COURSE TITLE : **PROJECT WORK AND SEMINAR**
COURSE CODE : **6009a**
COURSE CATEGORY : **A**
PERIODS/WEEK : **6**
PERIODS/SEMESTER : **90**
CREDITS : **10**

TIME SCHEDULE

MODULE	TOPIC	PERIODS
I		
II		
III		
IV		
TOTAL		

1. To develop design of a multi storeyed building.
2. To implement structural planning. And site planning
3. To enhance team spirit and creative talents for achieving a goal.

Selection of Project:
1. Select programme related project which has relevance to today's industry, preferably
with a social relevance.
2. Suggested type of Projects :
        a. Providing technical service to industry
        b. Entrepreneurship development
3. Project should be feasible at Diploma level and economically viable
4. Only projects which can be developed by the Diploma students need be selected. Support
of external agencies not permitted

Guidelines for Project Work:
1. Suitable batches may be formed with 3 – 5 students per batch
2. The programme of the project work should be monitored at least once a week and
progress may be documented
3. Involvement of each student should be ensured

Format for the preparation of Project work :
1. Cover Page as per format
2. Acknowledgement
3. Certificate of the Project Guide
4. Synopsys of the Project
5. Main Report
        - Objective & Scope of the Project
        - Theoretical Background
        - Definition of Problem
        - Methodology adopted, System Implementation & Details
         -Hardware/Software/Machinery/Equipment/used

COURSE TITLE : ADVANCED MICROPROCESSORS
COURSE CODE : 6041
COURSE CATEGORY : A
PERIODS/WEEK : 5
PERIODS/SEMESTER : 75/6
CREDITS : 5

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Architecture of Intel 8086.	19
2	Programming of 8086 & Interrupt Processing.	19
3	Intel 80386 and Pentium.	19
4	Introduction to Multicore Processors.	18
	Total	**75**

Course General Outcome :

Module	GO	On completion of the study of this course the students will be able :
1	1	To understand the architecture of Intel 8086.
2	2	To understand interrupt processing in 8086.
	3	To understand programming of 8086.
3	4	To understand the architecture of 80386.
	5	To understand the architecture of Pentium.
4	6	To understand hyper threading technology and multicore processors.

  GO - General Outcome

On the completion of the study the student will be able :

MODULE I ARCHITECTURE OF INTEL 8086

1.1.0 To understand the Architecture of Intel 8086.

  1.1.1 To list the main features of Intel 8086.

  1.1.2 To explain the internal architecture of Intel 8086.

1.1.3   To explain memory segmentation in 8086.

1.1.4   To explain physical address generation in 8086.

1.1.5   To describe the register set of 8086.

1.1.6   To illustrate the Flag register in 8086.

1.1.7   To describe the pin functions of 8086.

1.1.8   To explain the minimum mode and maximum mode configurations of 8086.

MODULE II   PROGRAMMING OF 8086 AND INTERRUPT PROCESSING

2.1.0   To understand Interrupt Processing in 8086.

2.1.1   To state the sources of interrupts in 8086.

2.1.2   To explain interrupt response in 8086.

2.1.3   To illustrate interrupt vector table.

2.1.4   To explain the types of interrupts in 8086.

2.2.0   To understand Programming of 8086

2.2.1   To define addressing mode.

2.2.2   To explain the data addressing modes of 8086.

2.2.3   To classify 8086 instructions.

2.2.4   To describe the instructions of 8086.

2.2.5   To define assembler.

2.2.6   To define assembler directives.

2.2.7   To describe the commonly used assembler directives.

2.2.8   To write simple assembly language programs using assembler directives.

MODULE III   INTEL 80386 AND PENTIUM

3.1.0   To understand the Architecture of 80386.

3.1.1   To list the key features of Intel 80386.

3.1.2   To explain the internal architecture of 80386.

3.1.3   To explain the operating modes of 80386.

3.1.4   To describe paging mechanism in 80386.

3.1.5   To explain address translation in PVAM (non paged and paged modes).

3.2.0   To understand the Architecture of Pentium.

3.2.1   To list the main features of Pentium processor.

3.2.2   To explain the internal architecture of Pentium processor.

3.2.3   To list the operating modes of Pentium processor.

3.2.4   To list the main features of Pentium-Pro processor.

MODULE IV   INTRODUCTION TO MULTICORE PROCESSORS

4.1.0   To understand hyper threading technology and multicore processors.

4.1.1   To describe the concept of hyper threading technology.

4.1.2   To define core.

4.1.3   To identify the limitations of single core processor.

4.1.4   To state the concept of multi core processing.

4.1.5   To distinguish between homogeneous and heterogeneous multicore processors.

4.1.6   To differentiate single core and multicore processors with general block diagrams.

4.1.7   To list the advantages of multicore technology.

4.1.8   To state the major issues in multicore processing.

4.1.9   To explain the internal architecture of Intel Core2 Duo.

4.1.10   To list the important technological features of IA processors.

4.1.11   To differentiate between Core i3, i5 and i7 processors.

COURSE CONTENTS

MODULE I   Architecture of 8086

Features of Intel 8086 - Internal architecture of Intel 8086 - Memory segmentation - Physical address generation - Register set of 8086 - Flag register - Pin functions - Minimum mode and maximum mode configurations.

