

V SEMESTER

COMPUTER HARDWARE & NETWORKING

Subject Title : Computer Hardware and Networking
Subject Code : CP-5301
Periods per Week : 04
Periods per Semester : 60

TIME SCHEDULE AND BLUEPRINT

| Sl. No | Major topics | No of PERIODS | Weightage of marks | Short type | | | Essay type | | |
|--------|---|---------------|--------------------|------------|---|------|------------|-----|-----|
| | | | | R | U | App. | R | U | App |
| | | Theory | | | | | | | |
| 1. | Computer Hardware | 20 | 26 | 2 | 0 | 0 | 0 | 2 | 0 |
| 2. | Networking components, Topologies & Network models | 10 | 16 | 2 | 0 | 0 | 0 | 1 | 0 |
| 3. | Data Link Layer | 10 | 21 | 2 | 0 | 0 | 0 | 1.5 | 0 |
| 4. | Network and Transport Layer | 10 | 21 | 2 | | 0 | 0 | 1.5 | 0 |
| 5. | Application layer | 10 | 26 | 2 | 0 | | | 2 | 0 |
| | TOTAL | 60 | 110 | 10 | | | 8 | | |

OBJECTIVES

On completion of the study of the course the student shall be able to

1.0 Understand Computer Hardware

- 1.1. Know meaning of PC Hardware, Software ,BIOS.
- 1.2. Know about POST and activities that take place during system start-up.
- 1.3. Identify various components present inside the cabinet and know their function (Mother Board, FDD, HDD, CD Drive, SMPS, various cables).
- 1.4. Identify various components present on the Mother Board and know their function (Microprocessor, chip-set, RAM, BIOS ROM, various connectors like Serial Port, Parallel Port, USB, AGP, FDD, HDD connectors).
- 1.5. Know about motherboard form factor and details of various form factors such as AT, ATX, micro ATX, NLX etc
- 1.6. Draw layout of components and I/O ports on a typical mother board and explain their function
- 1.7. Explain about functions of chipset and components of Intel 915, 945, 965 chipsets
- 1.8. Explain features of 4th Generation Intel Core Processors and AMD Accelerated Processors and know different Processor sockets like ZIF, SEC and PGA
- 1.9. Know about various memory technologies –SRAM, DRAM, SDRAM and DDR1, DDR2, DDR3 SDRAMs.
- 1.10. Know about RAM modules or packages like SIMM, DIMM and their specifications.
- 1.11. Know the constructional details and working of HDD.

- 1.12. Know the constructional details, writing and reading of data on CD-ROM, CD-R, CD-RW.
- 1.13. Know the differences between DVD and CD.
- 1.14. Know the operation of Optical Mouse.
- 1.15. Explain the operation of Dot Matrix, Inkjet, Laser Printers.
- 1.16. Explain the operation of LCD/TFT monitor.

2.0 Understand about Networking components ,Topologies & Network models : OSI & TCP/IP models

- 2.1. State the need for Networking.
- 2.2. List the Hardware and Software Components of Networking
- 2.3. Define LAN & WAN
- 2.4. Explain different network topologies (Bus, Star, Ring, Mesh, Hybrid)
- 2.5. Explain the working of token ring network.
- 2.6. Discuss FDDI and its properties.
- 2.7. Demonstrate about Coaxial Cables, Twisted-Pair Cables, Optical Fiber Cables, and Connectors.
- 2.8. State functions of LAN Devices : Repeaters, Hubs, Switches, Bridge, Network Interface Cards (NICs), Routers (CISCO, DAX, Etc.), Modem (56KBPS Internal or External, ADSL Modems etc.) and Gateways
- 2.9. Explain OSI Reference Model with emphasis on each layer
- 2.10. Explain TCP/ IP model with emphasis on each layer
- 2.11. Compare OSI and TCP/IP model

3.0 Understand Data Link Layer

- 3.1 Explain the design issues of data link layer:
 - (a) Services provided to network layer
 - (b) Framing
 - (c) Error control and flow control.
- 3.2 Explain elementary data link protocols.
 - (a) Simplex Stop and Wait protocol
 - (b) Sliding window protocols : Go-back-N protocol and Selective repeat
- 3.3. Explain the point-to-point protocol (PPP).
- 3.4. Explain HDLC protocol
- 3.5. Multiple Access protocols:
 - (a) List random access protocols
 - (b) List Controlled access protocols
 - (c) List Channelization protocols
 - (d) Explain CSMA/CD and CSMA/CA.
- 3.6. Discuss static and dynamic channel allocation in LANs and MANs.
- 3.7. List IEEE 802 standards
- 3.8. Explain IEEE 802 standard for wired LANs
- 3.9. Explain IEEE Standard 802.3 & Ethernet

- 3.10. Explain IEEE Standard 802.4 -Token Bus
- 3.11. Explain IEEE Standard 802.5 – Token Ring.
- 3.12. Explain Fiber Distributed Data Interface (FDDI)

3.13. MAC Sublayer:

- (a) Ethernet Cabling
- (b) Describe the concept of Ethernet MAC sub layer protocol
- (c) Explain MAC layer of Wireless LAN (IEEE 802.11 standard)

4.0 Understand Network and Transport Layer

- 4.1 Explain Network layer design issues.
 - (a) Store and Forward switching
 - (b) Services provided to the transport layer
 - (c) Implementation of connection less services and connection oriented services.
 - (d) Compare virtual circuits and datagram subnets.
- 4.2 Routing Algorithms:
 - (a) Define Non adaptive algorithm and Adaptive algorithm
 - (b) List various Routing algorithms.
 - (c) Explain about Shortest path routing
 - (d) Explain about distance vector routing
- 4.3 Define Congestion
- 4.4 Explain general principles of Congestion control
- 4.5 Explain the role of Network layer in the internet.
- 4.6 IP Addressing:
 - (a) Explain IP addressing and classes with examples
 - (b) Explain subnet masking .
 - (c) Explain format of IPv4 datagram
 - (d) State the need for IPv6
 - (e) Explain format of IPv6 datagram
- 4.7 Transport Layer
 - (a) Explain services provided to upper layers
 - (b) Explain the concept of connection establishment and release.
- 4.8 The Internet Transport protocols:
 - (a) Explain UDP header
 - (b) Explain TCP service model
 - (c) Explain TCP segment header
 - (d) Explain TCP connection establishment and release.

5.0 Understand Application layer

5.1 DNS

- (a) Explain DNS namespace
- (b) Explain the importance of Resource Records
- (c) Explain the role of DNS server

5.2 Email

- (a) Explain architecture and services
- (b) The User Agent
- (c) List Header fields related to message transport
- (d) List types and subtypes of MIME
- (e) Explain SMTP , POP3

- 5.3 World Wide Web
 - (a) Explain the architecture overview of World Wide Web
 - (b) Explain the importance of HTML, XML, XSL, XHTML
 - (c) Explain about HTTP protocol and HTTP commands
 - (d) Explain FTP
 - (e) Explain SMTP
 - (f) Explain Telnet
- 5.4 Multimedia services: VOIP
- 5.5 Explain about SNMP
- 5.6. Explain working of Virtual Private Networks (VPNs).and its protocols
- 5.7 Explain Network Monitoring and Troubleshooting and Remote Monitoring

COURSE CONTENTS

1.0 Computer Hardware

PC Hardware Software - Importance of BIOS and BIOS hardware interaction-POST and Bootstrap loading- Components inside the cabinet and know their function about Microprocessor, chip-set, RAM, BIOS ROM, Mother Board, FDD, HDD, CD Drive, SMPS, various connectors like Serial Port, Parallel Port, USB, AGP, FDD, HDD connectors- Motherboards based on the form factor -AT,ATX, micro ATX, mini ATX , Baby AT,BTX,NLX etc- Intel Chipsets – Intel 4th Generation Intel core Processor family – AMD Accelerated Processor Units - SMPS - RAM- Cache - L1, L2 Cache- Assembly and disassembly of Computer -Configuration and installation of Processor ,RAM, HDD, CDROM / DVD, Keyboard, mouse, monitor, and printer

Constructional details and working of a Hard disk Drive - Hard disk interfacing standards like IDE/SCSI /SATA / PATA - Installation and constructional details of a CD- RO- process of reading and writing of data on various disk drives like CD-ROM,CD- Writer, Combo drive , DVD Drive etc.- Principle of working of an optical and opto mechanical mouse -Working principle of LCD/TFT -Working principle of Dot matrix printer, inkjet printer and Laser printer

2.0 Networking components, Networking Topologies & Networking models - OSI and TCP/IP Model

Networking.- Hardware and Software Components of Networking-Define LAN & WAN-Network topologies (Bus, Star, Ring, Mesh, Hybrid)- token ring network.- FDDI and its properties- LAN Devices : Repeaters, Hubs, Switches, Bridge, Network Interface Cards (NICs), Routers (CISCO, DAX, Etc.), Modem (56KBPS Internal or External, ADSL Modems etc.) and Gateways
OSI Reference Model Layers- TCP/ IP Layers-Compare OSI and TCP/IP model

3.0 Data Link Layer: Design issues of data link layer: (a) Services provided to network layer (b) Framing (c) Error control and flow control - Elementary data link protocols: Simplex Stop and Wait protocol, Sliding window protocols : Go-back-N protocol and Selective repeat -Point-to-Point protocol (PPP).- HDLC protocol

Multiple Access protocols: Random access protocols - Controlled access protocols - Channelization protocols - CSMA/CD and CSMA/CA- Static and Dynamic channel allocation in LANs and MANs.- IEEE 802 standards: IEEE 802 standard for wired LANs - IEEE Standard 802.3 & Ethernet - IEEE Standard 802.4 -Token Bus- IEEE Standard 802.5 – Token Ring- Explain Fiber Distributed Data Interface (FDDI)

MAC Sublayer: Ethernet Cabling - Ethernet MAC sub layer protocol- MAC layer of Wireless LAN (IEEE 802.11 standard)

4.0 Network and Transport Layer: Network layer design issues: Store and Forward switching-Services provided to the transport layer-Implementation of connection less services and connection oriented services.- Compare virtual circuits and datagram subnets.- Routing Algorithms: Non adaptive algorithm and Adaptive algorithm: - Shortest path routing- distance vector routing - Congestion - General principles of Congestion control.
 Network layer in the internet.- IP Addressing: IP addressing and classes with examples - Subnet masking - format of IPv4 datagram - format of IPv6 datagram
 Transport Layer: Services provided to upper layers - Connection establishment and release- Transport protocols: UDP header- TCP service model - TCP segment header - TCP connection establishment and release.

5.0 Application layer: DNS : DNS namespace-Importance of Resource Records-Role of DNS server -Email : Architecture and services -The User Agent- Header fields related to message transport -Subtypes of MIME- SMTP , POP3 -World Wide Web: Architecture overview of World Wide Web - Importance of HTML, XML, XSL, XHTML- HTTP protocol and HTTP commands- FTP- SMTP- Telnet- Multimedia services: VOIP- VPN-Network Monitoring and Troubleshooting.- Simple Network Management Protocol (SNMP) and its working- Remote Monitoring (RMON).

REFERENCE BOOKS

| | | |
|---|----|--|
| 1. PC Upgrading | -- | Stephen Bigelow (TMH) |
| 2. Computer Hardware | -- | Manhar Lotia & Others (BPB Publications) |
| 3. Computer Networks, 4 th Edition | -- | Tannenbaum |
| 4. Enhanced Guide to Managing And Maintaining Your PC | -- | Jean Andrews (Thomson) |
| 5. Basics of Networking | -- | NIIT PHI publications |
| 6. PC Hardware A Beginners Guide | -- | Gilster (TMH) |
| 7. Basics of Networking | -- | NIIT, PHI Publications |
| 8. Networking Essentials with Projects | - | Palmer, Thomson |

**COMPUTER NETWORKS
(COMMON TO CN, IE, EV, BM & ES)**

Subject Title : **Computer Networks**
Subject Code : **CN/IE/EV/BM/ES - 5301**
No. of period/week : **04**
No. of period/year : **60**

TIME SCHEDULE WITH BLUE PRINT

| Sl. No | Major Topics | Periods | Weight age of marks | Remembering | Understanding | Applying | Analysing | Short type | Essay Type |
|--------|------------------------------------|---------|---------------------|-------------|---------------|----------|-----------|------------|------------|
| 1. | Introduction to computer networks. | 10 | 19 | 19 | - | - | - | 3 | 1 |
| 2. | Data link Layer and MAC sub layer | 20 | 36 | 06 | 20 | 10 | - | 2 | 3 |
| 3. | Network layer and Transport Layer | 20 | 36 | 06 | 15 | 15 | - | 2 | 3 |
| 4. | Application Layer | 10 | 19 | - | 10 | 09 | - | 3 | 1 |
| Total | | 60 | 110 | 31 | 45 | 34 | | 10 | 8 |

OBJECTIVES

On completion of the course a student will be able to:

1.0 Understand introduction to Computer networks

- 1.1 State the need for Networking.
- 1.2 List the Network Hardware and Software Components.
- 1.3 Explain the uses of Computer Networks
- 1.4 List various Network Standards.
- 1.5 Explain different network topologies (Bus, Star, Ring, Mesh, Hybrid)
- 1.6 Explain the working of token ring network.
- 1.8 Discuss FDDI and its properties.
- 1.9 Explain OSI Reference Model and TCP/ IP model with emphasis on each layer
- 1.10 Demonstrate about LAN Cables and Connectors, wireless network adapter
- 1.11 Demonstrate about Coaxial Cables, Twisted-Pair Cables, Optical Fiber Cables, and Connectors.
- 1.12 State functions of LAN Devices : Repeaters, Hubs, Switches, Bridge, Network Interface Cards (NICs), Routers (CISCO, DAX, Etc.), Modem (56KBPS Internal or External, ADSL Modems etc.)
- 1.13 Explain connection oriented networks: X .25, frame relay and ATM

3.0 Understand the concepts of Data Link Layer and MAC sub layer

- 3.3. Explain the design issues of data link layer:
 - (d) Services provided to network layer
 - (e) Framing

- (f) Error control and flow control.
- 3.4. Explain elementary data link protocols.
 - (c) Simplex Stop and Wait protocol
 - (d) Sliding window protocols : Go-back-N protocol and Selective repeat
- 3.5. Explain the point-to-point protocol (PPP).
- 3.6. Explain HDLC protocol
- 3.7. Multiple Access protocols:
 - (e) List random access protocols
 - (f) List Controlled access protocols
 - (g) List Channelization protocols
 - (h) Explain CSMA/CD and CSMA/CA.
- 3.8. Discuss static and dynamic channel allocation in LANs and MANs.
- 3.9. List IEEE 802 standards
- 3.10. Explain IEEE 802 standard for wired LANs
- 3.11. MAC Sublayer:
 - (d) Ethernet Cabling
 - (e) Describe the concept of Ethernet MAC sub layer protocol
- 3.12. Explain MAC layer of Wireless LAN (IEEE 802.11 standard)

3.0 Understand Network and Transport layer .

- 3.1 Explain Network layer design issues.
 - (a) Store and Forward switching
 - (b) Services provided to the transport layer
 - (c) Implementation of connection less services and connection oriented services.
 - (d) Compare virtual circuits and datagram subnets.
- 3.2 Routing Algorithms:
 - (a) Define Non adaptive algorithm and Adaptive algorithm
 - (b) List various Routing algorithms.
 - (c) Explain about Shortest path routing
 - (d) Explain about distance vector routing
- 3.3 Define Congestion
- 3.4 Explain general principles of Congestion control
- 3.5 Explain the role of Network layer in the internet.
- 3.6 IP Addressing:
 - (a) Explain IP addressing and classes with examples
 - (b) Explain subnet masking .
 - (c) Explain format of IPv4 datagram
 - (d) State the need for IPv6
 - (e) Explain format of IPv6 datagram
- 3.7 Explain mobile IP.
- 3.8 Transport Layer
 - (a) Explain services provided to upper layers
 - (b) Explain the concept of connection establishment and release.
- 3.9 The Internet Transport protocols:
 - (a) Explain UDP header
 - (b) Explain TCP service model
 - (c) Explain TCP segment header
 - (d) Explain TCP connection establishment and release.

4.0 Understand Application layer

- 4.1 DNS

- (a) Explain DNS namespace
- (b) Explain the importance of Resource Records
- (c) Explain the role of DNS server
- 4.2 Email
 - (a) Explain architecture and services
 - (b) The User Agent
 - (c) List Header fields related to message transport
 - (d) List types and subtypes of MIME
 - (e) Explain SMTP , POP3
- 4.3 World Wide Web
 - (a) Explain the architecture overview of World Wide Web
 - (b) Explain the importance of HTML, XML, XSL, XHTML
 - (c) Explain about HTTP commands
- 4.4 Multimedia services: VOIP

COURSE CONTENT:

1 Introduction to Computer Networks:

Networking -Networking Hardware and Software Components.-Uses of Computer Networks- Standards- Network topologies (Bus, Star, Ring, Mesh, Hybrid) -Working of token ring network- FDDI- FDDI and its properties- OSI Reference Model and TCP/ IP model - LAN Cables and Connectors, wireless network adapter-Coaxial Cables, Twisted-Pair Cables, Optical Fiber Cables, and Connectors - functions of LAN Devices : Repeaters, Hubs, Switches, Bridge, Network Interface Cards (NICs), Routers (CISCO, DAX, etc), Modem (56KBPS Internal or External, ADSL Modems,etc.)- Connection oriented networks: X .25, frame relay and ATM

2 Data Link Layer and MAC sub layer

Design issues of data link layer: Services provided to network layer , Framing , Error control and flow control - Elementary data link protocols: Simplex Stop and Wait protocol, Sliding window protocols : Go-back-N protocol and Selective repeat - Point-to-Point Protocol (PPP)- HDLC protocol

Multiple Access protocols: CSMA/CD and CSMA/CA

IEEE 802 standard for wired LANs

MAC Sublayer:Ethernet Cabling -Ethernet MAC sub layer protocol- Wireless LAN(IEEE 802.11 standard)

3 The Network and Transport layer

Network layer design issues: Store and Forward switching-Services provided to the transport layer--connection less services and connection oriented services-Compare virtual circuits and datagram subnets

Routing Algorithms:

Non adaptive algorithm and Adaptive algorithm - Routing algorithms- Shortest path routing - Distance vector routing- Congestion - General principles of Congestion control- Network layer in the internet

IP Addressing: IP addressing and classes- subnet masking- IPv4 datagram - IPv6- Mobile IP Transport Layer:

Services provided to upper layers -connection establishment and release

The Internet Transport protocols:

UDP header- TCP service model -TCP segment header -TCP connection establishment and release.

