books.
2. Switching & Finite Automata Theory. Z.Kohavi, @nd Edition THi.
3. Digital Design Morris Mano-PHI, #rd Edition 2006
4. Digital Circuits & Logic Design –by Samuel C Lee, PHI

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II Year B.Tech ICE II-Sem	L	T/P/D	C
	3	1/-/-	3

(54025) CONTROL SYSTEMS

Objective :

In this course it is aimed to introduce to the students the principles and applications of control systems in every day life. The basic concepts of block diagram reduction, time domain analysis solutions to time invariant systems and also deals with the different aspects of stability analysis of systems in frequency domain and time domain.

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

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.

UNIT-IIITIME RESPONSE ANALYSIS

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

UNIT – IV 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 – V FREQUENCY RESPONSE ANALYSIS

Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.

UNIT – VI STABILITY ANALYSIS IN FREQUENCY DOMAIN

Polar Plots, Nyquist Plots Stability Analysis.

UNIT – VII CLASSICAL CONTROL DESIGN TECHNIQUES

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

UNIT – VIII State Space Analysis of Continuous Systems

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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 Engg. by NISE 3rd Edition – John wiley
4. "Modelling & Control Of Dynamic Systems" by Narciso F. Macia George J. Thaler, Thomson Publishers..

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II Year B.Tech ICE II-Sem	L	T/P/D	C
	3	1/-/-	3

(54046) SENSORS AND SIGNAL CONDITIONING

UNIT-I:

INTRODUCTION TO MEASUREMENT SYSTEMS: general concepts and terminology, measurement systems, sensor classification, general input-output configuration, methods of correction performance characteristics: static characteristics of measurement systems, accuracy, precision, sensitivity, other characteristics: linearity, 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 and types, resistive temperature detectors (RTD's), thermistors, magneto resistors, light-dependent resistors (LDR's)

UNIT-III:

SIGNAL CONDITIONING FOR RESISTIVE SENSORS: measurement of resistance, voltage dividers, Wheatstone bridge. Balance and deflection measurements, sensor bridge calibration and compensation instrumentation amplifiers, interference types and reduction

UNIT-IV:

REACTANCE VARIATION AND ELECTROMAGNETIC SENSORS: capacitive sensors - variable & differential, inductive sensors - reluctance variation, eddy current, linear variable differential transformers (LVDT's), variable transformers: Synchros, resoivers, inductosyn, magneto elastic sensors, electromagnetic sensors - sensors based on faraday's law, hall effect sensors

UNIT-V:

SIGNAL CONDITIONING FOR REACTANCE VARIATION SENSORS: problems and alternatives, ac bridges, carrier amplifiers - application to the LVDT, variable oscillators, resolver-to-digital and digital-to-resolver converters

UNIT-VI:

SELF-GENERATING SENSORS: thermoelectric sensors, piezoelectric sensors, pyroelectric sensors, photovoltaic sensors, electrochemical sensors

UNIT-VII:

SIGNAL CONDITIONING FOR SELF-GENERATING SENSORS: chopper and low-drift amplifiers, offset and drifts amplifiers, electrometer amplifiers, charge amplifiers, noise in amplifiers

UNIT-VIII:

DIGITAL SENSORS: position encoders, variable frequency sensors - quartz digital thermometer, vibrating wire strain gages, vibrating cylinder sensors, saw sensors, digital flow meters, Sensors based on semiconductor junctions: thermometers based on semiconductor junctions, magneto diodes and magneto transistors, photodiodes and phototransistors, sensors based on MOSFET transistors, charge-coupled sensors - types of ccd imaging sensors, ultrasonicbased sensors, fiber-optic sensors

TEXT BOOKS:

1. Sensors and Signal Conditioning: Ramon Pallás Areny, John G. Webster; 2nd edition, John Wiley and Sons, 2000.
2. Sensors and Transducers – D.Patranabis, TMH 2003

REFERENCES:

1. Sensor Technology Handbook – 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

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II Year B.Tech ICE II-Sem	L	T/P/D	C
	0	-/3/-	2

(54634) TRANSDUCERS AND INSTRUMENTATION LAB

(Minimum TEN experiments should be performed)

1. Extension of Range of DC Ammeter, Voltmeter
2. Extension of Range of AC Voltmeter, Ammeter
3. Construction of Series & Shunt type Ohm meters using PMMC
4. RLC and Q measurement using Q-meter
5. Study of Strain gauges using any one application
6. Measurement of temperature using RTD
7. Measurement of linear displacement using LVDT
8. Study of Capacitive transducers
9. Measurement of Resistance Using Wheat stone Bridge / Kelvin Bridge.
10. Measurement of Capacitance Using Shearing Bridge.
11. Measurement of Inductance Using Maxwell's Bridge.
12. Characteristics of Opto – Electric Transducers (Photo Transistor, Photo diode, LDR)

1. Piezoelectric transducers
2. Bourdon tube
3. Acceleration transducers

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II Year B.Tech ICE II-Sem	L	T/P/D	C
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(54635) CONTROL SYSTEMS LAB

(Minimum TEN experiments should be performed)

1. Characteristics of synchro transducer, Synchro receiver and control transformers
2. Gain control of the output of D.C. Amplifier with and without chopper stabilization.
3. Programming a P.L.C
4. Torque- displacement characteristics of stepper motor using A\D converters.
5. Open loop control of a relay servomechanism (On- off control of a temp in a heater bath)
6. Advantage of . feedback on the performance of an open loop speed control system (D.C. Motor speed control system)
7. Response of a first order system, with R.C Components (Simulated transfer function) on X-Y plotter/ Servo scope.
8. Operation of pneumatically operated pressure control system using pressure sensitive bellows and LVDT as sensors.
9. Error comparators- gauged potentiometer and systems potentiometersensitivity determination.
10. Calibration of a torque- balance pressure control system using a flapper nozzle in the pressure sensing circuit.
11. Modeling of a distillation column as a lumped parameter multi variable system.
12. Pneumatically operated PID controller, with independent gain control of P.I, and D control loops, of a step input response.

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III Year B.Tech. ICE -I Sem

L	T/P/D	C
4	-/-/-	4

(55015) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Unit I

Introduction to Managerial Economics: Definition, Nature and Scope of Managerial Economics- Demand Analysis: Demand Determinants, Law of Demand and its exceptions.

Unit II

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

Unit III

Theory of Production and Cost Analysis: Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Cost concepts, Opportunity cost, Fixed vs. Variable costs, Explicit costs Vs. Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems)- Managerial Significance and limitations of BEA.

Unit IV

Introduction to Markets & Pricing Policies: Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly.

Objectives and Policies of Pricing- Methods of Pricing: 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

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 VI

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 VII

Introduction to Financial Accounting: Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

Unit VIII

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

TEXT BOOKS:

1. Aryasri: Managerial Economics and Financial Analysis, TMH, 2009.

2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.

REFERENCES:

1. Raghunatha Reddy & Narasimhachary: Managerial Economics& Financial Analysis, Scitech, 2009.
2. V.Rajasekarn & R.Lalitha, Financial Accounting, Pearson Education, New Delhi, 2010.
3. Suma Damodaran, Managerial Economics, Oxford University Press, 2009.
4. Domnick Salvatore: Managerial Economics in a Global Economy, 4th Edition, Cengage, 2009.
5. Subhash Sharma & M P Vittal, Financial Accounting for Management, Text & Cases, Machmillan, 2008.
6. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2008.
7. Truet and Truet: Managerial Economics:Analysis, Problems and Cases, Wiley, 2009.
8. Dwivedi:Managerial Economics, Vikas, 2009.
9. M.Kasi Reddy, S.Saraswathi: Managerial Economics and Financial Accounting, PHI, 2007.
10. Erich A. Helfert: Techniques of Financial Analysis, Jaico, 2007.

Prerequisites: Nil

Objective: To explain the basic principles of managerial economics, accounting and current business environment underlying business decision making.

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

Question Paper Pattern: 5 Questions to be answered out of 8 questions .Out of eight questions 4 questions will be theory questions and 4 questions should be problems.

Each question should not have more than 3 bits.

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(55046) DIGITAL SIGNAL PROCESSING

Unit I

Introduction: Introduction to Digital Signal Processing: Discrete time signals & sequences, linear shift invariant systems, stability, and causality, Linear constant coefficient difference equations, Frequency domain representation of discrete time signals and systems

Unit II

Discrete Fourier Series: DFS representation of Periodic Sequences, Properties of Discrete Fourier Series, , Discrete Fourier Transforms: Properties of DFT, linear convolution of sequences using DFT, Computation of DFT : Over-lap Add method, Over-lap Save method, Relation between DTFT, DFS, DFT and Z-Transform.

Unit III

Fast Fourier Transforms: Fast Fourier transforms (FFT) - Radix-2 decimation-in-time and decimation-in-frequency FFT Algorithms, Inverse FFT, and FFT with general Radix-N

Unit IV

Realization of Digital Filters: Applications of Z – transforms, solution of difference equations of digital filters, System function, Stability criterion, Frequency response of stable systems, Realization of digital filters – Direct, Canonic, Cascade and Parallel forms

Unit V

IIR Digital Filters: Analog filter approximations – Butterworth and Chebyshev, Design of IIR Digital filters from analog filters, Step and Impulse invariant techniques, Bilinear transformation method, Spectral transformations.