MODULE II   Programming of 8086 and interrupt processing

Sources of interrupts in 8086 - interrupt response - interrupt vector table - types of interrupts - addressing mode - data addressing modes of 8086 - classification of 8086 instructions - instructions of 8086 (description only) - assembler - assembler directives - commonly used assembler directives (ASM 86) - simple assembly language programs.

MODULE III   Intel 80386 and Pentium

Key features of Intel 80386 - internal architecture of 80386 - operating modes - paging mechanism - address translation in PVAM (non paged and paged modes) - features of Pentium processor - internal architecture of Pentium processor - list of operating modes - features of Pentium-Pro processor.

MODULE IV   Introduction to multicore processors

Hyper threading technology - define core - limitations of single core processor - concept of multi core processing - advantages - homogeneous and heterogeneous multicore processors - single core and multicore processors comparison - major issues in multicore processing - internal architecture of Intel Core2 Duo (Simple block diagram only) - important technological features of IA processors - comparison of Core i3, i5 and i7 processors.

Text Books

1. Microprocessors and Interfacing - Douglas V Hall – TMH.

2. The x86 Microprocessors - Second Edition - Lyla B Das – Pearson.

3. Microcomputer Systems: The 8086/8088 Family - Yu Cheng Liu and Glen A Gibson – PHI.

4. Microprocessor 8086 Programming & Interfacing - A Nagoor Kani - RBA Publications.

COURSE TITLE   : COMMUNICATION SYSTEMS
COURSE CODE   : 6042
COURSE CATEGORY   : A
PERIODS PER WEEK   : 5
PERIODS PER SEMESTER : 75/6
CREDITS   : 5

TIME SCHEDULE

MODULE	TOPIC	PERIODS
1	Microwave communication	19
2	Satellite communication	19
3	Optical fibre communication	18
4	Mobile communication	19
	TOTAL	**75**

Course General Outcome :

MODULE	GO	On completion of the study of this course the students will be able :
1	1	To understand the working of microwave devices
	2	To understand the function of microwave transmission system
2	3	To understand the satellite communication system
	4	To know the transmission devices in satellite communication system
3	5	To understand fibre optics communication system
	6	To understand the working of fibre optic devices
4	7	To understand mobile communication system
	8	To understand various mobile technologies

GO - General Outcome

On completion of the study of this course the students will be able :

MODULE I MICROWAVE COMMUNICATION

1.1.0 To understand the working of microwave devices

    1.1.1   To explain the concept of microwave communication
    1.1.2   To explain the working of reflex klystron, magnetron and TWT
    1.1.3   To explain the working of gunn diode and tunnel diode
    1.1.4   To describe the function of wave guides and horn antenna

1.2.0   To understand the function of microwave transmission system

1.2.1   To explain the function of microwave transmitter
      1.2.2   To explain microwave repeater
      1.2.3   To explain microwave receiver

MODULE II   SATELLITE COMMUNICATION

2.1.0   To understand the satellite communication system

      2.1.1   To explain the principle of satellite communication with block diagram
      2.1.2   To explain FDMA, TDMA and CDMA
      2.1.3   To compare FDMA, TDMA and CDMA
      2.1.4   To write the advantages and disadvantages of FDMA, TDMA and CDMA
      2.1.5   To describe communication satellite orbit
      2.1.6   To describe geostationary satellite

2.2.0   To know the transmission devices in satellite communication system

      2.2.1   To explain various equipments used in satellite earth station
      2.2.2   To describe dish antenna
      2.2.3   To list applications of satellite
      2.2.4   To explain direct-to-home (DTH) satellite television
      2.2.5   To describe direct broadcast services (DBS)
      2.2.6   To describe GPS navigation system
      2.2.7   To describe geographic information system (GIS)

MODULE III   OPTICAL FIBRE COMMUNICATION

3.1.0   To understand fibre optics communication system

      3.1.1   To explain the block diagram of fibre optic communication system
      3.1.2   To list advantages of fibre optic communication
      3.1.3   To explain acceptance angle and numerical aperture
      3.1.4   To explain single mode, multimode and graded index fibres
      3.1.5   To explain cable losses

3.2.0   To understand the working of fibre optic devices

      3.2.1   To explain optical sources; LED and Lasers
      3.2.2   To explain the working of PIN diode and avalanche diodes as optical receivers
      3.2.3   To explain the application of fibre optics in data communication

MODULE IV   MOBILE COMMUNICATION

4.1.0   To understand mobile communication system

    4.1.1   To write the advantages and applications of mobile communication
    4.1.2   To explain the concept of cell, frequency reuse
    4.1.3   To explain the operation of cellular network
    4.1.4   To explain handoff strategies and channel fading
    4.1.5   To explain the GSM network architecture

4.2.0   To understand various mobile technologies

    4.2.1   To describe the GSM standards
    4.2.2   To explain CDMA technology
    4.2.3   To compare GSM and CDMA
    4.2.4   To describe RFID
    4.2.5   To explain the concept of Wi-Fi
    4.2.6   To explain Wi-Max
    4.2.7   To list the features and applications of Wi-Max
    4.2.8   To compare Wi-Fi and Wi-Max
    4.2.9   To describe Bluetooth
    4.2.10 To describe 3G and 4G mobile technologies

CONTENT DETAILS

MODULE I   Microwave communication

Introduction to microwave communication - characteristics - frequency bands - transit time effect - microwave devices - reflex klystron - magnetron- TWT - gunn diode - tunnel diode - wave guides - types - horn antennas - microwave transmitter - microwave repeater - receiver