4 The Application layer

DNS: DNS namespace - Resource Records- DNS server

Email:

Architecture and services - The User Agent- Header fields related to message transport- MIME types - SMTP, POP3

World Wide Web: Architecture overview of World Wide Web -Importance of HTML, XML, XSL, XHTML

-HTTP commands-Multimedia services: VOIP

REFERENCE BOOKS:

1. Computer networks Tannen Baum
2. Data Communications and Networking – Behrouz A Forouzan
3. Data Communication and Computer networks – William Stallings
4. Local Area Networks Basendra
5. Computer networking with internet protocols and technology by William Stallings. Pearson education
6. Computer Communications & Networking technologies by Michael A.Gallo, William M.Horrcock, Thompson Learning

**MEASUREMENTS AND TEST EQUIPMENT
(COMMON TO CP, CN, IE, EV, BM & ES)**

Subject Title : **Measurements and Test Equipment**
Subject Code : **BM-5302 & CP/CN/EV/ES – 5402 & IE-5202**
Periods/Week : **04**
Periods/Semester : **60**

TIME SCHEDULE WITH BLUE PRINT

| S. No | Major Topics | No. of periods | Weightage of Marks | Short type | Essay type |
|--------------|---|-----------------------|---------------------------|-------------------|-------------------|
| 1 | Basics of Measurement and instrumentation | 05 | 13 | 1 | 1 |
| 2 | Analog instruments | 13 | 26 | 2 | 2 |
| 3 | Digital instruments | 10 | 16 | 2 | 1 |
| 4 | Cathode Ray Oscilloscope | 10 | 16 | 2 | 1 |
| 5 | Signal generators | 12 | 21 | 2 | 1 1/2 |
| 6 | Test Instruments | 10 | 18 | 1 | 11/2 |
| | Total | 60 | 110 | 10 | 8 |

OBJECTIVES

On completion of the study of the subject a student should be able to comprehend the following:

- 1.0 Understand the purpose of measurement and instrumentation.**
 - 1.1 Define measurement.
 - 1.2 Classify the methods of measurements.
 - 1.3 List the factors in selection of measuring instruments.
 - 1.4 Explain the performance characteristics - a) Calibration, b) accuracy, c) precision, d) repeatability, e) reproducibility, f) Drift, g) sensitivity, h) resolution, i) Dead zone, J) backlash, k) true value, l) hysteresis.
- 2.0 Understand the working of Analog instruments.**
 - 2.1 Explain the construction and principle of operation of PMMC meters.
 - 2.2 List Explain the principle of extending the range of DC ammeter and Dc voltmeter.
 - 2.3 List the advantages of using the Ayrton Shunt (Universal) shunt with an example.
 - 2.4 Explain the Conversion of Ammeter to Voltmeter
 - 2.5 Explain the Conversion of Voltmeter to Ammeter
 - 2.6 Define sensitivity of voltmeter.
 - 2.7 Describe loading of volt meter with an example.
 - 2.8 List the precautions to be taken while using an ammeter and voltmeter.
 - 2.9 Explain construction and principle of series and shunt type Ohm meters

- 2.10 Explain the principle and working rectifier type AC voltmeter.
- 2.11 Explain the circuits of DC/AC voltmeter, DC/AC ammeter and resistance measurement sections of a multimeter.
- 2.12 Explain the working principle of FET input electronic voltmeter.
- 2.13 Explain differential Voltmeter with necessary circuit..
- 2.14 Explain the operation of Wheat Stone Bridge and list its applications.
- 2.15 Explain the operation of Kelvin Bridge and list its advantages over Wheatstone bridge.
- 2.16 Explain the inductance measurement using Maxwell's Bridge and Hay's bridge and compare.
- 2.17 Explain the capacitance measurement using Schering Bridge.

3.0 Understand working of Digital instruments.

- 3.1 List the advantages of digital instruments over analog instruments.
- 3.2 Define terms Resolution, Settling time, Propagation Delay.
- 3.3 Explain Ramp type Digital Voltmeter with block diagram
- 3.4 Explain dual slope integrating type digital voltmeters with block diagram
- 3.5 List the specifications of digital voltmeters.
- 3.6 Explain the working of Digital Multimeter with block diagram and list its specifications.
- 3.7 Explain the working of Digital capacitance meter.
- 3.8 Explain the working of digital LCR meter with block diagram
- 3.9 List the specifications of digital LCR meter.
- 3.10 Explain the principle of digital tachometer and digital PH meter.

4.0 Understand construction, working principle and use of CRO

- 4.1 Sketch the block diagram of general purpose CRO and describe the function of each block.
- 4.2 Sketch CRT and describe the function of different parts.
- 4.3 List different focussing techniques and compare them.
- 4.4 Write the expression for deflection sensitivity.
- 4.5 Explain vertical deflection system with block diagram.
- 4.6 Explain the horizontal deflection system and the necessity of time base.
- 4.7 List the conditions for stationary waveforms.
- 4.8 Identify the function and use of various controls and terminals of CRO.
- 4.9 List the specifications of CRO.
- 4.10 Explain the principle of Dual beam CRO.

5.0 Understand the construction, working principle of AF, RF signal generators and power meters

- 5.1 Explain the working of AF Oscillator (sine & square) with operational amplifier (Wein Bridge).
- 5.2 List the front panel controls and specifications of AF Oscillator.
- 5.3 Explain the principle of beat frequency oscillator.
- 5.4 Explain the working of function generator with operational amp.integrator and differentiator.
- 5.5 List the front panel controls and specifications of Function generator.
- 5.6 List the applications of AF oscillators and function generators.
- 5.7 Explain the block diagram of a pulse generator.
- 5.8 Give the principle of energy measurement

- 5.9 Explain the working of AF power meter.
- 5.10 Explain the working of bolometer type RF power meters.
- 5.11 List the applications of power meters.

6.0 Understand the construction and working of test instruments

- 6.1 Explain the method of testing passive and active components (diode, transistor) using multimeter.
- 6.2 Explain the method of measuring leakage current, alpha, beta of a transistor using transistor tester.
- 6.3 Describe the set up for displaying the characteristics of Transistor using Curve tracer.
- 6.4 Explain the Block diagram and operation of spectrum analyzer.
- 6.5 Explain the construction & working of Q-meter.
- 6.6 Discuss the necessity of Logic probe and its applications.
- 6.7 Explain how the digital ICs can be tested with digital IC tester
- 6.8 Explain the working of Logic Analyser with block diagram.
- 6.9 State the necessity of plotter and recorders.
- 6.10 Explain the working of XY recorders.
- 6.11 Explain the working of plotter.

COURSE CONTENTS

1. Basics of Measurements and Instrumentation

Definition of measurement and instrumentation, performance characteristics, classification,

2. Analog instruments:

PMMC Instrument, extending the range of ammeter and voltmeter, sensitivity, Loading of voltmeter, series and shunt type ohmmeter, ac measuring with meters, Multimeter, Electronic voltmeter, differential voltmeter, Wheatstone, Kelvin, Maxwell Hay and Schering Bridges.

3. Digital Instruments:

Digital voltmeter: Dual slope integrating type, resolution and sensitivity of Digital instruments. Multimeter, Specifications, Digital Capacitance meter, Digital LCR Meter, Working principle of Digital tachometer and PH meters,

4. Cathode Ray Oscilloscope:

Block diagram of CRO, parts of CRT, Deflection Sensitivity, vertical and horizontal deflection systems, delay line, controls, specifications, applications, Dual Beam CRO

5. Signal Generators & Power meters

AF oscillator, Beat Frequency Oscillator, function generator, Pulse generator, specifications, AF and RF power meters

6. Test instruments:

Testing of components with Multimeter, Transistor tester, Curve Tracer, Digital Spectrum analyser, Logic Probe, Digital IC tester, Logic analyser, Q meter, plotters and recorders

REFERENCES

1. Electronic instrumentation and measurements by David A Bell, PHI
2. Electronic Instrumentation by H S Khalsi, TMH
3. Modern Electronic Instrumentation and Measurement Techniques -William D Cooper
Electronic measurements by A K Shaurky
4. Electronic Measurements & Instruments by Cooper, PHI
5. Modern Electronic Equipment by Khandpur
6. Electrical, Electronic Measurements and Instruments by Sahney
7. Electronic Measuring Instruments Gupta, TMH

INTERNET TECHNOLOGIES

Subject Title : Internet Technologies
Subject Code : CP- 5303
Periods per Week : 04
Periods per Semester : 60

TIME SCHEDULE & BLUE PRINT

| S.No | Major Topic | No. of Periods | Weightage of Marks | Short Type | | | Essay Type | | |
|------|--|----------------|--------------------|------------|----|-----|------------|----|-----|
| | | Theory | | R | U | App | R | U | App |
| 1 | Principles of Web Designing, HTML Tags, Style sheets and XML | 8 | 13 | | 1 | | | 1 | |
| 2 | Client side scripting using Java Script | 3 | 8 | | 1 | | | ½ | |
| 3 | Features of Java | 2 | 3 | | 1 | | | 0 | |
| 4 | Java basics & usage of Classes, Objects & Inheritance | 9 | 16 | | 2 | | | 1 | |
| 5 | Package and Interfaces in Java | 9 | 18 | | 1 | | | 1½ | |
| 6 | Multi threaded programming and Exception handling | 9 | 13 | | 1 | | | 1 | |
| 7 | I/O streams and Applets in Java | 8 | 13 | | 1 | | | 1 | |
| 8 | AWT and Event handling in Java | 3 | 13 | | 1 | | | 1 | |
| 9 | Java Servlets and JDBC | 9 | 13 | | 1 | | | 1 | |
| | TOTAL | 60 | 110 | 0 | 10 | | | 8 | |

OBJECTIVES

On completion of the study of the course the student shall be able to:

1. Understand the principles of Web Designing, use of HTML Tags and apply style sheets, XML

- 1.1 Describe the anatomy of web page and format of web page.
- 1.2 List and explain Web page elements and the process of navigation through web pages
- 1.3 State the steps in building, launching and maintenance of a web site
- 1.4 Describe the importance of HTML and applications of HTML
- 1.5 Illustrate the use of the basic tags <html>, <head>, <title>, <body>.
- 1.6 Illustrate the use of the following tags with attributes : <h1> to <h6>, <q>, , <cite>, <big>, <small>, <ins> and
- 1.7 Illustrate the use of the presentation tags with attributes: , <i>, <u>, <strike>, <sub>, <sup>, <center>, , <marquee>
- 1.8 Illustrate the use of hyperlink and imaging tags with attributes, <object> tag with all important attributes.
- 1.9 Illustrate the use of the listing tags along with attributes.
- 1.10 Illustrate the use of colors to various HTML elements.
- 1.11 Illustrate the use of the following table creation tags with attributes: <table>, <col>, <colgroup>, <tr>, <td>, <th>, <tbody>, <thead>, <tfoot>
- 1.12 Illustrate the use of the following control tags with attributes: <form>, <input>, <button>, <label>, <select>, <options>, <textarea>, <legend>.
- 1.13 the use of the following frame tags with attributes: <frame>, <frameset>, <noframe>, <iframe>
- 1.14 Apply cascading style sheets
- 1.15 Create Inline styles.
- 1.16 Create embedded style sheets.
- 1.17 Resolve style conflicts.
- 1.18 Link external style sheets to a HTML page.
- 1.19 Place HTML elements at required position.
- 1.20 Change background colors, images etc.
- 1.21 Set the properties margin, padding, height, width to an element.
- 1.22 Illustrate the use of XML file
- 1.23 Describe the organization of data in the form of XML.
- 1.24 State the significance of Namespace
- 1.25 Compare and Contrast DTD and Schema
- 1.26 Understand the parsing process of XML by DOM and SAX.
- 1.27 List the applications of XML

2 Understand Client side scripting using Java Script

- 2.1 Describe the need for client side scripting.
- 2.2 List various client side scripting languages.
- 2.3 Use various operators.
- 2.4 Use **if**, **if/else** and **switch** conditional statements.
- 2.5 Use **while**, **do/while** and **for** iterative statements.
- 2.6 Write small programs using conditional and iterative statements.
- 2.7 Understand the process of debugging JavaScript code.
- 2.8 Implement functions
 - 2.8.1 Define and call a function.
 - 2.8.2 Illustrate parameter passing.
 - 2.8.3 List and explain global functions provided by JavaScript.

- 2.8.4 Explain the scope and lifetime of variables.
- 2.8.5 Write small programs using recursion.
- 2.9 Implement arrays
 - 2.9.1 Understand single and multi dimensional arrays.
 - 2.9.2 Declare an array.
 - 2.9.2.1 Manipulate an array.
 - 2.9.2.2 Write small programs using arrays.
- 2.10 Implement **Math** object, **String** object, **Date** object, **Boolean** and **Number** object.

3 Understand the Features of Java

- 3.1.1 Describe the importance of Java in Internet programming.
- 3.1.2 Compare Java & C++.
- 3.1.3 Define an Applet and explain features and applications of Java applets.
- 3.1.4 Explain 'Byte codes' of Java, JVM.
- 3.1.5 Explain the process of entering and executing a Java program
- 3.1.6 Describe white space, literals, separators, keywords in Java.

4 Understand Java basics & usage of Classes, Objects & Inheritance

- 4.1.1 Explain eight simple types of data.
- 4.1.2 Explain Java literals.
- 4.1.3 Declare and initialize variables.
- 4.1.4 Illustrate type conversion and casting features.
- 4.1.5 Illustrate use of one-dimensional and two-dimensional array.
- 4.1.6 Explain various types of operators.
- 4.1.7 Write the syntax of selection statements, iteration statements, jump, break, and continue statements
- 4.1.8 Create classes and objects.
- 4.1.9 Illustrate the use of new operator and methods, constructors, method overloading, 'this' pointer
- 4.1.10 Explain the working of static and final.
- 4.1.11 Explain string classes and methods.
- 4.1.12 Illustrate the use of command-line arguments.
- 4.1.13 Illustrate the Implementation of inheritance
- 4.1.14 Illustrate the implementation of multi level hierarchy
- 4.1.15 Illustrate the use of 'final' to avoid overriding.

5 Understand Package and Interfaces in Java

- 5.1 Define a package.
- 5.2 Describe the concept of class path.
- 5.3 Describe the concept of Access protection.
- 5.4 Illustrate the use of a class from another class
- 5.5 Appreciate the concept of importing packages.
- 5.6 Define an Interface and explain the concept of Interfaces.
- 5.7 Write the difference between class and interface.
- 5.8 Illustrate the implementation of interfaces and explain the scope of variables in interfaces

6 Understand Multi threaded programming and Exception handling in Java

- 6.1 Explain the thread model of Java.
- 6.2 Explain thread priorities.
- 6.3 Explain the concept of synchronization.
- 6.4 Implement the thread class and runnable interface.

- 6.5 Illustrate the creation of a thread
- 6.6 Illustrate the creation of creation of multiple threads.
- 6.7 Describe alive(), join (), suspend(), resume() methods.
- 6.8 Explain Inter thread communication.
- 6.9 Explain dead lock.
- 6.10 Explain the sources of errors.
- 6.11 Write the advantages of Exception handling.
- 6.12 Explain how to deal with exceptions.
- 6.13 Explain the types of Exceptions
- 6.14 Explain the concept of Multi-catch statements programs.

7 Understand I/O streams and Applets in Java

- 7.1 Explain the concept of streams.
- 7.2 Explain various stream classes.
- 7.3 Describe the Basics of Applets – Life cycle of an applet.
- 7.4 Describe Applet classes, Applet Architecture.
- 7.5 Describe Applet Selection.
- 7.6 Explain the order of Applet initialization and termination.
- 7.7 Write a simple example for creating Applets.

8 Understand AWT and Event handling in Java

- 8.1 List and discuss AWT classes
- 8.2 Discuss about Window fundamentals-Container .Panel. Window. Frame. Canvas
- 8.3 Discuss working with frame windows
- 8.4 Distinguish different Graphics controls.
- 8.5 Discuss working with color
- 8.6 Discuss Working with Fonts
- 8.7 Explain AWT controls and handlings -labels. buttons. checkboxes. lists. scrollbars. Text fields. text area. menus. dialog boxes
- 8.8 Explain the Two event handling mechanisms.
- 8.9 Discuss about The Delegation event model- events. event sources and event Listeners
- 8.10 List and explain event Classes
- 8.11 Explain various sources of events.
- 8.12 Describe event listener interfaces.
- 8.13 Explain mouse and keyboard events.
- 8.14 Differentiate between Adapter classes. Inner classes

9 Understand Java Servlets and JDBC

- 9.1 Explain about The life cycle of a servlet.
- 9.2 Discuss about Java Servlet Development Kit
- 9.3 Create a simple servlet.
- 9.4 Discuss Javax.servlet package.
- 9.5 Working with Reading Servlet Parameters.
- 9.6 Handling HTTP requests and responses
- 9.7 Discuss about Loading JDBC driver
- 9.8 Explain how to establish a JDBC connection.
- 9.9 Discuss how to create statement
- 9.10 Implement Simple Application and execution query.
- 9.11 Discuss about Scrollable ResultSet.
- 9.12 Describe various transactions.
- 9.13 Discuss about Advanced JDBC

COURSE CONTENTS

1 Principles of Web Designing, HTML Tags ,Style sheets, XML:

Anatomy of Web page, Format, Elements, Navigation, Building, Launching and maintaining web site -HTML – Introduction, Format of web page, Tags and attributes, Formatting text, Adding images- Positioning. Lists, Colors, Connecting to hyperlinks, Tables, Forms, Frames-CSS – Introduction, Inline styles, Embedded style sheets, Conflicting styles, Linking external style sheets, Positioning elements, Backgrounds, Element dimensions

XML – Introduction, Structuring Data, XML Namespaces, DTD and Schemas, Document Object Model (DOM), Simple API for XML (SAX), Applications of XML

2.0 Client side scripting using Java Script

Introduction to Scripting, Operators, Conditional Statements, Iterative Statements, Debugging

Functions – Function definitions, Duration of Identifiers, Scope rules, Global functions, Recursion

Arrays – Declaring and allocating arrays, References and reference parameters, Passing arrays to functions, Sorting and Searching arrays, Multiple-Subscripted arrays

Objects – **Math** object, **String** object, **Date** object, **Boolean** and **Number** object

3.0 Features of Java

Importance of Java in Internet programming-Compare Java & C++- Applet features and applications of Java applets- 'Byte codes' of Java, JVM.-executing a Java program -white space, literals, separators, keywords in Java

4.0 Java basics & usage of Classes, Objects & Inheritance

Java eight simple types of data - Java literals-Declare and initialize variables- type conversion and casting features-one-dimensional and two-dimensional array.- types of operators-Selection statements, iteration statements, jump, break, and continue statements-Classes and objects- new operator and methods, constructors, method overloading, 'this' pointer-Static and final-String classes and methods- Command-line arguments -Inheritance -Multi level hierarchy- 'final' to avoid overriding

5.0 Package and Interfaces in Java

Package-Class path- Access protection.-Use of a class from another class- importing packages-Interface- Differences between class and interface -Scope of variables in interfaces

6.0 Multi threaded programming and Exception handling in Java

Threads- Thread priorities.-Synchronization.- Thread class and runnable interface-Creation of a thread -Multiple threads - alive(), join(), suspend(), resume() methods- Inter thread

communication.- Dead lock- Exception handling- Dealing with exceptions.- Types of Exceptions
-Multi-catch statements programs.

