

2009-10

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR
ANANTAPUR – 515 002 (A.P) INDIA**

**ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABI**

**ELECTRONICS AND INSTRUMENTATION
ENGINEERING**



**B.Tech. Regular Four Year Degree Course
(Applicable for the batches admitted from 2009-2010)
&
B.Tech. (LES) (for the batches admitted from 2010-11)**

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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. Pursue a course of study for not less than four academic years and in not more than eight academic years.
 - ii. Register for 220 credits and secure all 220credits
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 and their admission is cancelled.

3. Courses of study

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

S.No.	Branch
1.	Aeronautical Engineering.
2.	Biotechnology.
3.	Civil Engineering.
4.	Computer Science and Engineering.
5.	Computer Science and System Engineering.
6.	Electrical and Electronics Engineering.
7.	Electronics and Communication Engineering.
8.	Electronics and Computer Engineering.
9.	Electronics and Control Engineering.
10.	Electronics and Instrumentation Engineering.
11.	Information Technology.
12.	Mechanical Engineering.

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

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4. Credits

	I Year		Semester	
	Periods / Week	Credits	Periods / Week	Credits
Theory	03	06	03	04
	02	04	--	--
Practical	03	04	03	02
Drawing	06	06	03	02
			06	04
Seminar	--	--	6	02
Project	--	--	15	10

5. Distribution and Weightage of Marks

- 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 seminar and project work shall be evaluated for 50 and 200 marks respectively.
- For theory subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.
- For theory subjects, during the semester there shall be Two midterm examinations. Each mid term examination consists of objective paper for 10 marks and subjective paper for 20 marks with duration of 1hour 50 minutes (20 minutes for objective and 90 minutes for subjective paper).

Objective paper is set for 20 bits for 10 marks. Subjective paper shall contain 5 questions of which student has to answer 3 questions evaluated* for 20 marks. First mid term examination shall be conducted for I-IV units of syllabus and second mid term examination shall be conducted for V -VIII units. The total marks secured by the student in each mid term examination for 30 marks is considered and the better of the two mid term examinations shall be taken as the final sessional marks secured by each candidate in the subject.

However for first year, there shall be Three midterm examinations as in the above pattern and the average marks of the

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best two midterm examinations secured in each subject shall be considered as final marks for sessionals.

*Note 1: The subjective paper shall contain 5 questions of equal weightage of 10 marks and the marks obtained for 3 questions shall be condensed to 20 marks, any fraction rounded off to the next higher mark

*Note 2: The mid term examination shall be conducted first by distribution of the Objective paper simultaneously marking the attendance, after 20 minutes the answered objective paper is collected back. The student is not allowed to leave the examination hall. Then the descriptive question paper and the answer booklet are distributed. After 90 minutes the answered booklets are collected back.

- iv. For practical subjects there shall be a continuous evaluation during the semester for 25 sessional marks and 50 end examination marks. Day-to-day work in the laboratory shall be evaluated for 25 marks by the concerned laboratory teacher based on the report of experiments/jobs. The end examination shall be conducted by the laboratory teacher and another examiner.
- v. For the subject having design and / or drawing, such as Engineering Drawing, Machine Drawing and estimation, the distribution shall be 30 marks for internal evaluation and 70 marks for end examination. The Internal evaluation for sessionals will be 15 marks for day-to-day work in the class that shall be evaluated by the concerned subject teacher based on the reports/submissions prepared in the class. And there shall be two midterm exams in a Semester for a duration of 2hrs each, evenly distributed over the syllabi for 15 marks and the better of the two shall be considered as internal test marks. The sum of day to day evaluation and the internal test marks will be the final sessionals for the subject. However in the I year class, there shall be three midterm exams and the average of best two will be taken into consideration.
- vi. There shall be a seminar presentation in IV year II Semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the department before presentation. The report and the presentation shall be evaluated by the Departmental committee consisting of Head of the

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department, seminar supervisor and a senior faculty member. The seminar shall be evaluated for 50 marks and marks shall be submitted to the University along with internal marks. There shall be no external examination for seminar.

- vii. Out of a total of 200 marks for the project work, 60 marks shall be for Internal Evaluation and 140 marks for the End Semester Examination (Viva-voce). The viva-voce shall be conducted by a committee consisting of HOD, Project Supervisor and an External Examiner nominated by the University. The evaluation of project work shall be conducted at the end of the IV year. The Internal Evaluation shall be made by the departmental committee, on the basis of two seminars given by each student on the topic of his project.
- viii. 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.
- ix. 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 are 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 in a semester/ I year.
- 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. 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.
- v. A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester / I

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year, as applicable. They may seek readmission for that semester / I year when offered next.

- vi. A stipulated fee shall be payable towards condonation of shortage of attendance to the University.

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, practical, design, 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. In the Seminar he should secure 40%.
- ii. A student shall be promoted from II to III year only if he fulfils the academic requirement of securing **40** credits from
 - a. One regular and one supplementary examinations of I year.
 - b. One regular examination of II year I semester irrespective of whether the candidate takes the end examination or not as per the normal course of study.
- iii. A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of securing **68** credits from the following examinations,
 - 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.irrespective of whether the candidate takes the end examination or not as per the normal course of study.

And in case of getting detained for want of credits by sections ii and iii above, the student may make up the credits through supplementary exams of the above exams before the date of class work commencement of Third or Fourth year I semester respectively.

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- iv. A student shall register and put up minimum attendance in all 220 credits and earn all the 220 credits. Marks obtained in all 220 credits shall be considered for the calculation of percentage of marks obtained.
- v. Students who fail to earn 220 credits as indicated in the course structure within eight academic years from the year of their admission shall forfeit their seat in B.Tech 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 next supplementary examination offered.
- iii. When a student is detained due to lack of credits / shortage of attendance he may be re-admitted when the semester is offered after fulfilment of academic regulations, whereas he continues to be in the academic regulations he was first admitted.

9. Transitory Regulations:

Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone the course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, subject to Section 2. and they continues to be in the academic regulations they were first admitted.

10. With-holding of results:

If the candidate has any dues not paid to the university or if any case of indiscipline or malpractice is pending against him, the result of the candidate shall be withheld and he will not be allowed / promoted into the next higher semester. The issue of degree is liable to be withheld in such cases.

11. 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.

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Tech. Degree he shall be placed in one of the following four classes:

Class Awarded	% of marks to be secured	From the aggregate marks secured for the best 220 Credits.
First Class with Distinction	70% and above	
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)

12. Minimum Instruction Days:

The minimum instruction days including exams for each semester / I year shall be 90/180 days respectively.

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

14. There shall be no place transfer within the Constituent Colleges.

15. General:

- i. The academic regulations should be read as a whole for purpose of any interpretation.
- ii. Malpractices rules- nature and punishments is appended
- iii. Where the words “he”, “him”, “his”, occur in the regulations, they include “she”, “her”, “hers”.
- iv. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.
- v. The University may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on roles 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 through Lateral Entry Scheme from the Academic Year 2010-2011 and onwards)

1. Award of B.Tech. Degree

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

- i. Pursue a course of study for not less than three academic years and in not more than six academic years.
- ii. Register for 168 credits and secure all 168 credits from II to IV year of Regular B.Tech. program

2. Students, who fail to fulfil the requirement for the award of the degree in six consecutive academic years from the year of admission, shall forfeit their seat.

3. The regulations 3 to 6 are to be adopted as that of B. Tech. (Regular).

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, practical, design, 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. For the Seminar he should secure 40% in the internal evaluation.

ii. A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of 42 credits from the following 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.
irrespective of whether the candidate takes the end examination or not as per the normal course of study.
and in case of getting detained for want of credits the student may make up the credits through supplementary exams of the above

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exams before the date of class work commencement of Fourth year I semester.

8. Course Pattern

- i. The entire course of study is three academic 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 next supplementary examination offered.
 - iii. When a student is detained due to lack of credits / shortage of attendance he may be re-admitted when the semester is offered after fulfilment of academic regulations, whereas he continues to be in the academic regulations he was first admitted.
9. The regulations 9 to 10 are to be adopted as that of B. Tech. (Regular).

11. 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:

First Class with Distinction	70% and above	From the aggregate marks secured for 168 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)

12. The regulations 12 to 15 are to be adopted as that of B. Tech. (Regular). All other regulations as applicable for B. Tech. Four-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme)

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**RULES FOR
DISCIPLINARY ACTION FOR MALPRACTICES / IMPROPER
CONDUCT IN EXAMINATIONS**

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

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

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

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	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.	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

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		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

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		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.

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

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
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**Course structure for B.Tech. (Regular) I year (2009-10) for
affiliated Engineering Colleges.**

**ELECTRONICS AND INSTRUMENTATION ENGINEERING
(E.I.E)**

**(Common for Branches: E.C.E., E.E.E., E.I.E., C.S.E., I.T.,
C.S.S.E., E.Cont.E., E.C.M.)**

S.No	Course code	Subject	Th	Tu/Drg/Lab	Credits
1.	9ABS101	English	2		4
2.	9ABS102	Engineering Physics	2		4
3.	9ABS103	Engineering Chemistry	2		4
4.	9ABS104	Mathematics – I	3	1 - -	6
5.	9A05101	Programming in C and Data Structures	3	1 - -	6
6.	9A03101	Engineering Drawing *		- 6 -	6
7.	9ABS105	Mathematical Methods	3	1 - -	6
8.	9A05102	C Programming & Data Structures Lab		- 3 -	4
9.	9A03102	Engineering & I.T. Workshop #		- 3 -	4
10.	9ABS106	Engineering Physics and Engineering Chemistry Lab **		- 3 -	4
11.	9ABS107	English Language & Communication Skills Lab		- 3 -	4
		contact periods/week	15	3 6 12	
			Total/week	36	
Total Credits (7 Theory + 4 Labs)					52

Th = Theory; Tu = Tutorial; Drg = Drawing & Lab = Laboratory:

* Engineering Drawing will have University External Exam.

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** The Students attend the Physics lab and Chemistry lab in alternate weeks. The end exam shall be conducted separately and average of the two exams will be recorded by the University exam section.

Students attend Engineering and IT work shop as a single lab every week and the end exam is conducted as a single lab. Sharing the Maximum marks and time for one task each from Engineering workshop and IT workshop. The sum of the marks awarded will be recorded

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**ELECTRONICS AND INSTRUMENTATION ENGINEERING
(E.I.E)**

II Year B.Tech - I Semester

S. No	Course code	Subject	Theory	Lab	Credits
1.	9ABS302	Mathematics – III.	4		4
2.	9ABS303	Environmental Science.	4		4
3.	9A02305	Electrical Circuits.	4		4
4.	9A04303	Probability Theory & Stochastic Processes.	4		4
5.	9A04301	Electronic Devices and Circuits.	4		4
6.	9A04304	Signals and Systems.	4		4
7.	9A04302	Electronic Devices & Circuits Lab.		3	2
8.	9A04305	Basic Simulation Lab.(using MATLAB)		3	2
		contact periods/week	24	6	
		Total/Week	30		
Total Credits (6 Theory + 2 Labs)					28

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II Year B.Tech - II Semester

S. No	Course code	Subject	Theory		Lab	Credits
1.	9AHS401	Managerial Economics & Financial Analysis	4			4
2.	9A02401	Principles of Electrical Engineering.	4			4
3.	9A04402	Electronic Circuit Analysis.	4			4
4.	9A04404	Pulse & Digital Circuits.	4			4
5.	9A04401	Switching Theory & Logic Design.	4			4
6.	9A04405	Electronic Measurements.	4			4
7.	9A04403	Electronic Circuit Analysis Lab.			3	2
8.	9A02402	Electrical Engineering Lab.			3	2
		contact periods/week	24		6	
			Total/Week		30	
Total Credits (6 Theory + 2 Labs)						28

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III B. Tech. – I Semester (E.I.E)

S. No.	Group	Subject	L	T	P	CP
01.	9A10501	Sensors and Signal Conditioning	4	0	0	4
02.	9A10502	Industrial Instrumentation	4	0	0	4
03.	9A10503	Electro Magnetic Theory	3	1	0	4
04.	9A10504	Linear & Digital IC Applications	3	1	0	4
05.	9A02503	Control Systems	3	1	0	4
06.	9A10505	Principles of Communications	4	0	0	4
07.	9A04506	Pulse & Digital Circuits Lab	0	0	3	2
08.	9A10507	Electronic Measurements Lab	0	0	3	2
		contact periods / week	21	03	06	
			Total/Week 30			
Total Credits (6 Theory + 2 Labs)						28

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III B. Tech. – II Semester (E.I.E)

S. No.	Group	Subject	L	T	P	CP
01.	9A10601	Analytical Instrumentation	4	0	0	4
02.	9A04602	Microprocessors & Microcontrollers	4	0	0	4
03.	9A04605	VLSI Design	4	0	0	4
04.	9A05406	Computer Organization	3	1	0	4
05.	9A04603	Digital Signal Processing	3	1	0	4
06.	9A10602	Process Control Instrumentation	4	0	0	4
07.	9A04505	Linear & Digital IC Applications Lab	0	0	3	2
08.	9AHS601	Advanced English Communication skills lab	0	0	3	2
		contact periods / week	22	02	6	
			Total/Week 30			
Total Credits (6 Theory + 2 Labs)						28

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IV B. Tech. – I Semester (E.I.E)

S. No.	Group	Subject	L	T	P	CP
01.	9A04701	Embedded Real Time Operating Systems	4	0	0	4
02.	9A10701	Automation of Industrial Processes	4	0	0	4
03.	9A10702	Reliability Engineering	4	0	0	4
04.	9AHS701	Management Science	4	0	0	4
05.	9A13701	Elective – I	4	0	0	4
	9A05505	1. Robotics and Automation				
	9A10703	2. Operating Systems				
06.	9A10704	Elective – II	4	0	0	4
	9A05506	1. EMI & EMC				
	9A10705	2. Computer Networks				
07.	9A10706	3. Power Plant Instrumentation	0	0	3	2
08.	9A10707	Electronic Design and Automation Lab	0	0	3	2
		Process Control Lab	24	0	06	
		contact periods / week	Total/Week 30			
Total Credits (6 Theory + 2 Labs)						28

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IV B.Tech. – II Semester (E.I.E)

S. No.	Code	Subject	L	T	P	CP
01.	9A10801	PC Based Instrumentation	4	0	0	4
02.	9A10802	Biomedical Instrumentation	4	0	0	4
03.	9A13802	Elective – III 1. Telemetry & Tele Control	4	0	0	4
	9A10803	2. Virtual Instrumentation				
	9A10804	3. Opto-Electronics & LASER Instrumentation				
04.	9A04704	Elective – IV 1. DSP Processors and Architectures	4	0	0	4
	9A10805	2. Artificial Neural Networks				
	9A13501	3. Digital Control Systems				
05.	9A10807	Seminar	0	0	0	2
06.	9A10808	Project	--	--	--	10
		contact periods / week	16	0	0	
			Total/Week 16			
Total Credits (4Theory + Seminar + Project Work)						28

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****Detailed Syllabus****B.Tech. I Year (E.I.E.)**

T	P	C
2	0	4

(9ABS101) ENGLISH**1. INTRODUCTION :**

The sweeping changes in the world have elevated English to the status of a tool of global communication and transformed it into e-English. The syllabus has been drafted to improve the competence of students in communication in general and language skills in particular. The books prescribed serve as students' handbooks.

The teacher should focus on the skills of reading, writing, listening and speaking while using the prescribed text and exercises. The classes should be interactive. The students should be encouraged to participate in the classroom proceedings and also to write short paragraphs and essays. The main aim is to encourage two way communications in place of the one-sided lecture.

The text for non-detailed study is meant for extensive reading by the students. They may be encouraged to read some select topics on their own, which could lead into a classroom discussion. In addition to the exercises from the texts done in the class, the teacher can bring variety by using authentic materials such as newspaper articles, advertisements etc.

2. OBJECTIVES:

- To improve the language proficiency of the students in English with an emphasis on LSRW skills.
- To equip the students to study academic subjects with greater facility through theoretical and practical components of the syllabus.
- To develop study skills as well as communication skills in formal and informal situations.

2009-10**3. SYLLABUS :****Listening Skills:**

Objectives

1. To enable students to develop their listening skills 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 they can comprehend the speech of people of different backgrounds and dialects.

Students should be given practice in listening and identifying the sounds of English language and to mark stress , right intonation in connected speech.

- 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 ability to speak fluent 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
 - Just A Minute (JAM) Sessions.

(Using exercises from all units of the prescribed text)

Reading Skills:

Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.
2. To develop the ability 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

2009-10

- Understanding discourse features
- Recognizing coherence/sequencing of sentences

The students shall be trained in reading skills using the prescribed text for detailed study. They shall 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 articles from magazines/newspapers

Writing Skills:**Objectives**

1. To develop an awareness in the students the skill to write exact and formal writing
2. To equip them with the components of different forms of writing.
 - 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 are prescribed and divided into Eight Units:

For Detailed study: ENJOYING EVERYDAY ENGLISH,

Sangam Books (India) Pvt Ltd, Hyderabad, 2009

For Non-detailed study: INSPIRING LIVES,

Maruti Publications, Guntur, 2009

UNIT -I

- a. Heaven's Gate from **ENJOYING EVERYDAY ENGLISH**
- b. Mokshagundam Visveswaraya from **INSPIRING LIVES**

UNIT -II

- a. Sir C.V.Raman from **ENJOYING EVERYDAY ENGLISH**
- b. Mother Teresa from **INSPIRING LIVES**

2009-10**UNIT -III**

- a. The Connoisseur from **ENJOYING EVERYDAY ENGLISH**
- b. Dr. Amartya Kumar Sen from **INSPIRING LIVES**

UNIT -IV

- a. The Cuddalore Experience from **ENJOYING EVERYDAY ENGLISH**
- b. Gertrude Elion from **INSPIRING LIVES**

UNIT -V

- a. Bubbling Well Road from **ENJOYING EVERYDAY ENGLISH**
- b. Vishwanathan Anand from **INSPIRING LIVES**

UNIT-VI

- a. Odds Against Us from **ENJOYING EVERYDAY ENGLISH**
- b. Charlie Chaplin from **INSPIRING LIVES**

UNIT – VII

Exercises on

Reading and Writing Skills
Reading Comprehension
Letter writing
Report writing

UNIT – VIII

Exercises on

Remedial Grammar covering Common errors in English, Subject-Verb agreement,

Use of Articles and Prepositions, Active/Passive Voice, Reported speech, Tenses

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

Evaluation: The question paper shall contain two parts, Part A containing questions from Units I- VI and Part B containing questions from units VII & VIII. The student is required to answer five full questions choosing at least one from Part B.

