

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.

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

- i. The performance of a student in each semester / I year shall be evaluated subject –wise with a maximum of 100 marks for theory and 75 marks for practical subject. In addition seminar and project work shall be evaluated for 50 and 200 marks respectively.
- ii. For theory subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.
- iii. 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

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

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

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.

- 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.

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

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)

**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	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate

	the examination (theory or practical) in which the candidate is appearing.	has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled 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	Expulsion from the examination hall and

	arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or 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,	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.

	either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or	Expulsion from the

	firearm in the examination hall.	examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and

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

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.
2. Punishment for institutions : (if the squad reports that the college is also involved in encouraging malpractices)
 - (i) A show cause notice shall be issued to the college.
 - (ii) Impose a suitable fine on the college.

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

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

IV B. Tech. – I Semester (E.C.E)

S. No.	Group	Subject	L	T	P	CP
01.	9AHS701	Management Science	4	0	0	4
02.	9A04701	Embedded Real Time Operating Systems	3	1	0	4
03.	9A05506	Computer Networks	4	0	0	4
04.	9A04702	Optical Communications	3	1	0	4
05.	9A04703	Elective – I 1. RADAR Systems 2. DSP Processors & Architectures 3. Operating Systems	3	1	0	4
	9A04704					
	9A05505					
06.	9A10802	Elective – II 1. Bio-Medical Instrumentation 2. T.V. Engineering 3. Digital Design through Verilog HDL	4	0	0	4
	9A04705					
	9A04706					
07.	9A04707	Microwave & Optical Communications Lab	0	0	3	2
08.	9A04708	Microprocessors & DSP lab	0	0	3	2
		contact periods / week	21	03	06	
			Total/Week 30			
Total Credits (6 Theory + 2 Labs)						28

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

**Electronics and Communication Engineering
(9AHS701) MANAGEMENT SCIENCE
(Common to ECE, E Con E, EIE)**

B.Tech IV-I Sem. (E.C.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.

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.

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 & Wehrich: 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.

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

**Electronics and Communication Engineering
(9A04701) EMBEDDED REALTIME OPERATING SYSTEMS
(Common to ECE, CSSE, E Con E, EIE)**

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

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.

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 PROGAM 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.

TEXT BOOKS:

1. Introduction to Embedded System- Shibu KV, Mc-Graw Hill Higher Edition.
2. Embedded Systems Architecture, Programming and Design- Raj Kamal, Second 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.

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

**Electronics and Communication Engineering
(9A05506) COMPUTER NETWORKS
(Common to ECE, EIE)**

B.Tech IV-I Sem. (E.C.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.

UNTI VII

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

UNTI 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.

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

**Electronics and Communication Engineering
(9A04702) OPTICAL COMMUNICATIONS**

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

UNIT-I

Introduction and Optical fiber waveguides: Historical Development, The General System, Advantages of Optical Fiber Communications, Ray Theory transmission, Electromagnetic mode theory for Optical Propagation, Cylindrical Fiber.

UNIT-II

Single mode fibers, Fiber Materials - Fiber Fabrication, Mechanical Properties of Fibers, Fiber Optic Cables.

UNIT-III

Attenuation, Material Absorption Losses in Silica Glass Fibers, Linear Scattering Losses, Fiber Bend Loss, Dispersion, Chromatic dispersion, Intermodal dispersion, Overall fiber dispersion, Polarization.

UNIT-IV

Fiber alignment and joint loss, Fiber Splices, Fiber Connectors, Fiber Couplers, Optical Isolators and Circulators.

UNIT-V

Light Emitting Diodes (LEDs): LED Structures, Light Source Materials, Quantum efficiency and LED Power, Modulation of LED. LASER Diodes- Laser Diode Modes and Threshold Conditions, Laser Diode Rate Equations, External Quantum Efficiencies, Resonant Frequencies.