MODULE II   Satellite communication

Satellite communication block diagram up-link and down-link transponder - modulation - FDMA, TDMA, CDMA - communication satellite orbits - concepts of geo stationary synchronous satellite - earth station - block diagram explanation of earth station - dish antenna - applications of satellite systems - direct-to-home (DTH) satellite television - direct broadcast services (DBS) - GPS navigation system - geographic information system (GIS)

MODULE III   Optical fibre communication

Fiber optic system - block diagram, advantages - optical fibers - refraction, acceptance angle, numerical aperture - single mode vs multimode - grade index fiber, cable losses - optical sources - LED, LASERs - optical detectors - PIN diodes - avalanche diodes - application in data communication

MODULE IV   Mobile communication

Mobile communication - advantages - applications - operation of cellular networks - concept of cell, frequency reuse - handoff strategies and channel fading - GSM network architecture - GSM standards - CDMA technology - RFID - concept of Wi-Fi - Wi-Max - features and applications Wi-Fi and Wi-Max comparison - bluetooth - principles of operation - 3G and 4G mobile technologies - comparison

Text Book

1. Microwave Devices & Circuits- Samuel Y. Liao – 3rd Edition - PHI
2. Optical Fiber Communication - John Senior - 3rd Edition - PHI
3. Wireless Communication - Theodore S. Rappaport – 2nd Edition - PHI
4. Mobile communication - Jochen Schiller – Pearson

Reference

1. Electronic communication systems - George Kennedy, Robert J Schoenbeck
2. Electronic communication - Roy Blake - 2nd Edition - Thomson and Delmar
3. Satellite Communication - Roddy
4. Satellite Communication - Timothy Pratt
5. Fiber-Optic Communication Systems- 3rd Edition – Govind P. Agrawal - Wiley
6. Mobile and personal communication systems and service - Raj Pandya

COURSE TITLE   **: COMPUTER HARDWARE AND NETWORKING**
COURSE CODE   **: 6043**
COURSE CATEGORY **: A**
PERIODS PER WEEK **: 5**
PERIODS PER SEMESTER **: 75/6**
CREDITS   **: 5**

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TIME SCHEDULE

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MODULE	TOPIC	PERIODS
1	Power supply and I/O devices.	19
2	Motherboard organisation.	18
3	Storage devices and ESD.	19
4	Computer networks.	19
	TOTAL	**75**

Course General Outcome :

Module	GO	On completion of the study of this course the students will be able:
1	1	To understand power supplies used in computer system.
	2	To understand the I/O devices of computer.
2	3	To understand motherboard organisation.
3	4	To understand magnetic and optical storage devices.
	5	To know the basics of electrostatic discharge.
4	6	To understand computer networks.
	7	To understand internet and wireless networks.

    GO - General Outcome

On the completion of the study the student will be able :

MODULE I POWER SUPPLY AND I/O DEVICES.

1.1.0 To understand power supplies used in computer system.

  1.1.1 To explain the block diagram of an ATX SMPS.

1.1.2 To list the advantages of SMPS.

1.1.3 To state voltage levels of various SMPS used in computer.

1.1.4 To identify AT and ATX power connectors for various components in a PC.

1.2.0 To understand the I/O devices of computer.

1.2.1 To describe I/ O Devices.

1.2.2 To describe the display adapter/display controllers used in PC.

1.2.3 To explain the display adapters VGA, SVGA, XGA.

1.2.4 To state the basics of LED, LCD.

1.2.5 To identify the pin configuration of various display adapters.

1.2.6 To explain the block diagram of a VGA monitor.

1.2.7 To describe AGP, PCI Express (PCIe) and their advantages.

1.2.8 To explain the matrix keyboard organization and the method of encoding a key press.

1.2.9 To state the concept of keyboard controllers.

1.2.10 To identify different keyboard connectors - 5 pin DIN, mini DIN (ps/2), USB.

1.2.11 To explain the working principle of optical mouse.

1.2.12 To describe mouse connectors - serial, PS/2, USB, wireless.

1.2.13 To explain the working principle of scanners (flat bed, hand held) and digital camera.

1.2.14 To distinguish between impact and non impact printers.

1.2.15 To explain the working principle of different types of printers - dot matrix, inkjet, laser printers.

1.2.16 To describe the centronics Interface and USB interface.

MODULE II   MOTHERBOARD ORGANISATION

2.1.0 To understand motherboard organisation.

2.1.1 To state different motherboard form factors.

2.1.2 To explain the block diagram of ATX motherboard organization.

2.1.3 To describe microprocessors based on year of design, coprocessors, speed, address lines, data lines, address space.

2.1.4 To describe RAM, DRAM, SRAM, SDRAM, DDRAM, RDRAM.

2.1.5 To state memory refreshing.

2.1.6 To describe various memory modules - SIMM, DIMM and RIMM.

2.1.7 To explain the need for cache memory and its classification.

2.1.8 To describe the chipsets and support chips, CMOS chip - CMOS setup – BIOS.

2.1.9 To explain the mechanism of POST.

2.1.10 To describe various expansion cards - I/O card, graphics card, sound card, network interface card, internal modem.