Unit VI

FIR Digital Filters: Characteristics of FIR Digital Filters, Frequency response, Design of FIR Filters: Fourier Method, Digital Filters using Window Techniques, Frequency Sampling technique, Comparison of IIR & FIR filters

Unit VII

Multirate Digital Signal Processing: Introduction, Down sampling, Decimation, Upsampling, Interpolation, Sampling Rate Conversion, conversion of band pass signals, Concept of resampling, Applications of multi rate signal processing

Unit VIII

Finite Word Length Effects : Limit cycles, Overflow oscillations, Round-off noise in IIR digital filters, Computational output round off noise, Methods to prevent overflow, Trade off 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, Dimitris G. Manolakis, Pearson Education / PHI, 2007.
2. Discrete Time Signal Processing – A. V. Oppenheim and R.W. Schaffer, PHI, 2009
3. Fundamentals of Digital Signal Processing – Loney Ludeman, John Wiley, 2009

REFERENCE BOOKS:

1. Digital Signal Processing – Fundamentals and Applications – Li Tan, Elsevier, 2008
2. Fundamentals of Digital Signal Processing using Matlab – Robert J. Schilling, Sandra L. Harris, Thomson, 2007
3. Digital Signal Processing – S.Salivahanan, A.Vallavaraj and C.Gnanapriya, TMH, 2009
4. Discrete Systems and Digital Signal Processing with MATLAB – Taan S. ElAli, CRC press, 2009.
5. Digital Signal Processing - A Practical approach, Emmanuel C. Ifeachor and Barrie W. Jervis, 2nd Edition, Pearson Education, 2009

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(55042) PULSE AND DIGITAL CIRCUITS

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, its applications in CRO probe, RL and RLC circuits and their response for step input, Ringing circuit.

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, Transfer characteristics of clampers.

UNIT III

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, Design of transistor switch, transistor-switching times.

UNIT IV

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

UNIT V

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

generator, Transistor Bootstrap time base generator, Current time base generators.

UNIT VI

SYNCHRONIZATION AND FREQUENCY DIVISION : Principles of Synchronization, Frequency division in sweep circuit, Astable relaxation circuits, Monostable relaxation circuits, Synchronization of a sweep circuit with symmetrical signals, Sine wave frequency division with a sweep circuit.

UNIT VII

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

UNIT VIII

REALIZATION OF LOGIC GATES USING DIODES & TRANSISTORS : AND, OR gates using Diodes, Resistor, Transistor Logic, Diode Transistor Logic.

TEXT BOOKS:

1. Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, McGraw-Hill, 1991.
2. Solid State Pulse circuits - David A. Bell, PHI, 4th Edn.., 2002

REFERENCES

1. Pulse and Digital Circuits – A. Anand Kumar, PHI.
2. Wave Generation and Shaping - L. Strauss.
3. Pulse, Digital Circuits and Computer Fundamentals - R.Venkataraman.

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(55041) ANALOG AND DIGITAL IC APPLICATIONS

UNIT I

INTEGRATED CIRCUITS : Classification, chip size and circuit complexity, basic information of Opamp, 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.

UNIT II

OP-AMP APPLICATIONS : Basic application of Op-amp, instrumentation amplifier, ac amplifier, V to I and I to V converters, sample & hold circuits, multipliers and dividers, Differentiators and Integrators, Comparators, Schmitt trigger, Multivibrators, introduction to voltage regulators, features of 723.

UNIT III

ACTIVE FILTERS & OSCILLATORS : Introduction, 1st order LPF, HPF filters. Band pass, Band reject and all pass filters. Oscillator types and principle of operation – RC, Wien and quadrature type, waveform generators – triangular, sawtooth, square wave and VCO.

UNIT IV

TIMERS & PHASE LOCKED LOOPS : Introduction to 555 timer, functional diagram, monostable and astable operations and applications, Schmitt Trigger. PLL - introduction, block schematic, principles and description of individual blocks of 565.

UNIT V

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 VI

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

UNIT VII

Design using TTL-74XX & CMOS 40XX series, code converters, decoders, Demultiplexers, decoders & drives for LED & LCD display. Encoder, priority Encoder, multiplexers & their applications, priority generators/checker circuits. Digital arithmetic circuits-parallel binary adder/subtractor circuits using 2's, Complement system. Digital comparator circuits.

UNIT VIII

SEQUENTIAL CIRCUITS : Flip-flops & their conversions. Design of synchronous counters. Decade counter, shift registers & applications, familiarities with commonly available 74XX & CMOS 40XX series of IC counters.

Memories : ROM architecture, types & applications, RAM architecture, Static & Dynamic RAMs, synchronous DRAMs.

TEXT BOOKS :

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

REFERENCES :

1. Operational Amplifiers & Linear Integrated Circuits – R.F. Coughlin & Fredrick F. Driscoll, PHI, 1977.
2. Operational Amplifiers & Linear Integrated Circuits: Theory & Applications –Denton J. Daibey, TMH.
3. Design with Operational Amplifiers&Analog Integrated Circuits-Sergio Franco,McGraw Hill,3rd Ed .,2002.
4. Digital Fundamentals – Floyd and Jain, Pearson Education,8th Edition, 2005.

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(55072) INSTRUMENTATION PRACTICES IN INDUSTRIES

Unit I:

Pulp and Paper Industries-I : Manufacture of pulp: Raw materials, pulping processes, craft pulping, soda pulping, sulfite pulping, semi chemical pulping, Mechanical and Thermomechanical Pulping.

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

Unit II:

Pulp and Paper Industries-II : 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:

Petrochemical Industries-I : Unit Operations: Drying-Separation-Heat transfer-Distillation-Thermal cracking-Catalytic cracking-Catalytic reforming- Hydro cracking – Hydro treating -Chemical oxidation-Chemical reduction-Polymerisation-Alkylation-Isomerization-Production of Ethylene, Acetylene- and Propylene from petroleum

Unit IV:

Petrochemical Industries-II : Measurements in refineries petrochemical industries – Differential pressure transmitter, Thermocouples Infrared pyrometer, Mass flow meters, Potentiometric level Transmitter, Vacuum Measurement,

Unit V:

Power Plant Instrumentation : Introduction, The power plant scheme, Pressure, temperature, flow and level measurement, Vibration and expansion measurements, Analysis of impurities in cooling water, Flue Gas analysis.

Unit VI:

Flight Instrumentation-I : Primary Flight Instruments (Principle of operation): Pitot static system for the measurement of aircraft speed, Aneroid Barometer and Altimeter, Gyroscope and its properties, methods of operating gyroscopic flight instruments, Gyro horizon, Vacuum driven Gyro Horizon, Electric Gyro Horizon.

Heading indicating instruments(Principle of operation): Direct reading Magnetic Compass, Liquid damping Direct reading Compass and Liquid expansion compensating Direct reading Compass, Remote indicating Compass system.

Unit VII:

Flight Instrumentation-II : Measurement of Engine Speed, Engine Temperature, Aircraft Pressure (Principle of operation): Mechanical Tachometers, Electrical Tachometers, Air Temperature sensors to measure RAT and SAT, Radiation Pyrometer system, Methods of measuring pressure, U-tube Manometer, Direct reading pressure gauges, Remote Indicating pressure gauges.

Measurement of Fuel quantity and Fuel flow(Principle of operation): Float type Fuel Quantity indicating system, Capacitance type fuel gauge system, Fuel Flow Measurement, Independent and Integrated Flow Meter System.

Unit VIII:

Industrial Safety : Safety Interlocks, safety in boiler equipment, safety interlocks for industrial chillers, Safety systems in Steam Turbine safety in Reformer furnaces and Cracking furnaces.

TEXT BOOKS:

1. Austin G.T. Shreeves, Chemical Process Industries, McGraw-Hill International student edition, Singapore, 1985

2. Pallet, E.H.J.'Aircrafts instruments and integrated systems'. Longmn Scientific & Technical, Mcgraw-Hill, 1992.
3. Sankaranarayana, P.E., Pulp and Pper Industry Technology & Instrumentation, Kothari's Deskbook.
4. Principles of Industrial Instrumentation, D. Patranabis, Mc Graw Hill.

REFERENCES:

1. John R Lavigne, An Introduction to Paper Industry Instrumentation, Miller Freeman Publications, Califirnia, 1985 Series.
2. Robert J. McGill, Mearsurement and Control in Papermaking, Adam Hilger Limited, Bristol, 1980
3. Gregory K. McMillan, Doig;as M. Considine, Process/ industrial instruments and controls hand book.
4. Liptak B.G. Instrumentation in process industries, Chilton book Company, 1994.
5. Liptak B.G., Process measurement and analysis, Third edition, Chilton book Company, 1996.

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(55621) PULSE CIRCUITS AND IC LAB

Minimum Twelve experiments to be conducted:

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers.
3. Non Linear wave shaping – Clampers.
4. Astable Multivibrator.
5. Monostable Multivibrator.
6. Schmitt Trigger.
7. UJT Relaxation Oscillator.
8. Adder, Integrator and differentiator using 741 OPAMP
9. Function Generator using 741 OP AMP
10. Verification of Logic Gates& Flip-Flops using ICs
11. Half Adder, Full Adder and Subtractor
12. Counters and Shift Registers & 7490 Counter
13. BCD to 7 Segment decoder using IC 7447
14. D/A Converter
15. A/D Converter
16. Multiplexer and Demultiplexer

Equipment required for Laboratories:

1. Regulated power supply - 0 – 30 V
2. CRO - 0 – 20 M Hz.
3. Function Generators - 0 – 1 M Hz
4. Components
5. Multi Meters

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(55632) INDUSTRIAL INSTRUMENTATION LAB

(Minimum of Twelve experiments should be conducted.)

1. **Design and simulation of Analog Circuits using CAD Package.**
2. **Design of PCBs using Packages and Fabrication of PCB.**
3. **Linearization of Thermistor**
4. **Study of Level monitoring Instruments using PLC.**
5. **Measurement of Blood Pressure.**
6. **Measurement of EGG.**
7. **Calibration of P to I and I to P converters.**
8. **RPM indicator using Stroboscope and Tachometer**
9. **Torque Measurement using Gyroscope.**
10. **Measurement of Humidity.**
11. **Measurement of fluid density**
12. Measurement of velocity of liquid using Ultrasonic (Doppler effect) method and also flow measurement.
13. Measurement of Level using Capacitance method/Transducer.
14. Displacement measurement using inductive pickup and capacitive pickup.
15. Measurement of Sound intensity
16. PID Controller setup (Flow/Temp. Level).