UNIT-VI

Power launching and Coupling - Source to Fiber Power Launching, Lensing schemes for Coupling Improvement, fiber-to-fiber Joints, LED coupling to single mode fibers, Fiber Splicing, Optical fiber connectors. Photo Detectors – Physical principles of photo diodes, photo detector noise, detector response time, avalanche multiplication

noise, structures for InGaAs APDs, temperature effect on avalanche gain, comparisons of photo detectors.

UNIT-VII

Digital Links: Point to point links, power penalties, error control.

Analog links: Over-view of analog links, carrier to noise ratio, multichannel transmission techniques, RF over fiber, radio over fiber links.

UNIT-VIII

WDM Concepts and components: Over-view, Passive optical couplers, Isolators & circulators, Fiber grating filters, dielectric thin film filters, Phased array based devices, Diffraction gratings, Active optical components, tunable light sources.

TEXT BOOKS:

1. Optical fiber communications- Gerd keiser, McGraw Hill International Edition, 4th Edition, 2010.
2. Optical fiber communications-John M. Senior, PHI, 3rd Edition, 2010.

REFERENCES:

1. Principles and Applications of Optical Communications, Max Ming-Kang Liu, TMH, 2010.
2. Text book on optical fiber communication and its applications- S.C.Gupta, PHI, 2005.
3. Fundamentals of Optical Fiber communications, Satish Kumar, PHI, 2009.

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

**Electronics and Communication Engineering
(9A04703) RADAR SYSTEMS
(ELECTIVE – I)**

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

UNIT I**BASICS OF RADAR:**

Introduction, Maximum Unambiguous Range, Simple form of Radar Equation, Radar Block Diagram and Operation, Radar Frequencies and Applications, Prediction of Range Performance, Minimum Detectable Signal, Receiver Noise, Modified Radar Range Equation, Illustrative Problems.

UNIT II**RADAR EQUATION:**

SNR, Envelope Detector, False Alarm Time and Probability, Integration of Radar Pulses, Radar Cross Section of Targets (simple targets - sphere, cone-sphere), Transmitter Power, PRF and Range Ambiguities, System Losses (qualitative treatment), Illustrative Problems.

UNIT III**CW AND FREQUENCY MODULATED RADAR:**

Doppler Effect, CW Radar – Block Diagram, Isolation between Transmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth Requirements, Applications of CW radar, Illustrative Problems.

UNIT IV

FM-CW Radar, Range and Doppler Measurement, Block Diagram and Characteristics (Approaching/ Receding Targets), FM-CW altimeter, Multiple Frequency CW Radar.

UNIT V**MTI AND PULSE DOPPLER RADAR:**

Introduction, Principle, MTI Radar with - Power Amplifier Transmitter and Power Oscillator Transmitter, Delay Line Cancellers – Filter

Characteristics, Blind Speeds, Double Cancellation, And Staggered PRFs. Range Gated Doppler Filters, MTI Radar Parameters, Limitations to MTI Performance, MTI versus Pulse Doppler radar.

UNIT VI

TRACKING RADAR:

Tracking with Radar, Sequential Lobing, Conical Scan, Monopulse Tracking Radar – Amplitude Comparison Monopulse (one- and two-coordinates), Phase Comparison Monopulse, Tracking in Range, Acquisition and Scanning Patterns, Comparison of Trackers.

UNIT VII

DETECTION OF RADAR SIGNALS IN NOISE:

Introduction, Matched Filter Receiver – Response Characteristics and Derivation, Correlation Function and Cross-correlation Receiver, Efficiency of Non-matched Filters, Matched Filter with Non-white Noise.

UNIT VIII

RADAR RECEIVERS:

Noise Figure and Noise Temperature, Displays – types. Duplexers – Branch type and Balanced type, Circulators as Duplexers. Introduction to Phased Array Antennas – Basic Concepts, Radiation Pattern, Beam Steering and Beam Width changes, Series versus Parallel Feeds, Applications, Advantages and Limitations.