2009-10**REFERENCES:**

1. Technical Communication , Principle and Practice, Meenakshi Raman and Sangita Sharma, OUP, 2009
2. Essential Grammar in Use, (with CD) 3/e, Cambridge University Press, 2009
3. Resumes and Interviews, M.Ashraf Rizvi, Tata – McGraw Hill, 2009
4. Everyday Dialogues in English by Robert J. Dixon, Prentice-Hall of India Ltd., 2006.
5. Communication Skills for Technical Students, Farhathullah, T.M., Orient Blackswan, 2008
6. Developing Communication Skills, 2/e. by Krishna Mohan & Meera Banerji , Macmillan, 2009
7. English for Technical Communication, Vol. 1 & 2, by K. R. Lakshmi Narayanan, Sci tech. Publications.
8. Basic Communication Skills For Technology, Andrea J Ruthurford, Pearson Education , Asia.
9. Longman Dictionary of Contemporary English with DVD, Pearson Longman

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****B.Tech. I Year (E.I.E.)**

T	P	C
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(9ABS102) ENGINEERING PHYSICS

UNIT I- OPTICS: Interference - Interference in thin films by reflection - Newton's rings - Diffraction - Fraunhofer diffraction at a single slit - Fraunhofer diffraction at a double slit - Diffraction grating - Grating spectrum - polarization - Nicol prism - Theory of circular and elliptical polarized light - Quarter and half wave plates.

UNIT II- CRYSTAL STRUCTURES AND X-RAY DIFFRACTION: Introduction - Space lattice - Basis - Unit cell - Lattice parameter - Bravais lattices - Crystal systems - Structure Simple cubic - Body Centered Cubic - Face Centered Cubic crystals - Miller indices of planes and directions in crystals - Separation between successive (h k l) planes - X-ray diffraction by crystal planes - Bragg's law - Laue and Powder methods.

UNIT III- PRINCIPLES OF QUANTUM MECHANICS & ELECTRON THEORY: Waves and Particles - de- Broglie's hypothesis - Heisenberg's uncertainty principle - Schroedinger's one dimensional wave equation (Time Independent) - Particle in a one dimensional potential box - Energy levels - Fermi-Dirac distribution and effect of Temperature (qualitative treatment only) - Scattering - Source of electrical resistance - Kronig-Penney model (qualitative treatment only) - energy bands - metals, semi conductors & insulators.

UNIT IV- SEMICONDUCTORS: Intrinsic and extrinsic semiconductors - Law of mass action - Continuity equation - Drift & diffusion - Einstein's relation - Hall effect - Direct & indirect band gap semiconductors - p-n junction - Band diagram of p-n junction diode - Diode Equation-LED, LCD & Photo diode.

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UNIT V- MAGNETIC PROPERTIES: Introduction - Origin of magnetic moment – Classification of magnetic materials - Dia, Para , Ferro, anti-Ferro and Ferri magnetism - Hysteresis - Soft and hard magnetic materials – Magnetic bubbles memory.

DIELECTRIC PROPERTIES: Introduction - Dielectric constant - Electronic, Ionic and Orientation polarizations (qualitative treatment only) - Local field - Clausius-Mossotti equation –Frequency dependence of polarisability (qualitative treatment only) – Ferro electricity- BaTiO₃.

UNIT VI- SUPERCONDUCTIVITY: General properties - Meissner effect - Penetration depth - Type I and Type II superconductors - Flux quantization – Josephson effects – BCS theory - Applications of superconductors.

LASERS: Introduction – Characteristics of laser - Spontaneous and stimulated emission of radiation - Einstein's coefficients - Population inversion - Ruby Laser - Helium-Neon Laser – GaAs Laser - Applications of Lasers in Industry, Scientific and Medical fields.

UNIT VII- FIBER OPTICS: Introduction - Principle of optical fiber - Acceptance angle and Acceptance cone - Numerical aperture – Types of Optical fibers and refractive index profiles – Optical fiber communication systems - Application of optical fibers.

UNIT VIII- NANOMATERIALS : Introduction - Basic principles of nano materials – Fabrication of nano materials - ball milling –plasma arching – Chemical vapour deposition method – sol-gel methods – properties of nano materials – carbon nanotubes – properties and applications of carbon nano tubes - Applications of nano materials.

TEXT BOOKS:

1. Engineering Physics by P.K.Palanisamy, Scitech Publications
2. Engineering Physics by V. Rajendran & K.Thyagarajan, Tata McGraw-Hill Publishing Co. Ltd.
3. Engineering Physics by M.R.Srinivasan New Age Publications

2009-10**REFERENCES:**

1. Physics Volume 2, by Halliday, Resnick and Krane; John Wiley India
2. Solid State Physics by C.Kittel, Wiley India
3. Engineering Physics by Mittal, I.K.International
4. Introduction to Nanoscience & Nano Technology by K.K Chattopadhyay & A.N. Banarjee , Prentice – Hall of India Pvt. Ltd

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****B.Tech. I Year (E.I.E.)**

T	P	C
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(9ABS103) ENGINEERING CHEMISTRY

UNIT I: Water: Sources of Water, Types of impurities in Water, Hardness of Water – Temporary and Permanent hardness. Units. Estimation of hardness by EDTA Method. Analysis of Water - Dissolved Oxygen. Disadvantages of Hard Water. Problems on hardness of water. Methods of Treatment of Water for Domestic Purpose – Sterilisation: Chlorination, Ozonisation.

Water for Industrial purpose - Water for Steam Making, Boiler Troubles – Carry Over (Priming and Foaming), Boiler Corrosion, Scales and Sludge, Caustic Embrittlement. Water Treatment: - Internal Treatment – Colloidal, Phosphate, Calgon, Carbonate, Sodium aluminates Conditioning of Water. External Treatment - Ion- Exchange Process; Demineralization of Brakish Water – Reverse Osmosis.

UNIT II: Science of Corrosion: Definition, Types of corrosion: Dry Corrosion, (Direct Chemical attack), Wet Corrosion, Theories of Corrosion and Mechanism, Electro Chemical Theory of Corrosion. Galvanic Series, Galvanic Corrosion, Concentration Cell Corrosion, Oxygen absorption type. Factors Influencing Corrosion. Control of Corrosion – Cathodic Protection – Sacrificial anode and Impressed Current. Uses of Inhibitors. Electro Plating, and Electro less plating (copper and nickel)

UNIT III: Polymers: Polymerization Reactions – Basic concepts. Types of Polymerization – Addition and Condensation Polymerization. Plastics –Thermosetting and Thermoplastics. Composition, Properties and Engineering Uses of the Following: Teflon, Bakelite, Nylon. Rubber – Processing of Natural Rubber and Compounding. Elastomers – Buna S, Buna N, Polyurethane Rubber; Silicone Rubber. Conducting Polymers, Synthesis and applications of Polyacetylene and Poly aniline Liquid Crystals definition, properties, suitable examples and Engineering Applications

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UNIT IV: Chemistry of nano materials: Nano materials definition, properties and applications;

Explosives and Propellants: Explosives, Classification, precautions during storage, blasting fuses, important explosives. Rocket propellants, classification of propellants.

Lubricants :Principles and function of lubricants - Classification and properties of lubricants – Viscosity, flash and fire points, cloud and pour points, aniline point, Neutralisation Number and Mechanical Strength.

UNIT V: Electro Chemistry: Conductance – Equivalent Conductance – Molecular Conductance, Conductometric Titrations – Applications of Conductivity Measurements.

Electrochemical Cells: Measurement of EMF, Standard electrode potential, concentration cells, batteries (Ni–Cd cell), Lithium batteries. Fuel cell: hydrogen oxygen fuel cell and methanol fuel cell

Insulators – Definition, Properties and Characteristics of Insulating Materials; Engineering Applications.

UNIT VI: Phase rule: Definition, Terms involved in Phase Rule and Phase rule equation. Phase diagrams – one component system (water system), two component system (lead- silver system) Eutectics, heat treatment based on iron-carbon phase diagram, hardening, annealing.

UNIT VII: Fuels and Combustion: Definition and Classification of fuels. Solid, liquid & gaseous fuels, Characteristics of a good fuel. Metallurgical Coke – Characteristics & Manufacture (Otto-Halfmann). Petroleum – Refining – Synthetic Petrol. Calorific Value & its determination (Bomb Calorimeter – Junker's Gas Calorimeter). Combustion: Flue gas analysis by Orsat's apparatus.

UNIT VIII: Building Materials: Cement: composition of Portland cement, analysis, setting and hardening of cement (reactions).

Refractories : Definition, Classification With Examples; Criteria of a Good Refractory Material; Causes for the failure of a Refractory Material

2009-10**TEXT BOOKS:**

1. Engineering Chemistry Prof. K.N.Jayaveera, Dr.G.V.Subba Reddy and Dr.C. Ramachandraiah, McGraw Hill Higher Education Hyd., 2009
2. A text book of Engineering Chemistry by S.S. Dara, S.Chand & Co, New Delhi (2008)
3. Text book of Engineering Chemistry by Jain & Jain, Dhanpat Rai Publishing Company, 15th edition New Delhi (2008).

REFERENCE:

1. Engineering Chemistry Dr. K. B. Chandrasekhar, Dr. U.N. Dash, Dr. Sujatha Mishra, Scitech Publications(India) Pvt. Limited, Hyderabad. 2009
2. Fuel Cells principles and applications by B.Viswanath, M.Aulice Scibioh-Universities press
3. Chemistry of Engineering Materials by C.V. Agarwal, Tara Publication, Varanasi.20084, Physical Chemistry - Glasston & Lewis.
4. Engineering Chemistry (Vol.1&2) by J C Kuriacose and J. Rajaram, Tata McGraw-Hill Co, New Delhi (2004)
5. Applied Chemistry: A Text Book for chemistry for Engineers & Technologists, G.D. Gesser, Springer, 2000

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****B.Tech. I Year (E.I.E.)**

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(9ABS104) MATHEMATICS – I

UNIT I– Differential equations of first order and first degree – Exact, linear and Bernoulli equations. Applications: to Newton's law of cooling, law of natural growth and decay, orthogonal trajectories.

UNIT II– Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax} V(x)$, $xV(x)$, method of variation of parameters.

UNIT III– Rolle's Theorem – Lagrange's Mean Value Theorem – (excluding proof). Simple examples of Taylor's and Maclaurin's Series - Functions of several variables – Jacobian – Maxima and Minima of functions of two variables, Lagrangian method of Multipliers with three variables only.

UNIT – IV

Raidus of Curvature – Curve tracing – Cartesian, polar and parametric curves. Applications of integration to lengths, volume and surface area of solids of revolution in Cartesian and polar coordinates

UNIT V– Multiple integral: – Double and triple integrals – Change of Variables – Change of order of integration.

UNIT VI– 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 – Laplace transform of Periodic function.

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UNIT VII– Differentiation and integration of Laplace transform – Application of Laplace transforms to ordinary differential equations of first and second order.

UNIT VIII– Vector Calculus: Gradient – Divergence – Curl and Their properties; Vector integration – Line integral - Potential function – Area , Surface and volume integrals. Vector integral theorems: Green's theorem – Stoke's and Gauss's Divergence Theorem (excluding their proof). Verification of Green's–Stoke's and Gauss's Theorems.

TEXT BOOKS:

1. A Text Book of Engineering Mathematics, Vol – 1, T.K.V. Iyengar, B. Krishna Gandhi and Others, S. Chand & Company.
2. A Text Book of Engineering Mathematics, C. Sankaraiah, V.G.S. Book Links.
3. A Text Book of Engineering Mathematics-1, E. Rukmangadachari, E. Keshava Reddy, Pearson Education.

REFERENCES:

1. A Text Book of Engineering Mathematics, B.V. Ramana, Tata Mc Graw Hill.
2. A Text Book of Engineering Mathematics, Thomson Book Collection.
3. A Text Book of Advanced Engineering Mathematics – A Computer Approach, N.Bail, M.Goyal & C. Watkins.
4. Engineering Mathematics, Sarveswara Rao Koneru, Universities Press.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****B.Tech. I Year (E.I.E.)****Th Tu C
3 1 6****(9A05101) PROGRAMMING IN C AND DATA STRUCTURES
(Common to all Branches)**

UNIT I- Overview of Computers and Programming - Electronic Computers then and Now, Computer Hardware, Computer Software, Algorithm, Flowcharts, Software Development Method, Applying the Software Development Method.

UNIT II- Introduction to C Language - C Language Elements, Variable Declarations and Data Types, Executable Statements, General Form of a C Program, Expressions, Precedence and Associativity, Expression Evaluation, Operators and Expressions, Type Conversions, Decision Statements - If and Switch Statements, Loop Control Statements - while, for, do-while Statements, Nested for Loops, Other Related Statements -break, continue, goto.

UNIT III- Functions - Library Functions, Top-Down Design and Structure Charts, Functions with and without Arguments, Communications Among Functions, Scope, Storage Classes - Auto, Register, Static, Extern, Scope rules, Type Qualifiers, Recursion - Recursive Functions, Preprocessor Commands.

Arrays - Declaring and Referencing Arrays, Array Subscripts, Using For Loops for Sequential Access, Using Array Elements as Function Arguments, Arrays Arguments, Multidimensional Arrays.

UNIT IV- Pointers - Introduction, Features of Pointers, Pointer Declaration, Arithmetic Operations With Pointers, Pointers and Arrays, Pointers and Two-Dimensional Arrays, Array of Pointers, Pointers to Pointers, Void Pointers, Memory Allocation Functions, Programming Applications, Pointer to Functions, Command- Line Arguments.

Strings - String Basics, String Library Functions, Longer Strings, String Comparison, Arrays of Pointers, Character operations, String-To-Number and Number-To- String Conversions, Pointers and Strings.

UNIT V- Structure and Union – Introduction, Features of Structures, Declaration and Initialization of Structures, Structure within Structure,

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Array of Structures, Pointer to Structure, Structure and Functions, typedef, Bit Fields, Enumerated Data Type, Union, Union of Structures.

UNIT VI- Files - Introduction, Streams and File Types, Steps for File Operations, File I/O Structures, Read and Write, Other File function, Searching Errors in Reading/Writing of Files, Low Level Disk I/O, Command Line Arguments, Application of Command Line Arguments, File Status functions (error handling).

UNIT VII- Data Structures - Overview of Data Structure, Representation of a Stack, Stack Related Terms, Operation on a Stack, Implementation of a Stack, Representation of Arithmetic Expressions, Infix, Prefix, and Postfix Notations, Evaluation of Postfix Expression, Conversion of Expression from Infix to Postfix, Recursion, Queues - Various Positions of Queue, Representation of Queue, Insertion, Deletion, Searching Operations.
Linked List - Singly Linked List, Linked List with and without header, Insertion, Deletion and Searching Operations.

UNIT VIII- Searching and Sorting - Exchange (Bubble) Sort, Selection Sort, Quick Sort, Insertion Sort, Merge Sort. Searching-Linear and Binary Search Methods.

TEXT BOOKS :

1. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education
2. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.

REFERENCES :

1. Programming in C – Stephen G. Kochan, III Edition, Pearson Education.
2. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press
3. C and Data Structures, a snapshot oriented treatise with live engineering examples, Dr. N.B.Venkateswarlu, Dr. E.V.Prasad, S. Chand

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4. C and Data Structures, E.Balaguruswamy, Tata Mc Graw Hill
5. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI, Eighth Edition.

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www.FirstRanker.com

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
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**(9A03101) ENGINEERING DRAWING
(Common to all Branches)****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:

- a) Conic Sections including the Rectangular Hyperbola – General method only.
- b) Cycloid, Epicycloids and Hypocycloid
- c) Involute.
- d) Helices

UNIT II– PROJECTION OF POINTS AND LINES: Principles of Orthographic Projection – Conventions – First and Third Angle Projections. Projections of Points, Lines inclined to one or both planes, Problems on projections, Finding True lengths & traces only.

UNIT III– PROJECTIONS OF PLANES: Projections of regular Plane surfaces/figures, Projection of lines and planes using auxiliary planes.

UNIT IV– PROJECTIONS OF SOLIDS: Projections of Regular Solids inclined to one or both planes – Auxiliary Views.

UNIT V– SECTIONS AND DEVELOPMENTS OF SOLIDS: Section Planes and Sectional views of Right Regular Solids–Prism, Cylinder, Pyramid and Cone. True shapes of the sections.

Development of Surfaces of Right Regular Solids – Prisms, Cylinder, Pyramid, Cone and their Sectional parts.

UNIT VI– ISOMETRIC AND ORTHOGRAPHIC PROJECTIONS: Principles of Isometric Projection – Isometric Scale – Isometric Views–

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Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non-isometric lines. Isometric projections of spherical parts.

Conversion of Isometric projections/views to Orthographic Views – Conventions.

UNIT VII– INTERPENETRATION OF RIGHT REGULAR

SOLIDS: Projections of curves of Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone, Square Prism Vs Square Prism.

UNIT VIII– PERSPECTIVE PROJECTIONS: Perspective View of Plane Figures and Simple Solids. Vanishing Point Method (General Methods only).