2.1.11 To explain ROM - PROM, EPROM, EEPROM, UVEPROM and EAPROM.

2.1.12 To identify firmware.

MODULE III   STORAGE DEVICES AND ESD

3.1.0   To understand magnetic and optical storage devices.

    3.1.1   To describe FAT, boot sector, directory area, data area.
    3.1.2   To explain various file systems - FAT16, FAT32, New Technology File System(NTFS), High Performance File System(HPFS), Linux file system.
    3.1.3   To state the terms track, sector, cluster and cylinder of a hard disk.
    3.1.4   To explain the construction of a hard disk.
    3.1.5   To state the terms seek time and latency time.
    3.1.6   To describe hard disk controller.
    3.1.7   To state the need for formatting.
    3.1.8   To explain low level and high level formatting.
    3.1.9   To state the need for partitioning of disk.
    3.1.10 To describe the procedure and tools of partitioning.
    3.1.11 To explain the optical recording techniques.
    3.1.12 To know the trends in optical media - CDROM, CD-R, CD-RW.
    3.1.13 To compare CD, DVD and blue ray.
    3.1.14 To know USB drives - pen drive and external hard drive.

3.2.0   To know the basics of electrostatic discharge.

    3.2.1   To state the term ESD.
    3.2.2   To describe the causes of ESD.
    3.2.3   To describe the types of ESD - spark, corona discharge and brush discharge.
    3.2.4   To describe the methods for preventing ESD.
    3.2.5   To describe antistatic devices - ESD wrist strap, antistatic bag, antistatic mat and antistatic spray.

MODULE IV   COMPUTER NETWORKS

4.1.0   To understand computer networks.

    4.1.1   To state the need for networking and components of networking.
    4.1.2   To explain ISO-OSI 7 layer reference model.
    4.1.3   To explain different network topologies - star, ring, mesh, tree and bus.
    4.1.4   To distinguish different networks - LAN, MAN and WAN.
    4.1.5   To describe various guided transmission medias - coaxial, twisted pair and optical fibre.
    4.1.6   To describe various unguided transmission medias - satellite and microwave.
    4.1.7   To explain dial-up modem and cable modem.
    4.1.8   To explain the operation of hub and switch.
    4.1.9   To explain the structure and ISO-OSI 7 layer models of router, bridge and gateway.

To understand internet and wireless networks.

  4.2.1 To describe the concept of Internet and applications.
  4.2.2 To explain TCP/IP protocols architecture.
  4.2.3 To describe the concept of e-mail, World Wide Web and WML.
  4.2.4 To explain Digital Subscriber Line (DSL).
  4.2.5 To explain Virtual Private Network.
  4.2.6 To explain the Wireless LAN Standards - architecture and service.
  4.2.7 To describe infrared LAN, spread spectrum LAN, and narrowband microwave LAN.
  4.2.8 To describe the concept of wireless access point, wireless node, Wi-Fi and Bluetooth.

CONTENTS

MODULE I Power supply and I/O devices

SMPS - block diagram - advantages - voltage levels of various SMPS - AT and ATX power connectors - I/O Devices - display adapter/display controllers - VGA, SVGA, XGA - pin configuration - basics of LED, LCD - VGA monitor block diagram - AGP and PCIe - advantages - matrix keyboard organization - method of encoding a key press - keyboard controllers - keyboard connectors - 5 pin DIN, mini DIN (ps/2), USB - optical mouse - connectors - serial, PS/2, USB, wireless - scanners (flat bed, hand held) and digital camera - printers - impact and non impact printers - dot matrix, inkjet, laser printers - centronics interface and USB interface

MODULE II Motherboard organisation

Motherboard - form factors - block diagram of ATX motherboard - comparison of microprocessors - RAM, DRAM, SRAM, SDRAM, DDRAM, RDRAM - memory refreshing - memory modules - SIMM, DIMM and RIMM - cache memory - types - CMOS chip - CMOS setup - BIOS - POST - expansion cards - I/O card, graphics card, sound card, network - interface card, internal modem - ROM - PROM, EPROM, EEPROM, UVEPROM and EAPROM - firmware

MODULE   III Storage devices

FAT - boot sector, directory area, data area - file systems - FAT16, FAT32, New Technology File System (NTFS), high performance file System (HPFS), linux file system - hard disk - track, sector, cluster and cylinder - construction - hard disk controller - seek time and latency time - formatting - low level and high level formatting - partitioning - optical recording - optical media - CDROM, CD-R, CD-RW - comparison of CD and DVD - blue ray disk - USB Drives - pen drive and external hard drive - ESD - causes - types - spark, corona discharge and brush discharge - methods for preventing ESD - antistatic devices - ESD wrist strap, antistatic bag, antistatic mat and antistatic spray

MODULE IV Computer networks

Need for networking - ISO-OSI 7 layer reference model - network topologies - star, ring, mesh, tree and bus - networks - LAN, MAN and WAN - guided transmission medias - coaxial, twisted pair and optical fibre - unguided transmission medias - satellite and microwave - dial - up and cable modems - hub and switch - router, bridge and gateway - TCP/IP - concept of e-mail, World Wide Web and WML - digital subscriber line (DSL) - Virtual Private Network - wireless LAN standards - architecture and service - infrared LAN - spread spectrum LAN - narrowband microwave LAN - wireless access point - wireless node - Wi-Fi and Bluetooth

Text Book

1. Troubleshooting, maintaining and repairing PCs - Stephen J Bigelow.
2. Data and Computer Communications - William Stallings.
3. A + Exam Guide - 2nd edition - Christopher A Crayton - Course Technology.