TEXT BOOKS:

1. Introduction to Radar Systems – Merrill I. Skolnik, TMH Special Indian Edition, 2nd Edition, 2007.

REFERENCES:

1. Introduction to Radar Systems – Merrill I. Skolnik, 3rd Edition, Tata McGraw-Hill, 2001.
2. Radar Principals, Technology, Applications – Byron Edde, Pearson Education, 2004.
3. Radar Principles – Peebles, Jr., P.Z. Wiley, NweYork, 1998.

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

**Electronics and Communication Engineering
(9A04704) DSP PROCESSORS & ARCHITECTURES
(Common to ECE, ECM)
(ELECTIVE – I)**

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

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.

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.

REFERENCES:

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

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

**Electronics and Communication Engineering
(9A05505) OPERATING SYSTEMS
(Common to ECE, E Con E, EIE)
(ELECTIVE – I)**

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

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.

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.

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. Operating Systems, A.S.Godbole, 2nd Edition, TMH.
5. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
6. Operating Systems, G.Nutt, N.Chaki and S.Neogy, 3rd Edition, Pearson Education.
7. Operating Systems, R.Elmasri, A,G.Carrick and D.Levine, McGraw Hill.

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

**Electronics and Communication Engineering
(9A10802) BIO-MEDICAL INSTRUMENTATION
(ELECTIVE – II)**

B.Tech IV-I Sem. (E.C.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.

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. Geoddes 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, 2nd edition, 1968.

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

**Electronics and Communication Engineering
(9A04705) T.V. ENGINEERING
(ELECTIVE – II)**

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

UNIT-I**INTRODUCTION:**

TV transmitter and receivers, synchronization, Television pictures: Geometric form and aspect Ratio, image continuity, interlaced scanning, picture Resolution, composite video signal: Horizontal and vertical sync, Scanning sequence, color signal generation and encoding: perception of brightness and colors, additive color mixing, video signals for colors, Luminance signal, color difference signals, encoding of color difference signals, formation of Chrominance signals, PAL encoder.

UNIT-II**TV SIGNAL TRANSMISSION AND PROPAGATION:**

Picture signal transmission, positive and negative modulation, VSB transmission, sound signal transmission, standard channel BW, TV transmitter, TV signal propagation, Interference, TV broadcast channels, TV transmission antennas.

UNIT-III**TV CAMERAS:**

Camera tube types, Vidicon, silicon diode array vidicon, monochrome TV camera, color camera, CCD image sensors.

UNIT-IV**PICTURE TUBES:**

Monochromatic picture tube, electrostatic focusing, beam deflection, picture tube characteristics and specifications, color picture tubes, TV standards: American 525 line B&W TV system, NTSC color system, 625-line monochrome system, bPAL color system, TV standards.

UNIT-V**MONOCHROME TV RECEIVER:**

RF tuner, IF sub system, video amplifier, sound section, sync separation and processing, deflection circuits, scanning circuits, PAL-D color receiver: electron tuners, IF sub system, Y-signal channel, Chroma decoder, separation of U & V color phasors, synchronous demodulators, sub carrier generation, Raster circuits.

UNIT-VI**VISION IF SUB SYSTEM:**

AGC, Noise cancellation, video and inter carrier sound signal detection, vision IF sub system of Black & White receivers, color Receivers IF sub system. Receiver sound system: FM detection, FM sound detectors, typical applications. TV receiver tuners: tuner operation, VHF and UHF tuners, digital tuning techniques, Remote control of receiver functions.

UNIT-VII**COLOR SIGNAL DECODING:**

PAL-D decoder, chroma signal amplifiers, separation of U & V signals, color Burst separation, Burst phase discriminator, ACC amplifier, Reference Oscillator, Indent and color killer circuits, RO phase shift and 180° PAL-switch circuitry, U & V demodulators, color signal mixing.