TEXT BOOKS:

1. Engineering Drawing, N.D. Bhat, Charotar Publishers
2. Engineering Drawing, Johle, Tata McGraw-Hill
3. Engineering Drawing, Shah and Rana, 2/e, Pearson Education

REFERENCES:

1. Engineering Drawing and Graphics, Venugopal/ New age
2. Engineering Drawing, B.V.R. Gupta, J.K. Publishers
3. Engineering Drawing, K.L. Narayana, P. Khanniah, Scitech Pub.
4. Engineering Drawing, Venkata Reddy, B.S. Publishers.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****B.Tech. I Year (E.I.E.)**

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**(9ABS105) MATHEMATICAL METHODS
(EEE, ECE, E.Con.E, E.I.E, CSE, IT, CSS, ECM)****UNIT – I**

Matrices: Elementary row transformations – Rank – Echelon form, normal form – Solution of Linear System of Homogenous and Non Homogeneous equations – Direct Methods – Gauss Elimination, Gauss Jordan methods.

Eigen Values, Eigen vectors – Properties – Cayley – Hamilton Theorem – Inverse and powers of a matrix by Cayley–Hamilton theorem – Diagonalization of matrix. Calculation of powers of matrix.

UNIT – II

Real matrices – Symmetric, skew – Symmetric, orthogonal matrices Linear Transformation – Orthogonal Transformation. Complex matrices: Hermitian, Skew-Hermitian and Unitary matrices – Eigen values and Eigen vectors and their properties. Quadratic forms – Reduction of quadratic form to canonical form and their nature.

UNIT – III

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

Interpolation: Introduction – Finite differences – Forward Differences – backward Differences – Newton's forward and backward difference formulae for interpolation – Lagrange's Interpolation formula.

2009-10**UNIT – IV**

Curve fitting: Fitting a straight line – Second degree curve – Exponential curve-Power curve by method of least squares. Numerical Differentiation and Integration – Trapezoidal rule – Simpson's $1/3$ Rule – Simpson's $3/8$ Rule.

UNIT – V

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 Method – Milne's Method.

UNIT – VI

Fourier Series: Determination of Fourier coefficients – Fourier series – Even and odd functions – Fourier series in an arbitrary interval – Even and odd periodic continuation – Half-range Fourier sine and cosine expansions. Fourier integral theorem (only statement) – Fourier sine and cosine integrals. Fourier transform – Fourier sine and cosine transforms – Properties – Inverse transforms – Finite Fourier transforms.

UNIT – VII

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Method of separation of variables – Solutions of one dimensional wave equation, heat equation and two-dimensional Laplace's equation under initial and boundary conditions.

UNIT – VIII

z-transform – Inverse z-transform – Properties – Damping rule – Shifting rule – Initial and final value theorems. Convolution theorem – Solution of difference equations by z-transforms.

TEXT BOOKS:

1. Mathematical Methods, T.K.V. Iyengar, B. Krishna Gandhi and Others, S. Chand & Company.
2. Mathematical Methods, C. Sankaraiah, V.G.S. Book Links.

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3. Mathematical Methods, G. Shanker Rao, E. Keshava Reddy, I. K. International Publishing House Pvt. Ltd.

REFERENCES:

1. Numerical Methods for Scientific and Engineering Computation , M.K. Jain, S.R.K. Iyengar R.K. Jain, New Age international Publishers.
2. Mathematical Methods – Pal – Oxford.
3. Introduction to Numerical Analysis – S.S. Sastry Ph - I
4. Mathematical Methods, S.K.V.S. Sri Ramachary, M. Bhujanga Rao, P.B. Bhaskar Rao & P.S. Subramanyam, BS Publications.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****B.Tech. I Year (E.I.E.)**

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**(9A05102) C PROGRAMMING AND DATA STRUCTURES
LAB****(Common to all Branches)**

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 with ANSI C Compiler and 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:
$$\text{Sum} = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$$
- b) Write a C program to 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.

2009-10**Week 4**

- a) The total distance travelled by vehicle in 't' seconds is given by distance $S = ut + \frac{1}{2}at^2$ where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec²) respectively. 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 the geometric progression:

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

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. Find if any values of x are 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)

2009-10**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 Quick sort method to sort a given list of integers in ascending order.

Week 21

Write C program that implement the Merge sort method to sort a given list of integers in ascending order.

2009-10**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.

REFERENCE BOOKS

1. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education
2. The Spirit of C, an introduction to modern programming, M.Cooper, Jaico Publishing House.
3. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.
4. Computer Basics and C Programming, V. Rajaraman, PHI Publications.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****B.Tech. I Year (E.I.E.)****T P C**
0 3 4**(9A03102) ENGINEERING AND I.T. WORKSHOP**
(Common to all Branches)**ENGINEERING WORKSHOP**

Objectives: The budding Engineer may turn out to be a technologist, scientist, entrepreneur, practitioner, consultant etc. There is a need to equip the engineer with the knowledge of common and newer engineering materials as well as shop practices to fabricate, manufacture or work with materials. Essentially he should know the labour involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work. Hence engineering work shop practice is included to introduce some common shop practices and on hand experience to appreciate the use of skill, tools, equipment and general practices to all the engineering students.

1. TRADES FOR EXERCISES:

- Carpentry shop— Two joints (exercises) involving tenon and mortising, groove and tongue: Making middle lap T joint, cross lap joint, mortise and tenon T joint, Bridle T joint from out of 300 x 40 x 25 mm soft wood stock
- Fitting shop— Two joints (exercises) from: square joint, V joint, half round joint or dove tail joint out of 100 x 50 x 5 mm M.S. stock
- Sheet metal shop— Two jobs (exercises) from: Tray, cylinder, hopper or funnel from out of 22 or 20 guage G.I. sheet
- House-wiring— Two jobs (exercises) from: wiring for ceiling rose and two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, wiring for a water pump with single phase starter.
- Foundry— Preparation of two moulds (exercises): for a single pattern and a double pattern.
- Welding – Preparation of two welds (exercises): single V butt joint, lap joint, double V butt joint or T fillet joint

2009-10**2. TRADES FOR DEMONSTRATION:**

- a. Plumbing
- b. Machine Shop
- c. Metal Cutting

Apart from the above the shop rooms should display charts, layouts, figures, circuits, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, Plastics, steels, meters, gauges, equipment, CD or DVD displays, First aid, shop safety etc. (though they may not be used for the exercises but they give valuable information to the student). In the class work or in the examination knowledge of all shop practices may be stressed upon rather than skill acquired in making the job.

REFERENCE BOOKS:

- 1. Engineering Work shop practice for JNTU, V. Ramesh Babu, VRB Publishers Pvt. Ltd., 2009
- 2. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers.
- 3. Engineering Practices Lab Manual, Jeyapoovan, Saravana Pandian, 4/e Vikas
- 4. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.

I.T. WORKSHOP**Objectives:**

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

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 a working PC (PIV or higher) to disassemble and assemble back 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.**

2009-10

Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace for 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, power point presentations and personal web sites using the Microsoft suite of office tools and LaTeX. **(It is 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 shall 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

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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.

OFFICE TOOLS

LaTeX and Word

Week 7 – 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 four 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 in word.

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.

Excel

Week 8 - 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 four 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

LaTeX and MS/equivalent (FOSS) tool Power Point

Week 9 - Task1: Students will be working on basic power point utilities and tools which help them create basic power point

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presentation. Topic covered during this Exercise includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Powerpoint. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Week 10 - Task 2 : Second Exercise helps students in making their presentations interactive. Topic covered during this Exercise includes : Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts

Internet & World Wide Web **2 Weeks**

Week 11 - 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.

Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers.

Week 12 - Task 2: 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 by the student to the satisfaction of instructors.

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.

2009-10**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.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****B.Tech. I Year (E.I.E.)**

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**(9ABS106) ENGINEERING PHYSICS LAB and ENGINEERING
CHEMISTRY LAB****ENGINEERING PHYSICS LAB**

Any **TEN** of the following experiments are to be performed during the Academic year.

Sl.No.	Name of the Experiment
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1. Determination of wavelength of given source – spectrometer – normal incidence method.
2. Dispersive power of the prism – Spectrometer.
3. Determination of wavelength of a laser source - Diffraction Grating.
4. Determination of particle size by using a laser source.
5. Determination of thickness of a thin wire using parallel fringes.
6. Newton's Rings.
7. Magnetic field along the axis of a current carrying coil – Stewart and Gee's method.
8. Numerical aperture of an optical fiber.
9. Hall effect.
10. B – H Curve.
11. Energy gap of a material of p-n junction
12. Determination of rigidity modulus of a wire material – Torsional pendulum
13. Determination of dielectric constant.
14. Verification of laws of stretched string – Sonometer.
15. Melde's experiment – Transverse & Longitudinal modes.

2009-10**Equipment required:**

Spectrometer, Grating, Prism, Mercury vapour lamp, Sodium vapour lamp, Travelling Microscope, Wedge arrangement, Newton rings setup, Stewart-Gee's apparatus, He-Ne laser source, Optical fiber, Hall effect kit, B-H loop kit, Energy gap kit (four probe method), Torsional pendulum, Dielectric constant kit, Sonometer, Melde's apparatus

ENGINEERING CHEMISTRY LAB

1. Preparation of Standard Potassium Dichromate and Estimation of Ferrous Iron.
2. Preparation of Standard Potassium Dichromate and Estimation of Copper, by Iodometry.
3. Preparation of Standard EDTA solution and Estimation of Hardness of Water.
4. Preparation of Standard EDTA and Estimation of Copper
5. Determination of Manganese in Steel and Iron in Cement.
6. Determination of strength of the given Hydrochloric acid against standard sodium hydroxide solution by Conductometric titration
7. Determination of viscosity of the oils through Redwood viscometer
8. Determination of calorific value of fuel using Bomb calorimeter
9. Estimation of dissolved oxygen
10. Determination of Eutectic Temperature of binary system (Urea – Benzoic Acid)

BOOKS:

1. Chemistry-lab manual by Dr K.N.Jayaveera and K.B. Chandra Sekhar, S.M. Enterprises Ltd.
2. Vogel's Book of Quantitative Inorganic Analysis, ELBS Edition.

Equipment Required:

1. Glass ware: Pipettes, Burettes, Volumetric Flasks, Beakers, Standard flasks, Measuring jars, Boiling Test tubes, reagent bottles, (Borosil)
2. Analytical balance (kero) (15 Nos)
3. Calorimeter
4. Bomb Calorimeter
5. Redwood viscometer No.1& No.2

2009-10

6. Conductometer/ Conductivity bridge
7. Wash bottles, test tube stands, burette stands
8. Gas cylinders with Bunsen burners
9. Chemicals: Hydrochloric acid, sodiumhydroxide, EDTA, EBT indicator, fast sulfon black-f, urea, benzoic acid, methanol, Mohr's salt, copper sulphate, magnesium sulphate, ammonia, ammonium sulphate, calcium sulphate etc.,

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****B.Tech. I Year (E.I.E.)**

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**(9ABS107) ENGLISH LANGUAGE AND COMMUNICATION
SKILLS LAB**

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

Objectives:

1. To train students to use language effectively in everyday conversations, to participate in group discussions, to help them face interviews, and sharpen public speaking skills
2. To expose the students to a varied blend of self-instructional, learner-friendly modes of language learning
3. To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm
4. To initiate them into greater use of the computer in resume preparation, report- writing, format-making etc.
5. To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required ability to face computer-based competitive exams such GRE, TOEFL, GMAT 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 (giving directions etc.)
4. Speaking on the mobiles and telephone conversation
5. Role Play.
6. Oral Presentations- Prepared and Extempore.

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7. 'Just A Minute' Sessions (JAM).
8. Describing Objects / Situations / People.
9. Information Transfer
10. Debate

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

PRESCRIBED SOFTWARE: GLOBARENA**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
- Learning to Speak English - 4 CDs
- Microsoft Encarta with CD
- 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):

2009-10

1. **English Pronouncing Dictionary**, Daniel Jones Current Edition with CD.
2. **Spoken English**, R. K. Bansal and J. B. Harrison, Orient Longman 2006 Edn.
3. **Speaking English Effectively**, Krishna Mohan & NP Singh (Macmillan)
4. **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.
5. **Body Language- Your Success Mantra**, Dr Shalini Verma, S.Chand & Co, 2008
6. **English Dictionary for Advanced Learners**, (with CD) International edn. Macmillan 2009
7. **A Handbook for English language Laboratories**, E.Sureshkumar, P.Sreehari, Foundation Books, 2009
8. **DELTA's key to the Next Generation TOEFL Test**, 6 audio CDS, New Age International Publishers, 2007

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****B.Tech. II-I Sem. (E.I.E.)**

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(9ABS302) MATHEMATICS – III**(Common to EEE, ECE, E Con E, E.I.E, ECM)****UNIT – I**

Special Functions: Gamma and Beta Functions – their properties – Evaluation of improper integrals. Bessel functions – Properties – Recurrence relations – Orthogonal. Legendre polynomials – Properties – Rodrigue's formula – Recurrence relations – Orthogonality.

UNIT – II

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

UNIT – III

Elementary functions: Exponential, trigonometric, hyperbolic functions and their properties – General power Z^c (c is complex), principal value.

UNIT – IV

Complex integration: Line integral – Evaluation along a path and by indefinite integration – Cauchy'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.

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UNIT – VI

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) $\int_0^{2\pi} R(\cos \theta, \sin \theta) d\theta$

(c) $\int_{-\infty}^{\infty} e^{imx} f(x)dx$

UNIT – VII

Argument principle – Rouché's theorem – Determination of number of zeros of complex polynomials – maximum Modulus principle – Fundamental theorem of Algebra, Liouville's Theorem.

UNIT – VIII

Conformal mapping: Transformation by e^z , $\ln z$, z^2 , $\sin z$, $\cos z$, Bilinear transformation - Translation, rotation, magnification and inversion – Fixed point – Cross ratio – Determination of bilinear transformation mapping three given points.

TEXT BOOKS:

1. A Text Book of Engineering Mathematics, Vol–III, T.K.V. Iyengar, B. Krishna Gandhi and Others S. Chand & Company.
2. A text Book of Engineering Mathematics, C. Sankaraiah, V.G.S. Book Links.
3. A text Book of Engineering Mathematics-III, E. Rukmangadachari, E. Keshava Reddy, Pearson Education.

REFERENCES:

1. A Text Book of Engineering Mathematics, B.V. Ramana, Tata Mc Graw Hill.
2. Complex Variables – Churchill and Brown.
3. Complex Variables – Schaum Series.
4. Higher Engineering Mathematics, B.S. Grewal, Khanna Publication.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****B.Tech. II-I Sem. (E.I.E.)****T P C**
4 0 4**(9ABS303) ENVIRONMENTAL SCIENCE****(Common to ECE, E Con E, ECM, EIE, EEE, CSSE)****UNIT – I****MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES** : – Definition, Scope and Importance – Need for Public Awareness.**UNIT – II****NATURAL RESOURCES** : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources:**UNIT – III****ECOSYSTEMS** : Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

- Forest ecosystem.
- Grassland ecosystem
- Desert ecosystem
- Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT – IV**BIODIVERSITY AND ITS CONSERVATION** : Introduction 0
Definition: genetic, species and ecosystem diversity – Bio-geographical

2009-10

classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-spots of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – V

ENVIRONMENTAL POLLUTION : Definition, Cause, effects and control measures of :

- a. Air Pollution.
- b. Water pollution
- c. Soil pollution
- d. Marine pollution
- e. Noise pollution
- f. Thermal pollution
- g. Nuclear hazards

SOLID WASTE MANAGEMENT : Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

UNIT – VI

SOCIAL ISSUES AND THE ENVIRONMENT: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

2009-10**UNIT – VII**

HUMAN POPULATION AND THE ENVIRONMENT : Population growth, variation among nations. Population explosion – Family Welfare Programme. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

UNIT – VIII

FIELD WORK : Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, birds – river, hill slopes, etc..

TEXT BOOKS :

- (1) Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press.
- (2) Environmental Studies by R.Rajagopalan, Oxford University Press.
- (3) Environmental Studies by Benny Joseph, Mc.GrawHill Publications.

REFERENCES :

- (1) Text book of Environmental Sciences and Technology by M.Anji Reddy, BS Publication.
- (2) Comprehensive Environmental studies by J.P.Sharma, Laxmi publications.
- (3) Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – Printice hall of India Private limited.
- (4) Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Printice hall of India Private limited.
- (5) Environmental Studies by Anindita Basak – Pearson education.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****B.Tech. II-I Sem. (E.I.E.)**

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(9A02305) ELECTRICAL CIRCUITS
(Common to EEE, ECE, E Con E, E.I.E, ECM)**Objective:**

This course introduces the basis 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, transient analysis and network topology.

UNIT-I Introduction to Electrical Circuits

Circuit concept– R-L-C parameters-Voltage and Current sources-Independent and dependent sources-source transformation-Voltage - Current relationship for passive elements (for different input signals-square, ramp, saw tooth, triangular)

UNIT-II

Kirchoff's laws – network reduction techniques-series, parallel, series parallel, star-to-delta, delta-to-star transformation, Nodal analysis, mesh analysis, super node and super mesh for D.C excitations.

UNIT-III Single Phase A.C Circuits

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

2009-10**UNIT-IV Locus diagrams & Resonance**

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

UNIT-V Magnetic Circuits

Magnetic circuits-Faraday's laws of electromagnetic induction-concept of self and Mutual Inductance-dot convention, coefficient of coupling-Composite magnetic circuit-analysis of series and parallel magnetic circuits

UNIT-VI Network topology

Graph, Tree, Basic cut-set and Basic Tie-set matrices for planar networks – Loop and Nodal methods of analysis of Networks with dependent & independent voltage and current sources – Duality & Dual networks.