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(55633) BASIC SIMULATION LAB

List of Experiments:

1. Basic Operations on Matrices.
2. Generation of Various Signals and Sequences (Periodic and Aperiodic), such as Unit Impulse, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc.
3. Operations on Signals and Sequences such as Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.
4. Finding the Even and Odd parts of Signal/Sequence and Real and Imaginary parts of Signal.
5. Convolution between Signals and sequences.
6. Auto Correlation and Cross Correlation between Signals and Sequences.
7. Verification of Linearity and Time Invariance Properties of a given Continuous/Discrete System.
8. Computation of unit sample, unit step and sinusoidal responses of the given LTI system and verifying its physical realiazability and stability properties.
9. Gibbs Phenomenon
10. Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
11. Waveform Synthesis using Laplace Transform.
12. Locating the Zeros and Poles and plotting the Pole-Zero maps in S-plane and Z-Plane for the given transfer function.

13. Generation of Gaussian noise (Real and Complex), Computation of its mean, M.S. Value and its Skew, Kurtosis, and PSD, Probability Distribution Function.
14. Sampling Theorem Verification.
15. Removal of noise by Autocorrelation / Cross correlation.
16. Extraction of Periodic Signal masked by noise using Correlation.
17. Verification of Weiner-Khinchine Relations.
18. Checking a Random Process for Stationarity in Wide sense.

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(56041) MANAGEMENT SCIENCE

Unit I

Introduction to Management: Entrepreneurship and organization - Nature and Importance of Management, Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation, Systems Approach to Management, Leadership Styles, Social responsibilities of Management.

Unit II

Designing Organisational Structures: Departmentation and Decentralisation, Types of Organisation structures - Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, Virtual Organisation, Cellular Organisation, team structure, boundaryless organization, inverted pyramid structure, lean and flat organization structure and their merits, demerits and suitability.

Unit III

Operations Management: Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement-Statistical Quality Control: chart, R chart, c chart, p-chart, (simple Problems), Acceptance Sampling, Deming's contribution to quality.

Unit IV

A) **Materials Management:** Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records - Supply Chain Management

B) **Marketing:** Functions of Marketing, Marketing Mix, Marketing Strategies based on Product Life Cycle., Channels of distribution.

Unit V

Human Resources Management (HRM): Evolution of HRM, Concepts of HRM, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.

Unit VI

Project Management (PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing. (simple problems)

Unit VII

Strategic Management: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

Unit VIII

Contemporary Management Practices: Basic concepts of Just-In-Time (JIT) System, Total Quality Management (TQM), Six sigma and Capability Maturity Model (CMM) Levels, Value Chain Analysis,Enterprise Resource Planning (ERP), Performance Management, Business Process outsourcing (BPO), Business Process Re-engineering 5S Model, Deming's PDCA, Kaizen, Poka-Yoke, Muda, Benchmarking, Balanced Score Card.

TEXT BOOK:

1 Aryasri: Management Science, TMH, New Delhi, 2009

REFERENCE BOOKS:

1 Stoner, Management, Pearson, 2009

2. Kotler Philip & Keller Kevin Lane: Marketing Management PHI, 2009.
3. Koontz, Weihrich, & Aryasri: Principles of Management, TMH, 2009.
4. Thomas N.Duening & John M.Ivancevich Management—Principles and Guidelines, Cengage, 2009.
5. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2009.
6. Memoria & S.V.Ganker, Personnel Management, Himalaya, 2009
7. Schermerhorn: Management, Wiley, 2009.
8. Parnell: Strategic Management, Biztantra, 2009.
9. L.S.Srinath: PERT/CPM,Affiliated East-West Press, 2009.
10. William J. Stevenson & Ceyhun Ozgur: Introduction to Management Science, TMH, 2007.

Pre-requisites: Managerial Economics

Objective: To familiarize with the process of management and to provide basic insights into select contemporary management practices.

Codes/Tables: Normal Distribution Function Table need to be permitted into the examination Hall.

Question Paper Pattern: 5 Questions to be answered out of 8 questions. The question paper should contain atleast 2 practical problems, one each from units –III & VI

Each question should not have more than 3 bits.

Unit VIII will have only short questions, not essay questions.

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(56042) COMPUTER ORGANIZATION

(OPEN ELECTIVE)

UNIT I :

BASIC STRUCTURE OF COMPUTERS : Computer Types, Functional unit, Basic OPERATIONAL concepts, Bus structures, Software, Performance, multiprocessors and multi computers. Data Representation. Fixed Point Representation. Floating – Point Representation. Error Detection codes.

UNIT II :

REGISTER TRANSFER LANGUAGE AND MICRO OPERATIONS : Register Transfer language.Register Transfer Bus and memory transfers, Arithmetic Mircrooperatiaons, logic micro operations, shift micro operations, Arithmetic logic shift unit. Instruction codes. Computer Registers Computer instructions – Instruction cycle.

Memory – Reference Instructions. Input – Output and Interrupt. STACK organization. Instruction formats. Addressing modes. DATA Transfer and manipulation. Program control. Reduced Instruction set computer.

UNIT III :

MICRO PROGRAMMED CONTROL : Control memory, Address sequencing, microprogram example, design of control unit Hard wired control. Microprogrammed control

UNIT IV :

COMPUTER ARITHMETIC : Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit Decimal Arithmetic operations.

UNIT V :

THE MEMORY SYSTEM : Basic concepts semiconductor RAM memories. Read-only memories Cache memories performance

considerations, Virtual memories secondary storage. Introduction to RAID.

UNIT-VI

INPUT-OUTPUT ORGANIZATION : Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes of Transfer, Priority Interrupt Direct memory Access, Input –Output Processor (IOP) Serial communication, Introduction to peripheral component, Interconnect (PCI) bus. Introduction to standard serial communication protocols like RS232, USB, IEEE1394.

UNIT VII :

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

UNIT VIII :

MULTI PROCESSORS : Characteristics or Multiprocessors, Interconnection Structures, Interprocessor Arbitration. InterProcessor Communication and Synchronization Cache Coherance. Shared Memory Multiprocessors.

TEXT BOOKS :

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

REFERENCES :

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

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(56043) BIO-TECHNOLOGY

(OPEN ELECTIVE)

Unit I: Basics of Biology : Prokaryotic and Eukaryotic cells; Organelles: cell wall, mitochondria, chloroplast, nucleus, plasma membrane; Biomolecules: carbohydrates, proteins, lipids, nucleic acids and vitamins.

Unit II: Flow and regulation of information in biology : DNA replication and regulation; Transcription and regulation; Translation and regulation; Protein function.

Unit III: Cell signaling, Communication and Motility Cell signaling; Cell-cell communication; Cell motility (Cilia and flagella)

UNIT IV: Applications of Biotechnology in Plants Regeneration ; Plant products ; GM foods.

UNIT – V: Application of Biotechnology in Animals and Human Medicine Recombinant proteins and vaccines; Hybridoma and Monoclonal antibody; Transgenic animals.

Unit VI: Application of Biotechnology in Environmental Sciences Biofuels; Biopolymers; Biofertilizers; Biopesticides.

Unit VII: Bioindicators and Biosensors Biosensing methods; Types of transdusers; Bio MEMS, Applications of biosensors.

Unit VIII: Bioprocess/ Fermentation Technology Introduction to Bioreactor; Media design; Technology for mammalian and plant cell cultures; Downstream processing.

Text Books:

1) Smith J.E. Biotechnology. Cambridge University press. 2009.
2) Verma P.S AND Agarwal V.K. Cell Biology, Genetics, Molecular biology, Evolution & Ecology. 2009. S. Chand & company Ltd.
3) Thieman and Palladino. Introduction to Biotechnology, Second edition. Dorling Kindersley India Pvt Ltd. 2009.

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(56014) NANO TECHNOLOGY

(OPEN ELECTIVE)

Unit-I:

Introduction to nanotechnology: Importance of nanoscale, Nanostructure types, electronic, magnetic, optical Properties of Nanomaterials, top-down and bottom- up approach to nanostructures.

Unit-II:

Quantum Mechanical phenomenon in nanostructures: Quantum confinement of electrons in semiconductor Nano structures, one dimensional confinement (Quantum wires), two dimensional confinements (Quantum Wells), three dimensional confinements (Quantum dots).

Unit-III

Carbon Nano Structures: Carbon nanotubes (CNTs), Fullerenes, C60, C80 and C240 Nanostructures, Properties (mechanical, optical and electrical) and applications.

Unit-IV

Fabrication of Nanomaterials: Physical Methods: Inert gas condensation, Arc discharge, RFplasma, Plasma arc technique, Ion sputtering, Laser ablation, Laser pyrolysis, Molecular beam epitaxy, Chemical vapour deposition method.

Unit-V

Nano scale characterization techniques: Scanning probe techniques (AFM, MFM, STM, SEM, TEM), XRD

Unit-VI

Nanodevices and Nanomedicine: Lab on chip for bioanalysis, Core/shell Nanoparticles in drug delivery systems (site specific and

targeted drug delivery), cancer treatment, and bone tissue treatment.

Unit-VII

Nano and molecular electronics: Resonant-Tunneling structures, single electron tunneling, Single Electron transistors, coulomb blockade, giant magneto resistance, tunneling magneto resistance.

Unit-VIII

nanolithography and nanomanipulation: e-beam lithography and SEM based nanolithography and nanomanipulation, Ion beam lithography, oxidation and metallization. Mask and its application. Deep UV lithography, X-ray based lithography.