7.0 I/O streams and Applets in Java

I/O streams.- Stream classes.- Basics of Applets – Life cycle of an applet- Applet classes,
Applet Architecture.- Applet Selection-Order of Applet initialization and termination.

8.0 Understand AWT and Event handling in Java

AWT classes -Window fundamentals-Container .Panel. Window. Frame. Canvas

-Working with frame windows-Different Graphics controls-Working with color- Working with
Fonts-AWT controls and handlings -labels. buttons. checkboxes. lists. scrollbars. Text fields.
text area. menus. dialog boxes-Event handling mechanisms.- Delegation event model- events.
event sources and event Listeners-Event Classes - Sources of events -Event listener
interfaces.-Mouse and keyboard events. - Adapter classes- Inner classes

9.0 Understand Java Servlets and JDBC

The life cycle of a servlet - Java Servlet Development Kit - Simple servlet creation -
Javax.servlet package- Reading Servlet Parameters. - HTTP requests and responses-

JDBC connection.- Simple Application and execution query- Scrollable ResultSet. -
Transactions.- Advanced JDBC

REFERENCE BOOKS

- 1) Principles of Web Design, Sklar, TMH
- 2) HTML Complete Reference - Powell, TMH
- 3) Internet & World Wide Web , Dietel and Dietel, Pearson education Asia.
- 4) Basics of Web Site Design, NIIT – PHI
- 5) WWW Design with HTML, Xavier (TMH)
- 6) Programming in Java, Sachin Malhotra, Sourab Choudary, Oxford
- 7) The Complete reference Java, Herbert Schildt, Tata McGraw-Hill
- 8) Java Servlet & JSP Cookbook by Bruce W.Perry ,O'Reilly series.
- 9) Professional Java Server Programming, Wrox
- 10) Code notes for J2EE EJB, JDBC, JSP, and Servlets- Gregory Brill

**BASICS OF VLSI
(COMMON TO CN, IE & ES)**

Subject Title : **BASICS OF VLSI**
Subject Code : **CN/IE/ES 5303**
Periods / week : **4**
Periods / semester : **60**

TIME SCHEDULE WITH BLUE PRINT

| S. No | Major Topics | No of Periods | Weight age of marks | Remembering | Understanding | Applying | Analyzing | Short type | Essay type |
|-------|--|---------------|---------------------|-------------|---------------|-----------|-----------|------------|------------|
| 1 | Introduction to MOS technology | 14 | 26 | 9 | 6 | 6 | 5 | 2 | 2 |
| 2 | Basic Electrical Properties of MOS and BiCMOS Circuits | 16 | 29 | 6 | 10 | 7 | 6 | 3 | 2 |
| 3 | MOS and BiCMOS Circuit Design Processes | 14 | 26 | 8 | 7 | 8 | 3 | 2 | 2 |
| 4 | Basic circuit concepts | 16 | 29 | 9 | 6 | 6 | 8 | 3 | 2 |
| | Total | 60 | 110 | 18 | 65 | 37 | 16 | 10 | 8 |

OBJECTIVES

1.0 Introduction to MOS technology

- 1.1 Evolution of Integrated circuit technology
- 1.2 Describe Metal Oxide Semiconductor (MOS) and VLSI Technology
- 1.3 Explain Design methodology- Gajski – Kuhn y chart
- 1.4 List types of ASICS
- 1.5 Draw ASIC design flow diagrams
- 1.6 Draw Basic MOS transistor
- 1.7 Explain Enhancement mode transistor .
- 1.8 Explain Depletion mode transistor.
- 1.9 Explain nMOS fabrication process.
- 1.10 Explain pMOS fabrication process.
- 1.11 List steps in CMOS fabrication – the p-well process.
- 1.12 List steps in CMOS fabrication – the n-well process.
- 1.13 List steps in CMOS fabrication – Twin tube process.
- 1.14 Explain BiCMOS technology.
- 1.15 Compare CMOS and Bipolar technologies.

2.0 Analyze Basic Electrical Properties of MOS and BiCMOS Circuits

- 2.1 Derive drain to source current I_{ds} versus voltage V_{ds} relationships.
- 2.2 Examine aspects of MOS transistor threshold voltage V_t
- 2.3 Explain MOS transistor transconductance g_m and output conductance g_{ds} .
- 2.4 Define MOS transistor figure of merit ω_0 .

- 2.5 Explain the pass transistor.
- 2.5 Explain the nMOS inverter,
- 2.6 Determine pull-up to pull-down ratio ($Z_{p,u}/Z_{p,d}$) for an nMOS inverter driven by another nMOS inverter.
- 2.7 Explain Pull-up to pull-down ratio for an nMOS inverter driven through one or more pass transistors.
- 2.8 Differentiate alternative forms of Pull-up.
- 2.9 Explain the CMOS inverter – five regions of operation.
- 2.10 Draw MOS transistor circuit model.
- 2.11 Compare aspects of key parameters of CMOS and Bipolar transistors.
- 2.12 Draw BiCMOS inverters.
- 2.13 Examine latch-up in CMOS circuits.
- 2.14 Explain BiCMOS latch-up susceptibility.

3.0 Design Processes of MOS and BiCMOS Circuits

- 3.1 Illustrate MOS layers.
- 3.2 Sketch Stick diagrams for nMOS, CMOS & BiCMOS inverters
- 3.3 Sketch Stick diagrams for nMOS, CMOS & BiCMOS 2 i/p NAND gates.
- 3.4 Sketch Stick diagrams for nMOS, CMOS & BiCMOS 2 i/p NOR gates
- 3.3 Describe nMOS design style.
- 3.4 Describe CMOS design style.
- 3.5 Apply Design rules.
- 3.6 Apply Lambda-based design rules.
- 3.7 Illustrate Contact cuts.
- 3.8 List Double metal MOS process rules.
- 3.9 List CMOS lambda-based design rules.
- 3.10 Describe Layout diagrams.
- 3.11 Draw the simple CMOS layout.

4.0 Understand Basic circuit concepts

- 4.1 Define Sheet resistance
- 4.2 Calculate Inverter resistance.
- 4.3 Explain Area capacitances of layers.
- 4.4 Define Standard unit of capacitance $\square C_g$
- 4.5 Calculate area capacitance.
- 4.6 Define the delay unit (τ)
- 4.7 Explain Inverter delays.
- 4.8 Explain Rise-time and fall-time estimations of CMOS inverter.
- 4.9 Explain Cascaded inverters as drivers.
- 4.10 Explain Inverting type nMOS super buffer.
- 4.11 Explain BiCMOS drivers.
- 4.12 Explain Propagation delays – cascaded pass transistors.
- 4.13 Describe long polysilicon wires.
- 4.14 Explain Wiring capacitances.

COURSE CONTENT:

1. Introduction to MOS technology:

Evolution of Integrated circuit technology, Metal Oxide Semiconductor (MOS) and VLSI Technology, Basic MOS transistor, Enhancement mode transistor, Depletion mode transistor. nMOS fabrication process,

pMOS fabrication process, CMOS fabrication – the p-well process, CMOS fabrication – the n-well process, CMOS fabrication – Twin tube process, BiCMOS technology, CMOS and Bipolar technologies.

2. Basic Electrical Properties of MOS and BiCMOS Circuits :

Drain to source current I_{ds} versus voltage V_{ds} relationships, aspects of MOS transistor threshold voltage MOS transistor trans conductance g_m and output conductance g_{ds} , MOS transistor figure of merit ω_0 , pass transistor, nMOS inverter pull-up to pull-down ratio ($Z_{p,u.}/Z_{p,d.}$) for an nMOS inverter driven by another nMOS invert, Pull-up to pull-down ratio for an nMOS inverter driven through one or more pass transistors, alternative forms of Pull-up, CMOS inverter – five regions of operation, MOS transistor circuit model, key parameters of CMOS and Bipolar transistors, BiCMOS inverters, latch-up in CMOS circuits, BiCMOS latch-up susceptibility.

3. Design Processes of MOS and BiCMOS Circuits :

MOS layers, Stick diagrams, nMOS design style, CMOS design style, Design rules, Lambda-based design rules, Contact cuts, Double metal MOS process rules, CMOS lambda-based design rules, Layout diagrams, CMOS layout.

4. Basic circuit concepts:

Sheet resistance, Inverter resistance. ,Area capacitances of layers, Standard unit of capacitance $\square Cg$, area capacitance calculation, delay unit (τ), Inverter delays, Rise-time and fall-time estimations of CMOS inverter, Cascaded inverters as drivers, Inverting type nMOS super buffer ,BiCMOS drivers. Propagation delays – cascaded pass transistors, Long polysilicon wires, wiring capacitances.

REFERENCE BOOKS

1. PUCKNELL & ESHRAGHIAN: Basic VLSI design, PHI, (3/e), 1996
2. E.WESTE & ESHRAGHIAN: Principles of CMOS VLSI design, addition Wesley, 1994
3. M.CONWAY: Introduction to VLSI systems, addition Wesley, 1980
4. A.MUKHERJIE: Introduction to NMOS and CMOS system design, PHI,1986
5. MICHAEL JOHN SEBASTIAN SMITH: Application Specific Integrated circuits, addition Wesley, 1997

FILM & TELEVISION PRODUCTION & PLANNING

Subject Title : **Film & Television Production & Planning.**
Subject Code : **EV-5203**
Periods per Week : **04**
Periods / Semester : **60**

TIME SCHEDULE

| S.No | Major Topics | Periods | Weightage of marks | A | B | C | D | Short ques (S) | Essay Ques (E) |
|------|--|-----------|--------------------|-----------|-----------|-----------|-----------|----------------|----------------|
| 1. | Introduction to TV production and planning | 10 | 29 | 13 | | | | 3 | 2 |
| 2. | Pre production processes | 15 | 26 | | 19 | 13 | | 2 | 2 |
| 3. | Studio processes | 23 | 29 | 13 | 19 | | | 3 | 2 |
| 4. | Post Production | 12 | 26 | 3 | 17 | 3 | 10 | 2 | 2 |
| | TOTAL | 60 | 110 | 29 | 55 | 16 | 10 | 10 | 8 |

OBJECTIVES

On the completion of the study of the subject a student will be able to

1.0 Introduction to TV production and planning

- 1.1 Know about the concept of TV production.
- 1.2 Explain television team,
- 1.3 Give the role of production staff.
- 1.4 Know the role of technical staff (TD, Audio Engineer, lighting director, scene designer, floor manager, camera operators, video engineer).
- 1.5 Discuss about different stages in television production.
- 1.6 Estimating the production cost(hiring & procurement of equipment)

2.0 Pre Production process.

- 2.1 Discuss various steps in pre production stages.
- 2.2 Know about script.
- 2.3 Give detail description of different script format.
- 2.4 Study of any prepared script used for TV program.
- 2.5 Prepare script for environmental pollution.
- 2.6 Define the team talent.
- 2.7 Know the difference between performer and an actor.
- 2.8 Explain the procedure of selecting talent.
- 2.9 Discuss about role of talent in production stages.
- 2.10 Give the role of scene designer.
- 2.11 Explain the functions of set and staging.
- 2.12 Explain various elements in set design.
- 2.13 Use of cyclorama.
- 2.14 Discuss about props and furniture.
- 2.15 Know the role of producer.
- 2.16 Explain developing a program idea.
- 2.17 Preparing of program budget.

3.0 Studio processes.

- 3.1 Discuss about different studio processes.
- 3.2 Know about camera and its access.
- 3.3 Discuss about professional cameras such as Betacam, Digital beta,, Digital, Hi Definition formats and study their technical aspects.
- 3.4 Define shot and explain a different type of camera shots.
- 3.5 Explain different camera movements.
- 3.6 Discuss about framing and composition techniques.
- 3.7 Explain different camera angles.
- 3.8 Know the zoom lens and rack lens operation.
- 3.9 Prepare camera cards.
- 3.10 Give the setup for single camera and multi camera production and discuss about its alignment.
- 3.11 Know about various lighting instruments used for TV production.
- 3.12 Explain 1.2.3 – point lighting techniques.
- 3.13 Discuss about special lighting effect for indoors and outdoors.
- 3.14 Plan lighting for simple programs such as new program and interview program.
- 3.15 List the various equipment used for TV audio production.
- 3.16 Explain ON camera and OFF camera mikes techniques
- 3.17 Define low level and high level inputs.
- 3.18 Explain voice outer and lip syncs.

4.0 Post Production.

- 4.1 Explain various steps in postproduction.
- 4.2 Discuss about video editing techniques.
- 4.3 VTR's & VCR's
- 4.4 Discuss about vision mixing in editing.
- 4.5 Give the role of editor and director.
- 4.6 Discuss about use of graphics animations and titles

- 4.7 Discuss about sound mixing for video.
- 4.8 Special effects in video and audio.
- 4.9 Develop a program and discuss about its postproduction

COURSE CONTENTS

1. Introduction to TV production and planning:

The concept of TV production, TV teams, the role of production staffs, role of technical staff, various facilities in TV studio, different stages in TV production.

2. Various steps in pre-production stages script, description of different script format, prepare script used for TV program, script for environmental pollution, team talent, difference between performer and an actor, procedure of selecting required talent, role of talent in production stages. Role of scene designer, functions of set and staging various elements in set design, use of cyclorama, props furniture, role of producer, developing a program idea, preparing of program budget, involvement of producer in production stages.

3. Studio Process – different studio process camera and its access, professional cameras , Betacam digi beta, digital, Hi Definition formats and their technical aspects, shot and different types of shots, rectangular zoom lens operation camera cards, setup for single camera and multi special lighting effect for indoor and outdoor, plan lighting for new program and interview program, various equipment used for TV audio production, on camera and OFF camera mike techniques, low level and high level inputs voice over and lip sync.

4. Post production : Various steps in post production, video editing techniques , edit VTR's and VCR's, vision mixing in editing, role of editor and director, use of graphics animations and titles, sound mixing for video, Special effects, program and bout it's post production

REFERENCE BOOKS

- 1. Television Production by Alen Wortzel.
- 2. Television Production by Zetil

BIOMEDICAL EQUIPMENT

Subject Title : **Biomedical Equipment**
Subject Code : **BM –5303**
Periods Per Week : **04**
Periods Per Semester : **60**

TIME SCHEDULE

| S.No | Major Topics | No. of Periods | Weightage of marks | Short type | Essay type |
|------|--------------------------------|----------------|--------------------|------------|------------|
| 1. | Cardiac Instrumentation | 15 | 34 | 3 | 2.5 |
| 2 | Neuro-Muscular Instrumentation | 15 | 21 | 2 | 1.5 |
| 3 | Phonocardiography & Pace maker | 15 | 34 | 3 | 2.5 |
| 4 | Defibrillators | 15 | 21 | 2 | 1.5 |
| | TOTAL | 90 | 110 | 10 | 8 |

OBJECTIVES

On completion of this subject student will learn:

1.0 Principal & Working of Cardiac Instrumentation

- 1.1 Draw Typical ECG wave form and write its parameters
- 1.2 Explain the Correlation of the electrical activity of the heart with its mechanical activities
- 1.3 Explain Various lead configurations used in ECG recording
- 1.4 Explain Block diagram of an ECG machine
- 1.5 Explain different Types of ECG recorders – single channel, Three channel stress – testing and Holter monitor
- 1.6 List the sources of noises in ECG recording
- 1.7 Explain the minimization of noise in ECG recording.
- 1.8 List the Typical specifications of an ECG machines
- 1.9 Explain the Concept of continuous patient monitoring
- 1.10 Explain the Block diagram of a Bed side monitor and the central monitoring station
- 1.11 List the Critical parameters monitored in ICCU
- 1.12 List the normal ranges of blood pressure in the basic circulatory system
- 1.13 Explain the Principles of direct techniques of blood pressure measurement
- 1.14 Explain the Principles of and indirect techniques of blood pressure measurement using korotkoff sounds

2.0 Operation of Neruro-Muscular Instrumentaion

- 2.1 List different EEG waveforms and mention their characteristics.
- 2.2 Explain the working principle of EEG machine with a neat block diagram.
- 2.3 Name various controls in an EEG machine
- 2.4 List the requirements of an EEG amplifier
- 2.5 Explain the 10-20 system of EEG electrode placement.
- 2.6 List different electrodes used in EEG recording.
- 2.7 Describe different sleep stages with diagrams
- 2.8 Explain the block diagram of an EMG recording system
- 2.9 List the electrodes used in EMG recording
- 2.10 Explain the procedure for nerve conduction velocity determination and give its significance.
- 2.11 Describe the principle of nerve muscle stimulator with block diagram.
- 2.12 List types of waves forms used in nerve muscle stimulator & mention their applications.

3.0 Operation of Phonocardiography & Pacemaker

- 3.1 List various heart sounds & mention their origin
- 3.2 Explain the Characteristics of all heart sound
- 3.3 Give the Need for phonocardiography
- 3.4 Explain the block diagram of Phonocardiography
- 3.5 Give the Need for a cardiac pacemaker
- 3.6 Classify pacemakers on various aspects
- 3.7 Explain the Block diagram of an Asynchronous pacemaker
- 3.8 Explain the block diagram of demand and atrial synchronous pacemaker.
- 3.9 List the Advantages of Synchronous pacemakers over Asynchronous pacemakers
- 3.10 Explain the Block diagram of a Rate Responsive pacemaker
- 3.11 List the Power supplies used in external & internal pacemakers
- 3.12 List the types of electrodes and leads used in pacemakers

4.0 Principle of various defibrillators

- 4.1 Give the Need for a defibrillator
- 4.2 Classify defibrillators
- 4.3 Compare external & internal defibrillators
- 4.4 Explain the Circuit diagram of AC defibrillator
- 4.5 List the advantages of DC defibrillators over AC defibrillators
- 4.6 Explain the Circuit diagram of capacitive discharge DC defibrillator
- 4.7 Explain the Circuit diagram of delay line capacitive discharge defibrillator
- 4.8 Give the Need for synchronization of defibrillator shock
- 4.9 Explain the Block diagram of a cardioverter
- 4.10 List the types of electrodes used in external & internal defibrillators
- 4.11 Describe the types of electrodes used in external & internal defibrillators with diagram
- 4.12 List the Precautions to be taken while handling defibrillators
- 4.13 Explain defibrillator analyser.