UNIT-VII Network theorems -I

Thevenin's, Norton's, Maximum Power Transfer and Millman's theorems for D.C and sinusoidal excitations.

UNIT-VIII Network theorems - II

Tellegen's, Superposition, Reciprocity and compensation theorems for D.C and sinusoidal excitations.

TEXT BOOKS:

1. Circuits & Networks by A. Sudhakar and Shyammohan S Palli, Tata McGraw- Hill
2. Electric Circuits by N.Sreenivasulu, REEM Publications
3. Electric Circuits- Schuam Series

REFERENCE BOOKS:

1. Network Analysis by M.E Van Valkenberg, Prentice Hall(India), 3rd Edition.
2. Basic circuit analysis by D.R. Cunningham & J.A Stuller, Jaico Publications Engineering circuit analysis by William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 6th edition.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****B.Tech. II-I Sem. (E.I.E.)**

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**(9A04303) PROBABILITY THEORY AND
STOCHASTIC PROCESSES
(Common to ECE, E Con E, EIE, ECM)****UNIT I****PROBABILITY:**

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

UNIT II**THE RANDOM VARIABLE:**

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

UNIT III**OPERATION ON ONE RANDOM VARIABLE –
EXPECTATIONS:**

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

2009-10**UNIT IV****MULTIPLE RANDOM VARIABLES:**

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

UNIT V**OPERATIONS ON MULTIPLE RANDOM VARIABLES:**

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

UNIT VI**STOCHASTIC PROCESSES:**

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

UNIT VII**STOCHASTIC PROCESSES-TEMPORAL****CHARACTERISTICS:**

Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and its Properties, Cross-Correlation Function and its Properties, Covariance and its Properties, Linear system Response of Mean and Mean-Squared value, Autocorrelation Function, Cross-Correlation Functions, Gaussian Random Processes, and Poisson Random Process.

2009-10**UNIT VIII****STOCHASTIC PROCESSES – SPECTRAL****CHARACTERISTICS:**

Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, Cross-Power Density Spectrum, Properties. Relationship between Cross-Power Spectrum and Cross-Correlation Function, Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Spectral Density of Input and Output of a Linear System.

TEXT BOOKS:

1. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, TMH, 4th Edition, 2001.
2. Probability, Random Variables and Stochastic Processes – Athanasios Papoulis and S. Unnikrishna Pillai, Tata McGraw-Hill, 4th edition, 2002.
3. Principles of Communication Systems-H.Taub, Donlad.L.Schilling, Goutam saha, 3ed. 2007, TMH.
4. Theory of Probability and Stochastic Processes-Pradip Kumar Ghosh, University Press.

REFERENCES:

1. Probability Theory and Stochastic Processes-Mallikarjuna Reddy, cengage Learning.
2. Probability and Random Processes with Application to Signal Processing – Henry Stark and John W.Woods, Pearson Education, 3rd Edition.
3. Probability Methods of Signal and System Analysis. George R. Cooper, Clave D. MC Gillem, 3rd Edition, 999, Oxford.
4. Statistical Theory of Communication - S.P. Eugene Xavier, New Age Publications, 2003.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****B.Tech. II-I Sem. (E.I.E.)**

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(9A04301) ELECTRONIC DEVICES AND CIRCUITS**(Common to CSE, CSSE, IT, ECE, E Con E, ECM, EIE, EEE)****UNIT- I****PN JUNCTION DIODE:**

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

UNIT- II

RECTIFIERS AND FILTERS : PN Junction as a Rectifier, Half wave rectifier, ripple factor, full wave rectifier, Bridge Rectifier, Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L-section filter, Π - section filter, Use of Zener Diode as a Regulator, Problems on rectifier circuits, and voltage regulator.

UNIT- III

TRANSISTOR: Transistor construction, BJT Operation, BJT Symbol, Transistor as an Amplifier, Common Emitter, Common Base and Common Collector Configurations, Limits of Operation, BJT Specifications.

UNIT-IV

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

2009-10**UNIT- V****FIELD EFFECT TRANSISTOR:**

The Junction Field Effect Transistor (Construction, Principle of Operation, Symbol) - Pinch-Off Voltage – Volt-Ampere Characteristics, Small Signal Model of JFET & MOSFET, MOSFET Characteristics in Enhancement and Depletion Modes.

UNIT- VI**FET AMPLIFIERS:**

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

UNIT-VII**SMALL SIGNAL ANALYSIS OF BJT AMPLIFIERS:**

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

UNIT-VIII**SPECIAL PURPOSE ELECTRONIC DEVICES:**

Principle of Operation, and Characteristics of Tunnel Diode (With help of Energy Band Diagram) and Varactor Diode, Principle of Operations of Schottky Barrier Diode, Thermistor, Silicon Control Rectifier, and Uni-Junction Transistor (UJT).

TEXT BOOKS:

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

2009-10**REFERENCES:**

1. Integrated Electronics- J.Millman and C.C.Halkias, Satyabratajit, 2nd edition, 1998, TMH.
2. Electronic Devices and Circuits - K. Lal kishore, 2nd edition, 2005, BSP.
3. Introduction to Electronic Devices and Circuits – Rober T. Paynter, PE
4. Electronic Devices and Circuits – S. Salivahana, N.Suresh Kumar, A. Vallavaraj, 2nd Edition, 2008, TMH.

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(9A04304) SIGNALS AND SYSTEMS**(Common to ECE, E Con E, EIE, ECM)****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 transforms, 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 Poly-Wiener criterion for physical realization, Relationship between bandwidth and rise time.

2009-10**UNIT V**

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 VI

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 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's relation between L.T's, 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 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.

2009-10**TEXT BOOKS:**

1. Signals, Systems & Communications - B.P. Lathi, 2009,BS Publications.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.
3. Signals & Systems - Simon Haykin and Van Veen, Wiley, 2nd Edition.

REFERENCES:

1. Signals and Systems – A. Ramakrishna Rao - 2008, TMH.
2. Linear Systems and Signals – B. P. Lathi, Second Edition, Oxford University press, 2008.
3. Fundamentals of Signals and Systems Michel J. Robert, MGH International Edition, 2008.
4. Signals, Systems and Transforms - C. L. Philips, J. M. Parr and Eve A. Riskin, Pearson education.3rd

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**(9A04302) ELECTRONIC DEVICES
AND CIRCUITS LAB
(Common to ECE, E Con E, EIE, ECM, EEE)****ELECTRONIC WORKSHOP PRACTICE (in 3 lab sessions):**

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB s
2. Identification, Specifications and Testing of Active Devices, Diodes, BJTs, Lowpower JFETs, MOSFETs, Power Transistors, LEDs, LCDs, SCR, UJT.
3. Study and operation of
 - Multimeters (Analog and Digital)
 - Function Generator
 - Regulated Power Supplies
 - Study and Operation of CRO.

(For Laboratory examination – Minimum of 10 experiments)

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

2009-10**Equipment required for Laboratories:**

1. Regulated Power supplies (RPS) - 0-30v.
2. CROs - 0-20M Hz.
3. Function Generators - 0-1 M Hz.
4. Multimeters -
5. Decade Resistance Boxes/Rheostats -
6. Decade Capacitance Boxes -
7. Micro Ammeters (Analog or Digital)- 0-20 μ A, 0-50 μ A, 0-100 μ A, 0-200 μ A.
8. Voltmeters (Analog or Digital) - 0-50V, 0-100V, 0-250V.
9. Electronic Components - Resistors, Capacitors, BJTs, LCDs, SCRs, UJT, FETs, LEDs, MOSFETs, Diodes (Ge & Si type), transistors (NPN & PNP type)

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**(9A04305) BASIC SIMULATION LAB
(Common to ECE, E Con E, EIE)****List of Experiments:**

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

Using Licensed MATLAB of version 7.0 and above

2009-10**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****B.Tech. II-II Sem. (E.I.E.)****T P C****4 0 4****(9AHS401) MANAGERIAL ECONOMICS & FINANCIAL
ANALYSIS****(Common to ECE, E Con E, EIE)****UNIT I: INTRODUCTION TO MANAGERIAL ECONOMICS**

Definition, nature and scope of managerial economics- relation with other disciplines- 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 AND PRICING POLICIES

Market structures: Types of competition, features of perfect competition, monopoly- monopolistic competition. Price-Output determination under perfect competition and monopoly - Methods of

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Pricing-cost plus pricing, marginal cost, limit pricing, skimming pricing, bundling pricing, sealed bid pricing and peak load pricing.

UNIT V: BUSINESS ORGANISATIONS AND NEW ECONOMIC ENVIRONMENT

Characteristic features of business, features and evaluation of sole proprietorship, partnership, Joint Stock Company, public enterprises and their types, changing business environment in post-liberalization scenario.

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 proposal, 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 financial statements through Liquidity Ratios (Current and Quick ratio), Activity ratios (Inventory Turnover Ratio and Debtor Turnover Ratio), Capital Structure Ratios (Debt- Equity Ratio, Interest Coverage Ratio) and Profitability ratios (Gross Profit Ratio, Net Profit Ratio, Operating Ratio, P/E Ratios and EPS), Du Pont Chart.

TEXT BOOKS:

1. Aryasri: Managerial Economics and Financial Analysis, 4/e, TMH, 2009.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.

2009-10**REFERENCES**

1. Premchand Babu, Madan Mohan: Financial Accounting and Analysis, Himalaya, 2009
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International, 2009.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage, 2009.
5. H.L. Ahuja: Managerial Economics, S.Chand, 3/e, 2009

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****B.Tech. II-II Sem. (E.I.E.)**

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**(9A02401) PRINCIPLES OF ELECTRICAL ENGINEERING
(Common to ECE, E Con E, EIE, ECM)****UNIT I****TRANSIENT ANALYSIS (First and Second Order Circuits)**

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

UNIT II**Two Port Networks**

Impedance Parameters, Admittance Parameters, Hybrid Parameters, Transmission (ABCD) Parameters, Conversion of one Parameter to another, Conditions for Reciprocity and Symmetry, Interconnection of two port networks in series, parallel and cascaded configurations, Image, Iterative Impedance, Illustrative problems.

UNIT III**Filters**

Classification of Filters, Filter Networks, Classification of Pass Band and Stop Band, Characteristic Impedance in the pass and stop Bands, Constant-k Low Pass Filter, High Pass Filter, m-derived, T-section, Band Pass Filter and Band Elimination filter, Illustrative problems.

UNIT IV**Symmetrical Attenuators**

Symmetrical Attenuators – T-type Attenuator, π -type Attenuator, Bridged T type Attenuator, Lattice Attenuator.

UNIT V**DC Generators**

Principle of Operation of DC Machines, EMF equation, Types of Generators, Magnetisation and Load Characteristics of DC Generators.

2009-10**UNIT VI****DC Motors**

DC Motors, Type of DC Motors, Characteristics of DC Motors, Losses and Efficiency, Swinburne's Test, Speed Control of DC Shunt Motor, Flux and Armature Voltage Control Methods.

UNIT VII**Transformers and Their Performance**

Principle of Operation of Single Phase transformer, Types, Constructional Features, Phasor Diagram on NLoad and Load, Equivalent Circuit, Losses and Efficiency of Transformer and Regulation, OC and SC Tests, Predetermination of Efficiency and Regulation(Simple Problems).

UNIT VIII**Special Machines**

Principle of Operation, Shaded Pole motors, Capacitor motors, AC Servomotor, AC Tachometers, Synchros, Stepper Motors, Characteristics.

TEST BOOKS:

1. Engineering Circuit Analysis – W.H.Hayt and J.E Kemmerly and S.M.Durbin, 6th Edition, 2008, TMH.
2. Fundamentals of Electric Circuits – Charles K.Alexander, Mathew N.O. Sadiku, 3rd Edition, 2008, TMH.
3. Network Analysis – A.Sudhakar, Shyammohan S.Pilli, 3rd edition, 2009, TMH.
4. Introduction to Electrical Engineering – M.S.Naidu and S.Kamakshaiah, 2008, TMH.

REFERENCE BOOKS:

1. Networks, Lines and Fields – John.D.Ryder, 2nd edition, 2008(Reprint), PHI.
2. Network Analysis and Synthesis -C.L Wadhwa, 3rd Edition, 2007, New Age International Publishers.
3. Network Analysis – N.C.Jagan and C.Lakshmi Narayana, BSP, 2006.
4. Electric Circuits – Nilsson, Riedel, 8th edition, PE.

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**(9A04402) ELECTRONIC CIRCUITS ANALYSIS
(Common to ECE, E Con E, EIE)****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, Design of Single stage RC Coupled Amplifier Using BJT.

UNIT II**MULTI STAGE AMPLIFIERS**

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

UNIT III**BJT FREQUENCY RESPONSE**

Logarithms, Decibels, General Frequency considerations, Frequency Response of BJT Amplifier, Analysis at Low and High Frequencies, Effect of Coupling and bypass Capacitors, The Hybrid- π (π)- Common Emitter Transistor Model, CE short Circuit Current gain, Current gain with Resistive Load, Single Stage CE Transistor Amplifier response, Gain-Bandwidth Product, Emitter follower at higher frequencies.

UNIT IV**MOSFET AMPLIFIERS**

Basic Concepts, MOSFET small signal Model, Common Source Amplifier with resistive load, Diode connected Load and Current Source Load, Source follower, Common gate stage cascade and folded cascade Amplifier and their Frequency Response.

2009-10**UNIT V****FEEDBACK AMPLIFIERS**

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

UNIT VI**OSCILLATORS**

Conditions for Oscillations, RC and LC type Oscillators, Crystal Oscillators, Frequency and Amplitude Stability of Oscillators, Generalized Analysis of LC Oscillators, Quartz, Hartley and Colpitts Oscillators, RC-Phase shift and Wien-Bridge Oscillators.

UNIT VII**LARGE SIGNAL AMPLIFIERS**

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

UNIT VIII**TUNED AMPLIFIERS**

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

TEXT BOOKS:

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

2009-10**REFERENCE BOOKS:**

1. Electronic Circuits Analysis and Design – Donald A Neamen, Third Edition, Tata McGraw-Hill, 2007.
2. Introductory Electronic Devices and Circuits- Robert T. Paynter, 7th edition, 2009, PEI.
3. Microelectric circuits- sedra/ Smith- 5th edition, 2009, Oxford University Press.
4. Electronic Circuit Analysis- K.Lal Kishore, 2004, BSP.
5. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A. Vallavaraj, 2nd edition, 2009, TMH.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****B.Tech. II-II Sem. (E.I.E.)****T P C
4 0 4****(9A04404) PULSE AND DIGITAL CIRCUITS
(Common to ECE, E Con E, EIE, ECM)****UNIT I****LINEAR WAVESHAPING**

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

UNIT II**NON-LINEAR WAVE SHAPING**

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

UNIT III**SWITCHING CHARACTERISTICS OF DEVICES**

Diode as a switch, piecewise linear diode characteristics, Diode Switching Times, Transistor as a switch, Break down voltages, transistor in saturation, temperature variations of Saturation Parameters, Transistor-Switching Times, Silicon- Controlled- Switch Circuits.

UNIT IV**MULTIVIBRATOR CIRCUITS**

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

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,

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Transistor Miller-time base generator, Transistor Bootstrap time base generator, Transistor Current time base generators, Methods of linearity Improvements.

UNIT VI

SAMPLING GATES

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

UNIT VII

SYNCHRONIZATION AND FREQUENCY DIVISION

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

UNIT VIII

REALIZATION OF LOGIC GATES USING DIODES & TRANSISTORS

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

TEXT BOOKS:

Millman's Pulse, Digital and Switching Waveforms – J. Millman, H. Taub and Mothiki S. Prakash Rao, 2nd Edition, 2008 TMH.
Solid State Pulse Circuits-David A. Bell, 4th edition, 2002 PHI.
Integrated Electronics – Jacob Millman, Christos C Halkias

REFERENCES:

1. Pulse and Digital Circuits – A. Anand Kumar, PHI, 2005.
2. Fundamentals of Pulse and Digital Circuits – Ronald J. Tocci, 3rd edition, 2008.
3. Pulse Circuits – Michel
4. Wave Generation and Shaping - L. Strauss.

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**(9A04401) SWITCHING THEORY AND LOGIC DESIGN
(Common to ECE, E Con E, EIE, ECM)****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.

2009-10**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 Specified and Incompletely Specified Sequential Machines, Partition Techniques and Merger chart Methods Concept of Minimal cover table.

UNIT VIII

ALGORITHMIC STATE MACHINES : Salient features of the ASM chart, Simple examples, System design using data path and control subsystems, control Implementations, Examples of Weighing machine and Binary multiplier.

TEXTBOOKS:

1. Switching & Finite Automata theory – Zvi Kohavi, TMH, 2nd Edition.
2. Digital Design – Morris Mano, PHI, 3rd Edition, 2006.
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, 5th Edition, 2004, Thomson Publications.
3. Digital Logic Applications and Design – John M. Yarbrough, 2006, Thomson Publications.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****B.Tech. II-II Sem. (E.I.E.)****T P C
4 0 4****(9A04405) ELECTRONIC MEASUREMENTS****UNIT – I:**

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

UNIT – II:

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

UNIT – III:

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

UNIT - IV

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

UNIT – V

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

2009-10**UNIT – VI**

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

UNIT – VII

Electron Dynamics & Oscilloscopes: Motion of Electron in Electric and Magnetic fields, Electrostatic and Magnetic focusing, Deflection sensitivity in both cases, CRO operation, CRT characteristics, probes, Time base sweep modes, Trigger generator, Vertical amplifier, modes of operation, A, B, alternate & chop modes, sampling oscilloscopes, storage oscilloscope, Standard specifications of CRO, Synchronous selector circuits, Lissajous Figures.

UNIT – VIII

Spectrum analyzers, Different types of spectrum analyzer, Recorders, Introduction to magnetic recording techniques & X-Y plotters. Display Devices and Display Systems, Logic Analyzers – State & time referenced data capture.