TEXT BOOKS:

1. Charles.p.pode, Introduction to nanotechnology, springer publications
2. Springer Handbook of Nanotechnology - Bharat Bhusan
3. Phani kumar, principles of nanotechnology, scitech publications

REFERENCES BOOKS:

1. David Ferry "Transport in Nano structures" Cambridge University press 2000
2. Nanobiotechnology; ed. C.M.Niemeyer, C.A. Mirkin.
3. Nanofabrication towards biomedical application: Techniques, tools, Application and impact – Ed. Challa S.,S. R. Kumar, J. H. Carola.
4. Encyclopedia of Nanotechnology- Hari Singh Nalwa
5. Carbon Nanotubes: Properties and Applications- Michael J. O'Connell.
6. S. Dutta "Electron Transport in Mesoscopic systems" Cambridge University press
7. H. Grabert and M. Devoret "Single charge Tunneling" Plenum press 1992

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. ICE - II Sem	L	T/P/D	C
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(56012) MICROPROCESSORS AND MICROCONTROLLERS

Unit 1

8086 Architecture: Introduction to 8085 Microprocessor, 8086 Architecture-Functional diagram, Register Organization, Memory Segmentation, Programming Model, Memory addresses, Physical memory organization, Architecture of 8086, signal descriptions of 8086- common function signals, Minimum and Maximum mode signals, Timing diagrams, Interrupts of 8086.

Unit 2

Instruction Set and Assembly Language Programming of 8086: Instruction formats, addressing modes, instruction set, assembler directives, macros, simple programs involving logical, branch and call instructions, sorting, evaluating arithmetic expressions, string manipulations.

Unit 3

I/O Interface: 8255 PPI, various modes of operation and interfacing to 8086, interfacing keyboard, display, stepper motor interfacing, D/A and A/D converter.

Unit 4

Interfacing with advanced devices: Memory interfacing to 8086, Interrupt structure of 8086, Vector interrupt table, Interrupt service routine, Introduction to DOS and BIOS interrupts, Interfacing Interrupt Controller 8259 DMA Controller 8257 to 8086.

Unit 5

Communication Interface: Serial communication standards, Serial data transfer schemes, 8251 USART architecture and interfacing, RS- 232, IEEE- 488, Prototyping and trouble shooting.

Unit 6

Introduction to Microcontrollers: Overview of 8051 microcontroller, Architecture, I/O Ports, Memory organization, addressing modes and instruction set of 8051, simple programs

Unit 7

8051 Real Time Control: Interrupts, timer/ Counter and serial communication, programming Timer Interrupts, programming external hardware interrupts, programming the serial communication interrupts, programming 8051 timers and counters

Unit 8

The AVR RISC microcontroller architecture: Introduction, AVR Family architecture, Register File, The ALU, Memory access and Instruction execution, I/O memory, EEPROM, I/O ports, Timers, UART, Interrupt Structure

TEXT BOOKS:

1. D. V. Hall, Micro processors and Interfacing, TMGH, 2nd edition 2006.
2. Kenneth, J. Ayala, The 8051 microcontroller , 3rd edition, Cengage learning, 2010

REFERENCES:

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandani, TMH, 2nd edition 2006.
2. The 8051Microcontrollers, Architecture and programming and Applications -K.Uma Rao, Andhe Pallavi, , Pearson, 2009.
3. Micro Computer System 8086/8088 Family Architecture, Programming and Design - By Liu and GA Gibson, PHI, 2nd Ed.,
4. Microcontrollers and application, Ajay. V. Deshmukh, TMGH, 2005
5. The 8085 Microprocessor: Architecture, programming and Interfacing – K.Uday Kumar, B.S.Umashankar, 2008, Pearson

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III Year B.Tech. ICE - II Sem	L	T/P/D	C
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(56045) PROCESS CONTROL INSTRUMENTATION

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 : Basic control actions – characteristics of two position, three position, Proportional, Single speed floating, Integral and Derivative control modes – PI, PD, PID control modes – Problems –

UNIT – III:

TYPES OF CONTROLLERS : Pneumatic, Hydraulic and Electronic Controllers to realize various control actions.

UNIT – IV:

CONTROLLER SETTINGS : Evaluation criteria – 1/4th decay ratio, IEA, ISE, ITAE - determination of optimum settings for mathematically described process using time response and frequency response.

UNIT – V:

TUNING OF CONTROLLERS : Tuning process curve reaction method – continuous oscillation method – damped oscillation method – problems.

UNIT – VI:

FINAL CONTROL ELEMENTS : I/P Converter, P/I converter - pneumatic, electric and hydraulic actuators – valve Positioner

UNIT – VII:

CONTROL VALVES : Control valves – characteristic of control valves – valve body – Globe, Butterfly, diaphragm, Ball valves – Control valve sizing – Cavitations, flashing - problems.

UNIT – VIII:

MULTILOOP CONTROL SYSTEM : Feed forward control – Ratio control – Cascade control – Split range – Multivariable control and examples from distillation column and Boiler system.

TEXT BOOK:

1. Chemical Process Control : An introduction to Theory and Practice – by Stephanopoulos, Prentice Hall, New Delhi, 1999.
2. Process Control – Harriott P. , TMH, 1991

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

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III Year B.Tech. ICE - II Sem	L	T/P/D	C
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(56075) ANALYTICAL INSTRUMENTATION

UNIT–I:

pH AND CONDUCTIVITY & DISSOLVED COMPONENT ANALYSER : Conductivity meters – pH meters – Dissolved oxygen, hydrogen analyzers – Sodium analyzer – Silica analyzer and sampling systems.

UNIT – II:

GAS ANALYSERS : Thermal conductivity types – CO monitor – NOX analyzer – H 2 S analyzer system and sampling – Industrial analyzer circuits, Theory and problems on Beer – Lamberts Law.

UNIT – III:

CHROMATOGRAPHY - I : Gas chromatography – Liquid chromatography – their principles and applications

UNIT – IV:

CHROMATOGRAPHY - II : oxygen analyzer – paramagnetic type – detectors and sampling systems.

UNIT – V:

SPECTROPHOTOMETERS - I : UV, VIS Spectrophotometers – Single beam and double beam instruments – Instrumentation associated with the above Spectrophotometers – Sources and detectors – Sources and detectors for IR Spectrophotometers.

UNIT – VI:

SPECTROPHOTOMETERS - II : FT IR Spectrometer – Flame emission and atomic absorption Spectrophotometer – Atomic emission Spectrophotometer - sources for Flame Photometers and online calorific value measurements.

UNIT – VII:

PRINCIPLE OF NUCLEAR MAGNETIC RESONANCE : Instrumentation associated with NMR Spectrophotometer – Introduction to mass spectrophotometers , Principle and brief discussion on ELECTRON SPIN RESONANCE (ESR.)

UNIT – VIII:

SPECIAL ANALYTICAL INSTRUMENTS : Nuclear radiation detectors – Ionization chamber – GM Counter – Proportional Counter – Solid state detectors ND PMT.

TEXT BOOK:

1. Handbook of Analytical Instruments – by Khandpur. TMH
2. Analytical Instrumentation by Bela G. Liptak, CRC Press -1994

REFERENCES:

1. Instrumental Methods of Analysis – by Willard H.H., Merrit L.L., Dean J.A., and Seattle F.L., CBS Publishing and Distributors, 6/e, 1995.
2. Instrument Technology – by Jones B.E., Butterworth Scientific Publ., London, 1987.
3. Mechanical and Industrial Measurements – by Jain R.K., Khanna Publishing, New Delhi, 2/e, 1992.
4. Principles of Instrumental Analysis – by Skoog D.A. and West D.M., Holt Sounder Publication, Philadelphia, 1985.
5. Instrumental Analysis – by Mann C.K., Vickerks T.J. & Gullick W.H., Harper and Row Publishers, New York, 1974.

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III Year B.Tech. ICE - II Sem	L	T/P/D	C
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(56636) PROCESS CONTROL LAB

(Minimum Twelve experiments should be conducted)

1. Electronic controllers.
2. Servo regulator operation and DC motor control.
3. Control valve characteristics (Different types).
4. Flow level control unit.
5. Temperature level control unit.
6. Realization of control actions: Pneumatic controllers, Hydraulic controllers
7. Process tuning – Process reaction curve method.
8. Process tuning – continuous and damped oscillation method.
9. Operation of flow loop in plant.
10. Input converter – Pneumatic actuator.
11. Input converter – Hydraulic actuator.
12. Multi loop control systems – Ratio Control.
13. Multi loop control systems – Cascade Control.
14. Interacting and Non- interacting systems.
15. Feed-forward control.

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III Year B.Tech. ICE - II Sem	L	T/P/D	C
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(56637)MICROPROCESSORS AND MICROCONTROLLERS LAB

List of Experiments:

Note: - Minimum of 12 experiments to be conducted.

The Following programs/experiments are to be written for assembler and execute the same with 8086 and 8051 kits.

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.
7. Parallel communication between two microprocessors using 8255.
8. Serial communication between two microprocessor kits using 8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Programming using arithmetic, logical and bit manipulation instructions of 8051.
11. Program and verify Timer/ Counter in 8051
12. Program and verify Interrupt handling in 8051
13. UART Operation in 8051.
14. Communication between 8051 kit and PC.
15. Interfacing LCD to 8051
16. Interfacing Matrix/ Keyboard to 8051.
17. Data Transfer from Peripheral to Memory through DMA controller 8237 / 8257.

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III Year B.Tech. ICE - II Sem

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(56638) ADVANCED ENGLISH COMMUNICATION SKILLS LAB

1. Introduction

The introduction of the English Language Lab is considered essential at 3rd year level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be an integrated theory and lab course to enable students to use 'good' English and perform the following:

- Gather ideas and information, to organise ideas relevantly and coherently.
- Engage in debates.
- Participate in group discussions.
- Face interviews.
- Write project/research reports/technical reports.
- Make oral presentations.
- Write formal letters.
- Transfer information from non-verbal to verbal texts and vice versa.
- To take part in social and professional communication.