COURSE TITLE   : DIGITAL SIGNAL PROCESSING
COURSE CODE   : 6044
COURSE CATEGORY   : E
PERIODS/WEEK   : 4
PERIODS/SEMESTER   : 60
CREDITS   : 4

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Signals and Systems	15
2	Fourier and Z Transform	15
3	Fast Fourier Transform	15
4	Digital Signal Processor	15
TOTAL		**60**

Course General Outcome:

MODULE	G.O.	ON COMPLETION OF THE STUDY OF THIS COURSE THE STUDENTS WILL BE ABLE:
1	1	To understand different types of signals and signal operations
	2	To know different classification of systems
2	3	To understand Fourier and Z Transform
3	4	To understand Fast Fourier Transform
4	5	To understand Digital signal Processor

G.O - General Outcome
On the completion of the study the student will be able:

MODULE I SIGNALS AND SYSTEMS

1.1.0   To understand different types of signals and signal operators
    1.1.1   To describe Discrete time signals
    1.1.2   To define unit impulse, unit step , ramp and exponential signals
    1.1.3   To describe Sinusoidal signals, periodic and aperiodic signals
    1.1.4   To describe Even and odd signal, causal and non causal signal
    1.1.5   To explain Shifting, time reversal and time scaling operator
    1.1.6   To explain Scalar multiplication and signal multiplication
    1.1.7   To explain Addition operator
1.2.0   To know different classification of systems
    1.2.1   To explain discrete time system, linear and non linear, causal and non causal system
    1.2.2   To describe Time variant and time invariant system
    1.2.3   To define LTI system
    1.2.4   To explain the block diagram of a DSP system
    1.2.5   To list the advantage of DSP system

MODULE II FOURIER AND Z TRANSFORM

2.1.0 To understand Fourier and Z Transform
- 2.1.1 To Describe discrete Fourier series
- 2.1.2 To describe discrete Fourier transform
- 2.1.3 To find DFT of unit impulse and other dc signal, sinusoidal signal
- 2.1.4 To list properties of DFT
- 2.1.5 To state Linearity and periodicity, circular shift and symmetry
- 2.1.6 To explain circular convolution
- 2.1.7 To define Z Transform
- 2.1.8 To discuss Z transform of unit step, unit impulse and sinusoidal signal
- 2.1.9 To discuss properties of Z transform; linearity, left shift ,right shift
- 2.1.10 To explain convolution, Multiplication by $a^n u(n$, initial value theorem and final value theorem
- 2.1.11 To discuss inverse Z transform
- 2.1.12 To list the types inverse Z transform
- 2.1.13 To find inverse Z transform by partial fraction method – simple problems

MODULE III FAST FOURIER TRANSFORM

3.1.0 To understand Fast Fourier Transform
- 3.1.1 To explain Decimation in time
- 3.1.2 To discuss 4 point and 8 point FFT using radix 2 DIT block diagram
- 3.1.3 To draw 8 point FFT using radix 2 DIT butterfly diagram
- 3.1.4 To explain decimation in frequency
- 3.1.5 To discuss 4 point and 8 point FFT using radix 2 DIF block diagram
- 3.1.6 To draw 8 point FFT using radix 2 DIF butterfly diagram

MODULE IV DIGITAL SIGNAL PROCESSOR

4.1.0 To understand Digital signal Processor
- 4.1.1 To describe FIR filters
- 4.1.2 To explain about FIR filter coefficients
- 4.1.3 To describe about FIR windows
- 4.1.4 To describe IIR filters
- 4.1.5 To explain about IIR filter coefficients
- 4.1.6 To discuss the overview of Digital signal processors
- 4.1.7 To describe the selection of digital signal processor
- 4.1.8 To explain architectural features, execution speed, type of arithmetic, word length
- 4.1.9 To explain the Texas DS processor TMX320c50 DSP
- 4.1.10 To describe the addressing Modes of TMX320c50 DSP
- 4.1.11 To list the DSP applications

CONTENTS

MODULE I   SIGNALS AND SYSTEMS

Classification of signals- discrete time signals- unit step –unit ramp-unit impulse, exponential sequence,sinusoidal signal - periodic and non periodic signals,even and odd signals - causal and non-causal signal, operation of signal –shifting, time reversal , time scaling, scalar multiplication, signal multiplier, addition, discrete time system – classification – linear and nonlinear system – causal and non-causal system – time variant and time invariant system, LTI system - block diagram of a DSP system – advantages of a DSP system

MODULE II FOURIER AND Z TRANSFORM

Fourier series- fundamentals - Discrete Fourier transform- DFT of unit impulse, unit step signal, sinusoidal signal, properties of DFT- linearity- periodicity- circular shift – symmetry property- circular convolution of time domain signal- circular convolution of frequency domain ,Z- transform- Z-transform of unit step- unit impulse – sinusoidal, property of z- transform- linearity – left shift of a signal- right shift of a signal- convolution – multiplication by $a^n u(n)$ – initial value theorem – final value theorem , inverse z- transform

MODULE III FAST FOURIER TRANSFORM

Decimation in Time(DIT) – 4 point and 8 point FFT using radix 2 DIT FFT- flow graph for 8 point DFT, Decimation in Frequency(DIF)- 4 point and 8 point FFT using radix 2 DIF FFT, comparison of DIT and DIF.