TEXT BOOKS:

1. Modern Electronic Instrumentation and Measurement techniques- Albert D. Helfrick, William D. Cooper-PHI.
2. Electronic Instrumentation and Measurements- David A. Bell-PHI.
3. Electronic Instrumentation – HS Kalsi, Tata Mc Graw Hill, 2004.

REFERENCES:

1. Measuring Systems, Application and Design – by E.O. Doebelin, McGraw Hill.
2. Electrical and Electronic Measurements – by Shawney, Khanna Publ.
3. Electronic Test Instruments- Robert A. Witte, Pearson Edition
4. Electronic Measurements and Instrumentation-Oliver-Case-TMH.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****B.Tech. II-II Sem. (E.I.E.)**

T	P	C
0	3	2

(9A04403) ELECTRONIC CIRCUIT ANALYSIS LAB**List of Experiments (12 experiments to be done):****I) Design and Simulation in Simulation Laboratory using Any Simulation Software. (Minimum of 6 Experiments):**

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

II) Testing in the Hardware Laboratory (6 Experiments)

- A. Any Three circuits simulated in Simulation laboratory
B. Any Three of the following

1. Class A Power Amplifier (with transformer load)
2. Class C Power Amplifier
3. Single Tuned Voltage Amplifier
4. Hartley & Colpitt's Oscillators.
5. Darlington Pair.
6. MOSFET Amplifier

2009-10**Equipments required for Laboratories:**

1. For software simulation of Electronic circuits
 - i) Computer Systems with latest specifications.
 - ii) Connected in LAN (Optional).
 - iii) Operating system (Windows XP).
 - iv) Suitable Simulations software.
2. For Hardware simulations of Electronic Circuits
 - i) Regulated Power Supply (0-30V)
 - ii) CRO's
 - iii) Functions Generators.
 - iv) Multimeters.
 - v) Components.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****B.Tech. II-II Sem. (E.I.E.)**

T	P	C
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**(9A02402) ELECTRICAL ENGINEERING LAB
(Common to ECE, E Con E, EIE, ECM)****PART – A**

1. Verification of KVL and KCL.
2. Serial and Parallel Resonance – Timing, Resonant frequency, Bandwidth and Q-factor determination for RLC network.
3. Time response of first order RC/RL network for periodic non-sinusoidal inputs – time constant and steady state error determination.
4. Two port network parameters – Z-Y Parameters, chain matrix and analytical verification.
5. Two port network parameters – ABCD and h-Parameters.
6. Verification of Superposition and Reciprocity theorems.
7. Verification of maximum power transfer theorem. Verification on DC, verification on AC with Resistive and Reactive loads.
8. Experimental determination of Thevenin's and Norton's equivalent circuits and verification by direct test.
9. Constant – k Low Pass Filter and High Pass Filter – Design and Test.

PART – B

1. Magnetization characteristics of D.C. Shunt generator. Determination of critical field resistance.
2. Swinburne's Test on DC shunt machine (Predetermination of efficiency of a given DC Shunt machine working as motor and generator).
3. Brake test on DC shunt motor. Determination of performance characteristics.
4. OC & SC tests on Single-phase transformer (Predetermination of efficiency and regulation at given power factors and determination of equivalent circuit).
5. Load test on Single Phase transformer.

Note: Any 12 of the above experiments are to be conducted.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A10501) SENSORS AND SIGNAL CONDITIONING****(Common to EIE, E Con E)****B.Tech. III-I Sem. (E.I.E.)**

T	P	C
4	0	4

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 (rtDs), thermistors, magneto resistors, light-dependent resistors (ldrs).

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 (lvDts), variable transformers: synchros, resolvers, inductosyn, magneto elastic sensors, electromagnetic sensors - sensors based on faraday's law, hall effect sensors.

2009-10**UNIT V****SIGNAL CONDITIONING FOR REACTANCE VARIATION**

SENSORS: Problems and alternatives, ac bridges, carrier amplifiers - application to the lvdv, 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 drift 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, magnetodiodes and magnetotransistors, photodiodes and phototransistors, sensors based on mosfet transistors, charge-coupled sensors - types of ccd imaging sensors, ultrasonic-based sensors, fiber-optic sensors.

TEXT BOOK:

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, 2004.
2. Instrument Transducers – An Introduction to Their Performance and Design – by Herman K.P. Neubrat, Oxford University Press.

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3. Measurement System: Applications and Design – by E.O. Doebelin, McGraw Hill Publications.
4. Process Control Instrumentation Technology – D. Johnson, John Wiley and Sons.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A10502) INDUSTRIAL INSTRUMENTATION****B.Tech. III-I Sem. (E.I.E.)**

T	P	C
4	0	4

UNIT – I**METROLOGY**

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

UNIT – II**VELOCITY AND ACCELERATION MEASUREMENT**

Relative velocity – Translational and Rotational velocity measurement – Revolution counters and Timers - Magnetic and Photoelectric pulse counting stroboscopic methods - Accelerometers of different types - Gyroscopes.

UNIT – III**FORCE AND TORQUE MEASUREMENT**

Force measurement – Different methods –Torque measurement – Dynamometers- Gyroscopic Force and Torque Measurement – Vibrating wire Force transducer.

UNIT – IV**PRESSURE MEASUREMENT**

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

UNIT – V**FLOW MEASUREMENT**

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

2009-10**UNIT – VI****TEMPERATURE MEASUREMENT**

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

UNIT - VII**LEVEL MEASUREMENT**

Visual techniques - Float operated devices - Displacer devices - Pressure gauge method - Diaphragm box-Air purge system-Differential pressure method – Hydro-step for boiler drum Level measurement - Electrical methods - Conductive sensors - capacitive sensors – Ultrasonic Method - Point level sensors-Solid level measurement.

UNIT – VIII**OTHER MEASUREMENTS**

Nuclear Radiation Fundamentals, Radiation Detectors, Sound-Level Meter, Microphones, Time, Frequency, and Phase-Angle measurement, Liquid Level, Humidity, Chemical Composition, Particle Instruments and Clean-Room.

TEXT BOOKS:

1. Measurement Systems – Applications and Design – by Doebelin E.O., 4/e, McGraw Hill International, 1990.
2. Mechanical measurements by – A.K Shawney, Khanna publishers
3. Instrumentation by Rangan, Mani, sharma.

REFERENCES:

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

 2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR**

(9A10503) ELECTRO MAGNETIC THEORY

B.Tech. III-I Sem. (E.I.E.)	T	P	C
	4	0	4

Review of Coordinate Systems, Vector Calculus:

UNIT I

ELECTROSTATICS: Coulomb's Law, Electric Field Intensity – Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Maxwell's Two Equations for Electrostatic Fields, Energy Density, Related Problems. Convection and Conduction Currents, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations; Capacitance – Parallel Plate, Coaxial, Spherical Capacitors, Related Problems.

UNIT II

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

UNIT III

MAXWELL'S EQUATIONS (TIME VARYING FIELDS): Faraday's Law and Transformer emf, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements. Conditions at a Boundary Surface: Dielectric-Dielectric and Dielectric-Conductor Interfaces, Related Problems.

UNIT IV

EM WAVE CHARACTERISTICS - I: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations Between E & H. Sinusoidal Variations. Wave Propagation in Lossless and Conducting Media. Conductors &

2009-10

Dielectrics – Characterization, Wave Propagation in Good Conductors and Good Dielectrics. Polarization. Related Problems.

UNIT V

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

UNIT V

GUIDED WAVES: Parallel Plane Waveguides: Introduction, TE, TM, TEM Modes - Concepts and Analysis, Cut-off Frequencies, Velocities, Wavelengths, Wave Impedances. Attenuation Factor – Expression for TEM Case, Related Problems.

UNIT VII

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

UNIT VIII

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

TEXT BOOKS:

1. Elements of Electromagnetic – Matthew N.O. Sadiku, Oxford Univ. Press, 3rd ed., 2001.
2. Principles and Techniques of electromagnetic compatability-Christos Christopoulos- 2/e-CRC Press (Taylor & Francis Group)-2007.

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3. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd Edition, 2000.

REFERENCES:

1. Engineering Electromagnetics – Nathan Ida, Springer (India) Pvt. Ltd., New Delhi, 2nd ed., 2005.
2. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, TMH, 7th ed., 2006.
3. Networks, Lines and Fields – John D. Ryder, PHI, 2nd ed., 1999.
4. Transmission Lines and Networks – Umesh Sinha, Satya Prakashan (Tech. India Publications), New Delhi, 2001.
5. Electromagnetic Field Theory and Transmission Lines – G.S.N. Raju, Pearson Edn. Pte. Ltd., 2005.
6. Introduction to Electromagnetic Compatability- Clayton R.Paul – Jhon Wiley& Sons, 1992.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A10504) LINEAR & DIGITAL IC APPLICATIONS****(Common to E.I.E, E.Con.E, ECM)****B.Tech. III-I Sem. (E.I.E.)**

T	P	C
4	0	4

UNIT I

Differential Amplifier-Characteristics of OP-Amps, Integrated circuits-Types, Classification, Package Types and temperature ranges, Power supplies, Op-amp Block Diagram, ideal and practical Op-amp specifications, DC and AC characteristics, 741 op-amp & its features, FET input. Op-Amps, Op-Amp parameters & Measurement, Input & Output Offset voltages & currents, slew rates, CMRR, PSRR, drift, Frequency Compensation technique.

UNIT II**LINEAR & NON-LINEAR APPLICATIONS OF OP- AMPS:**

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

UNIT III

TIMERS & PHASE LOCKED LOOPS: Introduction to 555 timer, functional diagram, Monostable and Astable operations and applications, Schmitt Trigger. PLL - introduction, block schematic, principles and description of individual blocks, 565 PLL, Applications of PLL – frequency multiplication, frequency translation, AM, FM & FSK.

UNIT IV

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

2009-10**UNIT V**

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

UNIT VI

THE VHDL HARDWARE DESCRIPTION LANGUAGE: Design flow, program structure, types and constants, functions and procedures, libraries and packages. Structural design elements, data flow design elements, behavioral design elements, time dimension and simulation synthesis.

UNIT VII

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

UNIT VIII

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

TEXT BOOKS:

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

REFERENCES:

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

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A02503) CONTROL SYSTEMS****(Common to EEE, ECE, E Con E, EIE)****B.Tech. III-I Sem. (E.I.E.)**

T	P	C
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Objective:

In this course it is aimed to introduce to the students the principles and applications of control systems in everyday 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- 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 algebra –Signal flow graph - Reduction using Mason's gain formula.

UNIT III**TIME RESPONSE ANALYSIS**

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

2009-10**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. 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, P, PD, PI, 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 its Properties.

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, 5th edition, 2007.

REFERENCES:

1. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 5th edition, 2010.

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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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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A10505) PRINCIPLES OF COMMUNICATIONS****(Common to EIE, E Con E)****B.Tech. III-I Sem. (E.I.E.)**

T	P	C
4	0	4

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 Division Multiplexing, Frequency Division 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.

2009-10**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.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A04506) PULSE AND DIGITAL CIRCUITS LAB
(Common to ECE, E Con E, EIE)**

B.Tech. III-I Sem. (E.I.E.)	T	P	C
	0	3	2

Minimum Twelve experiments to be conducted:

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

Equipment required for Laboratories:

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

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A10507) ELECTRONIC MEASUREMENTS LAB
(Common to EIE, E Con E)****B.Tech. III-I Sem. (E.I.E.)**

T	P	C
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List of Experiments :(Minimum 10 experiments should be conducted)

1. Conversion of D' Arsonval Galvanometer into DC meters (Current and voltage)
2. Conversion of D' Arsonval Galvanometer into AC meters (Current and voltage)
3. Conversion of D' Arsonval Galvano meter into Ohm meter.
4. Measurement of RLC and Q using Q-meter
5. Measurement of strain using strain gauge
6. Measurement of R, L and C using bridge circuits.
7. RTD – characteristics.
8. LVDT – characteristics.
9. Inductive and capacitive transducers.
10. Piezoelectric transducers.
11. Bourdon tube
12. Acceleration transducer.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A10601) ANALYTICAL INSTRUMENTATION****B.Tech. III-II Sem. (E.I.E.)**

T	P	C
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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 – H₂S 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.

2009-10**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**APPLICATIONS**

Nuclear radiation detectors – Ionization chamber – GM Counter – Proportional Counter – Solid state detectors.

TEXT BOOKS:

1. Handbook of Analytical Instruments – by Khandpur. TMH.
2. Modern optical methods of analysis- by Eugene D. Olsen, McGRAW-HILL.

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.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A04602) MICROPROCESSORS AND MICROCONTROLLERS
(Common to CSE, ECE, E Con E, EIE, EEE)****B.Tech. III-II Sem. (E.I.E.)**

T	P	C
4	0	4

UNIT-I**INTRODUCTION**

Architecture of 8086 microprocessor, special functions of general purpose registers. 8086 flag register and function of 8086 flags, addressing modes of 8086, instruction set of 8086, assembler directives, simple programs, procedures and macros.

UNIT-II**ASSEMBLY LANGUAGE PROGRAMMING**

Assembly language programs involving logical, branch and call instructions, sorting, evaluation of arithmetic expressions, string manipulation.

UNIT-III**ARCHITECTURE OF 8086 & INTERFACING**

Pin diagram of 8086-Minimum mode and maximum mode of operation, Timing diagram, memory interfacing to 8086 (static RAM and EPROM). Need for DMA. DMA data transfer method. Interfacing with 8237/8257.

UNIT-IV**PROGRAMMABLE INTERFACING DEVICES**

8255 PPI-various modes of operation and interfacing to 8086, interfacing keyboard and display controller- 8279, stepper motor and actuators. D/A and A/D converter interfacing, Interrupt structure of 8086, Vector interrupt table. Interrupt service routines. Introduction to DOS and BIOS interrupts. 8259 PIC architecture and interfacing cascading of interrupt controller and its importance.

UNIT-V**SERIAL DATA TRANSFER SCHEMES**

Asynchronous and synchronous data transfer schemes. 8251 USART architecture and interfacing. TTL to RS232C and RS232C to TTL conversion. Sample program of serial data transfer. Introduction to high-speed serial communications standards, USB.

2009-10**UNIT-VI****PROGRAMMABLE INTERRUPT CONTROLLERS**

PIC 8259, Programming with 8259, Programmable interval timer 8253, Modes of 8253, Programming examples with 8253.

UNIT-VII**8051 MICROCONTROLLER AND ITS PROGRAMMING**

Architecture of micro controller-8051 Microcontroller-internal and external memories-counters and timers-synchronous serial-cum asynchronous serial communication-interrupts. Addressing modes of 8051, Instruction set of 8051, Assembly Language Programming examples using 8051.

UNIT-VIII**ADVANCED MICROCONTROLLERS**

MCS – 96 Microcontrollers: Important Features, Pin Diagram, Internal Architecture, Memory Map, Addressing Modes, Instruction set. ARM Microcontrollers: ARM Core Architecture, Versions of ARM, Important Features.

TEXT BOOKS:

1. Advanced microprocessor and peripherals-A.K. Ray and K.M.Bhurchandi, 2nd edition, TMH, 2000.
2. Microcontrollers-Deshmukh, Tata Mc-Graw Hill Edition, 2004.
3. Microcontrollers Architecture, programming, interfacing and system Design-Raj kamal, Pearson Education, 2005.

REFERENCES:

1. Microprocessors Interfacing-Douglas V.Hall, 2nd edition, 2007.
2. The 8088 and 8086 Microprocessors- Walter A. Triebel, Avtar Singh, PHI, 4th Edition, 2003.
3. Micro computer system 8066/8088 family Architecture, programming and Design-By Liu and GA Gibson, PHI, 2nd Ed.
4. 8051 Microcontroller-Internals, Instructions, Programming and Interfacing by Subrata Ghoshal, Pearson, 2010.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A04605) VLSI DESIGN
(Common to ECE, E Con E, EIE)****B.Tech. III-II Sem. (E.I.E.)**

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UNIT –I**INTRODUCTION**

Introduction to IC technology-MOS,PMOS,NMOS,CMOS and BI-CMOS technologies-oxidation, lithiography, diffusion, Ion implantation, metallisation , Encapsulation, probe testing, integrated resistors and capacitors.

UNIT-II**BASIC ELECTRICAL PROPERTIES**

Basic electrical properties of MOS and BI-CMOS circuits: I_{ds} - V_{ds} relationships, MOS transistor threshold voltage, g_m , g_{ds} , figure of merit; pass transistor, NMOS inverter, various pull-ups, CMOS inverter analysis and design, BI-CMOS inverters.

UNIT-III**VLSI CIRCUIT DESIGN PROCESSES**

VLSI design flow, MOS layers, stick diagrams, design rules and layout, 2 m CMOS design rules for wires, contacts and transistors layout diagrams for NMOS and CMOS inverters and gates, scaling of MOS circuits, limitations of scaling.

UNIT-IV**GATE LEVEL DESIGN**

Logic gates and other complex gates, switch logic, alternate gate circuits, basic circuit concepts, sheet resistance R_s and its concept to MOS, area capacitance units, calculations-(Micro)-delays, driving large capacitive loads, wiring capacitances, fan-in and fan-out, choice of layers.

UNIT-V**SUB SYSTEM DESIGN**

Sub system design, shifters, adders, ALUs, multipliers, parity generators, comparators, zero/one detectors, counters, high density memory elements.

2009-10**UNIT-VI****SEMICONDUCTOR INTEGRATED CIRCUIT DESIGN**

PLAs, FPGAs, CPLDs, standard cells, programmable array logic, design approach.

UNIT-VII**VHDL SYNTHESIS**

VHDL synthesis, circuit design flow, circuit synthesis, simulation, layout, design capture tools, design verification tools, test principles.