COURSE CONTENTS

1. **Cardiac Instrumentation and Patient Monitoring:** Basis of ECG, typical ECG waveform, 12 – lead ECG, block schematic of ECG machine, ECG amplifier circuits, special types of ECG recorders, Noise ;and their elimination in ECG recording IICCU organization, Block diagram of bed side monitor, critical physiological parameters to be monitored Techniques for direct and indirect B.P. measurement
2. **Neuro-Muscular Instrumentation:** EEG Basics of EEG, block schematic of EEG machine, 10 – 20 electrode placement, resting rhythms and sleep stages.EMG Block diagram of EMG recording system types of electrodes used, instrumentation for measurement of nerve condition velocity.
3. **Phonocardiography & pacemakers:** Origin of heart sounds, Phonocardiographic instrumentation. Classification of pacemakers, Block diagrams of various types of pacemakers asynchronous, synchronous (demand and atrial – synchronous) and power supplies and electrodes used in pacemakers
4. **Defibrillators:** Circuit diagrams of AC, capacitive discharge and delay line capacitive discharge defibrillators. Types of electrodes Need for synchronization block diagram of cardioverter testing and safety

REFERENCE BOOKS

1. Medical Instrumentation Application & Design John G Webster (Houghton Mifflin Company)
2. Hand Book of Bio-Medical Instrumentation – R.S. Khandpur (Tata Mc. Graw Hill)
3. Introduction to Biomedical equipment Technology – Carr & Brown (John Willey & sons, Newyork – 1981)
4. Encyclopedia of Medical devices & Instrumentation - Vo I,II,III, & IV Editor John G. Webster
5. Biomedical Engg. Principles David O. Cooney

MOBILE COMPUTING

Subject Title : Mobile Computing
 Subject Code : CP-5304
 Periods per Week : 04
 Periods per Semester : 60

TIME SCHEDULE & BLUE PRINT

| S.No | Major topic | No.of Periods | | Weightage of marks | Short type | | | Essay type | | |
|-------|---|---------------|----------|--------------------|------------|----|---|------------|---|---|
| | | Theory | Practice | | R | U | A | R | U | A |
| 1 | Basic concepts of Mobile Communications | 6 | | 13 | | 1 | | | 1 | |
| 2 | GSM technology in Telecommunications systems | 6 | | 16 | | 2 | | | 1 | |
| 3 | Satellite systems & Broadcasting systems | 6 | | 13 | | 1 | | | 1 | |
| 4 | Wireless LAN technology | 10 | | 16 | | 2 | | | 1 | |
| 5 | Mobile network layer & Mobile Transport Layer | 12 | | 26 | | 2 | | | 2 | |
| 6 | Mobile Application development platforms: Android | 15 | 5 | 26 | | 2 | | | 2 | |
| Total | | 55 | 5 | 110 | | 10 | | | 8 | |

OBJECTIVES

On completion of the study of the subject the student should be able to comprehend the following

1.0 Understand the basic concepts of Mobile Communications

- 1.1 Explain the applications of Mobile Communication
- 1.2 Explain the history of wireless communication
- 1.3 Explain the simplified reference model
- 1.4 Explain about Cellular systems

- 1.5 Explain about the Protocols and the TCP/IP suite
 - 1.5.1 Explain about the need for a protocol architecture
 - 1.5.2 Explain about the TCP/IP protocol architecture
 - 1.5.3 Explain about Internet working
 - 1.5.4 Explain about Internet protocol
 - 1.5.5 Explain about Transmission control protocol
 - 1.5.6 Explain about User datagram protocol
- 1.6 Explain about Medium access control
 - 1.6.1 Explain about the purpose for specialized MAC
 - 1.6.2 Explain about hidden & exposed terminals
 - 1.6.3 Explain about near & far terminals

2.0 Understand the concept of GSM technology in Telecommunications systems

- 2.1 Explain about GSM
- 2.2 Explain about Mobile services
- 2.3 Explain about System architecture
- 2.4 Explain about Radio interface
- 2.5 Explain about Protocols
- 2.6 Explain about Localization & calling
- 2.7 Explain about Handover
- 2.8 Explain about Security
- 2.9 Explain about New data services

3.0 Understand the concepts of Satellite systems & Broadcasting systems

- 3.1 Explain about Satellite applications
- 3.2 Explain about basics of Satellites
 - 3.2.1 Explain about dependency of Satellite period and distance to Earth
 - 3.2.2 Explain about plane of Satellite or Bit inclination angle of a Satellite
 - 3.2.3 Explain about elevation and elevation angle of the Satellite
- 3.3 Explain about different types of Orbits
 - 3.3.1 Explain about GEO advantages and disadvantages
 - 3.3.2 Explain about LEO advantages and disadvantages
 - 3.3.3 Explain about MEO advantages and disadvantages
- 3.4 Explain about Routing
- 3.5 Explain about Localization
- 3.6 Explain about Handover
- 3.7 Explain about Broadcast systems
 - 3.7.1 Explain about Overview of Broadcast systems
 - 3.7.2 Explain about Cyclic repetition of data
 - 3.7.3 Explain about Digital audio broadcasting
 - 3.7.4 Explain about Multimedia object transport protocol
 - 3.7.5 Explain about Digital video broadcasting

4.0 Understand the Wireless LAN technology

- 4.1 State the importance of WLAN
- 4.2 List the advantages of WLAN
- 4.3 Differentiate between Infrared and radio transmission
- 4.4 Explain about Infrastructure network & ad hoc network
- 4.5 Explain about IEEE 802.11

- 4.5.1 Explain System architecture of IEEE 802.11 based infrastructure network
- 4.5.2 Explain about IEEE 802.11 Protocol architecture
- 4.5.3 Explain about Physical layer
 - 4.5.3.1 Explain the concept of Spread spectrum.
 - 4.5.3.2 Explain the concepts of frequency hopping, spread spectrum.
 - 4.5.3.3 Describe the concepts of direct sequence spread spectrum.
 - 4.5.3.4 Describe about infra red communication
- 4.5.4 Explain about Wireless Medium access control layer
- 4.5.5 Explain about MAC management
- 4.5.7 Explain about Future development
 - 4.5.7.1 Explain about 802.11e (MAC Enhancements)
 - 4.5.7.2 Explain about 802.11f(Inter-Access Point Protocol)
 - 4.5.7.3 Explain about 802.11g (Data rates above 20 Mbits/s at 2.4 GHz)
 - 4.5.7.4 Explain about 802.11h (Spectrum managed 802.11a)
 - 4.5.7.5 Explain about 802.11i (Enhanced Security mechanism)

4.6 Explain Bluetooth

- 4.6.1 Explain about Bluetooth applications
- 4.6.2 Explain about Bluetooth standards documents
- 4.6.3 Explain about Protocol architecture
- 4.6.4 Explain about Usage models
- 4.6.5 Explain about Piconets & Scatternets
- 4.6.6 Explain about Radio specification
- 4.6.7 Explain about Base band specification
- 4.6.8 Explain about Frequency hopping
- 4.6.9 Explain about Physical links
- 4.6.10 Explain about Packets
- 4.6.11 Explain about Error Correction
- 4.6.12 Explain about Logical channels
- 4.6.13 Explain about Channel control
- 4.6.14 Explain about Bluetooth Security
- 4.6.15 Explain about Link manager specification
- 4.6.16 Explain about Logical link control and adaptation protocol
- 4.6.17 Explain about L2CAP Channels
- 4.6.18 Explain about L2CAP packets
- 4.6.19 Explain about Signaling commands
- 4.6.20 Explain about Quality of service

5.0 Understand about Mobile network layer & Mobile Transport Layer

5.1 Explain about Mobile IP

- 5.1.1 List the Goals, assumptions & requirements of Mobile IP
- 5.1.2 Define the Entities & terminology used in Mobile IP
- 5.1.3 Explain the process of IP packet delivery
- 5.1.4 Explain about Agent advertisement & discovery
- 5.1.5 Explain about Registration
- 5.1.6 Explain about Tunneling & encapsulation
- 5.1.7 Explain about Optimizations
- 5.1.8 Explain the process of Reverse tunneling
- 5.1.9 Explain about IPv6

- 5.2 Explain Dynamic host configuration protocol
- 5.3 Understand the following transmission techniques in Mobile transport layer
 - 5.3.1 Explain about Traditional TCP
 - 5.3.2 Explain about Congestion control
 - 5.3.3 Explain about Slow start
 - 5.3.4 Explain about Fast retransmit & fast recovery
 - 5.3.5 Explain about Transmission / time out freezing
 - 5.3.7 Explain about Selective retransmission
 - 5.3.7 Explain about Transaction oriented TCP
- 5.4 Explain salient features of CDMA, 1G, 2G, 3G and 4G

6.0 Understand Mobile Application development platforms: Android

- 6.1 Explain about Mobile development platforms
- 6.2 List different Mobile platform development environments
- 6.3 Explain the benefits and drawbacks of Smartphones programming
- 6.4 Explain features of Mobile Application development platforms-Android and J2ME
- 6.5 Explain about hardware requirements, significance of Linux kernel and Android Update schedule, Android framework
- 6.6 Explain in detail about Software stack in Android
- 6.7 Explain about Security and Privacy of Android
- 6.8 Explain how Android can makes phones crash resistant
- 6.9 Explain five salient features of current Android version (Android 4.4 Kitkat)
- 6.10 State the need of ADT (Android Development Tool) bundle
- 6.11 Explain the salient features of Java in Android application development
- 6.12 Explain Android Programming Basics: Activities, Intents, Cursorless controls, Views and Widgets, Asynchronous calls, Background services
- 6.13 Demonstrate installation of
 - i. Java Development Kit (JDK)
 - ii. Android SDK and list SDK folders installed or ADT bundle
 - iii. Eclipse
 - iv. ADT plugin in Eclipse
 - v. Apache Ant
- 6.14 Explain the significance of Emulators and how to setup the Emulator
- 6.15 Explain the importance of Android AVD (Android Virtual Devices) Manager and configuring AVDs
- 6.16 Explain how to Setup the device for the Android application development
- 6.17 Demonstrate the following steps using Eclipse for
 - i. Creation of a new Android project
 - ii. Build, Install and Run the Application in Emulator or Device
- 6.18 Demonstrate the steps in
 - i. Importing non- Eclipse project in Eclipse
 - ii. Working with DDMS
 - iii. Running a Project
- 6.19 Explain anatomy of Android Application Project

COURSE CONTENTS:

1.0 Basic concepts of Mobile Communications

Applications of Mobile Communication -History of wireless communication –Simplified reference model - Cellular systems

TCP/IP suite: Need for a protocol architecture - TCP/IP protocol architecture- Internet working- Internet protocol- Transmission control protocol - User datagram protocol Medium access control: Purpose for specialized MAC-Hidden & exposed terminals -Near & far terminals

2.0 GSM technology in Telecommunications systems:

GSM- Mobile services -System architecture-Radio interface-Protocols-Localization & calling- Handover-Security-New data services

3.0 Satellite systems & Broadcasting systems:

Satellite applications-Basics of Satellites -Dependency of Satellite period and distance to Earth - Plane of Satellite or Bit inclination angle of a Satellite-Elevation and elevation angle of the Satellite- Different types of Orbits-GEO advantages and disadvantages-LEO advantages and disadvantages-MEO advantages and disadvantages- Routing- Localization- Handover

Broadcast systems: Overview of Broadcast systems - Cyclic repetition of data- Digital audio broadcasting - Multimedia object transport protocol- Digital video broadcasting

4.0 Bluetooth:

Bluetooth applications-Bluetooth standards documents-Protocol architecture-Usage models- Piconets & Scatternets-Radio specification-Base band specification-Frequency hopping- Physical links-Packets -Error Correction-Logical channels-Channel control-Bluetooth Security- Link manager specification - Logical link control and adaptation protocol - L2CAP Channels- L2CAP packets-Signaling commands

Quality of service

5.0 Mobile network layer & Mobile Transport Layer:

Mobile IP- Goals, assumptions & requirements of Mobile IP- Define the Entities & terminology used in Mobile IP -Process of IP packet delivery- Agent advertisement & discovery-Registration- Tunneling & encapsulation-Optimizations- Process of Reverse tunneling-IPv6- Dynamic host configuration protocol-

Transmission techniques in Mobile transport layer: Traditional TCP -Congestion control-Slow start Fast retransmit & fast recovery-Transmission / time out freezing- Selective retransmission- Transaction oriented TCP- CDMA, 1G, 2G, 3G and 4G

6.0 Mobile Application development platforms: Android:

Mobile development platforms - Mobile platform development environments - Benefits and drawbacks of Smartphones programming - Features of Mobile Application development platforms-Android and J2ME –Android: hardware requirements, significance of Linux kernel and Android Update schedule, Android framework - Software stack in Android - Security and Privacy of Android - Android can makes phones crash resistant - Features of current Android version (Android 4.4 Kitkat)-

Need of ADT (Android Development Tool) bundle- Features of Java in Android application development - Android Programming Basics: Activities, Intents, Cursorless controls, Views and Widgets, Asynchronous calls, Background services

Installation of :- Java Development Kit (JDK) -Android SDK and list SDK folders installed or ADT bundle-Eclipse-ADT plugin in Eclipse-Apache Ant

Emulators and setup of the Emulator - Android AVD (Android Virtual Devices) Manager and configuring AVDs - Setup the device for the Android application development

Using Eclipse: Creation of a new Android project , Build, Install and Run the Application in Emulator or Device, Importing non- Eclipse project in Eclipse , Working with DDMS, Running a Project -Anatomy of Android Application Project

REFERENCE BOOKS

1. Mobile communications -----Jochen schiller, Pearson pub.
2. Wireless communications & networks ----- William stallings PHI
3. Beginning Android 4 ----- Grant Allen, APress
4. Android Application development for Dummies --- Donn Flekar
5. Learn Android App Development ----- Wallace Jackson, APress
- 6 Android Developer's website: <http://www.developer.android.com>

DIGITAL SIGNAL PROCESSING
(COMMON TO CN & ES)

Subject Title : Digital Signal Processing
Subject Code : CN/ES - 5304
Periods / week : 04
Periods / semester : 60

TIME SCHEDULE WITH BLUE PRINT

| S.NO | Major Topics | No. of periods | Weightage of Marks | Remembering | Understanding | Applying | Analyzing |
|------|-------------------------------------|----------------|--------------------|-------------|---------------|-----------|-----------|
| 1 | Introduction to signals and Systems | 15 | 29 | 20 | 9 | - | 3 |
| 2 | Fourier Transforms | 15 | 26 | 10 | 10 | 06 | 4- |
| 3 | Laplace & Z-transforms | 20 | 32 | 11 | 10 | 08 | 03 |
| 4 | DSP processors | 10 | 23 | 10 | 10 | 3 | |
| | Total | 60 | 110 | 51 | 39 | 17 | 07 |

OBJECTIVES

1.0 Understand Various Signals and Systems

- 1.1 Define signal and system
- 1.2 Define the following:
 - (a) Continuous Time and Discrete-Time signals,
 - (b) Analog and Digital signals,
 - (c) Periodic and Aperiodic signals,
 - (d) Energy and Power signals,
 - (e) Deterministic and Random signals
- 1.3 Discuss Signal operations (Time–shifting, Time-scaling, Time Inversion and combined Operations).
- 1.4 Define unit step, impulse and Exponential functions
- 1.5 Define Even and Odd functions
- 1.6 List the Properties of Even and Odd functions
- 1.7 Determine the Even and Odd components of given simple signals
- 1.8 Name the various systems and explain
- 1.9 Define Convolution Integral
- 1.10 List the Important properties of Convolution Integral

2.0 Understand Fourier Transforms

(a) Fourier representation of continuous time signals

- 2.1 Define Fourier transform and Inverse Fourier transform
- 2.2 Explain Existence of the Fourier transform
- 2.3 Solve Fourier transform of Sine, Cosine, Impulse, Exponential, Gating, Unit step functions.
- 2.4 List the properties of Fourier Transform
- 2.5 List the advantages of digital signals over analog signals

(b) Fourier representation of discrete time signals

- 2.6 Define DFT
- 2.7 State the mathematical notation for DFT
- 2.8 List the properties of DFT
- 2.9 Solve Simple problems on DFTs
- 2.10 List the applications of Fourier Transforms in Digital Signal Processing

3.0 Understand Laplace and Z-Transforms

- 3.1 Define Laplace Transform and Inverse Laplace transform
- 3.2 State the existence of Laplace Transform
- 3.3 List the properties of Laplace transform
- 3.4 Solve Laplace transform of Sine, Cosine, Impulse, Exponential, Unit step functions
- 3.5 Solve simple problems on Inverse Laplace transform
- 3.6 Define Z-Transform and Inverse Z-Transform
- 3.7 State the mathematical notation for the above.
- 3.8 List the properties of Z-Transform
- 3.9 Solve Z- Transform of Sin(ωt), Cos(ωt), Exponential, Unit step functions
- 3.10 Solve simpler problems on Inverse Z-Transform
- 3.11 List the applications of Laplace and Z- Transforms in Digital Signal Processing

4.0 Introduction to DSP Processors

- 4.1 Define DSP processor
- 4.2 List General purpose DSP processors
- 4.3 List the features of DSP processor TMS 320C5X
- 4.4 Draw the Architectural Block diagram of DSP processor TMS 320C5X
- 4.5 Illustrate the DSP computational building blocks of TMS 320C5X
- 4.6 Explain Bus Architecture of DSP processor TMS 320C5X
- 4.7 Explain addressing modes of DSP processor TMS 320C5X
- 4.8 Explain Address Generation unit of DSP processor TMS 320C5X
- 4.9 List the applications of DSP processors

COURSE CONTENTS:

Introduction to signals and systems-classification of signals-basic operations on signals-elementary functions-various systems- convolution integral.

Fourier representation of continuous and discrete time signals- Fourier transforms and inverse fourier transforms-existence of the Fourier transforms- properties of continuous and discrete time fourier transforms – simple problems on continuous and discrete time fourier transforms-Applications of continuous and discrete time fourier transforms

Laplace and Z-transforms - Laplace Transforms and Inverse Laplace transforms- Z-transforms and Inverse Z-transforms-properties of Laplace and Z-transforms- simple problems on , Laplace and Z-transforms- Applications of Laplace and Z-transforms

Introduction to DSP Processors: General Purpose DSP processors, Basic architectural features of TMS 320C5X - DSP computational Building blocks of TMS 320C5X -Bus Architecture,Addressing modes and Address Generation unit of TMS 320C5X - Applications of DSP processor TMS 320C5X

Text Books

1. Signal Processing and Linear Systems-B.P.Lathi-Oxford University Press,2000
2. A. V. Oppenheim, A. S. Willsky and S. H. Nawab, Signals & Systems, 2nd ed., PH,New Delhi, 1997
3. DSP Processor Fundamentals, Architectures & Features – Lapsley et al. S. Chand & Co, 2000.