MODULE IV DIGITAL SIGNAL PROCESSOR

Filters – types - FIR filter – coefficients - FIR windows, IIR filters – coefficients, Overview of a digital signal processor – selecting a digital signal processor- architecture of Texas Instruments- TMX320c50 DSP – CPU – Central ALU – Parallel Logic Unit – Auxiliary Register -Arithmetic unit- index Register- Aux. Reg Compare Reg. - Block move address register – status register- program controller- program counter – on chip memory – on chip peripherals, addressing modes, Applications of DSP

TEXT BOOK

1. Digital Signal Processing – Salivahanan – TMH - 2nd Edition
2. Digital Signal Processing - P Ramesh Babu , Scitech - 4 th Edition

REFERENCE

1. Digital Signal Processing – Nagoor Kani – TMH
2. Digital Signal Processing – Alan V Oppenheim, Ronald W Schafer (Pearson)
3. A Text book of Digital Signal Processing – R S Kaler, M Kulkarni, Umesh Gupta(I K International publishing company, NewDelhi)

COURSE TITLE   : RADAR AND NAVIGATION
COURSE CODE   : 6045
COURSE CATEGORY   : E
PERIODS/WEEK   : 4
PERIODS/SEMESTER   : 60/6
CREDITS   : 4

TIME SCHEDULE

Module	Topics	Periods
1	Introduction to Radar	15
2	Types of Radar	15
3	Navigation	15
4	Approach and Landing Aids	15
	Total	**60**

Course general outcome :

Module	GO	On completion of the study of this course the students will be able :
1	1	To understand the concept of Radar , its applications and different Radar performance factors
2	2	To understand the operation of FM - CW Radar
	3	To understand the operation of MTI & Pulse Doppler Radar
3	4	To understand the concept of Navigation and types of radio navigation
4	5	To understand the two types of landing systems
	6	To understand satellite navigation systems

GO - General Outcome

On the completion of the study the student will be able :

MODULE - I - INTRODUCTION TO RADAR

1.1.0 To understand the concept of Radar, its applications and different Radar performance factors

    1.1.1   To describe the block diagram of Radar
    1.1.2   To state the Radar frequency ranges
    1.1.3   To list the applications of Radar

1.1.4   To derive Radar range equation

1.1.5   To explain the Radar performance factors

MODULE - II - TYPES OF RADAR

2.1.0   To understand the operation of FM -CW Radar

2.1.1   To explain Doppler effect with equation (no derivation)

2.1.2   To explain the block diagram of FM - CW Radar

2.1.3   To explain the block diagram of FM - CW super heterodyne receiver

2.2.0   To understand the operation of MTI & Pulse Doppler Radar

2.2.1   To explain the operation of MTI Radar

2.2.2   To explain the operation and block diagram of MTI Radar employing power amplifier

2.2.3   To explain the operation of delay line cancellers

2.2.4   To explain the block diagram of MTI Signal Processor

2.2.5   To describe the operation of Pulse Doppler Radar

2.2.6   To explain Tracking Radar and list out its types

2.2.7   To explain the types of Radar displays

MODULE - III - RADIO NAVIGATION

3.1.0   To understand the concept of Navigation and types of radio navigation

3.1.1   To define the concept of navigation

3.1.2   To describe the four methods of navigation

3.1.3   To explain the working of loop antenna and Goniometer

3.1.4   To explain the working principle of ADF / NDB – Radio compass ADF, VHF phase comparison ADF

3.1.5   To explain the working principle of hyperbolic navigation systems – LORAN, Omega, DECCA

3.1.6   To explain the principle of different types of radio ranges - VOR, Doppler VOR, DME

MODULE - IV - APPROACH AND LANDING AIDS

4.1.0   To understand the two types of landing systems

4.1.1   To explain the function of components in an Instrument Landing System (ILS) with the help of diagram

4.1.2   To explain the significance of glide slope and markers

4.1.3   To explain Microwave Landing System (MLS)

4.1.4   To Understand satellite navigation systems

4.1.5   To state the basic principle of INS and DNS
4.1.6   To explain the basic ideas of GPS and DGPS
4.1.7   To explain GNSS and its classification

CONTENT DETAILS

Module - I Introduction to Radar

Radar – concept - block diagram – operation – frequency ranges – applications – range equation – derivation (no problems) - Radar performance factors – minimum detectable signal -receiver noise – Signal to Noise ratio -Radar cross section of targets – transmitter power – pulse repetition frequency – range ambiguities

Module - II - Types of Radar

Doppler effect - FM - CW Radar - FM - CW Radar with super heterodyne receiver – block diagram - MTI Radar - MTI Radar with power amplifier transmitter -delay line cancelers - MTI Signal Processor - Pulse Doppler Radar - Tracking Radar – basic block diagram – types - Radar displays – A Scope – PPI Scope

Module - III - Radio Navigation

Navigation - methods of navigation - Radio direction finder - loop antenna – goniometer - Radio Navigation systems - ADF / NDB – Radio compass ADF, VHF phase comparison using ADF - Hyperbolic navigation systems – basic principle - LORAN, Omega, DECCA - Radio ranges – VOR – ground equipment – VOR receiver - Doppler VOR – DME