UNIT-VIII**SYNC.SEPARATION, AFC AND DEFLECTION****OSCILLATORS:**

Synchronous separation, K Noise in sync. Pulses, separation of frame and line sync. Pulses, AFC, single ended AFC circuit. Deflection oscillators, deflection drive IC's, Receiver antennas, Digital TV digital satellite TV, direct to home satellite TV, digital TV receiver, digital terrestrial TV.

TEXT BOOKS:

1. Modern television practice-Principles, Technology and service-R.R. Gulati, New Age International publication, 2002.
2. Monochrome and color TV-R.R Gulati, New Age International publication, 2002.

REFERENCES:

1. Color Television Theory and practice-S.P.Bali, TMH, 1994.
2. Television and Video engineering-A.M. Dhake, 2nd Edition, Tata McGraw Hill.
3. Basic television and video systems-B.Grob and C.E.Herndon, McGraw Hill, 1999.

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

**Electronics and Communication Engineering
(9A04706) DIGITAL DESIGN THROUGH VERILOG HDL
(ELECTIVE – II)**

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

UNIT I

INTRODUCTION TO VERILOG:

Verilog as HDL, Levels of design description, concurrency, simulation and synthesis, functional verification, system tasks, programming language interface(PLI), module, simulation and synthesis tools, test benches.

LANGUAGE CONSTRUCTS AND CONVENTIONS:

Introduction, keywords, identifiers, whitespace characters, comments, numbers, strings, logic values, strengths, data types, scalars and vectors, parameters, memory, operators, system tasks, exercises.

UNIT II

GATE LEVEL MODELLING:

Introduction, AND gate primitive, module structure, other gate primitives, illustrative examples, tristate gates, array of instances of primitives, additional examples, design of Flip flops with gate primitives, delays, strengths and contention resolution, net types, design of basic circuits, exercises.

UNIT III

BEHAVIORAL MODELLING:

Introduction, operations and assignments, functional Bifurcation, initial construct, always construct, examples, assignments with delays, wait construct, multiple always blocks, designs at behavioral level, blocking and non-blocking assignments, the case statement, simulation flow, if and if else constructs, assign-De assign construct, repeat construct, FOR loop, the disable construct, While loop, Forever loop, parallel blocks, force-release construct, event.

UNIT IV

MODELLING AT DATAFLOW LEVEL:

Introduction, continuous assignment structures, delays and continuous assignments, assignment to vectors, operators.

SWITCH LEVEL MODELLING: Introduction, basic transistor switches, CMOS switch, Bidirectional gates, time delays with switch primitives, instantiations with strengths and delays, strength contention with trireg nets, exercises.

UNIT V

SYSTEM TASKS, FUNCTIONS AND COMPILER

DIRECTIVES:

Introduction, parameters, path delays, module parameters, system tasks and functions, file –based tasks and Functions, Compiler Directives, Hierarchical Access, General Observations, exercises.

FUNCTIONS, TASKS, AND USER-DEFINED PRIMITIVES:

Introduction, Function, Tasks, User- Defined Primitives (UDP), FSM Design (Moore and Mealy Machines).

UNIT VI

DIGITAL DESIGN WITH SM CHARTS:

State Machine Charts, Derivation of SM Charts, Realization of SM Charts, Implementation of the Dice Game, Alternative realizations for SM Charts using Microprogramming, Linked State Machines.

UNIT VII

DESIGNING WITH PROGRAMMABLE GATE ARRAYS AND COMPLEX PROGRAMMABLE LOGIC DEVICES:

Xilinx 3000 Series FPGAs, Designing with FPGAs, Using a One-Hot State Assignment, Altera Complex Programmable Logic Devices (CPLDs), Altera FLEX 10K Series CPLDs.

UNIT VIII

VERILOG MODELS:

Static RAM Memory, A simplified 486 Bus Model, Interfacing Memory to a Microprocessor Bus, UART Design, Design of Microcontroller CPU.