Reference Books

1. R. E. Zeimer, W. H. Tranter, and D. R. Fannin, Signals and Systems: Continuous and Discrete, 4th ed., Pearson Education, Delhi, 1998.
2. J. Roberts, Signals and Systems: Analysis using Transform methods and MATLAB, Tata McGraw Hill, New Delhi, 2003.
3. Avtar Singh, S.Srinivasan, *Digital Signal Processing – Implementations using DSP Processors*, Thomson-Engineering, 2004

MICROCONTROLLER & APPLICATIONS

Subject Title : **Microcontroller & Applications**
Subject Code : **IE –5304**
Periods Per Week : **04**
Periods Per Semester : **60**

TIME SCHEDULE WITH BLUE PRINT

| S. No | Major Topics | No. of periods | Weightage of Marks | Remembering | Understanding | Applying | Analysing | Short type | Essay type |
|-------|--------------------------------------|----------------|--------------------|-------------|---------------|-----------|-----------|------------|------------|
| 1 | Architecture of 8051 microcontroller | 15 | 19 | 8 | 8 | - | 3 | 2 | 2 |
| 2 | 8051 Assembly Programming | 18 | 29 | 10 | 13 | 6 | - | 3 | 2 |
| 3 | 8051 Interrupts and Communication | 15 | 20 | 6 | 8 | 3 | 3 | 2 | 2 |
| 4 | 8051 Interfacing | 12 | 29 | 10 | 13 | 6 | - | 3 | 2 |
| | Total | 60 | 110 | 39 | 47 | 18 | 6 | 10 | 8 |

OBJECTIVES

On completion of the study of the subject a student should be able to comprehend the following:

1.0 Understand the Architecture of 8051 Microcontroller

- 1.1 Compare and contrast microprocessors and microcontrollers.
- 1.2 List features of the 8051.
- 1.3 List various members of the 8051 family and compare them.
- 1.4 List different applications of 8051 Microcontroller.
- 1.5 Sketch the pin diagram of 8051 Microcontroller and give the pin details.
- 1.6 Sketch and explain the internal block diagram of 8051 Microcontroller
- 1.7 List the registers of the 8051 Microcontroller.
- 1.8 Define ROM and RAM memories and describe their use in 8051
- 1.9 Explain Memory organization in 8051
- 1.10 List Special Function Registers (SFR) of 8051
- 1.11 Explain CPU registers and PSW
- 1.12 Explain Stack and stack pointer
- 1.13 Explain Program counter and DPTR
- 1.14 Explain Counters and timers
- 1.15 Explain configuration as input and output

- 1.16 Explain Serial data input and output
- 1.17 Explain Interrupts

2.0 Understand 8051 Assembly programming.

- 2.1 State the 8051 data types and derivatives.
- 2.2 Describe five major groups of instructions: Data transfer, Arithmetic, Logical, Single bit instructions and Branching instructions.
- 2.3 Mention about the different addressing modes of 8051 and explain them with examples.
- 2.4 Practice programs using data transfer instructions.
- 2.5 Practice programs using Arithmetic instructions.
- 2.6 Practice programs using Logical instructions.
- 2.7 Practice programs using single bit instructions.

3.0 8051 interrupts and communication

- 3.1 Practice programs using Branch instructions and delay programs
- 3.2 Practice Timer and Counter programs.
- 3.3 List the interrupts
- 3.4 Explain programming using interrupts.
- 3.5 List the steps in executing an interrupt.
- 3.6 List the interrupts of the 8051 based on their priority.
- 3.7 Practice simple programs using interrupts
- 3.8 Explain 8051 serial communication concepts and programming.
- 3.9 Explain the process of data framing.
- 3.10 Explain the use of the MAX232 and MAX233 chips.
- 3.11 Explain how to change baud rate in 8051
- 3.12 Explain programming 8051 to transfer data serially.
- 3.13 Explain programming 8051 to receive data serially.

4.0 Know about 8051 Interfacing

- 4.1 Explain need for Interfacing
- 4.2 Explain different modes of 8255.
- 4.3 Describe how to expand the I/O ports of 8051 using 8255 by connecting it to 8255 chip
- 4.4 Describe how to interface LEDs to 8051
- 4.5 Interface a stepper motor to 8051 and write program to control and operate the stepper motor
- 4.6 Describe the key press and detection mechanisms and Interface a 4x4 matrix keypad to 8051.
- 4.7 Interface a DAC chip to 8051 and write programs to produce analog output
- 4.8 Explain how to interface external ROM /RAM to 8051 and also explain how to use both on-chip and off-chip memory with the 8051
- 4.9 Interface Traffic light controller to the 8051.

CORSE CONTENT:

1. Architecture of 8051 Microcontroller

Features, applications, pin diagram, internal block diagram, registers, Memory organization, SFRs, PSW, Counters of 8051.

2. 8051 Assembly programming

Data types and derivatives, major groups of instructions, addressing modes, and programs.

3. 8051 interrupts and communication

Programs using Branch instructions and delay programs, Interrupts, communication concepts, MAX232 and 233.

4. Know about 8051 Interfacing

Modes of 8255, Interface LEDs, stepper motor, 4x4 matrix keypad, DAC chip, external ROM /RAM, Traffic light controller to 8051,

Reference Books:

1. The 8051 Microcontroller and Embedded Systems by Ali Mazidi, Janice Mazidi
2. The 8051 Microcontroller by Kenneth J. Ayala

TV STUDIO & BROADCASTING TECHNIQUES

Subject Title : TV Studio & Broadcasting Techniques
Subject Code : EV– 5304
Periods per Week : 04
Periods per Semester : 60

TIME SCHEDULE

| S.No | Major Topics | Periods | Weightage of marks | A | B | C | D | Short ques (S) | Essay Ques (E) |
|------|---|-----------|--------------------|-----------|-----------|-----------|-----------|----------------|----------------|
| 1. | Studio Planning and Requirements | 10 | 13 | 13 | | | | 1 | 1 |
| 2. | Studio Cameras & lighting | 20 | 39 | 3 | 26 | 13 | | 3 | 3 |
| 3. | Video Recorders and Editing Equipment | 20 | 29 | 13 | 13 | | | 3 | 2 |
| 4. | TV Broadcasting Techniques & Transmitter Power Protection | 10 | 29 | | 13 | 3 | 10 | 3 | 2 |
| | TOTAL | 60 | 110 | 29 | 55 | 16 | 10 | 10 | 8 |

OBJECTIVES

1 Studio planning and requirements

- 1.1 List the types of studio centers
- 1.2 Give the layout of studio
- 1.3 Discuss about various rooms in studio
- 1.4 Know about acoustic requirements of studio
- 1.5 Know about studio planning and construction
- 1.6 Explain basic video and audio facilities in studio
- 1.7 Explain communication system used in studio
- 1.8 Understand about studio construction and ventilation

2 Studio cameras & lighting

- 2.1 Discuss about Betacam, Digi beta, DV, DVC pro and HD etc., used in TV industry
- 2.2 Explain basic camera chain
- 2.3 Identify the parts of TV camera
- 2.4 Explain the functions of various controls in video camera
- 2.5 Explain various controls in C.C.U.
- 2.6 Draw the C.C.D. camera block diagram and explain it
- 2.7 Explain the advantages of digital camera over conventional cameras
- 2.8 Classify the Television camera on the basis of applications
- 2.9 Explain the need for horizontal and vertical camera movements
- 2.10 List the camera mounting equipment and explain it.
- 2.11 Explain physical and optical characteristics of lens
- 2.12 Discuss about filters used in TV camera
- 2.13 Explain video signal distribution in studio
- 2.14 Discuss about telecine equipment.
- 2.15 Discuss about teleprompter.
- 2.16 Explain the use of waveform monitor and vectroscope
- 2.17 Discuss about the nature of light
- 2.18 Discuss about color temperature
- 2.19 Explain the direction of lighting
- 2.20 Define hard light and soft light
- 2.21 List the TV lighting equipment
- 2.22 Know about various lamps used for lighting
- 2.23 Explain about Key lighting
- 2.24 Explain about spot lights
- 2.25 Explain about flood lights
- 2.26 Explain methods of hanging and mounting system
- 2.27 Discuss about lighting control equipment
- 2.28 Explain about the light measuring equipment

3.0 Video Recorders and Editing Equipment

- 3.1 List the various microphone used for audio
- 3.2 Study the audio console controls
- 3.3 Discuss about audio tape recorders
- 3.4 Discuss about cables and connectors used for audio
- 3.5 Understand various recorders and history of videotape recording
- 3.6 Explain helical scan recording, azimuth recording system in V.T.R.'s
- 3.7 Explain components and composite recording
- 3.8 List the various formats used in TV industry
- 3.9 Study the Betacam and DV cam recorders
- 3.10 Know the various controls in V.T.R.'s
- 3.11 Explain time base correctors
- 3.12 Give the layout of a studio control room
- 3.13 Define i). Vision Mixer ii). Mixing iii). Non-additive mixing iv). WipingV)Keying
- 3.14 Study the professional vision mixer

- 3.15 Know the switcher effects
- 3.16 Explain about Electronic character generator
- 3.17 Explain connections of various equipment used in Editing.
- 3.18 Understand the video tape editing
- 3.19 Give the basic structure of video editing
- 3.20 Explain control track editor and time code editors
- 3.21 Explain about professional non-linear editor
- 3.22 Explain briefly about nonlinear softwares

4.0 TV Broadcasting techniques and Transmitter Power Protection

- 4.1 Understand the basics of TV broadcasting techniques
- 4.2 Discuss about different TV transmitter system
- 4.3 Discuss about vision and sound combiner
- 4.4 Give the transmitter specifications
- 4.5 Know the concept of TV transmitter network
- 4.6 Explain the monitor up the output of transmission system
- 4.7 Define various parameter measured for monitor
- 4.8 Explain the concept of station controller
- 4.9 Give the functions of control center
- 4.10 Discuss about different types of top mounted antenna
- 4.11 Understand the power supply and various protection systems for TV transmitter
- 4.12 List the types of microwave links
- 4.13 Explain ENG links O.B. links
- 4.14 Explain Up-link and Down-link in TV transmission

COURSE CONTENTS

1. Studio planning and Requirements:

Types of Studio centers, layout of studio, various rooms in studio, requirements of studio, studio planning and construction, basic video and audio facilities in studio communication systems used in studio and studio construction and ventilation.

2. Studio Cameras & lighting

Basic camera chain and identification of parts of TV camera, various controls in C.C.U. block diagram explanation of C.C.D. Camera , advantages of digital camera over conventional cameras, classification of TV cameras as per applications, explanation of camera mounting equipment, physical and optical characteristics of lens, filters used in TV cameras,. Video signal distribution in studio, telecine equipment, uses of waveform monitors and vectroscope. Nature of light, color temperature, hard light, soft light, TV light equipment, various lamps used for lighting , spot lights and flood lights, methods of hanging and mounting system, lighting control equipment , microphones used for audio, audio console controls. Audio tape recorder used in studio, cables and connectors used for audio.

3. Video Recorder and Editing Equipment:

Helical scans recording, azimuth recording system in V.T.R.'s component and composite recording, various formats used in T.V. Industry, Betacam and DV cam recording/. Various controls in V.T.R.'s time base correctors layout of studio control room, definition of vision mixer, mixing, non-additive mixing, wiping, keying, professional vision mixer, switcher effects electronic character generator, video tape editing, structure of video editor, control tack editors and time code editors, non-linear editor. About Final cutpro, Avidmojo, Soundscape, Protocols Softwares.

4. TV Broadcasting techniques and Transmitter Power Protection

Different TV transmitter systems, vision and sound combiners, use of control logic and safety in transmission , transmitter specification, concept of TV transmitter network, , various parameter measured for monitoring, concept of station controller, function of control centers, different types of top mounted antenna, Power supply and various protection systems for TV transmitter, general transmission power equipments and used in transmitter, earthing facility in transmitter, lighting and fire protection system for transmitter.TV communication network, microwave links, ENG links , OB links , uplink and down link in TV transmission , digital TV broad casting system.

REFERENCE BOOKS

1. TV Production by Alan wurtzel
2. Television Production by Zetil
3. Television and audio hand book by K. Blair Benson
4. Video studio by focal press
5. Equipment manuals.

ANALYTICAL INSTRUMENTATION ENGINEERING

Subject title : Analytical Instrumentation Engineering
Subject Code : BM-5304
Periods Per Week : 04
Periods Per Semester : 60

TIME SCHEDULE

| S. No | Major Topics | No. of Periods | Weightage of marks | Short type | Essay type |
|-------|--|----------------|--------------------|------------|------------|
| 1 | Introduction to spectrophotometer & colorimeter | 15 | 29 | 3 | 2 |
| 2 | Concept of flame photometer, chromatograph & Electrophoresis | 15 | 29 | 3 | 2 |
| 3 | Concept of biochemical analyzer & blood gas analyzer | 15 | 26 | 2 | 2 |
| 4 | Concept of conductivity meter, pH meter and Biosensors | 15 | 26 | 2 | 2 |
| | TOTAL | 60 | 110 | 10 | 8 |

OBJECTIVES

On Completion of the course a student will be able to understand:

1.0 Concept of colorimeter and spectrophotometer

- 1.1 Draw and explain block diagram of Analytical instrumentation.
- 1.2 Explain the use of personal computers in analytical instruments
- 1.3 Draw and explain Electromagnetic spectrum.
- 1.4 Describe Beer Lamberts law.
- 1.5 Explain Monochromator (Prism and Grating)
- 1.6 List the different types of Visible, UV and IR light sources.
- 1.7 List the different types of Visible, UV and IR light Detectors
- 1.8 Explain principle of Single beam Visible/U.V Spectrophotometer meter
- 1.9 List applications of spectrophotometer
- 1.10 Explain the principle of colorimeter and give its applications
- 1.11 Describe calibration in spectrophotometer.
- 1.12 Compare colorimeter & spectrophotometer

2.0. Concept of Flame Photometer, Chromatograph, Electrophoresis

- 2.1 Explain basic principle of flame photometer with block diagram
- 2.2 Explain the interferences in flame photometry
- 2.3 List the application of flame photometer
- 2.4 Give the basic principle of chromatography & classify.
- 2.5 Explain Block diagram of a gas chromatograph
- 2.6 Explain the methods of measurement of peak areas
- 2.7 Explain Block diagram of liquid chromatograph
- 2.8 List the applications of chromatography
- 2.9 Give the principle and techniques of electrophoresis
- 2.10 Explain complete electrophoresis apparatus
- 2.11 Explain the Need of densitometer in electrophoresis
- 2.12 Explain the role of Microprocessors in densitometer
- 2.13 List the applications of electrophoresis.

3.0 Concept of biochemical and blood gas analyzers:

- 3.1 Describe Principle of automated biochemical analysis system with necessary diagrams
- 3.2 List the component steps in automated system
- 3.3 Explain the schematic diagram of a continuous flow system
- 3.4 Explain system components of automated system.
- 3.5 List the applications automated biochemical analysis system
- 3.6 Explain what is blood gas analyzer
- 3.7 Explain catheter tip electrode for measurement of pO_2 and pCO_2
- 3.8 Explain complete blood gas analyzer with block diagram
- 3.9 List the applications of blood gas analyzer.

4.0 Principles of conductivity meter, pH meter and biosensors

- 4.1 Explain the principle of conductivity meter with block diagram
- 4.2 List the applications of conductivity meter.
- 4.3 Define pH
- 4.4 Explain working principle of pH meter with block diagram
- 4.5 Explain different electrodes for pH measurement
- 4.6 Explain digital pH meter with block diagram
- 4.7 Explain the applications of pH meter.
- 4.8 Describe the principle of Biosensors
- 4.9 List the applications of Biosensors

COURSE CONTENTS:

- 1.0 Concept of colorimeter & spectrophotometer :** block diagram of analytical instrumentation, electromagnetic spectrum beer lambert's law, monochromator, different types of visible, UV, IR light detectors, U.V Spectrophotometer meter, principle of colorimeter, spectrophotometer, colour filter and monochromator,
- 2.0 Concept of Flame photometer, Chromatograph, Electrophoresis:** Principle of flame photometry, interferences in flame photometry, gas

chromatograph, liquid chromatography, complete electrophoresis, densitometer

3.0 Concept of Biochemical and blood gas analyzers : Automated biochemical analysis system, applications of automated biochemical analysis system, blood gas analyzer and its applications

4.0 Principles of conductivity meter, p H meter , and Blood gas analyzer : Principle of measurement of conductance, conductivity meter, p H measurement , p H meter, Null –detector type p H meter, Chopper amplifier type pH meter, digital p H meter, Biosensors,

TEXT BOOKS

1. Medical Instrumentation – Application & Design John G. Webster Houghton Mifflin Company
2. Handbook of Biomedical Instrumentation R.S. Khandpur Tata Mc Graw Hill.

REFERENCE BOOKS

1. Handbook of Analytical Instruments R.S. Khandpur Tata Mc Graw Hill

RELATIONAL DATABASE MANAGEMENT SYSTEMS (RDBMS)

Subject Title : RELATIONAL DATABASE MANAGEMENT SYSTEMS (RDBMS)

Subject Code : CP-5305

Periods per week : 04

Periods per Semester: 60

| TIME SCHEDULE AND BLUE PRINT | | | | | | | | | | |
|------------------------------|------------------------------|---------------|-----------|--------------------|------------|----------|----------|------------|----------|----------|
| Unit No | Major Topic | No of Periods | | Weightage of marks | Short Type | | | Essay Type | | |
| | | Theory | Prac tice | | R | U | A pp | R | U | A pp |
| 1 | Concept of DBMS & RDBMS | 12 | 3 | 29 | | 3 | | | 2 | |
| 2. | Concept of SQL | 8 | 4 | 24 | | 3 | | | 1½ | |
| 3. | Management of schema Objects | 8 | 2 | 18 | 1 | | | 1½ | | |
| 4. | PL/SQL | 8 | 5 | 23 | | 1 | | | 2 | |
| 5. | Advanced PL/SQL | 6 | 4 | 16 | | 2 | | | 1 | |
| Total | | 42 | 18 | 110 | 5 | 5 | 0 | 3 | 5 | 0 |

OBJECTIVES

On completion of the study of the subject the student shall be able to

1.0 Understand the concept of DBMS & RDBMS

- 1.1 Define Database System
- 1.2 List atleast five advantages of Database System
- 1.3 Explain what is meant by data base abstraction
- 1.4 Explain Data models
- 1.5 Define instances and schemes
- 1.6 Explain data independence.
- 1.7 Explain data definition language
- 1.8 Explain data manipulation languages
- 1.9 Explain data base manager
- 1.10 Explain data base administrator and users
- 1.11 Describe the overall system structure
- 1.12 Explain entity and entity sets
- 1.13 Explain relationship and relationship sets

- 1.14 Define the terms super key , candidate key and primary key
- 1.15 Explain mapping constraints
- 1.16 Reduce the ER diagrams to tables
- 1.17 Explain generalization, specialization and aggregation
- 1.18 Explain Functional Dependencies
- 1.19 Describe Normalization– 1st NF, 2nd NF, 3rd NF
- 1.20 Explain E.F.CODD's rules for RDBMS

2.0 Understand the concept of SQL

- 2.1 Explain benefits of SQL
- 2.2 Describe about embedded SQL, Lexical conventions, oracle tools support for SQL
- 2.3 Describe Naming of the Objects and parts and how to refer them
- 2.4 Explain referring of the object in remote data bases
- 2.5 Explain literals, text and integers
- 2.6 Explain the different data types like character, number long, date, raw and long raw etc.
- 2.7 Illustrate pseudo-columns
- 2.8 Illustrate the comments within SQL Statement
- 2.9 List and explain the functions like single row, character, conversion and group functions

- 2.10 Explain date and number format models
- 2.11 Describe commands of SQL like data definition language commands, data manipulation language commands, transaction control commands.
- 2.12 Explain Sub queries
- 2.13 Explain Joins and types of Joins

3.0 Understand the management of schema objects

- 3.1 List atleast five schema objects
- 3.2 Explain the guidelines for managing schema objects
- 3.3 Explain the management of space usage of data base table etc
- 3.4 Explain the procedure of creating, altering and dropping tables
- 3.5 Explain the management of sequences like creating altering ,dropping etc
- 3.6 Explain the various synonyms management like creating, dropping etc
- 3.7 Describe steps of managing indexes
- 3.8 Define clusters
- 3.9 List two types clusters
- 3.10 State the purpose of clusters
- 3.11 Define view
- 3.12 Explain types of views
- 3.13 Illustrate creation of views from multiple tables
- 3.14 List atleast three advantages of views.
- 3.15 Explain management of integrity constraints like Primary key, Foreign key, Unique key, check constraint and illustrate

4.0 Understand PL/SQL

- 4.1 Explain the architecture of PL/SQL.
- 4.2 List atleast five features of PL/SQL
- 4.3 Explain the data types
- 4.4 Illustrate declarations and naming conventions of variables
- 4.5 List atleast five built in functions.
- 4.6 Explain PL/SQL tables and user defined records.
- 4.7 Explain decision making statements and illustrate
- 4.8 Explain looping statements and illustrate
- 4.9 Define the term Exception handling
- 4.10 Illustrate five built in Exceptions
- 4.11 Illustrate User defined Exceptions
- 4.12 List any four advantages of Exception handling
- 4.13 Explain the advantages and features of Exceptions.
- 4.14 Explain the propagation and re-raising of Exceptions.
- 4.15 Describe the advantages of sub programs.
- 4.16 List and explain the various statements and declarations for procedures and functions.