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 Douglas and A.pucknell, PHI, 2005 Edition.
2. Principles of CMOS VLSI design-Weste and EShraghian, Pearson Education, 1999.

REFERENCES:

1. Chip design for sub micron VLSI: CMOS layout and simulation-John P. Uyemura, Thomson Learning.
2. Introduction to VLSI circuits and systems-John P.Uyemura, John Wiley, 2003.
3. Digital Integrated circuits-John M. Rabaey, PHI, EEE, 1997.
4. Modern VLSI design-Wayne wolf, Pearson Education, 3rd Edition, 1997.
5. VLSI technology-S.M.SZE, 2nd Edition, TMH, 2003.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A05406) COMPUTER ORGANIZATION
(Common to E Con E, EIE)**

B.Tech. III-II Sem. (E.I.E.)	T	P	C
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UNIT I

BASIC STRUCTURE OF COMPUTERS: Computer Types, Functional Units, 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 AND MICROOPERATIONS: Register Transfer Language. Register Transfer, Bus and Memory Transfers, Arithmetic Microoperations, Logic Microoperations, 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

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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 of Multiprocessors, Interconnection Structures, Interprocessor Arbitration, InterProcessor Communication and Synchronization, Cache Coherence, Shared Memory Multiprocessors.

TEXT BOOKS:

1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, 5th Edition, McGraw Hill.
2. Computer Systems Architecture – M.Moris Mano, 3rd Edition, Pearson/PHI.

REFERENCES:

1. Computer Organization and Architecture – William Stallings 6th Edition, Pearson/PHI.
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson.
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, 4th Edition, Elsevier.
5. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A04603) DIGITAL SIGNAL PROCESSING
(Common to ECE, E Con E, EIE, ECM)**

B.Tech. III-II Sem. (E.I.E.)	T	P	C
	4	0	4

UNIT-I**INTRODUCTION**

Introduction to digital signal processing: discrete time signals and sequences, linear shift invariant systems, stability and causality, linear constant coefficient difference equations. Frequency domain representation of discrete time signals and systems.

UNIT-II**DISCRETE FOURIER SERIES**

Properties of discrete Fourier series, DFS representation of periodic sequences, discrete Fourier transforms: properties of DFT, linear convolution of sequences using DFT, computation of DFT. Relation between Z-Transform and DFS.

UNIT-III**FAST FOURIER TRANSFORMS**

Fast Fourier transforms (FFT)-Radix2 decimation in time and decimation in frequency FFT algorithms, inverse FFT and FFT for composite N.

UNIT-IV**REALIZATION OF DIGITAL FILTERS**

Review of Z-transforms, applications of Z-Transforms, solution of difference equations of digital filters, block diagram representation of linear constant-coefficient difference equations, basic structures of IIR systems, transposed forms, basic structures of FIR systems, system function.

UNIT-V**IIR DIGITAL FILTERS**

Analog filter approximations-Butterworth and chebyshev, design of IIR digital filters from analog filters, design examples: analog-digital transformations.

2009-10**UNIT-VI****FIR DIGITAL FILTERS**

Characteristics of FIR digital filters, frequency response. Design of FIR digital filters using window techniques, frequency sampling technique, comparison of IIR and FIR filters.

UNIT-VII**MULTIRATE DIGITAL SIGNAL PROCESSING****FUNDAMENTALS:**

Basic sample rate alteration devices, Multirate Structures for sampling rate Converters, Multistage design of decimator and Interpolator, Polyphase Decomposition, Nyquist filters.

UNIT-VIII**APPLICATIONS OF DIGITAL SIGNAL PROCESSING:**

Spectral analysis of nonstationary Signals, Musical Sound processing, signal Compression, Transmultiplexers, Discrete Multitone Transmission of digital data.

TEXT BOOKS:

1. Digital signal processing, principles, Algorithms and applications: John G.Proakis, Dimitris G. Manolakis, Pearson Education/PHI, 2007.
2. Digital signal processing, A computer base approach- Sanjit K Mitra, Tata McGraw Hill 3rd Edn, 2009.
3. Discrete Time Signal Processing-A.V. Oppenheim and R.W. Schaffer, PHI.

REFERENCES:

1. Digital signal processing: Andreas Antoniou, TATA McGraw Hill, 2006.
2. A Text book on Digital Signal processing – R S Kaler, M Kulkarni,, Umesh Gupta, I K International Publishing house Pvt.Ltd.
3. Digital signal processing: MH Hayes, Schaum's outlines, TATA McGraw Hill, 2007.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A10602) PROCESS CONTROL INSTRUMENTATION****(Common to EIE, E Con E)****B.Tech. III-II Sem. (E.I.E.)**

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UNIT I**INTRODUCTION TO PROCESS CONTROL**

Definition-Elements of process control-Process variables-degree of freedom- Characteristics of liquid system, gas system and thermal system- Mathematical model of liquid process, gas process, thermal process- Batch process and continuous process- Self regulation.

UNIT II**BASIC CONTROL ACTIONS**

Characteristics of ON-OFF, proportional, integral, derivative control modes, composite control modes – PC, PI and PID modes- two position control- Single speed floating control – Ziegler Nichols method.

UNIT III**MEASURING ELEMENTS**

Types of measuring means-Temperature elements-liquid level measurements – fluid flow measurements-pneumatic transmission-electric transmission-first order and second order response to measuring elements.

UNIT IV**CONTROLLING ELEMENTS**

Self operated controllers –pneumatic proportional controllers (displacement and force type)-Air supply for pneumatic systems-Hydraulic controllers-Electrical proportional controllers-Electronic proportional controllers-Theory of automatic controllers circuits.

UNIT V**ADVANCED CONTROL TECHNIQUES**

Ratio control systems – Dynamic compensatory-adding feedback-principle areas of feed forward control - Economic considerations. Properties of inner loop , External feedback –Tuning cascade controllers

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, Final Control Elements - Pneumatic actuators–Electro-pneumatic actuators–Hydraulic actuators –Electric motor actuators–Two position motor actuators –Sliding steam control valves- Rotating shaft control valves-control valve sizing. Applications of Process Control.

UNIT VI

ENERGY TRANSFER

Heat transfer-heat exchangers without phase change-Boiling liquids and condensing vapors-combustion control of fuel and air –fired heaters – steam plant control systems –drum level control-drum pressure control-steam temperature control.

UNIT VII

CHEMICAL REACTIONS AND CONVERSIONS

Principles of governing the conduct of reactions-chemical equilibrium-reaction rate- Stability of exothermic reactors – continuous reactors-appointing reactant flows temperature control-maximizing procedure-controlling conversion.

UNIT VIII

MASS TRANSFER OPERATIONS

Modeling the process- relative gain analysis-configuring the controls composition – Feedback pressure control methods – controlling at constraints – side steam columns material –balance control –vapor compression – Evaporation barometric condensers – rate of drying inferential controls-optimum air flow - Nuclear power plant & Operations.

TEXT BOOKS:

1. Automatic Process Control- Donal.P.Eckman (Wiley Eastern).
2. Process Control- Peter Harriot for units (T.M.H).

REFERENCES:

1. Process Control Systems –F.G Shirskey (Mc Graw Hill).
2. Instrument Engineering Hand Book- Liptak & Venezel (Chilton Randor).

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3. Process system analysis and control by D.R Coughanowr, 2nd edition McGraw Hill.
4. Chemical Process control by G.Stephaonopolom, PHI Publications (1998).

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A04505) LINEAR & DIGITAL IC APPLICATIONS LAB
(Common to E Con E, EIE)****B.Tech. III-II Sem. (E.I.E.)**

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Minimum Twelve Experiments to be conducted:**Part A (IC Application Lab):**

1. OP AMP Applications – Adder, Subtractor, Comparator Circuits.
2. Active Filter Applications – LPF, HPF (first order).
3. Function Generator using OP AMPs.
4. IC 555 Timer – Monostable and Astable Operation Circuit.
5. IC 566 – VCO Applications.
6. Voltage Regulator using IC 723.
7. 4 bit DAC using OP AMP.

Part B (ECAD Lab):

Simulate the internal structure of the following Digital IC's using VHDL / VERILOG and verify the operations of the Digital IC's (Hardware) in the Laboratory

1. Logic Gates- 74XX.
2. Half Adder, Half Subtractor, Full Adder, Full Subtractor & Ripple Carry Adder.
3. 3-8 Decoder -74138 & 8-3 Encoder- 74X148.
4. 8 x 1 Multiplexer -74X151 and 2x4 Demultiplexer-74X155.
5. 4 bit Comparator-74X85.
6. D Flip-Flop 74X74.
7. JK Flip-Flop 74X109.
8. Decade counter-74X90.
9. Universal shift register -74X194.

Equipment required for Laboratories:

1. RPS
2. CRO
3. Function Generator
4. Multi Meters
5. IC Trainer Kits (Optional)

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6. Bread Boards
7. Components: - IC741, IC555, IC566, 7805, 7809, 7912 and other essential components.
8. Analog IC Tester

For Software Simulation

1. Computer Systems
2. LAN Connections (Optional)
3. Operating Systems
4. VHDL/ VERILOG
5. FPGAS/CPLDS (Download Tools)

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9AHS601) ADVANCED ENGLISH LANGUAGE
COMMUNICATION SKILLS LAB
(Common to ECE, E Con E, ECM, EIE, EEE, ME, AE)****B.Tech. III-II Sem. (E.I.E.)**

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1. Introduction

The Advanced English Language Skills Lab introduced at the 3rd year B.Tech level is considered essential for the student for focusing on his/her career. At this stage it is imperative for the student to start preparing for the ever growing competition in the job market. In this scenario, in order to be on par with the best, he/she needs to improve his/her Communication and soft skills

This course focuses on the practical aspects of English incorporating all the four (LRSW) skills relevant to the requirements of the prospective employers in view of globalization. The proposed course will enable the students to perform the following:

- Intensive reading to improve comprehension and communication
- Attentive listening for better understanding
- Write project/research/technical reports
- Write Resume' to attract attention
- Discuss ideas / opinions for better solutions
- Face interviews confidently
- Gather information, organize ideas, and present them effectively before an audience
- To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required ability to face computer-based competitive exams such GRE, TOEFL, CAT, GMAT etc.

2. Objectives:

Keeping in mind the previous exposure of the student to English, this lab focuses on improving the student's proficiency in

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English at all levels. The lab intends to train students to use language effectively, to participate in group discussions, to help them face interviews, and sharpen public speaking skills and enhance the confidence of the student by exposing him/her to various situations and contexts which he/she would face in his/her career

3. Syllabus

The following course content is prescribed for the Advanced Communication Skills Lab:

Reading Comprehension -- Reading for facts, guessing meanings from context, speed reading, scanning, skimming for building vocabulary(synonyms and antonyms, one word substitutes, prefixes and suffixes, idioms and phrases.)

Listening Comprehension-- Listening for understanding, so as to respond relevantly and appropriately to people of different backgrounds and dialects in various personal and professional situations.

Technical Report Writing—Types of formats and styles, subject matter, organization, clarity, coherence and style, data-collection, tools, analysis

Resume' Writing—Structure, format and style, planning, defining the career objective, projecting one's strengths, and skills, creative self marketing, cover letter

Group Discussion-- Communicating views and opinions, discussing, intervening, providing solutions on any given topic across a cross-section of individuals,(keeping an eye on modulation of voice, clarity, body language, relevance, fluency and coherence) in personal and professional lives.

Interview Skills—Concept and process, pre-interview planning, mannerisms, body language, organizing, answering strategies, interview through tele and video-conferencing

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Technical Presentations (Oral)— Collection of data, planning, preparation, type, style and format ,use of props, attracting audience, voice modulation, clarity, body language, asking queries.

4. Minimum Requirements

The English Language Lab shall have two parts:

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.

The Communication Skills Lab with movable chairs and audio-visual aids with a P.A System, a TV, A digital stereo-audio and video system, Camcorder etc

System Requirement (Hardware Component):

Computer network with LAN with a minimum of 60 multimedia systems with the following specifications:

P-IV Processor, Speed-2.8 GHz, RAM 512 MB minimum, Hard Disk-80 GB, Headphones

Prescribed Software: GLOBARENA

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. **Technical writing and professional communication, Huckin and Olsen** Tata Mc Graw-Hil 2009.
2. **Speaking about Science, A Manual for Creating Clear Presentations by Scott Morgan and Barrett Whitener, Cambridge University press, 2006**
3. **Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/Cambridge University Press.**
4. **Handbook for Technical Writing** by David A McMurrey & Joanne Buckely CENGAGE Learning 2008
5. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
6. **The ACE of Soft Skills** by Gopal Ramesh and Mahadevan Ramesh, Pearson Education, 2010

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7. **Cambridge English for Job-Hunting** by Colm Downes, Cambridge University Press, 2008
8. **Resume's and Interviews** by M.Ashraf Rizvi, Tata Mc Graw-Hill, 2008
9. **From Campus To Corporate** by KK Ramachandran and KK Karthick, Macmillan Publishers India Ltd, 2010
10. **English Language Communication : A Reader cum Lab Manual** Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
11. **Managing Soft Skills** by K R Lakshminarayan and T.Muruguvel, Sci-Tech Publications, 2010
12. **Business Communication** by John X Wang, CRC Press, Special Indian Edition, 2008

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A04701) EMBEDDED REALTIME OPERATING SYSTEMS
(Common to ECE, CSSE, E Con E, EIE)**

B.Tech. IV-I Sem. (E.I.E.)	T	P	C
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UNIT I**INTRODUCTION**

History of Embedded Systems, Major Application Areas of Embedded Systems, Purpose of Embedded Systems, Core of the Embedded System, Sensors and Actuators, Communication Interface, Embedded Firmware.

UNIT II**HARDWARE SOFTWARE Co-DESIGN and PROGRAMME
MODELLING**

Characteristics of an Embedded System, Quality Attributes of Embedded Systems, Fundamental Issues in Hardware Software Co-Design, Computational Models in Embedded Design, Introduction to Unified Modeling Language (UML), Hardware Software Trade-offs.

UNIT III**EMBEDDED HARDWARE DESIGN AND DEVELOPMENT**

Analog Electronic Components, Digital Electronic Components, VLSI and Integrated Circuit Design, Electronic Design Automation (EDA) Tools, Embedded Firmware Design Approaches, Embedded Firmware Development Languages.

UNIT IV**REAL-TIME OPERATING SYSTEMS (RTOS) BASED
EMBEDDED SYSTEM DESIGN**

Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling, Threads, Processes and Scheduling :Putting them Altogether, Task Communication, Task Synchronization, Device Drivers, How to Choose an RTOS.

2009-10**UNIT V****DEVICES AND COMMUNICATION BUSES FOR DEVICES NETWORK**

IO Types and Examples, Serial Communication Devices, Parallel Device Ports, Sophisticated Interfacing Features in Device Ports, Wireless Devices, Timer and Counting Devices, Watchdog Timer, Real Time Clock, Networked Embedded Systems, Serial Bus Communication Protocols, Parallel Bus Device Protocols- Parallel Communication Network Using ISA, PCI, PCI-X and Advanced Buses, Internet Enabled Systems- Network Protocols, Wireless and Mobile System Protocols.

UNIT VI**PROGRAM MODELING CONCEPTS**

Program Models, DFG Models, State Machine Programming Models for Event-controlled Program Flow, Modeling of Multiprocessor Systems, UML Modeling.

UNIT VII**REAL TIME OPERATING SYSTEMS**

OS Services, Process Management, Timer .Functions, Event Functions, Memory Management, Device, File and IO Subsystems Management, Interrupt Routines in RTOS Environment and Handling of Interrupt Source Calls, Real-time Operating Systems, Basic-Design an RTOS, RTOS Task Scheduling Models, Interrupt Latency and Response of the Tasks as Performance Matrices, OS Security Issues.

UNIT VIII**DESIGN EXAMPLES AND CASE STUDIES OF PROGRAM MODELING AND PROGRAMMING WITH RTOS-2**

Case study of Communication between Orchestra Robots, Embedded Systems in Automobile, Case study of an Embedded System for an Adaptive Cruise Control(ACC) System in a Car, Case study of an Embedded System for a Smart Card, Case study of a Mobile Phone Software for Key Inputs.

2009-10**TEXT BOOKS:**

1. Introduction to Embedded System- Shibu KV, Mc-Graw Hill Higher Edition.
2. Embedded Systems Architecture, Programming and Design- Raj Kamal, 2nd Edition, McGraw-Hill Companies.
3. Embedded System Design by Peter Marwedel, Springer.

REFERENCES:

1. Embedded System Design – A Unified Hardware/Software Introduction-Frank Vahid, Tony D. Givargis, John Wiley, 2002.
2. Embedded/ Real Time Systems-KVKK Prasad, Dreamtech Press, 2005.
3. An Embedded Software Primer- David E. Simon, Pearson Ed. 2005.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A10701) AUTOMATION OF INDUSTRIAL PROCESSES****B.Tech. IV-I Sem. (E.I.E.)**

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UNIT – I**INTRODUCTION TO COMPUTER CONTROL**

Role of computers in the control of Industrial processes (plants). Elements of Computer Controlled Process / Plant. Classification – Batch, Continuous, Supervisory and Direct Digital Controls. Architecture – Centralized, Distributed and Hierarchical Systems. Man Machine or Human Computer Interface (HCI).

UNIT – II**BUILDING BLOCKS**

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

UNIT – III**CONTROL SYSTEM DESIGN -I**

Control System Design – Heuristics, Structural Controllability and Relative Gain Array. Controller Design – Regulator design and other design considerations. Controller Tuning – P, PI, PID, and Ziegler-Nicholas method, Computer aided Control System Design.

UNIT – IV**CONTROL SYSTEM DESIGN –II**

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

UNIT – V**DESIGN OF FEED FORWARD CONTROLLER**

Block Diagram, Feed Forward control algorithms – dynamic, static, Deadbeat.