Module - IV - Approach and landing aids

Instrument Landing System (ILS) – elements – localizer - glide slope – marker beacons -lighting systems – operation – limitation - Microwave Landing System (MLS) – operation – advantages – disadvantages - Navigation systems – INS – DNS -
Satellite Navigation systems – GPS – DGPS – GNSS – COMPASS – DORIS – GALILEO – IRNSS – QZSS (concept only)

Text Book

1.   Introduction to Radar Systems – Merrill I. Skolnik – McGraw Hill

Reference

1.   Radar Systems and Radio Aids to Navigation – Dr. A. K. Sen, Dr. A. B. Bhattacharya Khanna Publishers
2.   Elements of Electronic Navigation – N. S. Nagaraja – Tata McGraw Hill
3.   Radar, Sonar and Navigation Engineering – K. K. Sharma – Katson Books

COURSE TITLE   : TELEVISION ENGINEERING
COURSE CODE   : 6046
COURSE CATEGORY   : E
PERIODS PER WEEK   : 4
PERIODS PER SEMESTER : 60/6
CREDITS   : 4

TIME SCHEDULE

Module	Topics	Periods
1	Audio systems	15
2	Fundamentals of color TV	15
3	Digital TV	15
4	Modern TV technologies	15
	Total	**60**

Course General outcome :

Module	GO	On completion of the study of this course the students will be able :
1	1	To understand the concepts of microphone and loudspeakers.
	2	To understand the basics of sound recording and reproduction.
2	3	To understand the basics of colour TV broadcasting.
	4	To understand the concept of CCD Camera.
3	5	To understand the characteristics of Digital TV system.
	6	To understand the concepts of colour picture tubes.
4	7	To understand different TV technologies.
	8	To know the operation of different types of displays.

GO - General Outcome

On completion of the study the student will be able :

MODULE I AUDIO SYSTEMS

1.1.0 To understand the concepts of microphone and loud speakers.

 1.1.1 To state the principle of operation of microphones
 1.1.2 To explain construction and characteristics of moving coil, ribbon, crystal and condenser microphones
 1.1.3 To state the principle of operation of loud speakers

1.1.4   To explain the construction and characteristics of moving coil, electro-dynamic type loud speakers

1.2.0   To understand the basics of sound recording and reproduction.

1.2.1   To explain with block diagram the audio Compact disc recording and reproduction.
1.2.2   To explain the working principle of Hi-Fi stereo system.
1.2.3   To explain the concept of Dolby system.
1.2.4   To explain with diagram PA system.

MODULE II FUNDAMENTALS OF COLOUR TV

2.1.0   To understand the basics of colour TV broadcasting.

2.1.1   To describe aspect ratio.
2.1.2   To describe with diagram composite video signal.
2.1.3   To explain luminance, hue and saturation.
2.1.4   To describe mixing of colours - additive mixing and subtractive mixing.
2.1.5   To illustrate colour difference signal.
2.1.6   To explain chromaticity diagram.
2.1.7   To describe the significance of selecting R-Y and B-Y signal.
2.1.8   To compare colour TV systems – NTSC, PAL, SECAM.
2.1.9   To explain the block diagram of PAL D encoder & decoder.

2.2.0   To understand the concept of CCD Camera.

2.2.1   To explain with figure the operation of CCD camera.

MODULE - III – DIGITAL TV

3.1.0   To understand the characteristics of Digital TV System.

3.1.1   To describe the basic principle of Digital TV.
3.1.2   To define Digital TV signals and parameters.
3.1.3   To explain the block diagram of Digital TV transmitter.
3.1.4   To describe MAC signals.
3.1.5   To explain advanced MAC signal transmission.
3.1.6   To explain the working of Digital TV receiver.
3.1.7   To explain the principles of Digital Video compression techniques, MPEG1, MPEG2, MPEG4.
3.1.8   To explain Video compression ITU-Standards.

3.1.9   To explain Digital TV recording techniques.

3.2.0   To understand the concepts of colour picture tubes.

3.2.1   To explain the construction and operation of PIL picture tube.
3.2.2   To explain the construction and operation of Delta gun picture tube.
3.2.3   To explain the construction and operation of Trinitron picture tube.

MODULE IV MODERN TV TECHNOLOGIES

4.1.0   To understand different TV technologies.

4.1.1   To explain HDTV standards and system.
4.1.2   To explain block diagram of HDTV transmitter.
4.1.3   To explain block diagram of HDTV receiver.
4.1.4   To describe Digital TV satellite Systems.
4.1.5   To explain CCTV system.
4.1.6   To explain CATV system.
4.1.7   To explain Direct to home TV.
4.1.8   To explain set top box.
4.1.9   To explain CAS.

4.2.0   To know the operation of different types of displays.

4.2.1   To describe LCD
4.2.2   To describe LED display
4.2.3   To describe OLED display
4.2.4   To compare the different types of displays

CONTENT DETAILS

Module I Audio Systems

Microphone - characteristics – types - principle of operation - construction - applications - moving coil – ribbon - crystal – Condenser - loud speakers - characteristics – types – principle of operation - construction – comparison - moving coil – Electro-dynamic type - Compact disc -optical recording – playback - block diagram – advantages – disadvantages - Hi-Fi system – requirements – Hi-Fi stereo system – block diagram - noise reduction system - Dolby A - Dolby B - PA system – block diagram – requirements.