- 4.17 Explain three parameter modes in PL/SQL with examples
- 4.18 Illustrate parameter default values in PL/SQL procedures and functions
- 4.19 Explain PL/SQL global, local and system variables.
- 4.20 Define recursion
- 4.21 Explain recursion with an example

5.0 Understand Advanced PL/SQL.

- 5.1 Explain cursor attributes and cursor management
- 5.2 Explain database triggers
- 5.3 Explain the concept of stored sub programs with examples
- 5.4 List atleast five advantages of packages.
- 5.5 Explain the specifications of packaging.
- 5.6 Explain overloading and calling packaged sub programs.

COURSE CONTENTS

1.0 Concept of DBMS

Define Database – Advantage of Database- data Abstraction – Data Models – Instances and schemes – Data independence – Data Definition Language- Data manipulation Language – Data base manager – Data base Administrator - Database users – Overall system structure.

Entities and entity sets – Relationships and Relationship sets – mapping constraints – Entity – Relationship Diagram – Super key , candidate key and primary key - Reducing E- R Diagrams to tables – Generalization and specialization – Aggregation – Functional Dependencies - Normal forms 1st , 2nd , 3rd- EFCODD rules for RDBMS

2.0 Concept of SQL

Benefits of SQL – Embedded SQL – Lexical conversions – ORACLE tools support for SQL. Naming object and parts – Referring objects and parts – Referring to object in remote databases- Literals – Text –Integer – Number – Data types – Character data types – Number data type – Long data type – Data type Raw and long raw data types – Nulls –Pseudo columns – comments within SQL statements – comments on schema objects.

Operators – Unary and Binary operators – Precedence- Arithmetic operators – character operators – comparison operators – logical operators- se operators – other operators – functions – single row functions – number functions – character functions – row functions – number values – data functions – conversion functions – other functions- date format models .

SQL commands, data definition language commands data manipulation language commands. Transaction control commands-Subqueries - Joins .

3.0 Schema objects

Guidelines for Managing schema objects – managing the space usage of data blocks – setting storage parameters – understanding space use of datatypes – managing tables – creating tables – alter tables – dropping tables – managing sequences – creating sequence – altering sequences- initialization parameters affecting – sequences – dropping sequences – managing synonyms – creating synonyms – dropping synonyms – managing indexes – guidelines for managing indexes – calculating space for indexes – creating indexes – indexed tables, and cluster indexes – guidelines for managing clusters, calculating space required by clusters – creating clusters, clustered tables, and cluster indexes – for – clustered tables and cluster indexes – Altering clusters– Dropping clusters, clustered tables, and cluster indexes – managing hash cluster and clustered tables miscellaneous management for schema objects – creating views – renaming schema objects var type, tables, indexes and clusters – truncating tables and clusters – managing integrity constraints.

4.0 Elements of PL/SQL

Main features – architecture – advantage of PL/SQL – fundamentals – character set – Lexical units – Data types – data type conversion – declarations – naming conventions – scope and visibility – assignments – expressions and comparisons – built – in functions – PL/SQL tables – user defined records.

Conditional control IF statement – sequential control GOTO and NULL statements.

SQL support – national language support – Remote Access

Advantages of exceptions – predefined exceptions – user defined exceptions – how exceptions propagate – raising an exception – useful techniques.

Advantages of subprograms – procedures – Functions RETURN statement – forward declarations – actual versus formal parameters – positional and named notation parameter modes – parameter default values – overloading recursion

5.0 Advanced PL/SQL

Advantages of Stored programs – CURSORS - Advantages of Database Triggers - Advantages of packages – the package specification – the package body – overloading – calling packaged subprograms – package state and dependency – package standard.

REFERENCE BOOKS

1. Understanding ORACLE ---- James T. Peary & Joseph G. Laseer.
2. RDBMS with ORACLE ---- Rolland.
3. ORACLE series books of ORACLE Press ---- TMH.
4. Starting out with Oracle – Covering Databases ---- John Day & Craig Van
5. PL/SQL, Developer Tools & DBA ---- Slyke, Dreamtech
6. Relational Database Management Systems ---- ISRD Group, TMH

TRANSMISSION LINES, ANTENNAS AND WAVE PROPOGATION

Subject Title : Transmission lines, Antennas & Wave Propagation
Subject Code : CN - 5205
Periods / Week : 4
Periods / Year : 60

TIME SCHEDULE WITH BLUE PRINT

| Sl. No | Major Topics | No. of Periods | Weightage of Marks | Short Type | Essay Type |
|--------|--|----------------|--------------------|------------|------------|
| 1 | Transmission lines | 20 | 34 | 3 | 21/2 |
| 2 | Principles of Antenna & antenna arrays | 15 | 26 | 2 | 2 |
| 3 | Microwave antennas | 10 | 24 | 3 | 11/2 |
| 4 | Wave propagation | 15 | 26 | 2 | 2 |
| | Total | 60 | 110 | 10 | 8 |

OBJECTIVES

On Completion of the course the student will be able to

1.0 Understand different aspects of transmission lines

- 1.1. Distinguish between lumped and distributed parameters.
- 1.2. Define the primary and secondary constants of transmission line.
- 1.3. Express transmission line as a symmetrical T network.
- 1.4. Define an infinite line.
- 1.5. Derive an expression for Z_0 and propagation constant of transmission line.
- 1.6. Derive general expression of voltage and current of transmission line and explain its Significance.
- 1.7. Solve simple problems on the above.
- 1.8. Define reflection and reflection coefficient.
- 1.9. Explain the term standing wave and Define SWR.
- 1.10. Relate SWR and reflection coefficient.
- 1.11. Define dissipation less line and sketch voltage, current impedance variation for OC & SC dissipation less lines.
- 1.12. Explain the reactance properties for open and short circuit transmission line
- 1.13. List the characteristics of quarter wave OC & SC lines with the help of sketches showing input impedance variation.
- 1.14. Sketch voltage and current wave forms for dissipation less line when load impedance is equal to R_0 and load impedance equal to $3R_0$, $R_0/3$.
- 1.15. Define phase velocity and group velocity and list the relationship between them.
- 1.16. Obtain the expression for attenuation and phase constant from propagation constant.
- 1.17. List different wave form distortions in L F lines and mention the cause.
- 1.18. Derive the condition for distortion less transmission line (LF).
- 1.19. Explain loading.

- 1.20. Explain quarter wave line as an impedance matching device.
- 1.21. Explain single stub matching and double stub matching
- 1.22. Explain the circles in the smith chart and give the applications

2.0 Understand principles of Antenna and antenna arrays

- 2.1. State the purpose of an antenna
- 2.2. Explain the radiation of electromagnetic (EM) waves from an antenna.
- 2.3. Sketch the radiation pattern of dipole antennas of different sizes in terms of wavelengths
- 2.4. Sketch the voltage and current distribution in a wire antenna ,half wave dipole
- 2.5. Define the following terms with respect to antenna: Antenna gain, antenna resistance, Radiated power, radiation Pattern, beam width, aperture area, effective length, efficiency and polarization.
- 2.6. Explain linear, circular and elliptical polarization of antennas
- 2.7. Explain resonant and non resonant antennas
- 2.8. Explain the effects of antenna height
- 2.9. Explain the effect of ground on antennas
- 2.10. Explain impedance matching of antenna with feed and transmission line
- 2.11. List the various types of antennas based on frequency
- 2.12. State the purpose of antenna array and mention its types
- 2.13. Explain the working of two-element array, broad side and end fire arrays.
- 2.14. Sketch the radiation pattern of above antennas
- 2.15. Sketch the resultant patterns of a group of antenna from the method of multiplication of arrays.
- 2.16. Sketch the radiation pattern of binomial array.
- 2.17. Define gain of an array.
- 2.18. Explain the function of parasite (Yagi) antenna.
- 2.19. Explain the need for folded dipole antenna.
- 2.20. Explain with sketch the working of Rhombic antenna and sketch its radiation pattern.
- 2.21. Explain the working of loop and frame aerial.
- 2.22. Sketch the directional characteristics of loop aerials.
- 2.23. Explain the reasons for using loop aerial in direction finding.
- 2.24. Explain the working of log periodic antenna
- 2.25. List different types of broadcast antennas.
- 2.26. Mention the significance of wide band special purpose antennas.

3.0 Understand the principles of microwave antennas

- 3.1. List different types of microwave Antennas
- 3.2. Discuss the requirements of Microwave Antennas
- 3.3. Explain the basic principle of an Antenna system employing the various parabolic reflectors
- 3.4. Explain the various feed mechanisms for a parabolic reflector system
- 3.5. List the limitations of a simple wave-guide as a radiator
- 3.6. Discuss the development of a horn Antenna
- 3.7. Explain the radiation from horn Antenna
- 3.8. Explain the need for lens Antenna
- 3.9. List the various types of lens antenna
- 3.10. Explain the working of a zoned lens antenna
- 3.11. Explain discone antenna
- 3.12. Describe a method for the measurement of impedance & radiation pattern of an antenna.

4.0 Understand the principles of propagation of radio waves and their modes of propagation.

- 4.1. Name the various modes of propagation of radio waves in free space
- 4.2. Explain ground wave propagation
- 4.3. Express the field strength of ground wave
- 4.4. Describe space wave propagation over an ideal flat earth
- 4.5. Explain the atmospheric effects in space wave propagation
- 4.6. List the effects of earth imperfections and roughness of field strength
- 4.7. Describe duct propagation
- 4.8. Explain the general picture of ionosphere
- 4.9. Explain the characteristics of ionosphere layers, in terms of its initial height and critical frequency
- 4.10. Define the terms virtual height frequency, maximum usable frequency, skip distance and fading
- 4.11. Describe propagation mechanism of radio waves in ionosphere
- 4.12. Define primary and secondary service area
- 4.13. Explain fading of radio waves
- 4.14. Describe multiple hop transmission
- 4.15. Explain the use of troposphere scatter or forward scatter propagation
- 4.16. Explain the properties of forward scatter propagation

COURSE CONTENTS

1.0 TRANSMISSION LINES

Line parameters, primary and secondary constants, general equation of transmission line, physical significance of equations, infinite line, wave form distortion, distortion less condition, loading, reflection coefficient. Standing waves, Volt and current distributions on dissipation less lines, single and double stub matching., smith charts

2.0 Principles of Antenna & antenna arrays: Fundamentals of antenna, Defining important terms with respect to antenna., Resonant and non resonant antenna, Effects of antenna height, Effect of Ground on antennas, Directional characteristics of antenna arrays, linear arrays, broadside and end fire arrays, radiation pattern of a group of antennas, YAGI-UDA antenna, rhombic antenna, & log periodic antenna

3.0 Microwave Antennas : Parabolic antenna & it's feed mechanisms, horn antenna, lens antenna, disc one antenna, impedance & field pattern measurements.

4.0. Wave Propagation : Modes of Propagation of radio waves in free space, ground waves, sky wave & Space wave propagation, ionosphere layers, skip distance, critical height, critical frequency, critical angle, muff, multi hop - transmission, tropospheric propagation, fading, troposcatter and forward scatter propagation.

TEXT BOOKS

1. Engineering Electromagnetics - Hayt (Mc graw Hill)
2. Antennas and Wave propagation - K.D. Prasad
3. Electronic Communication System - George Kennedy
4. Electromagnetic Waves & Radiating System - Jordan & Balmain

INDUSTRIAL INSTRUMENTATION

| | | |
|----------------------|---|----------------------------|
| Subject Title | : | Industrial Instrumentation |
| Subject Code | : | IE-5305 |
| Periods per Week | : | 04 |
| Periods per Semester | : | 60 |

TIME SCHEDULE WITH BLUE PRINT

| S. No | Major Topics | No. of periods | Weightage of Marks | Remembering | Understanding | Applying | Analysing | Short Type | Essay Type |
|-------|--|----------------|--------------------|-------------|---------------|----------|-----------|------------|------------|
| 1 | Displacement, force, torque and pressure measurement | 15 | 26 | - | - | - | - | 2 | 2 |
| 2 | Temperature measurement | 10 | 16 | - | - | - | - | 2 | 1 |
| 3 | Flow and level measurement | 15 | 26 | - | - | - | - | 2 | 2 |
| 4 | Miscellaneous measurement and signal conditioning | 10 | 21 | - | - | - | - | 2 | 1 ½ |
| 5 | Advanced sensors | 10 | 21 | - | - | - | - | 2 | 1 1/2 |
| | Total | 60 | 110 | | | | | 10 | 8 |

OBJECTIVES

On completion of the following topics the student shall be able to

1.0 Displacement, Force, torque, pressure and speed measurement.

1.1 Define sensor and transducer

1.2 Distinguish sensor and transducer.

1.3 Explain types of transducers - primary, secondary

1.4 Explain the principle of measurement of displacement by the transducers listed below.

- a) Resistance strain gauge.
- b) Linear variable differential transformer (LVDT).
- c) Capacitive transducer.

1.5 Explain the measurement of force by

- a) Hydraulic force meter.
- b) Pneumatic force meter.
- c) Electric force transducer.
- d) Strain gauge load cell.

1.6 Explain pressure transducers diaphragm, bellows, bourdon tube

1.7 Explain measurement of torque by

- a) In line rotating torque sensor.
- b) In line stationary torque sensor.
- c) Proximity torque sensors.

1.8 Explain measurement of speed by DC tachometer.

2.0 Understand the measurement of temperature.

2.1 List the methods of temperature measurement.

2.2 Explain electrical temperature instruments.

- a) Bimetallic strip
- b) Resistance Temperature Detector (RTD)
- c) Thermocouple.
- d) Thermistor.

2.3 List out the advantages and limitation of above sensors

2.4 Explain the construction and working of pyrometers.

- a) Radiation pyrometer.
- b) Optical pyrometer.

3.0 Understand the measurement of flow and level.

3.1 Explain the methods of liquid level measurement.

- a) Sight glass type
- b) Float type.
- c) Capacitance level indicator.
- d) Radiation level detector.

3.2 Explain the methods of flow measurement.

3.3 Give the principle of measuring of flow by.

- a) In referential type
- b) Quantity
- c) Mass flow meters

3.4 List the parts of differential flow meter.

3.5 Explain importance of primary elements - Orifice plate, Venturi tube, Flow nozzles, weirs

3.6 Explain the basic operating principle of

- a) Variable Head flow meter,
- b) Rota meter,

- c) Thermal flow meter,
- d) Ultrasonic flow meter.

4.0 Understand the principles of of miscellaneous measurement and signal conditioning

- 4.1 Explain the principle of measurement of thickness using ultra sonic method.
- 4.2 Explain density measurement using Hydrometer for liquids.
- 4.3 Define Viscosity and state its units
- 4.4 Explain viscosity measurement using capillary viscometer.
- 4.5 Explain measurement of PH using Glass electrode PH measurement.
- 4.6 Explain the principle of Vibration measurement.
- 4.7 State the importance of Conductivity measurement
- 4.8 Explain about instruments for Humidity measurement.
- 4.9 Sketch and explain Instrumentation amplifier.
- 4.10 Explain Logarithmic, Chopper amplifier.
- 4.11 Explain voltage to frequency converter.

5.0 Advanced Sensors..

- 5.1 Explain Proximity Sensors-Inductive and capacitive.
- 5.2 State the importance of limit switch.
- 5.4 Explain principle of fiber optic sensors.
- 5.5 Explain the principle of Fiber-optic Pressure sensor.
- 5.6 Explain Displacement sensor
- 5.7 Explain the principle of Laser sensors.
- 5.8 List the various Industrial applications of laser sensors.
- 5.9 Explain bar-code systems.
- 5.10 Explain electromagnetic identifications methods.
- 5.11 Explain optical character recognition method.
- 5.12 State the importance of Fuzzy logic.

COURSE CONTENT

- 1.0 Introduction to instrumentation and measurement of displacement force and pressure:** em, sensors transducers and definition characteristics of sensors, Principle of strain gage,, strain gauge pressure transducers, force transducer, displacement transducer, piezo- electric transducer, Explain hydraulic force, pneumatic force meter, electric force transducers, principle of capacitive transducer, principle of LVDT, Explain in-line rotating torque sensor, Explain the in-line stationary torque sensor, the proximity torque sensor, speed measurement..
- 2.0 Introduction of different types of temperature sensors** - Principle of RTD, thermocouple and thermistors Bimetallic strip, List out the advantages and limitation of above sensors,, point contact sensors, Non-contact Temperature (pyrometers) ,List out the advantages and disadvantages of above.
- 3.0 Introduction to different types of flow measurement,** Principle, working of different flow meters like - variable Head meters, variable area meter (Rota meter) and thermal flow meter electromagnetic flow meter, ultrasonic flow meters,

Explain importance of primary elements - Orifice plate, Venturi tube, Flow nozzles, weirs

Introduction to Level Measurement: Principle, working and application and advantages, limitations of - Float type liquid level, sight glass method, capacitive Method level Transducers . Radiation level detector.