2. **Objectives:** This Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.

- Further, they would be required to communicate their ideas relevantly and coherently in writing.

3. **Syllabus:** The following course content is prescribed for the Advanced Communication Skills Lab:

- Functional English - starting a conversation – responding appropriately and relevantly – using the right body language – role play in different situations.
- Vocabulary Building – synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases.
- Reading Comprehension – reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, Critical reading.
- Writing Skills – structure and presentation of different types of writing – Resume writing / e-correspondence/Technical report writing/Portfolio writing – planning for writing – research abilities/ data collection/organizing data/tools/analysis – improving one's writing.
- Group Discussion – dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.
- Presentation Skills – Oral presentations (individual and group) through JAM sessions/seminars and written presentations through posters/projects/reports/PPTs/e-mails/assignments etc.
- Interview Skills – concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing.

4. **Minimum Requirement:** The English Language Lab shall have two parts:

i) The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.

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

System Requirement (Hardware component): Computer network with Lan with minimum 60 multimedia systems with the following specifications:

iii) P – IV Processor a) Speed – 2.8 GHZ

b) RAM – 512 MB Minimum c) Hard Disk – 80 GB

iv) 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)
- The following software from 'train2success.com'
  - Preparing for being Interviewed,
  - Positive Thinking,
  - Interviewing Skills,
  - Telephone Skills,
  - Time Management
  - Team Building,
  - Decision making
- English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

6. **Books Recommended:**

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.

2. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, Pearson Education 2011.
3. English Language Communication : A Reader cum Lab Manual Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
4. English Vocabulary in Use series, Cambridge University Press 2008.
5. Management Shapers Series by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.
6. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
7. Handbook for Technical Writing by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
8. Job Hunting by Colm Downes, Cambridge University Press 2008.
9. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
10. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hil 2009.
11. Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/ Cambridge University Press.
12. International English for Call Centres by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

DISTRIBUTION AND WEIGHTAGE OF MARKS: Advanced Communication Skills Lab Practicals:

1. The practical examinations for the English Language Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

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(57067) BIO-MEDICAL INSTRUMENTATION

UNIT – I:
Components of Medical Instrumentation System. Bioamplifier. Static and dynamic characteristics of medical instruments. Biosignals and characteristics. Problems encountered with measurements from human beings.

UNIT – II:
Organisation of cell. Derivation of Nernst equation for membrane Resting Potential Generation and Propagation of Action Potential, Conduction through nerve to neuromuscular junction.

UNIT – III:
Bio Electrodes – Biopotential Electrodes-External electrodes, Internal Electrodes. Biochemical Electrodes.

UNIT – IV:
Mechanical function, Electrical Conduction system of the heart. Cardiac cycle. Relation between electrical and mechanical activities of the heart.

UNIT – V:
Cardiac Instrumentation: Blood pressure and Blood flow measurement. Specification of ECG machine. Einthoven triangle, Standard 12-lead configurations, Interpretation of ECG waveform with respect to electro mechanical activity of the heart.

UNIT – VI:
Therapeutic equipment. Pacemaker, Defibrillator, Shortwave diathermy. Haemodialysis machine.

UNIT – VII:
Neuro-Muscular Instrumentation: Specification of EEG and EMG machines. Electrode placement for EEG and EMG recording. Intrepretation of EEG and EMG.

UNIT – VIII:
Respiratory Instrumentation: Mechanism of respiration, Spirometry, Pnemuotachograph 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. Biomedical Telemetry – by Mackay, Stuart R., John Wiley.

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IV Year B.Tech. ICE - I Sem	L	T/P/D	C
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(57125) COMPUTER AIDED DESIGN OF CONTROL SYSTEMS

UNIT I:

INTRODUCTION : Introduction and mathematical back ground, system models, Generation of system matrices-Least order, Decoupling zeros, mode of the system transformation – Mcmillian form – Reduction to least order

UNIT II:

CONTROLLABILITY AND OBSERVABILITY : Concepts of controllability and observability, Controllability and observability - Decomposition of state space and Duality.

UNIT III:

STABILITY ANALYSIS OF SISO SYSTEMS : System Specification, Stability- Decoupling zeros , Nyquist Diagram. Inverse Nyquist diagram-

UNIT IV:

DESIGN OF COMPENSATORS : Design of phase lead compensators from inverse Nyquist diagram- Design of phase lag compensators from inverse Nyquist diagram.

UNIT V:

DESIGN CRITERIA : Design using Root loci method of design, Comparison with inverse Nyquist diagram techniques – Sensitivity Design criteria , step response – frequency response – pole location – Selection of criteria. Irrational transfer functions, Non minimum phase response. the circle criteria – Connection with the describing function.

UNIT VI:

MULTIVARIABLE SYSTEMS : Notation, Gain space, stability,

frequency response criteria for stability, diagonal dominance, Ostrowski's theorem, Achieving dominance, Sensitivity, Direct Nyquist array, design procedure- Multi variable circle criterion.

UNIT VII:

MATLAB PROGRAMMING : Introduction, variables, Expressions, Control statements, Logical & Relational operators, Function files, Script files, Input-Output format, Working with Workspace

UNIT VIII:

DESIGN OF CONTROLLERS USING MATLAB : Introduction to Control system Tool Box, Time and Frequency domain analysis of Control Systems using MATLAB, Stability analysis using MATLAB, Controllability and Observability testing using MATLAB, Design of static Feed back Controllers.

TEXT BOOKS:

1. Computer Aided Design of Control Systems – by Resenbrock(Academic Press)
2. Multi variable Control Theory by Y.S. Apte.

REFERENCES:

1. MATLAB Control System Tool Box.
2. Simulation Tools for Electrical Engineers – by N. Yadaiah and G. Tulasi Ram Das, Pearson Education.

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IV Year B.Tech. ICE - I Sem

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(57035) VLSI DESIGN

Unit I

Introduction: Introduction to IC Technology – MOS, PMOS, NMOS, CMOS & BiCMOS Technologies; Oxidation, Lithography, Diffusion, Ion implantation, Metallization, Encapsulation, Probe testing, Integrated Resistors and Capacitors, CMOS Nanotechnology

Unit II

Basic Electrical Properties: Basic Electrical Properties of MOS and BiCMOS Circuits: I_{ds}-V_{as} relationships, MOS transistor threshold Voltage, g_m, g_{ds}, Figure of merit ωo; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

Unit III

VLSI Circuit Design Processes: VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, 2 μm CMOS Design rules for wires, Contacts and Transistors Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits.

Unit IV

Gate Level Design: Logic Gates and Other complex gates, Switch logic, Alternate gate circuits, Time delays, Driving large capacitive loads, Wiring capacitance, Fan – in, Fan – out, Choice of layers.

Unit V:

Data Path Subsystems: Subsystem Design, Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Zero/One Detectors, Counters.

Unit VI:

Array Subsystems: SRAM, DRAM, ROM, Serial Access Memories,

Content Addressable Memory.

Unit VII:

Semiconductor Integrated Circuit Design: PLAs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, Design Approach, Parameters influencing low power design.

Unit VIII

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

TEXT BOOKS:

1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Dougles and A. Pucknell, PHI, 2005 Edition
2. VLSI Desing- K .Lal Kishore, V. S. V. Prabhakar, I.K International, 2009.
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. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition, 1997.
3. VLSI Design – A.Albert Raj, Latha, PHI, 2008
4. Introduction to VLSI – Mead & Convey, BS Publications, 2010
5. VLSI Design – M. Micheal Vai, CRC Press, 2009.

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IV Year B.Tech. ICE - I Sem	L	T/P/D	C
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(57126) DIGITAL AND OPTIMAL CONTROL SYSTEMS

UNIT – I:

SAMPLING AND RECONSTRUCTION & THE Z- TRANSFORMS : Introduction, Examples of Data control systems –sample and hold operations, Reconstruction of original signals, Linear difference equations, pulse response.

The Z – TRANSFORMS: Z – transforms, Theorems of Z – Transforms, the inverse Z – transforms, Modified 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.

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.

UNIT – IV:

STABILITY ANALYSIS : Mapping between the S-Plane and the Z-Plane – Primary strips and Complementary Strips, Stability Analysis of closed loop systems in the Z-Plane. Jury stability test, Stability Analysis by use of the Bilinear Transformation and Routh Stability

criterion, Stability in the sense of Lyapunov., Lyapunov's stability and Lypanov's instability theorems. Direct method of Lypanov for the Linear and Nonlinear continuous time autonomous systems.

UNIT –V:

DESIGN OF DIGITAL CONTROLLERS : Design of digital control systems with digital controllers through bilinear transformation. Digital PID controller, Design for dead beat response, pole placement design by state feedback for single input and multi-input systems, pole placement design by incomplete feedback or output feedback.

UNIT – VI:

STATE OBSERVERS : Introduction, State Observers – Full order and Reduced order observers.

UNIT-VII:

CALCULUS OF VARIATIONS : Minimization of functionals of single function, Constrained minimization. Minimum principle. Control variable inequality constraints. Control and state variable inequality constraints. Euler Lagrangine Equation.

UNIT –VIII:

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

TEXT BOOKS:

1. K. OGATA : Discrete time control systems, Prentice Hall
2. Digital Control and State Variable Methods by M.Gopal, TMH

REFERENCES:

1. Modern Control Theory by M.Gopal, M/s. TMH Publications.
2. Digital Control Systems, Kuo, Oxford University Press, 2nd Edition, 2003.
3. Digital Control Engineering, M.Gopal

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(57127) VIRTUAL INSTRUMENTATION

(ELECTIVE-I)

UNIT–I:

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

UNIT – II:

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

UNIT –III:

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

UNIT –V:

Bus Interfaces: USB, PCMCIA, VXI, SCSI, PCI, PXI, Firewire. PXI system controllers, Ethernet control of PXI.