2009-10**UNIT – VI****CASCADE, PREDICTIVE AND ADAPTIVE CONTROL**

Cascade Control – Dynamic response, Types, Implementation.
Predictive Control – Model based and Multivariable System. Adaptive Control – Adjustment, Schemes, and Techniques.

UNIT – VII**ADVANCED STRATEGIES**

Inferential Control. Intelligent Control. Statistical Process Control. Algorithms for Processes with Dead Time – Smith Predictor (SP), Analytical Predictor (AP), Optimal Control.

UNIT – VIII**DISTRIBUTED DIGITAL CONTROL**

Programmable logic controllers (PLC)- Architecture , Selection. Overview of Distributed Digital Control System (DCS). DCS Software configuration. DCS Communication – Data Highway. DCS Supervisory computer Tasks. DCS Integration with PLCs and Computers.

TEXT BOOKS:

1. Computer Aided Process Control – S.K.Singh. PHI, 2004.
2. Computer Control of Processes – M.Chidambaram. Narosa 2003.

REFERENCES:

1. Computer-based Industrial Control by Krishna Kanth. PHI, 1997.
2. Real Time Control: An Introduction – second edition - S.Bennett, Pearson Education India 2003.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR**

**(9A10702) RELIABILITY ENGINEERING
(Common to EIE, E Con E)**

B.Tech. IV-I Sem. (E.I.E.)	T	P	C
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UNIT – I

BASICS OF PROBABILITY THEORY AND DISTRIBUTIONS

Basic Probability theory – Binomial, Poisson, Exponential and Weibull distributions.

UNIT – II

NETWORK MODELING AND RELIABILITY ANALYSIS

Analysis of series, Parallel, Series – Parallel networks, fully redundant and Partially redundant systems (K – out – of m) systems – use and types of redundancy and system reliability improvement methods.

UNIT – III

RELIABILITY FUNCTIONS

Reliability functions $f(t)$, $F(t)$, $h(t)$, $R(t)$ and their relationships, Expected value and Standard Deviation of exponential distribution – Bath Tub Curve – Reliability measures MTTF, MTTR, MTBF.

UNIT – IV

MARKOV MODELING

Markov Concepts – Markov chains – Concept of stochastic transitional probability matrix, Evaluation of limiting state probabilities – Markov processes – one component repairable systems – Time dependent probability evaluation – Evaluation of limiting state probabilities.

UNIT – V

MAINTAINABILITY - BASIC CONCEPTS

Definition, Basic concepts, Relationship between Reliability, Maintainability, Availability – corrective maintenance time distributions – Maintainability distributions.

2009-10**UNIT – VI****MAINTAINABILITY MEASURES**

Objectives, types of maintenance – Preventive, condition – based and reliability centered maintenance – Terotechnology, total productive maintenance (TPM).

UNIT – VII**MAINTAINABILITY – DESIGN ASPECTS**

Design considerations for maintainability – Introduction to Life testing, Estimation of parameters for exponential and Weibull distributions.

UNIT – VIII**SAFETY**

Causes of failure and reliability, Human reliability and operator training, Origins of Consumerism and importance of product knowledge, product safety, product reliability and product safety improvement program.

TEXT BOOKS:

1. Reliability Engineering, E. Balagurusamy.
2. An introduction to Reliability and Maintainability Engineering, Charles E. Ebeling, Tata McGraw Hill Edition.

REFERENCES:

1. Maintainability, B.S.Blanchard.
2. Introduction to Reliability Engineering by Sinha and Kale, Wiley Eastern.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9AHS701) MANAGEMENT SCIENCE
(Common to ECE, E Con E, EIE)****B.Tech. IV-I Sem. (E.I.E.)**

T	P	C
4	0	4

UNIT I**INTRODUCTION TO MANAGEMENT:**

Concepts of Management and organization- nature, importance and Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Mayo's Hawthorne Experiments, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation, Systems Approach to Management, Leadership Styles, Social responsibilities of Management.

UNIT II**DESIGNING ORGANIZATIONAL STRUCTURES:**

Basic concepts related to Organisation - Departmentation and Decentralisation, Types of mechanistic and organic structures of organisation (Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, Virtual Organisation, Cellular Organisation, team structure, boundaryless organization, inverted pyramid structure, 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.

2009-10**UNIT IV****MATERIALS MANAGEMENT:**

Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records.

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

UNIT V**HUMAN RESOURCES MANAGEMENT (HRM):**

Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs. PMIR, 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, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

UNIT VIII**CONTEMPORARY MANAGEMENT PRACTICES:**

Basic concepts of MIS, End User Computing, Materials Requirement Planning (MRP), Just-In-Time (JIT) System, Total Quality Management (TQM), Six sigma and Capability Maturity Model (CMM) Levels, Supply Chain Management, Enterprise Resource Planning (ERP), Performance Management, Business Process outsourcing (BPO), Business Process Re-engineering and Bench Marking, Balanced Score Card.

2009-10**TEXT BOOKS:**

1. Aryasri: Management Science, TMH, 2004.
2. Stoner, Freeman, Gilbert, Management, 6th Ed, Pearson Education, New Delhi, 2004.

REFERENCES:

1. Kotler Philip & Keller Kevin Lane: Marketing Mangement 12/e, PHI, 2005.
2. Koontz & Weihrich: Essentials of Management, 6/e, TMH, 2005.
3. Thomas N.Duening & John M.Ivancevich Management—Principles and Guidelines, Biztantra, 2003.
4. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2004.
5. Memoria & S.V.Gauker, Personnel Management, Himalaya, 25/e, 2005
6. Samuel C.Certo: Modern Management, 9/e, PHI, 2005
7. Schermerhorn, Capling, Poole & Wiesner: Management, Wiley, 2002.
8. Parnell: Strategic Management, Biztantra, 2003.
9. Lawrence R Jauch, R.Gupta & William F.Glueck: Business Policy and Strategic Management, Frank Bros., 2005.
10. L.S.Srinath: PERT/CPM, Affiliated East-West Press, 2005.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A13701) ROBOTICS AND AUTOMATION
(Common to EIE, E Con E)
(ELECTIVE -I)****B.Tech. IV-I Sem. (E.I.E.)**

T	P	C
4	0	4

UNIT – I**BASIC CONCEPTS**

Automation and Robotics – An over view of Robotics – present and future applications – classification by coordinate system and control system, Dynamic stabilization of Robotics.

UNIT – II**POWER SOURCES AND SENSORS**

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

UNIT – III**MANIPULATORS**

Construction of Manipulators, Manipulator Dynamic and Force Control, Electronic and Pneumatic manipulators.

UNIT – IV**ACTUATORS AND GRIPPERS**

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

UNIT – V

Differential transformation and manipulators, Jacobians – problems. Dynamics: Lagrange – Euler and Newton – Euler formations – Problems.

2009-10**UNIT VI****KINEMATICS**

Forward and Inverse Kinematic Problems, Solutions of Inverse Kinematic problems, Multiple Solution, Jacobian Work Envelop – Hill Climbing Techniques.

UNIT VII**PATH PLANNING**

Trajectory planning and avoidance of obstacles, path planning, Skew motion, joint integrated motion – straight line motion – Robot programming, languages and software packages.

UNIT VIII**CASE STUDY**

Multiple Robots – Machine Interface – Robots in Manufacturing and Non- Manufacturing applications – Robot Cell Design Selection of a Robot.

TEXT BOOKS:

1. Industrial Robotics / Groover M.P / Pearson Edu.
2. Robotics / Fu K S / McGraw Hill.

REFERENCES:

1. Robotics, CSP Rao and V.V. Reddy, Pearson Publications (In press).
2. Robotics and Control / Mittal R K & Nagrath I J / TMH.
3. An Introduction to Robot Technology, / P. Coiffet and M. Chaironze / Kogam Page Ltd, 1983, London.
4. Robotic Engineering / Richard D. Klafter, Prentice Hall.
5. Robot Analysis and Intelligence / Asada and Slow time / Wiley Inter-Science.
6. Introduction to Robotics / John J Craig / Pearson Edu.
7. Robot Dynamics and Control by Mark W. Spong and M. Vidyasagar, John Wiley & Sons.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A05505) OPERATING SYSTEMS
(Common to ECE, E Con E, EIE)
(ELECTIVE – I)****B.Tech. IV-I Sem. (E.I.E.)**

T	P	C
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UNIT I**OPERATING SYSTEMS OVERVIEW:**

Operating systems functions, Overview of computer operating systems, protection and security, distributed systems, special purpose systems, operating systems structures: operating system services and systems calls, system programs, operating system structure, operating systems generation.

UNIT II**PROCESS MANAGEMENT:**

Process concepts, threads, scheduling-criteria, algorithms, their evaluation, Thread scheduling, case studies UNIX, Linux, Windows.

UNIT III**CONCURRENCY:**

Process synchronization, the critical-section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Synchronization examples, atomic transactions. Case studies UNIX, Linux, Windows.

UNIT IV**MEMORY MANAGEMENT:**

Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, page-replacement, algorithms, Allocation of frames, Thrashing case studies UNIX, Linux, Windows.

2009-10**UNIT V****PRINCIPLES OF DEADLOCK:**

System model, deadlock characterization, deadlock prevention, detection and avoidance, recovery from deadlock.

UNIT VI**FILE SYSTEM INTERFACE:**

The concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection. File System implementation: File system structure, file system implementation, directory implementation, allocation methods, free-space management, efficiency and performance, case studies UNIX, Linux, Windows.

UNIT VII**MASS-STORAGE STRUCTURE:**

Overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, swap-space management, RAID structure, stable-storage implementation, Tertiary storage structure. I/O systems: Hardware, application I/O interface, kernel I/O subsystem, Transforming I/O requests to Hardware operations, STREAMS, performance.

UNIT VIII**PROTECTION:**

Protection, Goals of Protection, Principles of Protection, Domain of protection Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability- Based systems, Language – Based Protection, Security: The Security problem, program threats, system and network threats cryptography as a security tool, user authentication, implementing security defenses, firewalling to protect systems and networks, computer –security classifications, case studies UNIX, Linux, Windows.

TEXT BOOKS:

1. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne, 8th edition, John Wiley.
2. Operating systems- A Concept based Approach-D.M.Dhamdhare, 2nd Edition, TMH.

2009-10**REFERENCES:**

1. Operating Systems – Internals and Design Principles, Stallings, 6th edition–2009, Pearson education.
2. Modern Operating Systems, Andrew S Tanenbaum 2nd edition, PHI.
3. Operating Systems, S. Haldar, A.A. Aravind, Pearson education.
4. Principles of Operating Systems, B.L. Stuart, Cengage learning, India Edition.
5. Operating Systems, A.S. Godbole, 2nd Edition, TMH.
6. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
7. Operating Systems, G. Nutt, N. Chaki and S. Neogy, 3rd Edition, Pearson Education.
8. Operating Systems, R. Elmasri, A.G. Carrick and D. Levine, McGraw Hill.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A10703) NUCLEAR INSTRUMENTATION
(ELECTIVE – I)****B.Tech. IV-I Sem. (E.I.E.)**

T	P	C
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UNIT-I**GENERAL**

Introduction to Properties of Nuclear Systems & Radiation, Interaction of radiation with matter, Radioactive sources- choice of isotopes.

UNIT-II**RADIATION DETECTORS-I**

Ionization chamber, Geiger Muller counters, Scintillation counters, Semi conductor devices, Neutron detectors based on recoil measuring circuits including modulators.

UNIT-III**RADIATION DETECTORS-II**

Converters & stabilizers, Synchronous detectors, Counting statistics, correlation sets, standard deviation of ratio meters, error propagation, effect of background, statistical distribution of pulse height distribution, detector efficiency.

UNIT-IV**NUCLEAR REACTOR INSTRUMENTATION:**

Diffusion, moderation, absorption and delay processes, neutron flux, control rod calibration, nuclear fuel inspection and testing including poisoning, radiation energy measurement, remote control instrumentation, nuclear instrument maintenance.

UNIT-V**APPLICATION OF INDUSTRIAL SYSTEM-I**

a) Radioactive tracer technique- gas & liquid flow measurement, level detector, residence time & its distribution, application to blending corrosion & wear studies.

2009-10

- b) Thickness & density measurement by beta rays, gamma rays absorption technique, measurement of thickness of surface material by back scattering.
- c) Level detection by radioactive devices, interface detection by neutron moderation technique.

UNIT-VI**APPLICATION OF INDUSTRIAL SYSTEM-II**

- a) Measurement of gas pressure and gas analyzers, spectroscopy and frequency methods.
- b) Void detection idity meter, moisture meter, smoke detection, ozoniser, radio chromatography and interferometer.
- c) Portable instruments, source activity for dynamic properties of instruments

UNIT – VII**NUCLEAR POWER PLANT INSTRUMENTATION:**

Piping and instrumentation diagram of different types of nuclear power plants-radiation detection instruments process sensors for nuclear power plants-spectrum analyzers-nuclear reactor control systems and allied instrumentation.

UNIT- VIII**SAFETY**

Hazards of ionization radiation, physiological effect of radiation, dose and risk radiological protection (alpha, beta and gamma, X, neutron) - shielding material and effectiveness. Operational safety instrument, emergency schemes, effluent disposal, application to medical diagnosis and treatment.

TEXT BOOKS:

1. Vashtell, C.C, S.G Hewit Nucleonic instrumentation, Newnes, 1965.
2. A.Sherryet. Al. (Editors), Modern power station practice, Vol.6 (Instrumentation controls and testing), Pergamon Press, 1971.

2009-10**REFERENCES:**

1. Bela G.Liptak: Instrumentation in the process industries, volume 1 & 2, Chilton Book CO, 1973.
2. Modern Instrumentation and control for nuclear power plants: A guide book, INTERNATIONAL ATOMIC ENERGY AGENCY, VIENNA, 1999.
3. J.J. Duderstadt and L.J. Hamilton, Nuclear Reactor Analysis, John Wiley, New York, 1976.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A10704) EMI & EMC
(ELECTIVE – II)****B.Tech. IV-I Sem. (E.I.E.)**

T	P	C
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UNIT I

INTRODUCTION: History and concept of EMI, Definitions of EMI/EMC, Electro magnetic environment, Practical experiences and concerns, frequency spectrum conservations, mechanisms of EMI generation, EMI testing, Methods of elimination of EMI and Biological effects of EMI.

UNIT II

NATURAL AND MANMADE SOURCES OF EMI/EMC: Sources of Electromagnetic noise, typical noise paths, modes of noise coupling, designing for EM compatibility, lightening discharge, electro static discharge (ESD), electro magnetic pulse (EMP).

UNIT III

EMI FROM APPARATUS / CIRCUITS AND OPEN AREA TEST SITES: Electromagnetic emissions, noise from relays and switches, non-linearities in circuits, passive inter modulation, transients in power supply lines, EMI from power electronic equipment, EMI as combination of radiation and conduction, open area test sites: OATS measurements, measurement precautions.

UNIT IV

RADIATED INTERFERENCE MEASUREMENTS: Anechoic chamber, TEM cell, reverberating chamber, GTEM cell, comparison of test facilities.

UNIT V

CONDUCTED INTERFERENCE MEASUREMENT: Characterization of conduction currents / voltages, conducted EM noise and power lines, conducted EMI from equipment, immunity to conducted EMI, characteristics of EMI filters and power line filter design.

2009-10**UNIT VI**

GROUNDING AND CABLING: Safety and signal grounds, low and high frequency grounding methods, grounding of amplifiers and cable shields, isolation, neutralizing transformers, shield grounding at high frequencies, digital grounding, types of cables, mechanism of EMI emission / coupling in cables.

UNIT VII

SHIELDING AND BONDING: Effectiveness of shielding, near and far fields / impedances, methods of analysis, total loss due to absorption and reflection effects, composite absorption and reflection losses for electric fields / magnetic fields, magnetic materials as a shield, shield discontinuities, slots and holes, seams and joints, conductive gaskets Electrical Bonding, Shape and Material for Bond straps, General Characteristics of good bonds.

UNIT VIII

COMPONENTS FOR EMC AND EMC STANDARDS: Choice of capacitors, inductors, transformers and resistors, EMC design components National / International EMC standards, military and civilian standards.

TEXT BOOKS:

1. Engineering Electromagnetic Compatibility by Dr. V.P. Kodali, IEEE Publication, Printed in India by S. Chand & Co. Ltd., New Delhi, 2000.
2. Electromagnetic Interference and Compatibility IMPACT series, IIT-Delhi, Modules 1-9.

REFERENCES:

1. Introduction to Electromagnetic Compatibility, Ny, John Wiley, 1992, by C.R. Pal.
2. Radar hand book by Skolink, McGraw HILL.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A05506) COMPUTER NETWORKS
(Common to ECE, EIE)
(ELECTIVE – II)**

B.Tech. IV-I Sem. (E.I.E.)	T	P	C
	4	0	4

UNIT I

Introduction: Network Hardware, Network Software, References Models. The Physical Layer: The Theoretical Basis for Data Communication Guided Transmission Media, Communication Satellites, The public Switched Telephone Network- The Local Loop: Modern ADSL, and wireless, Trunks and Multiplexing, Switching.

UNIT II

The Data Link Layer: Data link Layer Design Issues, Elementary Data Link Protocols, Sliding Window Protocols.

UNIT III

The Medium Access Control Sublayer: The Channel allocation Problem, Multiple Access protocols, Ethernet- Ethernet Cabling, Manchester Encoding, The Ethernet MAC Sublayer Protocol. The Binary Exponential Backoff Algorithm, Ethernet Performance, Switched Ethernet, Fast Ethernet. Wireless Lans- The 802.11 Protocol Stack, The 802.11 Physical Layer, The 802.11 MAC SubLayer Protocol, The 802.11 Frame Structure .

UNIT IV

The Network Layer: Network Layer Design Issues, Routing Algorithms, Congestion Control Algorithms.