4.0 The principles of of miscellaneous measurement and signal conditioning

principles of measurement of – Viscosity, Thickness, PH, Conductivity, Density , Nuclear radiation, vibration, Instrumentation amplifier, Logarithmic amplifier,, Chopper amplifier, voltage to frequency converters.

5.0 Advanced Sensors..

principles of proximity sensors, inductive and capacitive proximity sensors, proximity switch, limit switches, fiber optic sensor Laser sensors, laser components, semi conductor displacement laser sensors, its applications and various industrial applications of laser sensors bar-code system, electromagnetic identifications method, optical character recognition method. State the importance of Fuzzy logic.

Reference Books

1. Industrial Instrumentation and control by S.K.Singh (Tata Mc Graw Hill, New Delhi)
2. Sensors and control systems in manufacturing by sabrie soloman (9Mc Graw Hill International Ider)
3. Transducers and Instrumentation by D.V.S. Murthy (Prentice – hall)
4. Instrumentation measurement and Analysis by Bc. Nakra K.K. Chowdary (Tata McGraw Hill)
5. Mechanical and Industrial measurements by R K Jain, Khanna publishers

STUDIO THEATRE ACOUSTICS

Subject Title : Studio theatre Acoustics
Subject Code : EV-5305
Periods Per Week : 04
Periods Per Semester : 60

TIME SCHEDULE

| S.No | Major Topics | Periods | Weightage of marks | A | B | C | D | Short ques (S) | Essay Ques (E) |
|------|---|-----------|--------------------|-----------|-----------|-----------|-----------|----------------|----------------|
| 1. | Basic Principle of Sound and its parameters | 15 | 29 | 16 | 13 | | | 3 | 2 |
| 2. | Psycho Acoustics and noise criteria | 15 | 26 | | 13 | 13 | | 2 | 2 |
| 3. | Room Acoustics and Sound Absorption materials | 15 | 26 | 13 | 13 | | | 2 | 2 |
| 4. | Sound isolation | 8 | 16 | | 13 | 3 | | 2 | 1 |
| 5. | Studio Design | 7 | 13 | | 3 | | 10 | 1 | 1 |
| | TOTAL | 60 | 110 | 29 | 55 | 16 | 10 | 10 | 8 |

OBJECTIVES

1.0 Know about basic principle of Sound and its parameters

- 1.1 Understand the basic principle of sound generation
- 1.2 Define sound and Acoustic
- 1.3 Explain the nature of sound waves
- 1.4 Define frequency, amplitude, wave length, wave front, ray and phase
- 1.5 Explain propagation of sound waves in different mediums
- 1.6 Define transverse waves and longitudinal waves
- 1.7 Explain generation of plane wave, spherical wave and cylindrical waves
- 1.8 What is obstacle effect of sound
- 1.9 Explain decibel scale
- 1.10 Define dyne, bar and microbars
- 1.11 Explain sound pressure levels
- 1.12 Define acoustic intensity and acoustic impedance
- 1.13 Derive fundamental, overtone and harmonics
- 1.14 Explain reflection, refraction, diffraction of sound

- 1.15 Give the effect of temperature and wind on sound propagation
- 1.16 Discuss about inverse square law
- 1.17 Explain sound in an enclosure
- 1.18 Define reverberation and reverberation time, live and dead room.
- 1.19 Give the factor effect on R.T
- 1.20 Discuss about the method of controlling R.T.

2.0 Know about Psycho Acoustics and noise criteria

- 2.1 Explain human hearing mechanism
- 2.2 Explain auditory area and define threshold of hearing and threshold of feeling
- 2.3 Explain equal loudness contours with sketch and what it indicates
- 2.4 Explain the graphical representation of loudness Vs Sound pressure level (S.P.L.)
- 2.5 Define PHON, SONE and AMEL
- 2.6 Explain about masking phenomenon
- 2.7 Explain weighting functions
- 2.8 Explain noise related hearing loss
- 2.9 Define noise criteria and give the noise rating curves for different enclosure
- 2.10 Know about voice producing mechanism
- 2.11 Know the nature of speech and music waves.

3.0 Know about room acoustics and absorption materials

- 3.1 Explain the meaning of diffusion
- 3.2 List the sound effects on size of the room
- 3.3 Discuss about problems due to parallel reflecting surfaces
- 3.4 Explain the effect of irregular surfaces and curved surfaces
- 3.5 Define optimum reverberation time for various acoustics room
- 3.6 Define absorption and co-efficient of absorption
- 3.7 Discuss about perfect absorber and perfect reflector.
- 3.8 List different types of sound absorbers
- 3.9 Explain porous absorber, their characteristics and give examples
- 3.10 Explain diaphragmatic absorbers
- 3.11 Explain different types of Helmholtz resonators
- 3.12 Explain absorption of sound in air
- 3.13 List the absorption co-efficient of various acoustics materials
- 3.14 What do you mean by variable acoustics
- 3.15 Explain different methods of altering the acoustics
- 3.16 Explain the use of screens or gobos in acoustics

4.0 Know about sound isolation

- 4.1 Know the meaning of sound isolation
- 4.2 Explain noise survey for site
- 4.3 Give the use of N.C. curves in audio rooms
- 4.4 What are the factors considered in site selection for audio rooms
- 4.5 Explain transmission loss requirement
- 4.6 What is the purpose of sound barrier
- 4.7 Discuss about floor and ceiling construction
- 4.8 Explain wall constructions for studio isolation
- 4.9 Discuss about different methods of floor construction
- 4.10 What is the use of sound lock lobby
- 4.11 Explain acoustics doors
- 4.12 Explain ventilation and air conditioning facilities in studio

- 4.13 Discuss about floating studio
- 5.0 Know about Studio Design**
- 5.1 Explain the steps involved in acoustics design (mathematically)
- 5.2 Know the acoustical design for speech and voice rooms
- 5.3 Discuss about music studio
- 5.4 Explain acoustics for TV studio
- 5.5 Explain theatre acoustics
- 5.6 What is live end-dead end studio
- 5.7 Discuss about film mixing studio
- 5.8 Explain construction of an anechoic chamber and reverberation chamber

COURSE CONTENTS

1. Basics of principle of sound and its parameters

Sound and acoustics – nature of sound – propagation of sound – sound characteristics and parameters – transverse and longitudinal – plane and spherical waves, wave fronts – obstacle effect – fundamentals overtones and harmonic – definitions of dyne, bar, microbar – sound power level – refraction, reflection, diffraction standing waves – reverberation – reverberation time – derive equations – Sabine, Eyring's formula.

2. Psycho acoustics and voice criteria

Sound and hearing – loudness of sound waves – threshold of hearing and pain – aural sensitivity curves – pitch – timbre – equal loudness contour – definitions of PHON, SONE, MEL Noise and music – noise criteria for different enclosure – nature of speech waves, articulation test for speech – voice producing mechanism masking effect.

3. Room Acoustics and Absorption Materials

Diffusion of sound – acoustic defects of room – effect of parallel walls and shape of reflective surface – optimum reverberation time. Absorption – different types of sound absorbers, coefficient of absorption – study of different types of acoustic materials – variable acoustics, use of screens or gobos

4. Sound Isolation

Site selection for audio rooms – noise criteria transmission loss – wall construction - floor and ceiling construction – floating studio – noise control – acoustic design of speech and music studio – TV studio – cinema theatre – anechoic chambers and reverberation chamber – live and – dead end studio.

REFERENCE BOOKS

1. Basic Acoustics by Donald E. Hall
2. Waves and Acoustics by Chakra Batri and Chowdary
3. Hand Book for Sound engineers audio encyclopedia by Glen Ballov
4. Fundamentals of Acoustics by Lawrence. E. Kinsler

MEDICAL IMPLANTS ENGINEERING

Subject Title : Medical Implants Engineering
Subject Code : BM- 5305
Periods per Week : 04
Periods per Semester : 60

TIME SCHEDULE

| Sl.No. | Major Topics | Periods | Weightage of marks | Short type | Essay type |
|--------|-----------------------------|-----------|--------------------|------------|------------|
| 1. | Bio Compatibility | 10 | 16 | 2 | 1 |
| 2. | Biomaterials | 20 | 34 | 3 | 2.5 |
| 3. | Orthopedic Implants | 12 | 26 | 2 | 1 |
| 4. | Cardiac & Muscular implants | 18 | 34 | 3 | 2.5 |
| | TOTAL | 60 | 110 | 10 | 8 |

OBJECTIVES

On completion of the study of the subject a student should be able to comprehend the following:

1.0 Bio compatibility

- 1.1 Define Bio Compatibility
- 1.2 Explain the significance of Bio Compatibility
- 1.3 Explain the wound - Healing process
- 1.4 Explain the tissue Response to Implants
- 1.5 Explain the Systemic effects of Implants
- 1.6 Explain the factors effecting Bio Compatibility
- 1.7 Explain In vitro testing (Mechanical testing) of implants, tensile, compression, wears, fatigue, corrosion studies and fracture toughness.
- 1.8 Explain In-vivo testing (animals): biological performance of implants

II. Bio Materials

- 2.1 Define Bio Material
- 2.2 Classify of biomaterials

- 2.3 Explain surface properties of materials-surface energy, contact angle, critical surface tension, electrokinetic theory.
- 2.4 Explain stress strain relationship
- 2.5 Explain metallic implant materials: Stainless steel, Co-based alloys, Ti and Ti-based alloys
- 2.6 Examine importance of metallic -corrosion cracking
- 2.7 Explain sterilization of biomaterials.
- 2.8 Give the biological tolerances of metals.
- 2.6 Explain polymeric implant materials: polyamides, acrylic polymers, hydrogels, Silicon rubbers
- 2.7 Define bio ceramics.
- 2.8 List the types of bio ceramic materials
- 2.9 Explain Bio reabsorbable and bioactive ceramics.
- 2.10 Give the importance of wear resistance and fracture toughness
- 2.11 Explain Composite implant materials
- 2.12 List applications of different Biomaterial
- 2.13 Compare characteristics of various Bio Materials

III. **Demonstrate the Orthopedic Implants**

- 3.1 Explain internal fracture Fixation devices
- 3.2 Explain Bone cement.
- 3.3 Differentiate cemented and uncemented joints
- 3.4 Explain permanent joint replacement.
- 3.5 Explain total Hip, Knee, Elbow and wrist Joint replacements.
- 3.6 List the problems with orthopedic implants
- 3.7 Explain the safety precautions to be taken with orthopedic Implants

IV. **Examine the Cardiac and Muscular Implants**

- 4.1 List the types of tissue grafts
- 4.2 Explain vascular implants, synthetic Blood vessels, and biological grafts
- 4.3 Explain the need for artificial heart valve
- 4.4 Compare artificial and tissue heart valves
- 4.5 List the types of artificial heart valves
- 4.4 Explain artificial heart valves
- 4.5 Give the need for implantable pacemaker
- 4.6 Explain programmable internal pacemaker
- 4.7 Explain batteries used in internal pacemakers
- 4.8 State the need of implantable defibrillator
- 4.9 Describe the block diagram of implantable defibrillator
- 4.10 List the safety precautions to be taken with defibrillators
- 4.11 Explain the operation of drop - foot stimulator.
- 4.12 Explain bladder stimulator.
- 4.13 Describe the electric hand and its applications with necessary diagrams
- 4.14 Explain the cochlear implants .
- 4.15 Explain lenses and intraocular lens.

COURSE CONTENTS

1. **Bio Compatibility**

Definition and significance of biocompatibility, factors influencing biocompatibility.

2. Biomaterials

Desirable characteristics of a material to be used in the manufacture of various medical implants, types of materials used as biomaterials – Metals, Polymers, Ceramics and composite materials, characteristics and application of different biomaterials, comparison of various biomaterials.

3. Orthopaedic implants

Orthopaedic fixation devices, Bone cement; Permanent joint replacement – Hip, Knee, ankle, shoulder, elbow and wrist; manufacturing process of orthopedic implants; problems with orthopedic implants and safety precautions

4. Cardiac and Muscular implants:

Implant able pacemakers, implant able defibrillators and prosthetic heart valves
Operation of drop-foot stimulator, bladder stimulator, my electric hand, cochlear implants and eye implants.

Text books

1. C.P.Sharma & M.Szycher, *Blood compatible materials and devices*, Technomic Publishing Co. Ltd., 1991.
2. Sujata V. Bhat, *Biomaterials*, Narosa Publishing House, 2002

REFERENCE BOOKS

1. Hand book of Biomedical Engineering - Joseph D. Bronzino (CRC press)
2. Encyclopedia of Medical Devices and Instrumentation - (Vol I, II, III, IV) John G Webster
3. Biomaterials – An interfacial approach - Hench Ethridhe
4. Medical Instrumentation Application and design John G. Webster (Houghton Mifflin Company)
5. Biomaterials Science and Engg.-Joon Bupark.
6. Encyclopedia Hand Book of Biomaterials and Bio Engg.Vol 1 to 4.

EMBEDDED SYSTEMS

Subject Title : Embedded systems

Subject Code : ES – 5305

Periods Per Week : 04

Periods Per Semester : 60

TIME SCHEDULE WITH BLUE PRINT

| S. No | Major Topics | No. of periods | Weightage of Marks | Remembering | Understanding | Applying | Analysing | Short Qns | Essay Qns |
|-------|---|----------------|--------------------|-------------|---------------|-----------|-----------|-----------|-----------|
| 1 | Introduction to Embedded Systems | 16 | 26 | 10 | 10 | - | 6 | 2 | 2 |
| 2 | Devices and Buses | 16 | 29 | 10 | 13 | - | 6 | 3 | 2 |
| 3 | Programming Concepts and Embedded Systems Programming | 18 | 29 | 5 | 6 | 15 | 3 | 3 | 2 |
| 4 | Embedded system development | 10 | 26 | 10 | 10 | - | 6 | 2 | 2 |
| | Total | 60 | 110 | 35 | 39 | 15 | 21 | 10 | 8 |

OBJECTIVES

On completion of the study of the subject a student should be able to comprehend the following:

1. 0 Introduction to Embedded Systems:

- 1.1 Explain the Concept of an Embedded system.
- 1.2 State Differences between General System and Embedded System.
- 1.3 List the components of Embedded Systems.
- 1.4 Classify Embedded Systems.
- 1.5 State the categories of Embedded systems.
- 1.6 Discuss the Hardware architecture of Embedded Systems.

- 1.7 List building blocks of the Hardware in an Embedded System .
- 1.8 List the processors and their architectural features used in Embedded Systems.
- 1.9 Explain the processor selection for an Embedded System.
- 1.10 Compare features of various RISC and CISC processor families.
- 1.11 Discuss about software architecture used in Embedded Systems.
- 1.12 Explain the architecture of Embedded operating systems.
- 1.13 State the categories of Embedded operating systems.
- 1.14 List Examples of Embedded Systems.

2.0 Devices and Buses

- 2.1 List the types and examples of I/O devices
- 2.2 Name the serial port and parallel port devices.
- 2.3 List out Hardware devices in Embedded System for memory.
- 2.4 Contrast and compare PROM, EPROM, UVROM, EEPROM, flash memory EPROM, and mask ROM memories
- 2.5 Contrast and compare SRAM, NV-RAM and DRAM memories
- 2.6 Discuss memory blocks for elements of different Data sets.
- 2.7 Explain memory maps in Precision Architecture and Harvard Architecture.
- 2.8 Explain the optimization of memory needs in an Embedded System.
- 2.9 Explain power saving considerations
- 2.10 Discuss power management in designing an Embedded system.
- 2.11 List Bus standards for serial and high speed communication
- 2.12 Explain serial communication using I²C, CAN and USB bus standards.
- 2.13 Explain parallel communication using ISA, PCI and PCI/X bus standards.
- 2.14 Discuss about Interrupt service Mechanisms.
- 2.15 Explain importance and functions of Device drivers.
- 2.16 Explain concept of device driver for Physical devices
- 2.17 Explain concept of device driver for Virtual Devices.

3.0 Programming concepts and Embedded Systems Programming.

- 3.1 Compare features of Assembly language Programming and High Level Programming
- 3.2 Explain about Cross compiler and cross assembler.
- 3.3 Explain Assembler directives with examples
- 3.4 Give function of program elements like Macros and Functions in cross compiler.
- 3.5 Explain about Data types, Modifiers, Statements, Loops and Pointers in cross compiler.
- 3.6 Write simple programs on cross compiler.
- 3.7 Explain process of compilation.
- 3.8 Explain function of Linkers and Loaders.
- 3.9 Discuss cross platform development.
- 3.10 Explain how software is embedded into a system.

4.0 Embedded System Development.

- 4.1 List various implementation tools for Embedded system design.
- 4.2 Give the hardware tools for the design.

- 4.3 State the use of Target system, Emulator and In-Circuit Emulator for Embedded system design.
- 4.4 State the use of Device programmer for down loading the codes into ROM.
- 4.5 State the use of soft ware tools for development of an Embedded system.
- 4.6 Explain about Integrated development environment.
- 4.7 List various software testing methods.
- 4.8 Explain Different debugging techniques.
- 4.9 State need for Software maintenance
- 4.10 Give types and importance of Software maintenance.

COURSE CONTENTS:

1. Introduction to Embedded Systems:

Importance of Embedded Systems, the Hardware and software architecture of Embedded Systems, processor selection for an Embedded System ,Examples of Embedded Systems,.

2. Devices and Buses:

Input, output and memory device used in an embedded system , use of serial and parallel buses, concept of device drivers.

3. Embedded Systems Programming:

Use of cross compiler, cross platform development tools, Assemblers, Compilers, Linkers, Loaders, programming on cross compilers.

4. Embedded System Development :

Use of hardware and Soft ware tools in Embedded system development, Emulator , In- circuit Emulators , importance of Software maintenance.

TEXT BOOKS

1. An Embedded Software Primer – David E. Simon
2. Embedded Systems – Raj Kamal (TMH)
3. Embedded/Real time systems concepts ,design and programming – Dr. K.V.K.K. Prasad.