UNIT –VI:

Networking basics for office & Industrial applications, VISA and IVI.

UNIT – VII:

VI toolsets, Distributed I/O modules. Application of Virtual Instrumentation: Instrument Control, Development of process database management system

UNIT –VIII:

Simulation of systems using VI, Development of Control system, Industrial Communication, Image acquisition and processing, Motion control.

TEXT BOOKS:

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

REFERENCE:

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

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(57070) OPTOELECTRONICS AND LASER INSTRUMENTATION

(ELECTIVE-I)

UNIT-I

Optical Fibers – Introduction, Light Guidance, Numerical Aperture, Types of Fibers. LED source – Principle of Operation, Double Hetero Structure of LED, Characteristics. Detectors – Principle of Operation of PIN Diode and Avalanche Photo Diode, Responsivity, Quantum Efficiency.

UNIT-II LASERS FOR INSTRUMENTATION-I

Introduction, The Einstein Equations, Light Amplification, The Threshold Condition, Laser Rate Equations, Ruby Laser, He-Ne Laser, Neodymium based Laser – Nd-YAG and Nd-Glass Lasers.

UNIT-IIILASRS FOR INSTRUMENTATION-II

Argon-ion Laser, CO_2 Laser, Dye Laser, Excimer Laser, Semiconductor Laser, Laser Alignment, Positioning and Tracking – The Quadrant Photo Diode, Position Sensing Detector, Position Sensing with Reticles, Laser Level, Laser Safety Issues.

UNIT-IV LASER TELEMETERY

Introduction, Triangulation, Time of Flight Telemeters – Power Budget, System Equation, Accuracy of Pulsed Telemeter, Accuracy of Sine Wave Telemeter, Ambiguity Problem, Intrinsic Precision and Calibration, Instrumental Development of Simple Pulsed Telemeter, Imaging Telemeters.

UNIT-V LASER INTERFEROMETRY

Introduction, Interferometry Applications, Basic Laser Interferometer – Two Beam and Two Frequency Laser Interferometer, Performance Parameters, Principle of Operationof Laser Vibrometer, White Light

Interferometry.

UNIT-VI LASER DOPPLER VELOCIMETRY AND GYROSCOPES

Laser Doppler Velocimetry – Principle of Operation, Velocimeter as Interferometer, Performance Parameters.

Gyroscopes – Overview, The Sagnac Effect and Relativity, The Sagnac Phase Signal and Phase Noise, Basic Configurations of Gyroscopes.

UNIT-VII OPTICAL FIBER SENSORS

Introduction, Classification of Optical Fiber Sensors, Outline of Optical Fiber Sensors, The Optical Straingage, Intensity Readout of Optical Fiber Sensors, Multiplexed and Distributed Optical Fiber Sensors.

UNIT-VIII MEDICAL APPLICATIONS OF LASERS

Lasers and Tissue Interaction, Laser Instruments for Surgery, Removal of Tumors of Vocal Cords, Plastic Surgery, Dermatology.

TEXT BOOKS:

Electro Optical Instrumantation – Sensing and Measuring with Lasers by Sivano Donati, Pearson Education India, 2004.

Optical Eletronics by Ajoy.K.Ghatak and K.Thyagarajan, Cambridge University Press, 1996.

REFERENCE BOOKS:

Lasers Principles and Applications by J.Wilson and F.B.Hawkers, Prentice Hall India, 1996.

Laser Surgery and Medicine: Principles and Practice by Carmen A.Puliafito, Wiley Interscience,1996.

Lasers and Holography by P.C.Mehta and V.V. Rampal, World Scientific Publishing Ltd., 1993.

Essentials of Optoeletronics with Applications by A.J.Rogers, CRC Press, 1997.

Lasers Theory and Applications by K.Thyagarajan and A.K.Ghatak, Plenum Press, New York,1981.

Lasers and Applications by W.O.N. Guimarass and A.Mooradian, Spinger-Verlag, 1981.

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IV Year B.Tech. ICE - I Sem	L	T/P/D	C
	3	1/-/-	3

(57069) TELEMETRY AND TELE CONTROL

(ELECTIVE – I)

UNIT-I:

Telemetry Fundamentals and Classification : Fundamental concepts-Significance, Principle, Functional blocks of telemetry and telecontrol system-Methods of telemetry-Electrical, Pneumatic, Hydraulic and optical telemetry-State of the art-Telemetry standards.

UNIT-II

Multiplexing & Demultiplexing : Multiplexing principles, frequency division multiplexing, transmitter Multiplexers, Receiver Multiplexers, FDM Application Time Division Multiplexing, PAM Multiplexers, PCM Demultiplexers, Digital carrier systems, demultiplexing.

Unit-III

Transmission of binary data in communication systems : Digital codes, principles of digital transmissions, transmission efficiency, modem concepts and methods, wideband modulation, broadband modem techniques, error detection and correction.

UNIT-IV:

Landline Telemetry : Electrical telemetry-current system-voltage systems-synchro systems-frequency systems-position and pulse systems-examples of a landline telemetry system.

UNIT-V:

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

UNIT-VI:

Optical Telemetry : Optical fibers Cable – Sources and detectors

– Transmitter and Receiving Circuits, Coherent Optical Fiber Communication System.

UNIT-VII:

Tele control Methods : Analog and digital techniques in telecontrol, telecontrol apparatus-remote adjustment, guidance and regular-telecontrol using information theory-examples of a telecontrol system.

UNIT-VIII

Introduction to networking & internet technologies : Network fundamentals, LAN hardware, Ethernet LANs, token ring LANs, internet Application, internet transmission systems.

TEXT BOOKS

1. Telemetry Principles- D.Patranabis TMH-1999
2. Principles of Electronics Communication Systems – Louise Frenzel TMH-2008 3rd edition

REFERENCE BOOKS:

1. Gruenberg L., Handbook of Telemetry and remote control, mcGrau Hill, New York, 1987.
2. Swoboda G., Telecontrol methods and applications of telemetry and remote control, Reinhold publishing corp., London, 1991.
3. Young R.E., Telemetry Engineering, Little books Ltd., London, 1988.
4. Housley T., Data Communication and teleprocessing system, prentice hall international, Englewood cliffs, New Jersey, 1987.

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IV Year B.Tech. ICE - I Sem	L	T/P/D	C
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(57128) INSTRUMENTATION AND CONTROL IN MANUFACTURING SYSTEMS

(ELECTIVE – II)

UNIT I

Introduction to manufacturing operations and systems : Manufacturing industries and products, manufacturing operations, product/production relationships, production concepts, and mathematical models, costs of manufacturing operations, Components of a manufacturing systems, classifications of manufacturing systems, overview of the classification scheme, manufacturing progress functions (learning curves)

UNIT II

Introduction to automation & Industrial control Systems : Basic elements of aim automated system, advanced automation functions, levels of automation, process industries, verse descrete manufacturing industries, continuous verses descrete control, computer process control, forms of computer process control,

UNIT – III

Numerical Control and Discrete Control Using PLC's, fundamental of NC technology, computer numerical, DNC, applications of numerical control, descrete process control, ladder logic diagrams, programmable logic controllers, personal computers using soft logic.

UNIT –IV

Industrial Robotics : Robot anatomic and related attributes, robot control systems, end effectors, sensers in robotics, industrial robot applications, robot programming, Engineering analysis of industrial robots.

UNIT –V :

Flexibile manufacturing Systems : What is an FMS ?, FMS Components, FMS applications, and benefits, FMS planning and implementation issues, fundamentals of automated assembly systems, design for auto0mated assembly, quantitative analysis of assembly systems.

UNIT –VI :

Quality assurance and statistical process control : Quality defined, traditional and modern quality control, taguchi methods in quality engineering, ISO 9000, process variability, and process capability, and control charts, other SPC tools, implementing statistical process control.

UNIT –VII :

Quality inspection technologies : Inspection metrology, contact verses non contact inspection techniques, conventional measuring and gauging techniques and coordinate measuring machines, surface measurement, machine vision, other optical inspection techniques, non-contact non-optical inspection technologies.

UNIT –VIII :

Process and Production Planning : Process planning, computer-aided process planning (CAP), concurrent engineering and design for manufacturing, aggregate production planning and the master production scheduled, material requirements planning (MRP), capacity planning, shop floor control, inventory control.

TEXT BOOK :

1. Mikell P.Grover, Automation, Production Systems and Computer Prentice Hall of India Pvt.Ltd. 1995.

REFERENCES:

1. A.Troitsky Principles of Automation and Automated Production Mir Publ., 1976.
2. C.Ray Astaihe, Robots and Manufacturing automation, John Wile and Sons, New York.

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IV Year B.Tech. ICE - I Sem	L	T/P/D	C
	3	1/-/-	3

(57037) COMPUTER NETWORKS

(ELECTIVE-II)

UNIT I

Introduction to networks, internet, protocols and standards, the OSI model, layers in OSI model, TCP/IP suite, Addressing, Analog and digital signals.

UNIT II

Physical Layer: digital transmission, multiplexing, transmission media, circuit switched networks, Datagram networks, virtual circuit networks, switch and Telephone network.

UNIT III

Data link layer: Introduction, Block coding, cyclic codes, checksum, framing, flow and error control, Noiseless channels, noisy channels, HDLC, point to point protocols

UNIT IV

Medium Access sub layer: Random access, controlled access, channelization, IEEE standards, Ethernet, Fast Ethernet, Giga-Bit Ethernet, wireless LANs.

UNIT V

Connecting LANs, backbone networks and virtual LANs, Wireless WANs, SONET, frame relay and ATM.

UNIT VI

Network Layer: Logical addressing, internetworking, tunneling, address mapping, ICMP, IGMP, forwarding, uni-cast routing protocols, multicast routing protocols.