UNIT V

Internetworking, The Network Layer in the Internet.

UNIT VI

The Transport Layer: The Transport Service, Elements of Transport Protocols, The Internet Transport Protocols: UDP, The Internet Transport Protocols: TCP.

2009-10

UNIT VII

The Application Layer: DNS-The Domain Name System, Electronic Mail. The World Wide Web, Multimedia.

UNIT VIII

Network Security: Cryptography, Symmetric-Key Algorithms, Public-Key Algorithms, Digital Signatures.

TEXT BOOKS:

1. Computer Networks, Andrew S. Tanenbaum, 4e, Pearson Education.

REFERENCES:

1. Computer Communications and Networking Technologies, Michael A. Gallo, William M. Hancock, Cengage Learning.
2. Computer Networks-Principles, Technologies and Protocols for Network Design, Natalia Olifer, Victor Olifer, Wiley India.
3. Data Communications and Networking, Behrouz A. Forouzan, 4th Edition, Tata McGraw Hill.
4. Understanding Communications and Networks, 3rd Edition, W.A.Shay, Cengage Learning.
5. Computer and Communication Networks ,Nader F. Mir, Pearson Education
6. Computer Networking: A Top-Down Approach Featuring the Internet, James F.Kurose, K.W.Ross, 3rd Edition, Pearson Education.
7. Data and Computer Communications, G.S.Hura and M.Singhal, CRC Press, Taylor and Francis Group.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A10705) POWER PLANT INSTRUMENTATION
(Common to EIE, E Con E)
(ELECTIVE -II)****B.Tech. IV-I Sem. (E.I.E.)**

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4	0	4

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.

2009-10**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.

REFERENCES:

1. Standard Boiler Operations - Questions and Answers – by Elonka S.M., and Kohal A.L., TMH, New Delhi, 1994.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A10706) ELECTRONIC DESIGN AND AUTOMATION LAB
(Common to EIE, ECM)****B.Tech. IV-I Sem. (E.I.E.)**

T	P	C
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ANALOG CIRCUIT SIMULATION:

Design and simulate the following experiments using Multisim or Pspice or equivalent simulation software.

1. Common Emitter and Common Source Amplifier.
2. Two stage RC Coupled Amplifier.
3. Any two of the following:
 - (i). Current Series Feedback amplifier.
 - (ii). Voltage Series Feedback amplifier.
 - (iii). Voltage Shunt Feedback amplifier.
 - (iv). Current Shunt Feedback amplifier.
4. RC Phase Shift Oscillator.
5. Class A / Class B Power Amplifier.
6. High Frequency Common Base (BJT) / Common Gate (JFET) amplifier.

LINEAR INTEGRATED CIRCUITS SIMULATION:

1. Pspice modeling of Inverting Summing Amplifier.
2. Pspice modeling of Instrumentation Amplifier using Op-Amp.
3. Pspice modeling of Triangular Waveform generator.
4. Pspice modeling and simulation of the absolute value output circuit using Op-Amp.
5. Pspice modeling of Astable Multivibrator using 555 Timer.
6. Pspice modeling of Zero-cross detector.
7. Pspice modeling of A/D Converter using Op-Amp.
8. Pspice modeling of D/A Converter using Op-Amp.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A10707) PROCESS CONTROL LAB****B.Tech. IV-I Sem. (E.I.E.)**

T	P	C
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(Minimum 10 experiments should be conducted)

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

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A10801) PC BASED INSTRUMENTATION****B.Tech. IV-II Sem. (E.I.E.)**

T	P	C
4	0	4

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 USING THE COMMAND LINE INTERFACE:**

Assembly language programming; C and C++ 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.

2009-10**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. Computer Control of Processes – M.Chidambaram. Narosa 2003.

REFERENCES:

1. PC Based Instrumentation and Control Third Edition by Mike Tooley, Elsevier.
2. PC Interfacing and Data Acquisition Techniques for Measurement, Instrumentation and Control. By Kevin James Elsevier.
3. Practical Data Acquisition for Instrumentation and Control Systems by John Park and Steve Mackay.
4. Distributed Control Systems, Lukcas M.P, Van Nostrand Reinhold Co., New York, 1986.
5. Programmable Logic Controllers, Second edition, Frank D. Petruzella, McGraw Hill, Newyork, 1997.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A10802) BIO-MEDICAL INSTRUMENTATION
(Common to EIE, E Con E)**

B.Tech. IV-II Sem. (E.I.E.)	T	P	C
	4	0	4

UNIT I

Components of Medical Instrumentation System, Bio – amplifier, 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 neuro-muscular 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, Therapeutic equipment, Pacemaker, Defibrillator, Shortwave diathermy, Hemodialysis machine.

UNIT VI

Neuro-Muscular Instrumentation Specification of EEG and EMG machines, Electrode placement for EEG and EMG recording, Interpretation of EEG and EMG.

2009-10**UNIT VII**

Respiratory Instrumentation Mechanism of respiration, Spirometry, Pneumotachograph Ventilators.

UNIT VIII

Patient electrical safety, types of hazards, natural protective mechanism, leakage current, patient isolation, hazards in operation rooms, grounding conditions in hospital environment.

TEXT BOOKS:

1. Biomedical Instrumentation and Measurements – Leslie Cromwell and F.J. Weibell, E.A. Pfeiffer, PHI, 2nd Ed, 1980.
2. Medical Instrumentation, Application and Design – John G. Webster, John Wiley, 3rd Ed., 1998.

REFERENCES:

1. Principles of Applied Biomedical Instrumentation – L.A. Geddes and L.E. Baker, John Wiley, 1975.
2. Hand-book of Biomedical Instrumentation – R.S. Khandpur, TMH, 2nd Ed., 2003.
3. Biomedical Telemetry – Mackay, Stuart R., John Wiley, 1968.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A13802) TELEMETRY AND TELECONTROL
(Common to EIE, E Con E)
(ELECTIVE - III)****B.Tech. IV-II Sem. (E.I.E.)**

T	P	C
4	0	4

UNIT – I**TELEMETRY PRINCIPLES**

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

UNIT – II**SYMBOLS AND CODES**

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

UNIT – III**FREQUENCY DIVISION MULTIPLXED SYSTEMS**

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

UNIT – IV**TIME DIVISION MULTIPLXED SYSTEMS**

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

UNIT – V**SATELLITE TELEMETRY**

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

UNIT – VI**OPTICAL TELEMETRY**

Optical fibers Cable – Sources and detectors – Transmitter and Receiving Circuits, Coherent Optical Fiber Communication System.

2009-10**UNIT – VII & VIII****TELECONTROL METHODS**

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

TEXT BOOKS:

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

REFERENCES:

1. Handbook of Telemetry and Remote Control – by Gruenberg L., McGraw Hill, New York, 1987.
2. Telemetry Engineering – by Young R.E., Little Books Ltd., London, 1988.
3. Data Communication and Teleprocessing System – by Housley T., PH Intl.
4. Englewood Cliffs, New Jersey, 1987.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A10803) VIRTUAL INSTRUMENTATION
(Common to EIE, E Con E)
(ELECTIVE - III)****B.Tech. IV-II Sem. (E.I.E.)**

T	P	C
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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.

2009-10**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, 2nd edition, McGraw Hill, Newyork, 1997.
2. Lisa K. wells & Jeffrey Travis, LabVIEW for everyone, Prentice Hall, New Jersey, 1997.

REFERENCES:

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

Course Aim: This course aims to introduce the latest instrumentation system design and development tools available today.

Prerequisite: Course on personal computer systems and interfacing.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A10804) OPTO-ELECTRONICS AND LASER
INSTRUMENTATION
(ELECTIVE – III)****B.Tech. IV-II Sem. (E.I.E.)**

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UNIT – I**OPTICAL FIBERS AND THEIR PROPERTIES**

Introduction to optical fibers – Light guidance – Numerical aperture – Dispersion – Different types of fibers and their properties.

UNIT – II

Light Sources for fiber optics, Photo detectors, source coupling, splicing and connectors.

UNIT – III**LASER FUNDAMENTALS**

Laser configuration – Q-Switching – Mode locking – Different types of Lasers – Ruby, Nd-Yag, He-Ne, CO₂, Argon ion.

UNIT – IV**FIBER OPTIC SENSORS**

IR sources and detectors – Interferometer method of measurement of length – Moire fringes – Measurement of pressure, Temperature, Current, Voltage, Liquid level and strain - fiber optic Gyroscope – Polarization maintaining fibbers – Applications.

UNIT – V**LASER INSTRUMENTATION**

Industrial applications of lasers – Bio-medical application – Laser Doppler velocity meter – Laser heating.

UNIT – VI**HOLOGRAPHY**

Principle, Methods, Holographic Interferometers and applications.

2009-10**UNIT – VII****MEDICAL APPLICATIONS**

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

UNIT – VIII**OPTO-ELECTRONIC COMPONENTS**

LED, LD, PIN & APD, Electro-optic, Magneto optic and Acousto-optic Modulators.

TEXT BOOKS:

1. An Introduction to Optical fibers. - Allen H.C. McGraw Hill, Singapore, 1993.
2. Lasers and their applications- by M.J. Beesly, Taylor and Francis.

REFERENCES:

1. Lasers: Theory and Applications – by Thyagarajan K. and Ghatak A.K., Plenum Press, New York.
2. Lasers and Optical Engineering – by Das P., Springer International Students Edition, 1991.
3. Optical Electronics – by Ghatak A.K. and Thyagarajan K., Foundation Books, 1991.
4. Laser and Applications – by Guimarass W.O.N. and Mooradian A., Springer Verlag, 1981.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A04704) DSP PROCESSORS AND ARCHITECTURES
(ELECTIVE – IV)**

B.Tech. IV-II Sem. (E.I.E.)	T	P	C
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UNIT I**INTRODUCTION TO PROGRAMMABLE DSPs:**

Multiplier & Multiplier accumulator, Modified bus structures & memory access schemes in P – DSPs, Multiple access memory, Multi ported memory, VLIW architecture, Pipelining, Special addressing modes in P – DSPs, On chip peripherals.

UNIT II**COMPUTATIONAL ACCURACY IN DSP
IMPLEMENTATIONS:**

Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT III**ARCHITECTURES FOR PROGRAMMABLE DSP DEVICES:**

Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT IV**PROGRAMMABLE DIGITAL SIGNAL PROCESSORS:**

Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline Operation of TMS320C54XX Processors.

2009-10**UNIT V****IMPLEMENTATIONS OF BASIC DSP ALGORITHMS:**

The Q-notation, FIR Filters, IIR Filters, Interpolation Filters, Decimation Filters, PID Controller, Adaptive Filters, 2-D Signal Processing.

UNIT VI**IMPLEMENTATION OF FFT ALGORITHMS:**

An FFT Algorithm for DFT Computation, A Butterfly Computation, Overflow and scaling, Bit-Reversed index generation, An 8-Point FFT implementation on the TMS320C54XX, Computation of the signal spectrum.

UNIT VII**INTERFACING MEMORY AND I/O PERIPHERALS TO PROGRAMMABLE DSP DEVICES:**

Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA). A Multichannel buffered serial port (McBSP), McBSP Programming, a CODEC interface circuit, CODEC programming, A CODEC-DSP interface example.

UNIT VIII**RECENT TRENDS IN DSP SYSTEM DESIGN:**

An over - view of the application nodes on DSP systems, An over - view of open multimedia applications platform (OMAP), An Introduction to FPGA, Design flow for an FPGA based system design, Cad tools for FPGA based system design, soft core processors, FPGA based DSP system design, New algorithms for Implementation of filters in VLSI, Distributed arithmetic algorithm, Case studies, Comparison of the performances of the systems designed using FPGAs and digital signals processors.

TEXT BOOKS:

1. Digital Signal Processing – Avtar Singh and S. Srinivasan, Thomson Publications, 2004.
2. Digital Signal Processors, Architecture, Programming and Applications – B. Venkata Ramani and M. Bhaskar, TMH, 2004.

2009-10**REFERENCES:**

1. Digital Signal Processing – Jonatham Stein, John Wiley, 2005.
2. DSP Processor Fundamentals, Architectures & Features – Lapsley et al. S. Chand & Co, 2000.

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 2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR**

**(9A10805) ARTIFICIAL NEURAL NETWORKS
(Common to EIE, E Con E)
(ELECTIVE - IV)**

B.Tech. IV-II Sem. (E.I.E.)	T	P	C
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UNIT I

INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS:

Introduction, Artificial Neural Networks, Historical Development of Neural Networks, Biological Neural Networks, Comparison Between Brain and the Computer, Comparison Between Artificial and Biological Neural Networks, Network Architecture, Setting the Weights, Activation Functions, Learning Methods.

UNIT II

FUNDAMENTAL MODELS OF ARTIFICIAL NEURAL NETWORKS:

Introduction, McCulloch – Pitts Neuron Model, Architecture, Learning Rules, Hebbian Learning Rule, Perceptron Learning Rule, Delta Learning Rule (Widrow-Hoff Rule or Leastmean Square (LMS) rule, Competitive Learning Rule, Out Star Learning Rule, Boltzmann Learning, Memory Based Learning.

UNIT III

FEED FORWARD NETWORKS:

Introduction, Single Layer Perceptron Architecture, Algorithm, Application Procedure, Perception Algorithm for Several Output Classes, Perceptron Convergence Theorem, Brief Introduction to Multilayer Perceptron networks, Back Propagation Network (BPN), Generalized Delta Learning Rule, Back Propagation rule, Architecture, Training Algorithm, Selection of Parameters, Learning in Back Propagation, Application Algorithm, Local Minima and Global Minima, Merits and Demerits of Back Propagation Network, Applications, Radial Basis Function Network (RBFN), Architecture, Training Algorithm for an RBFN with Fixed Centers.

2009-10**UNIT IV****ADALINE AND MADALINE NETWORKS:**

Introduction, Adaline Architecture, Algorithm, Applications, Madaline, Architecture, MRI Algorithm, MRII Algorithm.

UNIT V**COUNTER PROPAGATION NETWORKS:**

Winner Take – all learning, out star learning, Kohonen Self organizing network, Grossberg layer Network, Full Counter Propagation Network (Full CPN), Architecture, Training Phases of Full CPN, Training Algorithm, Application Procedure, Forward Only counter Propagation Network, Architecture, Training Algorithm, Applications, Learning Vector Quantizer (LVQ).

UNIT VI**ASSOCIATIVE MEMORY NETWORKS - I:**

Types, Architecture, Continuous and Discrete Hopfield Networks, Energy Analysis, Storage and Retrieval Algorithms, Problems with Hopfield Networks.

UNIT VII**ASSOCIATIVE MEMORY NETWORKS – II:**

Boltzman Machine, Bidirectional Associative Memory, Adaptive Resonance Theory Networks Introduction, Architecture, Algorithm.

UNIT VIII**APPLICATIONS OF NEURAL NETWORKS:**

Implementation of A/D Converter using Hopfield Network, Solving Optimization Problems, Solving Simultaneous Linear Equation, Solving Traveling Salesman Problems using Hopfield Networks, Application in Pattern Recognition, Image Processing.

TEXT BOOKS:

1. Introduction to Artificial Neural Systems - J.M.Zurada, Jaico Publishers, 3rd Edition.
2. Introduction to Neural Networks Using MATLAB 6.0 - S.N. Shivanandam, S. Sumati, S. N. Deepa, TMH.

2009-10**REFERENCES:**

1. Elements of Artificial Neural Networks - Kishan Mehrotra, Chelkuri K. Mohan, and Sanjay Ranka, Penram International.
2. Artificial Neural Network – Simon Haykin, Pearson Education, 2nd Ed.
3. Fundamental of Neural Networks – Laurene Fausett, Pearson, 1st Ed.
4. Artificial Neural Networks - B. Yegnanarayana, PHI.

2009-10

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR****(9A13501) DIGITAL CONTROL SYSTEMS
(ELECTIVE - IV)****B.Tech. IV-II Sem. (E.I.E.)**

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4	0	4

UNIT – I**SAMPLING AND RECONSTRUCTION**

Introduction, Examples of Data control systems – Digital to Analog conversion and Analog to Digital conversion, sample and hold operations.

UNIT-II**THE Z – TRANSFORMS**

Introduction, Linear difference equations, pulse response, Z – transforms, Theorems of Z – Transforms, the inverse Z – transforms, Modified Z- Transforms.

UNIT-III**Z-PLANE ANALYSIS OF DISCRETE-TIME CONTROL
SYSTEM**

Z-Transform method for solving difference equations; Pulse transfer function, block diagram analysis of sampled – data systems, mapping between s-plane and z-plane.

UNIT – IV**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 – V**CONTROLLABILITY AND OBSERVABILITY**

Concepts of Controllability and Observability - Tests – Duality - conditions for Controllability and Observability of Pulse Transfer Function.

2009-10**UNIT – VI****STABILITY ANALYSIS**

Mapping between the S-Plane and the Z-Plane – Primary strips and Complementary Strips – Constant frequency loci, Constant damping ratio loci, 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.

UNIT – VII**DESIGN OF DISCRETE TIME CONTROL SYSTEM BY CONVENTIONAL METHODS**

Transient and steady state response Analysis – Design based on the frequency response method – Bilinear Transformation and Design procedure in the w-plane, Lead, Lag and Lead-Lag compensators and digital PID controllers.

UNIT – VIII**STATE FEEDBACK CONTROLLERS AND OBSERVERS**

Design of state feedback controller through pole placement – Necessary and sufficient conditions, Ackerman's formula. State Observers – Full order and Reduced order observers.

TEXT BOOKS:

1. Discrete-Time Control Systems - K. Ogata, Pearson Education/PHI, 2nd Edition.

REFERENCES:

1. Digital Control Systems, Kuo, Oxford University Press, 2nd Edition, 2003.
2. Digital Control and State Variable Methods by M. Gopal, TMH.