TEXT BOOKS:

1. Design through Verilog HDL – T.R. Padmanabhan and B. Bala Tripura Sundari, WSE, IEEE Press, 2004.
2. A Verilog Primer – J. Bhasker, BSP, 2003.

REFERENCES:

1. Fundamentals of Logic Design with Verilog – Stephen. Brown and Zvonko Vranesic, TMH, 2005.
2. Advanced Digital Design with Verilog HDL – Michael D. Ciletti, PHI, 2005.

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

**Electronics and Communication Engineering
(9A04707) MICROWAVE & OPTICAL COMMUNICATIONS
LAB**

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

Minimum Twelve Experiments to be conducted:

Part – A (Any 7 Experiments):

1. Reflex Klystron Characteristics.
2. Gunn Diode Characteristics.
3. Attenuation Measurement.
4. Directional Coupler Characteristics.
5. VSWR Measurement.
6. Impedance Measurement.
7. Waveguide parameters measurement.
8. Scattering parameters of Directional Coupler.
9. Scattering parameters of Magic Tee.

Part – B (Any 5 Experiments):

1. Characterization of LED.
2. Characterization of Laser Diode.
3. Intensity modulation of Laser output through an optical fiber.
4. Measurement of Data rate for Digital Optical link.
5. Measurement of NA.
6. Measurement of losses for Analog Optical link.
7. Radiation Pattern Measurement of Antennas (at least two antennas).

Equipment required for Laboratories:

1. Regulated Klystron Power Supply
2. VSWR Meter
3. Micro Ammeter
4. Multi meter
5. CRO
6. GUNN Power Supply, Pin Moderator

7. Reflex Klystron
8. Crystal Diodes
9. Micro wave components (Attenuation)
10. Frequency Meter
11. Slotted line carriage
12. Probe detector
13. wave guide shorts
14. Pyramidal Horn Antennas
15. Directional Coupler
16. E, H, Magic Tees
17. Circulators, Isolator
18. Matched Loads
19. Fiber Optic Analog Trainer based LED
20. Fiber Optic Analog Trainer based laser
21. Fiber Optic Digital Trainer
22. Fiber cables - (Plastic, Glass)
23. Antenna Training System with Tripod and Accessories

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

**Electronics and Communication Engineering
(9A04708) MICRO PROCESSORS & DSP LAB**

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

I. Microprocessor 8086 & Microcontroller 8051:

(Any four from 1 – 6, and 7, 8 are compulsory)

1. Arithmetic operation – Multi byte Addition and Subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation, ASCII – arithmetic operation.
2. Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
3. By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Inserting, Deleting, Length of the string, String comparison.
4. Reading and Writing on a parallel port.
5. Timer in different modes.
6. Serial communication implementation.
7. 8259 – Interrupt Controller: Generate an interrupt using 8259 timer.
8. 8279 – Keyboard Display: Write a small program to display a string of characters.

II. DSP Processor: (Any six of the following)

1. To study the architecture of DSP chips – TMS 320C 5X/6X Instructions.
2. To verify linear convolution.
3. To verify the circular convolution.
4. To design FIR filter (LP/HP) using windowing technique
 - a) Using rectangular window
 - b) Using triangular window
 - c) Using Kaiser window
5. To Implement IIR filter (LP/HP) on DSP Processors.
6. N-point FFT algorithm.
7. MATLAB program to find frequency response of analog LP/HP filters.

8. To compute power density spectrum of a sequence.

Equipment required for Laboratories:

1. 8086 μ P Kits
2. 8051 Micro Controller kits
3. Interfaces/peripheral subsystems
 - i) 8259 PIC
 - ii) 8279-KB/Display
 - iii) 8255 PPI
 - iv) 8251 USART
4. ADC Interface
5. DAC Interface
6. Traffic Controller Interface
7. Elevator Interface