UNIT VII

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 VIII

Application Layer – Domain name space, DNS in internet, electronic mail, FTP, WWW, HTTP, SNMP, multi-media, network security

TEXT BOOKS:

1. Data Communications and Networking – Behrouz A. Forouzan, Fourth Edition TMH,2006.
2. Computer Networks — Andrew S Tanenbaum, 4th Edition, Pearson Education.

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networks-S.Keshav,2nd Edition,Pearson Education
2. Understanding communications and Networks,3rd Edition, W.A.Shay,Cengage Learning.
3. Computer and Communication Networks ,Nader F. Mir, Pearson Education
4. Computer Networking:A Top-Down Approach Featuring the Internet,James F.Kurose,K.W.Ross,3rd Edition,Pearson Education.
5. Data and Computer Communications,G.S.Hura and M.Singhal,CRC Press,Taylor and Francis Group.
6. Data communications and computer Networks,P.C.Gupta,PHI.

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IV Year B.Tech. ICE - I Sem	L	T/P/D	C
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(57072) EMBEDDED and REAL TIME SYSTEMS (ELECTIVE –II)

UNIT I :

INTRODUCTION : Embedded systems overview, design challenge, processor technology, IC technology, Design Technology, Trade-offs. Single purpose processors RT-level combinational logic, sequential logic (RT-level), custom single purpose processor design (RT-level), optimizing custom single purpose processors.

UNIT II:

GENERAL PURPOSE PROCESSORS : Basic architecture, operation, Pipelining, Programmer's view, development environment, Application Specific Instruction-Set Processors (ASIPs) – Micro Controllers and Digital Signal Processors.

UNIT III :

STATE MACHINE AND CONCURRENT PROCESS MODELS : Introduction, models Vs. languages, finite state machines with data path model (FSMD), using state machines, program state machine model (PSM), concurrent process model, concurrent processes, communication among processes, synchronization among processes, implementation, data flow model, real-time systems.

UNIT IV: COMMUNICATION INTERFACE : Need for communication interfaces, RS232 / UART, RS422 / RS485, USB, Infrared, IEEE 1394 Firewire, Ethernet, IEEE 802.11, Blue tooth.

UNIT - V Introduction to Real – Time Operating Systems : Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment.

(Chapter 6 and 7 from Text Book 3, Simon).

UNIT - VI

Basic Design Using a Real-Time Operating System : Principles, Semaphores and Queues, HardReal-Time Scheduling Considerations, Saving Memory and Power, An example RTOS like uC-OS (Open Source); Embedded Software Development Tools: Host and Target machines, Linker/Locators for Embedded Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine, Using Laboratory Tools, An Example System. (Chapter 8,9,10 & 11 from Text Book 3, Simon).

UNIT - VII

Introduction to advanced architectures : ARM and SHARC, Processor and memory organization and Instruction level parallelism; Networked embedded systems: Bus protocols, I2C bus and CAN bus; Internet-Enabled Systems, Design Example-Elevator Controller. (Chapter 8 from Text Book 1, Wolf).

UNIT VIII:

DESIGN TECHNOLOGY : Introduction, Automation, Synthesis, Parallel evolution of compilation and synthesis, Logic Synthesis, RT synthesis, Behavioral Synthesis, Systems Synthesis and Hardware/ Software Co-Design, Verification, Hardware/Software co-simulation, Reuse of intellectual property codes.

TEXT BOOKS:

1. Embedded System Design – A Unified Hardware/Software Introduction – Frank Vahid, Tony D. Givargis, John Wiley, 2002.
2. An Embedded Software Primer – David E. Simon, Pearson Ed., 2005.
3. Computers and Components, Wayne Wolf, Elseveir.,

REFERENCES :

1. Embedded Microcomputer Systems – Jonathan W. Valvano, Brooks / Cole, Thompson Learning.
2. Embedded / Real Time Systems – KVKK Prasad, Dreamtech Press, 2005.
3. Introduction to Embedded Systems – Raj Kamal, TMS, 2002.

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IV Year B.Tech. ICE - I Sem	L	T/P/D	C
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(57631) ANALYTICAL INSTRUMENTATION LAB

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 Meter
9. Conductivity Meter
10. Bomb Calorimeter
11. GM Counter
12. Measurement of Gas Pollutents- Co, No, So
13. NMR Spectrometer.
14. Water Purity Measurement
15. Turbidity Measurement

(To perform any Twelve experiments)

Equipment: Gas/ Liquid chromatographer, Gas Analyzer, UV & VIS spectrometer, IR spectrophotometer, Absorption spectrophotometer, Flame photometer, Bomb calorimeter.

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(57632) CONTROL SYSTEMS LAB

(Minimum TEN experiments should be performed)

1. Determination of the control characteristics of A.C servomotor.
2. Transfer function of armature controlled D.C servomotor with inertia and viscous
3. Control characteristic of a magnetic amplifier with and without feedback.
4. D.C Motor speed control with regenerative and degenerative feedback and with tach generator in the feedback path.
5. D.C position control system –Output control with variation of control loop gain
6. System identification for the frequency response of a filter (based pass + band elimination filter)
7. Shaft angle encoder, decoder, output characteristics.
8. Amplitude modulation of low frequency, Signal and recovery after demodulation (effect of modulating frequency on the signal to noise ratio).
9. Robot manipulator motion control using feed pendent.
10. Pick and plan assignment of robot manipulator with microcontroller.
11. 4-1 line multiplexer with digital logic gates.
12. Elementary fast programming on a robot manipulator (describing a trajectory, which is predefined).

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IV Year B.Tech. ICE - II Sem	L	T/P/D	C
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(58052) ADAPTIVE CONTROL SYSTEMS
(ELECTIVE-III)

UNIT I:
INTRODUCTION : Concept of Adaptive Control, Definitions, Types of adaptivity, Effects of process variation, Control Essentials, Ratio of Adaptive Control, and Adaptive Systems.

UNIT II:
REAL TIME PARAMETER ESTIMATION : Introduction to Parameter Estimation, Least Squares and Regression Models – Least Squares Estimation, Recursive Computation, Continuous-Time Models, Estimation Parameters in Dynamical Systems – Finite Impulse Response (FIR) Models, Transfer Function Models.

UNIT III:
DETERMINISTIC SELF TUNING REGULATORS : Introduction, Block Diagram, Pole Placement Design, Indirect Self Tuning Regulators(STR), Continuous – Time Self Tuners, Direct Self Tuning Regulators.

UNIT IV:
STOCHASTIC SELF TUNING REGULATORS : Design of Minimum Variance and Moving Average Controllers – Minimum Variance Control, Non-minimum phase System, Moving Average Controller, LQG control, Stochastic Self Tuning Regulators, Unification of Direct Self Tuning Regulators, Linear Quadratic STR.

UNIT V:
STABILITY ANALYSIS : Introduction to Stability, Definitions, Theorems, Lyapunov theory on stability, Bounded Input – Bounded Output Stability.

UNIT VI:
MODEL REFERENCE ADAPTIVE SYSTEMS (MRAS) : Introduction – The MIT rules, Determination of Adaptation Gain, Design of MRAS using Lyapunov Theory, Output Feedback, Relations between MRAS and STR.

UNIT VII:
AUTO-TUNING : Introduction, PID Control, Auto-Tuning Techniques, Transient Response Methods, Methods based on Relay feedback, Relay oscillations.

UNIT VIII:
GAIN SCHEDULING : Introduction, The principle, Design of Gain-Scheduling controllers, Nonlinear Transformations.

TEXT BOOK:
1. Adaptive control by Karl J Astrom, Bjorn Wittenmark, Pearson Education, 2003.

REFERENCES:
1. Adaptive control systems by Misthkin and Braun – McGraw Hill
2. Digital control systems by P.N Paraskevopoules Prentice Hall.

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IV Year B.Tech. ICE - II Sem

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(58098) DISTRIBUTED COMPUTER CONTROL SYSTEMS (ELECTIVE-III)

UNIT I : Architecture computer control systems – controlled architecture –Distributed control architecture Data highway system.

UNIT II : Distributed computing system: Distributed processing . Digital control system-digital control system – computer control, self tuning and adaptive algorithms .

UNIT III : Supervising control systems, Multi layer hierarchical structure , system decomposition , open loop co-ordination strategies, model reality differences, closed loop co-ordinate strategies

UNIT IV : Integrated system, Optimization an parameter estimation(ISOPE), Double interactive strategies

UNIT V : Real time control systems: Design techniques and tools – MASCOT , structured development of real time system.

UNIT VI : Fault tolerance in mixed hardware – software system-Fault detection measuresfault detection mechanism – Damage confinement and assessment.

UNIT VII : Expert system in real time control- Knowledge based process management , Representation of knowledge , reasoning in real time, application of knowledge based systems for process management.

UNIT VIII : Real time task management , Task scheduling dispatch , Task co- operations and Communications , distributed data, distributed control

TEXT BOOK:

1. Distributed Computer Control systems by SS Lamba, Y D Singh. TMH publioations new Delhi

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IV Year B.Tech. ICE - II Sem

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(58099)HYDRAULICS AND PNEUMATIC CONTROL SYSTEMS (ELECTIVE – III)

UNIT – I:

Introduction to Fluid Power, merits and utility of Fluid Power in industries. Difference between Hydraulic Systems & Pneumatic Systems. Fluid Power Components: Construction and operation of – Pump, Relief valve, Non-return valve, Pilot operated relief valve, Series and Parallel compensator of flow valve, Pressure compensated pump, motor, actuators, Seals used in the control systems.

UNIT – II:

Symbolic representation of Hydraulic and pneumatic Elements. Compressor and air line installations. Various types of Pumps used in hydraulic systems. Hydraulic Fluid and Effective contamination control. Purpose of Air-filters and types in Pneumatic systems.