Module II Fundamentals of Colour TV

Television basics - factors of TV systems - aspect ratio - composite video signal - signal transmission and channel bandwidth etc - colour fundamentals - luminance – hue – saturation - mixing of colours - additive mixing and subtractive mixing - colour difference signal - chromaticity diagram - significance of selecting (R-Y) and (B-Y) signal - Colour TV systems – NTSC, PAL, SECAM (comparison only) – PAL D encoder & decoder- CCD camera – operation.

Module III Digital TV

Digital TV - Introduction – principle - signals and parameters – Transmitters - MAC signals - advanced MAC signal transmission - digital TV receivers - basic principles of digital Video compression techniques - MPEG1 - MPEG2 - MPEG4 - video compression ITU - Standards(H) - digital TV recording techniques – colour picture tube – PIL- Delta gun – Trinitron - operation.

Module IV Modern TV technologies

HDTV standards and systems - HDTV transmitter and receiver/encoder - Digital TV satellite Systems - video on demand – CCTV – CATV - direct to home TV - set top box with recording facility - conditional access system (CAS) - Displays devices - LCD - LED - OLED - operation – comparison.

TEXT BOOK

1. Modern Television Practice Transmission, Reception and Applications - Fourth edition - R R Gulati - New Age International Publishers.
2. Audio and Video Systems Principles, Maintenance and Troubleshooting – R G Gupta - Tata McGraw Hill.

REFERENCES

1. Audio Video and TV Engineering Consumer Electronics - Ajay Sharma - Dhanpat Rai and Co.
2. Consumer Electronics – Bali
3. Monochrome and Colour Television - R R Gulati - New Age International Publishers.
4. Television and Video Engineering - A M Dhake - Tata McGraw Hill.

COURSE TITLE : HDL & MAT LAB
COURSE CODE : 6048
COURSE CATEGORY : A
PERIODS/WEEK : 5
PEIODS/ SEMESTER : 75/6
CREDITS : 3

On completion of the course, the student will be able:

1. To write simple programs in Verilog HDL and test them using simulator Software and implement it into an FPGA kit (Gate level, Data flow and behaviour level)

      a) Basic gates (Gate level, Data flow and behaviour level)

      b) 4 to 1 multiplexer

      c) Decoder

      d) Full adder

      e) 4 bit full adder

      f) D flip-flop

      g) JK flip-flop

      h) Ripple counter

      i) Shift Register

2. To write MATLAB programs and simulate using command prompt and script

      a) To perform basic matrix operations (addition, subtraction, multiplication, division & inverse) using command prompt.

      b) To find solution to linear equations using script editor.

      c) To determine eigen values and eigen vectors of a square matrix using command prompt.

      d) To determine the roots of a polynomial using script editor.

      e) To plot 2D and 3D curves using command prompt and script editor.

      f) To differentiate and integrate a given function.

      g) To determine the time response of RLC circuits using simulink.

      h) To plot amplitude modulated wave by giving carrier, modulating signal and depth of modulation using simulink.

COURSE TITLE   : COMPUTER HARDWARE AND NETWORKING LAB
COURSE CODE   : 6049
COURSE CATEGORY   : A
PERIODS/WEEK   : 5
PERIODS/SEMESTER   : 75
CREDITS   : 3

LIST OF EXPERIMENTS

On completion of this course the students will be able:

1. To study the different parts of computer system

2. To study different parts of mother board - ATX

3. To study various types of connectors

4. To draw the pin details of various connectors

5. To assemble the computer systems

6. To study CMOS setup

7. To partition and format the hard disc

8. To install optical drive

9. To install the OS and application softwares (office automation, anti-virus, etc.)

10. To apply PC diagnostic tools

11. To install scanner

12. To install network card

13. To connect systems in network using switch

14. To connect the systems in peer to peer network

15. To install modem and connect to Internet

16. To prepare the UTP cable for cross and direct connections using crimping tool

17. To install domain controller OS

18. To install remote administration

19. To configure web server

20. To configure e-mail server

21. To configure e-mail client

22. To download and upload files using relevant protocol

23. To install and configure proxy server

24. To configure browser for Internet access using proxy server

25. To configure Virtual Private Network (VPN)

Troubleshooting

1. To trouble shoot computer crashes
2. To trouble shoot computer operation is slow
3. To trouble shoot start up issues
4. To trouble shoot Blue Screen Of Death(BSOD)
5. To trouble shoot chipset problems
6. To trouble shoot display related problems
7. To trouble shoot CMOS check sum errors
8. To trouble shoot registry problems
9. To trouble shoot optical drive related problems
10. To trouble shoot disk boot failure - hard disc related problems
11. To trouble shoot driver software problems
12. To trouble shoot sound card problems
13. To trouble shoot fatal error problems
14. To trouble shoot script error problems
15. To trouble shoot typomatic errors - keyboard problems
16. To trouble shoot mouse problems
17. To trouble shoot printer related problems
18. To trouble shoot scanner related problems
19. To trouble shoot system hanging after 5 minutes due to SMPS
20. To trouble shoot IDE port problem in mother board
21. To trouble shoot PCI slot problems
22. To trouble shoot network card errors
23. To trouble shoot network connectivity issues
24. To use network diagnostic software
25. To access network resources using net at command prompt