ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

ELECTRONICS AND COMMUNICATION
ENGINEERING

FOR

B.TECH. FOUR YEAR DEGREE COURSE
(Applicable for batches admitted from 2010-2011)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

KAKINADA - 533 003, Andhra Pradesh, India
### III YEAR

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<td>Digital Signal Processing</td>
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**Total** 28
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COMPUTER NETWORKS

UNIT – I
Introduction : OSI, TCP/IP and other networks models, Examples of Networks: Novell Networks, Arpanet, Internet, Network Topologies WAN, LAN, MAN.

UNIT - II
Physical Layer : Transmission media copper, twisted pair wireless, switching and encoding asynchronous communications; Narrow band, broad band ISDN and ATM.

UNIT - III
Data link layer : Design issues, framing, error detection and correction, CRC, Elementary Protocol- stop and wait, Sliding Window, Slip, Data link layer in HDLC, Internet, ATM.

UNIT - IV
Medium Access sub layer : ALOHA, MAC addresses, Carrier sense multiple access. IEEE 802.X Standard Ethernet, wireless LANS. Bridges,

UNIT - V
Network Layer : Virtual circuit and Datagram subnets-Routing algorithm shortest path routing, Flooding, Hierarchical routing, Broadcast, Multi cast, distance vector routing.

UNIT – VI

UNIT – VII

UNIT – VIII
Application Layer – Network Security, Domain name system, SNMP, Electronic Mail; the World WEB, Multi Media.

TEXT BOOKS :
REFERENCES:

DIGITAL SIGNAL PROCESSING

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

UNIT II

UNIT III
FAST FOURIER TRANSFORMS: Fast Fourier transforms (FFT) - Radix-2 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

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 & FIR filters.

UNIT VII
MULTIRATE DIGITAL SIGNAL PROCESSING: Decimation, interpolation, sampling rate conversion, Implementation of sampling rate conversion.

UNIT VIII
INTRODUCTION TO DSP PROCESSORS: Introduction to programmable DSPs: Multiplier and Multiplier Accumulator (MAC), Modified Bus Structures and Memory Access schemes in DSPs Multiple access memory, multiport memory, VLSI Architecture, Pipelining, Special addressing modes, On-Chip Peripherals. Architecture of TMS 320C5X- Introduction, Bus Structure, Central Arithmetic Logic Unit, Auxiliary Registrar, Index Registrar, Auxiliary Register Compare Register,
Block Move Address Register, Parallel Logic Unit, Memory mapped registers, program controller, Some flags in the status registers, On-chip registers, On-chip peripherals

**TEXT BOOKS:**

**Reference Books:**
2. Digital Signal Processing: Ashok Ambardar , Satya Prasad , Cenage Learning,

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VLSI DESIGN

UNIT I
INTRODUCTION : Introduction to IC Technology, The IC Era, MOS and related VLSI Technology, Basic MOS Transistors, Enhancement and Depletion modes of transistor action, IC production process, MOS and CMOS Fabrication processes, BiCMOS Technology, Comparison between CMOS and Bipolar technologies.

UNIT II
BASIC ELECTRICAL PROPERTIES of MOS and BiCMOS Circuits: $I_{ds}$ versus $V_{ds}$ Relationships, Aspects of MOS transistor Threshold Voltage, MOS transistor Trans-conductance and Output Conductance, MOS transistor Figure of Merit, The Pass transistor, The nMOS Inverter, Determination of Pull-up to Pull-down Ratio for nMOS inverter driven by another nMOS inverter and for an nMOS inverter driven through one or more pass transistors, Alternative forms of pull-up, The CMOS Inverter, MOS transistor circuit model, Bi-CMOS Inverter, Latch-up in CMOS circuits and BiCMOS Latch-up Susceptibility.

UNIT III

UNIT IV

UNIT V
SCALING OF MOS CIRCUITS: Scaling models and scaling factors, Scaling factors for device parameters, Limitations of scaling, Limits due to subthreshold currents, Limits on logic levels and supply voltage due to noise, Limits due to current density, Some architectural Issues, Introduction to Switch Logic and Gate Logic.

UNIT VI
SEMICONDUCTOR INTEGRATED CIRCUIT DESIGN: Introduction to Programmable Logic Devices (PLDs), Programmable Logic Arrays (PLA), Programmable Array Logic (PAL), Implementation approaches in VLSI Design-Full Custom Design, Semicustom Design, Gate Arrays,
Standard Cells, Complex Programmable Logic Devices (CPLDs), Field Programmable Gate Arrays (FPGAs), Design Issues.