UNIT – III:

Transmission System: Transmission of Fluid Power through various type of cylinders. Compressibility and inertia loading. Hydraulic stiffness, stiffness of pneumatic system. Component effectiveness, breakage, constant torque load, constant power load, inertia load, viscous damping.

UNIT –IV:

Valve controlled Systems: Flow through a single speed control valve, Series Pressure Compensation, combined directional and flow rate control valve, Steady reaction and Transient Reaction force.

UNIT – V:

Hydraulic and pneumatic circuits for different controls like –

Sequencing circuit, counter balancing, indexing, linear motion, rotation & Hydro copying circuit. Electro-Pneumatics & Electro-Hydraulic controls, Hydro-Pneumatics, Cartridge valve design.

UNIT – VI:

Analysis of Accumulator Systems: Accumulator system dynamics, Thermodynamics, Thermodynamics consideration. Accumulator as Absorber of pressure shocks. Construction, operation and applications of Intensifier.

UNIT – VII:

Feed back Systems: Pressure control, Position control, Pump/motor systems. Control with variable capacity pumps. Pump stroke mechanisms. Position control using metering valve Double acting actuators.

UNIT – VIII:

Speed control, Inertia Load position control systems. Programmable sequential control using modular elements. Servo control systems. Trouble shooting and remedial measures in Hydraulic & Pneumatic Systems.

TEXT BOOKS:

1. Fluid Power Systems, by A.B. Goodinain, McMillan Press Ltd.
2. The Control of Fluid Power, by McCloy & Martin, Longman Publications.

REFERENCES:

1. Mechatronics, by Prof. C.V. Venkataramana, SBS Publishers and Distributors.
2. Production Drawing Practice, by Dr.P.Narsimha Reddy, T.A.Janardhan Reddy & C. Srinivas Rao, The Hi-Tech Publishers.

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IV Year B.Tech. ICE - II Sem

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3	1/-/-	3

(58100) POWER PLANT INSTRUMENTATION (ELECTIVE-IV)

UNIT – I: AN OVERVIEW OF POWER GENERATION

Brief survey of methods of power generation – Hydrothermal, Nuclear, Solar, Wind etc. Importance of instrumentation for power generation – Thermal power plants – Building blocks – Details of the Boiler Processes – PI diagram of Boiler – Cogeneration.

UNIT – II: PARAMETERS AND MEASUREMENTS -I

Electrical measurements – current, Voltage, Power, Frequency power factor, Trivector meter –

UNIT – III: PARAMETERS AND MEASUREMENTS - II

Non electrical parameters, flow of feed water, fuel, air and steam with correction factors for temperature – Pressure – temperature – level radiation detectors – smoke density measurements – dust monitor.

UNIT – IV: COMBUSTION CONTROL IN BOILERS

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

UNIT – V: OTHER CONTROLS

Spray and gas recirculation controls – BFP recirculation control – Hot well and deaerator level control – pulverizer control, Computers in Power Plants.

UNIT – VI: TURBINE MONITORING AND CONTROL

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

UNIT – VII: ANALYZERS IN POWER PLANTS - I

Thermal conductive type – paramagnetic type, Oxygen analyzer, infrared type and trim analyzer – Spectrum analyzer – hydrogen purity meter

UNIT – VIII: ANALYZERS IN POWER PLANTS - II

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

TEXT BOOKS

1. Modern Power Stations Practice, vol. 6, Instrumentation, Controls and Testing - Pergamon Press, Oxford, 1971.
2. Power Plant Technology – by Wakil M.M., McGraw Hill.
3. Standard Boiler Operations - Questions and Answers – by Elonka S.M., and Kohal A.L., TMH, New Delhi, 1994.

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IV Year B.Tech. ICE - II Sem	L	T/P/D	C
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(58050) PC BASED INSTRUMENTATION

(ELECTIVE-IV)

UNIT –I :

Introduction to Computers : Personal Computer, 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.

Unit – II:

Data Acquisition and Control using Standard Cards: PC expansion systems, Plug-in Data Acquisition Boards; Transducer to Control room, Backplane bus – VXI

Unit – III:

PC Programming Considerations- choice of Language, testing, documentation, Using command line interface; Assembly language programming, Data transfer; Scaling and linearization;

UNIT – IV:

Programmable logic controller (PLC) basics: Definition, overview of PLC systems, input/output modules, power supplies and isolators.

UNIT – V:

Basic PLC programming Programming on-off inputs/ outputs. Creating Ladder diagrams Basic PLC functions PLC Basic Functions, register basics, timer functions, counter functions.

UNIT – VI:

PLC intermediate functions: Arithmetic functions, number comparison functions, Skip and MCR functions, data move systems. Utilizing digital bits, sequencer functions, matrix functions.

UNIT – VII:

PLC Advanced functions: Analog PLC operation, networking of PLC, PLC-PID functions.

UNIT – VIII:

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. John. W .Webb Ronald A Reis , Programmable Logic Controllers – Principles and Applications, Fourth edition, Prentice Hall Inc., New Jersey, 1998.
2. PC Based Instrumentation and Control Third Edition by Mike Tooley ; Elsevier

REFERENCES:

1. Computer Control of Processes – M.Chidambaram. Narosa 2003
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, McGraw Hill, Newyork, 1997.

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IV Year B.Tech. ICE - II Sem	L	T/P/D	C
	3	1/-/-	3

(58016) ARTIFICIAL NEURAL NETWORKS

(ELECTIVE-IV)

UNIT I

Introduction - what is a neural network? Human Brain, Models of a Neuron, Neural networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks

UNIT II

Learning Process – error Correction learning, Memory based learning, Hebbian learing, Competitive, Boltzmann learning, Credit Asssignment Problem, Memory, Adaption, Statistical nature of the learning process

UNIT III

Single layer perceptrons – Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, learning curves, Learning rate annealing techniques, perceptron –convergence theorem, Relation between perceptron and Bayes classifier for a Gaussian Environment

UNIT IV

Multilayer Perceptron – Back propagation algorithm XOR problem, Heuristics, Output representation and decision rule, Comuter experiment, feature detection

UNIT V

Back Propagation - back propagation and differentiation, Hessian matrix, Generalization, Cross validation, Network pruning Techniques, Virtues and limitations of back propagation learning, Accelerated convergence, supervised learning.

UNIT VI

Self Organization Maps – Two basic feature mapping models, Self organization map, SOM algorithm, properties of feature map, computer simulations, learning vector quantization, Adaptive patter classification

UNIT VII

Neuro Dynamics – Dynamical systems, stability of equilibrium states, attractors, neurodynamical models, manipulation of attractors as a recurrent network paradigm

UNIT VIII

Hopfield models – Hopfield models, computer experiment

TEXT BOOK:

1. Neural networks A comprehensive foundations, Simon Hhaykin, PHI edition.

REFERENCES:

1. Artifical neural networks - B.Vegnanarayana Prentice Halll of India P Ltd 2005
2. Neural networks in Computer intelligence, Li Min Fu TMH 2003
3. Neural networks James A Freeman David M S kapura pearson education 2004
4. Introduction to Artificial Neural Systems Jacek M. Zurada, JAICO Publishing House Ed. 2006.

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IV Year B.Tech. ICE - II Sem	L	T/P/D	C
	3	-/-/-	3

(58017) RELIABILITY ENGINEERING

UNIT – I

Basics of Probability theory & Distribution : Basic probability theory – rules for combining probabilities of events – Bernoulli's trials – probabilities density and distribution functions – binomial distribution – expected value and standard deviation of binomial distribution.

UNIT – II

Network Modeling and evaluation : Analysis of Series, Parallel, Series-Parallel networks, Redundant System Conditional Probability Approach, Cut Set method.

UNIT – III

Reliability functions : Reliability functions f(t), F(t), R(t), h(t) and their relationships – exponential distribution – Expected value and standard deviation of exponential distribution – Bath tub curve – reliability analysis of series parallel networks using exponential distribution.

UNIT – IV

Reliability Evaluation : Reliability Characteristics, Component Reliability and Hazard Models, Component Reliability from Test Data, Evaluation Using Markov Model and Improvement Techniques.

UNIT – V

Reliability Testing : Life Test Objectives, Types of Reliability, Test Specifications, Tolerance Test Conditions, Tolerance of Instruments, Specifications.

UNIT – VI

Accelerated Life Testing : Methods for ALT Data Quantifications,

Temperature Stress And Failures Rates, Stress Combinations in ALT, ALT on Sub-Assemblies, Limitations, Accelerated Test for Evaluation Life, Compressed Time Testing, Cumulative Damage Model.

UNIT – VII

Data Analysis and Estimations : Graphical Representation of Statistical Data. Point and Interval Estimation, Goodness of Fit Test, Moment, Maximum, Likelihood and Least Square Estimators

UNIT – VIII

Monte Carlo Simulation : Random variates, Simulation output, Application of MCS Techniques: Tossing a coin, Throwing a die, Simulating a two component system, Time Depended Reliability Assessment. Two component non-repairable system. Reliability, Availability of Repairable and standby systems, Number of Simulations.

TEXT BOOKS:

1. Reliability Evaluation of Engg. Systems – Concepts and Techniques, by Roy. Billinton, R.N.Allan, 2nd edition Springer Publications,- (Reprint 2008).
2. 2. Reliability Engineering and Life Testing by V.N.A. Naikan , PHI Publications -2009.

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IV Year B.Tech. ICE - II Sem	L	T/P/D	C
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(58661) INDUSTRY ORIENTED MIN PROJECT

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
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IV Year B.Tech. ICE - II Sem	L	T/P/D	C
	0	-/6/-	2

(58662) SEMINAR

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IV Year B.Tech. ICE - II Sem	L	T/P/D	C
	0	-/15/-	10

(58663) PROJECT WORK

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IV Year B.Tech. ICE - II Sem	L	T/P/D	C
	0	-/-/-	2

(58664)COMPREHENSIVE VIVA