UNIT VII
DIGITAL DESIGN USING HDL: Digital system design process, VLSI Circuit Design Process, Hardware Simulation, Hardware Synthesis, History of VHDL, VHDL requirements, Levels of Abstraction, Elements of VHDL, Packages, Libraries and Bindings, Objects and Classes, Variable assignments, Sequential statements, Usage of subprograms, Comparison of VHDL and Verilog HDL.

UNIT VIII

TEXT BOOKS:

REFERENCES:
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MICROWAVE ENGINEERING

UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V
UNIT VI

HELIX TWTS: Significance, Types and Characteristics of Slow Wave Structures; Structure of TWT and Amplification Process (qualitative treatment), Suppression of Oscillations, Nature of the four Propagation Constants, Gain Considerations.

M-type Tubes
Introduction, Cross-field effects, Magnetrons – Different Types, 8-Cavity Cylindrical Travelling Wave Magnetron – Hull Cut-off and Hartree Conditions, Modes of Resonance and PI-Mode Operation, Separation of PI-Mode, o/p characteristics.

UNIT VII


UNIT VIII


TEXT BOOKS:

REFERENCES:
3. Microwave Engineering – GS Raghuvanshi and K Satya Prasad Cenage Learning

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MICROPROCESSORS AND MICROCONTROLLERS

UNIT-I: 8086/8088 MICROPROCESSORS
Register organization of 8086, Architecture, signal description of 8086, physical memory organization, general bus operation, I/O addressing capability, special purpose activities, Minimum mode, maximum mode of 8086 system and timings, the processor 8088, machine language instruction formats, addressing mode of 8086, instruction set off 8086, assembler directives and operators.

UNIT-II: PROGRAMMING WITH 8086 MICROPROCESSOR
Machine level programs, programming with an assembler, Assembly language programs, introduction to stack, stack structure of 8086/8088, interrupts and interrupt service routines, interrupt cycle of 8086, non-mask able interrupt and mask able interrupts, interrupt programming.

UNIT-III: BASIC PERIPHERALS AND THEIR INTERFACING WITH 8086/88
Semiconductor memory interfacing, dynamic RAM interfacing, interfacing i/o ports, PIO 8255 modes of operation of 8255, interfacing D/A and A/D converters, stepper motor interfacing, control of high power devices using 8255.

UNIT-IV: SPECIAL PURPOSE PROGRAMMABLE PERIPHERAL DEVICES AND THEIR INTERFACING
Programmable interrupt controller 8259A, the keyboard/display controller 8279, programmable communication interface 8251 USART, DMA Controller 8257, programmable with DMA interface 8237.

UNIT-V: ADVANCED MICRO PROCESSORS
Salient features of 0386DX, architecture and signal description of 80386, register organization of 80386 and addressing modes, data types of 80386, real address mode of 80386, protected mode of 80386, segmentation and Paging, virtual 8086 mode and enhanced mode. Instruction set of 80386. The coprocessor 80387, the CPU with a numeric coprocessor-80486DX.

UNIT-VI: 8051 MICROCONTROLLER
Introduction to microcontrollers, 8051 Microcontrollers, 8051 pin description, connections, i/o ports and memory organization, MCS51 addressing modes and instructions, assembly language programming tools.

UNIT-VII: PIC MICROCONTROLLERS
Overview and features, PIC16Cx/7X instructions, interrupts in PIC 16C61/71, PIC 16F8XX Flash controllers, DATA EEPROM and Flash EEPROM, i/o ports and timers.
UNIT-VIII: ARM 32-BIT MICROCONTROLLER
Introduction to 16/32 Bit processors, ARM architecture and organization, ARM / Thumb programming model, ARM / Thumb instruction set, Development tools.

TEXT BOOKS:

REFERENCES:

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MANAGEMENT SCIENCE

Unit I

Unit II
Operations Management: Principles and Types of Management – Work study- Statistical Quality Control- Control charts (P-chart, R-chart, and C-chart) Simple problems- Material Management: Need for Inventory control- EOQ, ABC analysis (simple problems) and Types of ABC analysis (HML, SDE, VED, and FSN analysis)

Unit III

Unit IV
Project Management: (PERT/CPM): Development of Network – Difference between PERT and CPM Identifying Critical Path- Probability- Project Crashing (Simple Problems)

Unit V

Unit VI
Management Ethics: Importance of Ethics in Business and Management – Ethics in Marketing - HRM- Financial Management – Business Ethics and Law (Case example)

Unit VII

Unit VIII
Contemporary Management Practice: Basic concepts of MIS, MRP, Just-in-Time(JIT) system, Total Quality Management(TQM), Six sigma and Capability Maturity Model(CMM) Levies, Supply Chain

**Text Books**

**References**
2. Seth & Rastogi: Global Management Systems, Cengage learning, Delhi, 2011
7. Hitt and Vijaya Kumar: Strategic Management, Cengage learning

**Pre-requisites:** Managerial Economics

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

**Codes/ Tables:** Normal Distribution Function Tables need to be permitted into the examination Halls

**Question paper pattern:** 5 questions to be answered out of 8 questions.
Each question should not have more than 3 bits.
Unit VIII will have only short questions, not essay questions
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MICROPROCESSORS AND MICROCONTROLLERS LAB

The students are required to develop the necessary Algorithm, Flowchart and Assembly Language Program Source Code for executing the following functions using MASM/TASM software and to verify the results with necessary Hardware Kits.

PART-I: MICROPROCESSOR 8086
1. Introduction to MASM/TASM.
2. Arithmetic operation- Multi byte Addition and Subtraction, Multiplication and Division- Signed and unsigned Arithmetic operation, ASCII- Arithmetic operation.
3. Logic operations-Shift and rotate- Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
4. By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Inserting, Deleting, Length of the string, String comparison.
5. DOS/BIOS programming: Reading keyboard (Buffered with and without echo)- Display characters, Strings.

PART-II: INTERFACING WITH MICROPROCESSOR
1. 8259 – Interrupt Controller-Generate an interrupt using 8259 timer.
2. 8279 – Keyboard Display- Write a program to display a string of characters.
3. 8255 – PPI-Write ALP to generate sinusoidal wave using PPI.
4. 8251 – USART-Write a program in ALP to establish Communication between two processors.

PART-III: MICROCONTROLLER 8051
1. Reading and Writing on a parallel port.
2. Timer in different modes.
3. Serial communication implementation.

PART-IV: INTERFACING WITH MICROCONTROLLER
Write C programs to interface 8051 chip to Interfacing modules to Develop single chip solutions.
1. Simple Calculator using 6 digit seven segment display and Hex Keyboard interface to 8051.
2. Alphanumeric LCD panel and Hex keypad input interface to 8051.
3. External ADC and Temperature control interface to 8051.
4. Generate different waveforms Sine, Square, Triangular, and Ramp etc. using DAC interface to 8051; change the frequency and Amplitude.

EQUIPMENT REQUIRED FOR LABORATORY
1. MASM/TASM software
2. 8086 Microprocessor Kits
3. 8051 Micro Controller kits
4. Interfaces/peripheral subsystems
i) 8259 PIC
ii) 8279-KB/Display
iii) 8255 PPI
iv) 8251 USART

5. A/D and D/AC Interface

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ELECTRONIC COMPUTER AIDED DESIGN LABORATORY

The students are required to Design and draw the internal structure of the following Digital Integrated Circuits and to develop VHDL Source code, Perform Simulation using relevant Simulator and analyze the obtained simulation results using necessary Synthesizer. Further, it is required to verify the logical operations of the Digital ICs (Hardware) in the Laboratory.

1. Realization of Logic Gates
2. 3 to 8 Decoder -74138
3. 8 x 1 Multiplexer-74151 and 2x 4 De-multiplexer-74155
4. 4- Bit comparator-7485
5. D Flip-Flop-7474
6. Decade counter -7490
7. 4 Bit counter-7493
8. Shift registers-7495
9. Universal shift registers-74194/ 195
10. RAM (16 x 4)-74189 (Read and Write operations)
11. Stack and Queue implementation using RAM
12. ALU Design

EQUIPMENT REQUIRED FOR LABORATORY

1. Xilinx ISE Software.
2. Digital ICs.
4. Necessary Hardware Kits.
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INTELLECTUAL PROPERTY RIGHTS AND PATENTS – II

Unit 1

Unit 2

Unit 3
Introduction to Transactional Law: Creating Wealth and Managing Risk – The Employment Relationship in the Internet and Tech Sector – Contact for the Internet and Tech Sector - Business Assets in Information Age – Symbol and Trademark – Trolls and Landmines and other Metaphors

Unit 4
Regulatory, Compliance and Liability Issues – State Privacy Law - Date Security – Privacy issues - Controlling Over use or Misuse of Intellectual Property Rights

Books:
3. Cyber Law. Texts & Cases, South-Western’s Special Topics Collections