OPERATING SYSTEMS & SYSTEMS PROGRAMMING

Subject Title : Operating Systems and Systems Programming

Subject Code : CP-5306

Periods per Week : 04

Periods per Semester : 60

TIME SCHEDULE AND BLUEPRINT

| S. No. | Major Topic | No. of Periods | | Weightage of Marks | Short Type | | | Essay Type | | |
|--------------|--|----------------|----------|--------------------|------------|---|-----|------------|---|-----|
| | | Theory | Practice | | R | U | App | R | U | App |
| 1 | UNIT I - Introduction to Operating System | 08 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 |
| 2 | UNIT II - Process Management | 16 | 0 | 29 | 2 | 1 | | 2 | | 0 |
| 3 | UNIT III-Storage management | 12 | 0 | 26 | 2 | 0 | 0 | 2 | 0 | 0 |
| 4 | UNIT IV-Secondary storage management | 10 | 0 | 13 | 1 | 0 | 0 | 1 | 0 | 0 |
| 5 | UNIT V-Files and Protection | 04 | 0 | 13 | 1 | 0 | 0 | 1 | 0 | 0 |
| 6 | UNIT VI- Systems Programming | 10 | 0 | 26 | 2 | | | 2 | | |
| TOTAL | | 60 | 0 | 110 | 10 | | | 8 | | |

OBJECTIVES

On completion of the study of the course the student shall be able to

1 Understand about basics of operating systems.

- 1.1 Define an operating system.
- 1.2 Discuss history of operating system.
- 1.3 Discuss about various operating systems.
- 1.4 Distinguish spooling and buffering.

- 1.5 Explain the concepts like multiprogramming and timesharing.
- 1.6 Differentiate between distributed and real time systems.
- 1.7 Describe multiprocessor systems.
- 1.8 Understand the operating system components.
- 1.9 Discuss operating system services.
- 1.10 Define system call with an example.
- 1.11 List different types of system calls.
- 1.12 Define single, multi user operating system structure.

2 Understand process management.

- 2.1 Define processes.
- 2.2 Understand a) sequential process b) process state diagram c) process control block.
- 2.3 Describe process creation and termination.
- 2.4 Understand the relation between processes.
- 2.5 Describe threads and multithreading.
- 2.6 Explain scheduling concepts.
- 2.7 Describe scheduling queues and schedulers.
- 2.8 Explain C.P.U. scheduling and scheduling criteria.
- 2.9 Explain various scheduling algorithms – FIFO, SJF, Round Robin, Time sharing, Multilevel scheduling, Multilevel feedback Queue scheduling.
- 2.10 Describe semaphores.
- 2.11 Explain inter process communication.
- 2.12 Define a deadlock.
- 2.13 State the necessary conditions for arising deadlocks.
- 2.14 State various techniques for deadlock prevention.
- 2.15 Discuss briefly deadlock avoidance and detection.
- 2.16 Describe the process of recovering from deadlock.

3 Understand the storage management.

- 3.1 Describe briefly address binding, dynamic loading, dynamic linking overlays.
- 3.2 Describe briefly on swapping.
- 3.3 Explain single partition allocation.
- 3.4 Explain multiple partition allocation.
- 3.5 Explain paging concept.
- 3.6 Explain briefly segmentation.
- 3.7 Define virtual memory techniques.
- 3.8 Describe briefly demand paging.
- 3.9 Describe page replacement.
- 3.10 Discuss briefly on page replacement algorithms - FIFO, LRU, optimal.
- 3.11 Define concept of thrashing.
- 3.12 Explain working set model and page fault frequency.

4.0 Understand the secondary storage management.

- 4.1 Explain disk structure.
- 4.2 Understand free space management.
- 4.3 Describe various allocation methods.
- 4.4 Explain various disk scheduling algorithms- FCFS, SST, Scan, C-Scan, Look.

5.0 Understand file system and protection.

- 5.1 Define file management.
- 5.2 List and explain various file operations.
- 5.3 List and explain various access methods.
- 5.4 Explain directory structure organization.
- 5.5 Describe the concept of file protection.

6.0 Systems Programming

6.1 Assembler Loader, linker, editor and debugger

- 6.1.1 Describe the function of an assembler,
- 6.1.2 Explain about various phases of an assembler
- 6.1.3 Explain about pass structure
- 6.1.4 Explain about various tables used in Assembler like symbol table, op-code table
- 6.1.5 Define macro and macro call
- 6.1.6 Describe about macro expansion
- 6.1.7 Explain about nested macros
- 6.1.8 Explain about macro facilities like flow of control, expansion of time variables
- 6.1.9 Explain design of a macro pre-processor
- 6.1.10 Explain what is loading
- 6.1.11 Describe about linking and relocation
- 6.1.12 Describe about relocation factor and types of relocation
- 6.1.13 Describe about various types of software tools like editors, debug monitors

6.2 Compilers and Parsing Techniques

- 6.2.1 Describe about functions of a compiler,
- 6.2.2 List the various phases of a compiler,
- 6.2.3 Describe about bookkeeping
- 6.2.4 Describe about Boot Strapping in a compiler
- 6.2.5 Describe about Basic Parsing technique like Shift reduce parsing
- 6.2.6 Explain about operator precedence parsing
- 6.2.7 Explain about top down parsing
- 6.2.8 Describe about predictive parsing and LR parsers
- 6.2.9 Describe about SLR and LALR parsing table

COURSE CONTENTS

1. Introduction to operating system

Introduction – History of operating system – Operating system concepts – Operating system structure – Overview of operating system functions- types system calls- single and multi user operating system structure.

2. Processor management

Introduction to processor – Job programs – Job scheduling – Process scheduling – Process synchronization – Process communications – Deadlocks.

3. Storage management

Memory management – Paging – Swapping – Virtual memory – Page replacement algorithms – working set model – page fault frequency.

4. Secondary storage management

Disk structure – Free space management – Allocation methods – Scheduling methods – Hierarchy.

5. File systems

Introduction to file systems – File system design – File servers – Security – Protection mechanism.

6 Systems Programming

Assembler Loader, linker, editor and debugger

Function of an assembler- phases of an assembler- pass structure-Tables used in Assembler like symbol table, op-code table-Macro and Macro call- macro expansion-

nested macros - macro facilities like flow of control, expansion of time variables- design of a macro pre-processor-Loading-Linking and relocation-Relocation factor and types of Relocation - software tools like editors, debug monitors

Compilers and Parsing Techniques

Functions of a compiler-Phases of a compiler- Book keeping operations of Compiler -Boot Strapping in a compiler- Basic Parsing technique like Shift reduce parsing- operator precedence parsing-Top down parsing- Predictive parsing and LR parsers -SLR and LALR parsing table

REFERENCE BOOKS

- | | | |
|-------------------------------|----|-------------------------|
| 1. Operating Systems | -- | Silberschatz and Galvin |
| 2. Operating Systems | -- | Dietel and Dietel |
| 3. Operating Systems | -- | Dhamdhare (TMH) |
| 4. Advanced Operating Systems | -- | Tanenbaum |

MICRO WAVE ENGINEERING

Subject Title : **Microwave Engineering**
Subject Code : **CN- 5306**
Periods Per Week : **04**
Periods Per Semester : **60**

TIME SCHEDULE WITH BLUE PRINT

| S N O | Major topics | No of period s | Weightage of Marks | A | B | C | D | Short Type | Essay Type |
|-------------|-------------------------------|----------------------|--------------------------|-----------|-----------|-----------|----------|---------------|---------------|
| 1 | Microwave Tubes | 15 | 26 | 6 | 20 | | | 2 | 2 |
| 2 | Microwave solid state devices | 20 | 39 | 6 | 23 | 10 | | 3 | 3 |
| 3 | Microwave integrated circuits | 10 | 19 | 6 | 13 | | | 3 | 1 |
| 4 | Microwave links | 15 | 26 | 6 | 20 | | | 2 | 2 |
| | Total | 60 | 110 | 24 | 76 | 10 | 5 | 10 | 8 |

A-Remembering B-Understanding C- Applying D-Analyzing

SPECIFIC OBJECTIVES

1.0 Understand the principles of working of different microwave tubes

- 1.1 Discuss the limitations of conventional tubes for operations at high frequencies
- 1.2 Explain the basic principle on which the microwave tubes work.
- 1.3 Explain its working of a two-cavity klystron amplifier with the help of Applegate diagram
- 1.4 Extend the principle of 2 cavity klystron to a multi-cavity klystron amplifier
- 1.5 Explain the working of reflex klystron tube
- 1.6 Explain the mode characteristics of reflex klystron
- 1.7 Explain the operation of magnetron tube with the help of necessary diagrams giving field patterns and path of elevation in interaction space
- 1.8 Explain the methods of mode separation in magnetron
- 1.9 Explain the operation of a travelling wave tube highlighting the need of slow wave structure
- 1.10 Explain the principles of working of back word wave oscillator

2.0 Understand the principles of working of various microwave solid state devices

- 2.1 Explain the classification of microwave solid-state devices
- 2.2 List applications of microwave solid state device
- 2.3 Explain the details of a microwave transistor with reference to its physical structure principle of operation & microwave characteristics
- 2.4 Explain the working of a tunnel diode, its principle of operation and its microwave characteristics
- 2.5 Explain the working of microwave FET its principle of operation physical structures & microwave characteristics

- 2.6 Define transferred electron devices.
- 2.7 Explain Gunn effect , & its principle of operation
- 2.8 Explain mode of operation of Gunn oscillator
- 2.9 Explain the working of PIN diode at microwave frequency
- 2.10 Explain, principle of operation of an IMPATT diode
- 2.11 Explain the physical structure, principle of operation TRAPATT diode
- 2.12 Explain the working principle of parametric amplifier
- 2.13 Explain the working of parametric up-converter & parametric down converter
- 2.14 Explain the features of negative resistance parametric amplifier & degenerate amplifier
- 2.15 Give the applications of parametric amplifier

3.0 Understand the principles of working of microwave integrated circuits

- 3.1 Define microstrip & striplines and its need at microwave frequencies
- 3.2 Explain the characteristic impedance of microstrip lines
- 3.3 List the advantages of MIC's over electric circuits
- 3.4 Discuss the materials used in MIC s for substrates, conductors and give their basic properties
- 3.5 Explain the basic properties of dielectric film and resistive film used in MICs
- 3.6 Explain the fabrication procedures for a MIC
- 3.7 Define hybrid MIC s
- 3.8 Explain the thin film and thick film technology for a hybrid MIC
- 3.9 Explain distributed line MICs lumped element MICs

4.0 Understand the principles of working of microwave link

- 4.1 Sketch the schematic of microwave link
- 4.2 Define microwave link and explain
- 4.3 Give the frequency band for a radio relay system
- 4.4 Explain the sequential block diagram of microwave (LOS) radio relay system
- 4.5 Explain the free space propagation with reference to microwave links
- 4.6 Explain the effects of Atmosphere Absorption, refraction and ducting on micro wave links
- 4.7 Explain terrain effects like reflections, fresnel zones, diffraction
- 4.8 Explain fading of signals on microwave link
- 4.9 Explain need of diversity and types of diversity
- 4.10 Describe microwave link analysis, multi hop calculations
- 4.11 Explain use of passive repeaters and types of passive repeaters
- 4.12 Discuss the effect of noise on link

COURSE CONTENTS

- 1.0 Microwave Tubes :** Limitation of conventional tubes at high frequencies. Two cavity and multi-cavity amplifier, reflex klystron Oscillator .Traveling Wave tube, magnetron oscillator and back ward wave oscillator.
- 2.0 Microwave Solid-state devices:** Microwave transistors, tunnel diodes, μ W FETS, Gunn diodes, PIN diodes,(ip μ).IMPATT diodes, TRAPATT diodes , parametric devices
- 3.0 Microwave Integrated circuits:** Introduction strip line, Micro strops. concepts thin film & thick film technologies (screen printing), Materials, fabrication, Hybrid μ W integrated circuits
- 4.0 Microwave Links:** schematic diagram, frequency bands for radio -relay system, free space propagation, atmospheric effects, Terrain effects,fading, fady link analysis, passive repeaters, noise on microwave link

TEXT BOOKS

1. Electronic communication George Kennedy
2. Telecommunication transmission system Robert winch (Mc Graw Hill)
- 3 Microwave devices & circuits Samuel Y. LIAO

POWER ELECTRONICS

Subject Title : Power Electronics

Subject Code : IE-5306

Periods per Week : 04

Periods per Year : 60

TIME SCHEDULE WITH BLUE PRINT

| Sl. No | Major Topics | Periods | Weightage of Marks | Remembering | Understanding | Applying | Analyzing | Short type | Essay type |
|--------|--|-----------|--------------------|-------------|---------------|-----------|-----------|------------|------------|
| 1 | Introduction to power electronics | 10 | 26 | 3 | 10 | 13 | -- | 2 | 2 |
| 2 | Turn on methods of SCR and it's protection | 15 | 26 | 6 | 10 | 10 | -- | 2 | 2 |
| 3 | Applications of Thyristors | 15 | 26 | 3 | 3 | 20 | -- | 2 | 2 |
| 4 | Special applications | 10 | 16 | 6 | -- | 10 | -- | 2 | 1 |
| 5 | Understand the Industrial heating principles | 10 | 16 | 3 | 13 | -- | -- | 2 | 1 |
| | Total | 60 | 110 | 21 | 36 | 53 | | 10 | 8 |

OBJECTIVES

Upon the completion of this topic the student shall be able to

1.0 Introduction to Power Electronics

1.1 List areas of application of power electronics.

1.2 Explain the principle of operation, VI characteristics and applications of the following devices. S.C.R., U.J.T., DIAC, TRIAC, IGBT, POWER DIODE, , LASCR, GTO Thyristor

1.3 Explain two transistor analogy of SCR

2.0 Understand Turn ON Methods of SCR

2.1 List and explain turn on methods of SCR

- (a) Forward voltage triggering
- (b) Gate triggering
- (c) dv/dt triggering
- (d) Temperature triggering
- (e) Light triggering

2.2 Discuss the circuits for gate triggering

2.3 Explain ramp and pedestal control

2.4 Discuss the need for multiple connection of SCRs.

2.5 Explain the series and parallel connection of SCRs.

2.6 List SCR ratings

2.7 Discuss protection of SCR against over voltage, over current, large dv/dt , large di/dt and gate protection etc.

3.0 Know Applications of Thyristors

3.1 Give Applications of thyristors.

3.2 Define Inverters:

- (a) Give the need of an inverter
- (b) List types of inverters
- (c) Draw and explain the principle of operation of
 - (1) series inverter
 - (2) parallel inverter
 - (3) single phase bridge inverter
 - (4) three phase bridge inverter.

3.3 Define Choppers:

- (a) Give the need of a chopper
- (b) List types of choppers
- (c) Draw and explain the operation of chopper

3.4 Define Rectifiers

- (a) Give the need of a rectifier
- (b) list the types of rectifiers
- (b) draw and explain the principle of operation of
 - (1) Single phase Half wave controlled rectifier
 - (2) Single phase full wave controlled rectifier
 - (3) Three phase half wave controlled rectifier
 - (4) Three phase full wave controlled rectifier

4.0 Know Special Applications Of Thyristors

4.1 Give special applications of thyristors

4.2 Define uninterrupted power supply:

- 4.3 (a) list types of UPS,
- (b) Draw block diagram for each and explain the principle of operation
- (c) list the applications of UPS

4.4 Define SMPS

- (a) list the types of SMPS
- (b) draw the block diagram and explain the principle of operation of SMPS
- (c) list the applications of SMPS

4.5 Discuss the principle of AC and DC motor speed control using phase controlled

Thyristor circuits

4.6 Explain lamp intensity control using triac

5.0 Understand Industrial Heating Principles

5.1 Discuss briefly the different ways of converting electrical energy into heat energy

5.2 Explain the principle of induction heating

5.3 List the advantages of & applications of induction heating

5.4 Explain the principle of Dielectric heating

5.5 Discuss briefly the methods used in coupling electrode to R.F. Generator

5.6 List the applications of Dielectric heating

COURSE CONTENTS

- 1 **Introduction to power electronics: VI characteristics and applications of SCR, UJT, DIAC, TRIAC, IGBT, POWERDIODE, LASCR, GTO Thyristor**
- 2 **Turn on methods of SCR and it's protection:** Turn on methods, circuits for gate triggering, Ramp and Pedestal control, Multiple connections of SCRs, SCR ratings and SCR protection.
- 3 **Applications of thyristors:** Invertors, Choppers, Rectifiers .
- 4 **Special applications:** UPS, SMPS-Types and their applications.
- 5 **Industrial Heating Principles:** Induction heating, dielectric heating and their applications

REFERENCE BOOKS

- 1 Power Electronics by Cyril W Londer
- 2 Power Electronics by Ramshaw
- 3 Power Electronics by Jamil Asghan
- 4 Industrial Electronics by G.K. Mithal
- 5 Introduction to thyristors and applications by Dr. M. Rama Murthy
- 6 Industrial power Electronic by Hanshitia (Umesh Publications)
- 7 Industrial electronics and control by S.K. Bhattacharya, S. Chatterjee, TTTI Chandigarh

MULTIMEDIA-I (2D Animations)

Subject title : Multimedia –I (2D animations)
Subject Code : EV-5306
Periods per Week : 04
Periods per Semester : 60

TIME SCHEDULE

| Sl No. | Major topics | No of periods | Weightage of marks | A | B | C | D | Short Ques (S) | Essay Ques (E) |
|--------|---------------|---------------|--------------------|-----------|-----------|-----------|-----------|----------------|----------------|
| 1 | Corel Draw | 15 | 26 | 13 | 13 | - | - | 2 | 2 |
| 2 | Photo Shop | 15 | 29 | | 13 | 3 | - | 3 | 2 |
| 3 | Flash (MX) | 15 | 29 | 13 | 16 | - | - | 3 | 2 |
| 4 | Adobe Premier | 15 | 26 | 3 | 13 | 13 | 10 | 2 | 2 |
| | Total | 90 | 110 | 29 | 55 | 16 | 10 | 10 | 8 |

OBJECTIVES:

1.0 To know overall view of coral draw

- 1.1 To create and open drawing file and to know working steps
- 1.2 To know the utilization of scrap book
- 1.3 To know and operate implementation of drawing and shaping the objects
- 1.4 To work with styles and templates
- 1.5 To implement the procedures of organizing the objects
- 1.6 How to create special effects
- 1.7 Procedure to take the hard copies of the work done.

2.0 To know about the Photo Shop

- 2.1 Know the applications of Photo Shop
- 2.2 Know the operation and applications of painting and patching (retouching)
- 2.3 List the various special effect tools
- 2.4 Explain the application of the above tools
- 2.5 Explain the utilization of the special effect tools
- 2.6 Know the generation of graphics for creating images
- 2.7 Know the generation of graphics for websites and brochures

- 2.8 Know the generation of graphics for videos and films
- 2.9 Know the limitations of Photo Shop

3.0 To know about the Flash

- 3.1 Know the applications of Flash
- 3.2 List the various tools in Flash
- 3.3 Explain the application of the above tools
- 3.4 Explain the utilization of the tools
- 3.5 List the various animating logos
- 3.6 Explain about how to work with animations
- 3.7 Explain about the action script.
- 3.8 Explain about sound track laying
- 3.9 Explain how to post sound to the animations
- 3.10 Explain in detail how to create web sites
- 3.11 Know the limitations of Flash.

4.0 To know about Adobe Premier

- 4.1 Know the application of Adobe Premier
- 4.2 Know the various tools of Adobe premier
- 4.3 Know the editing of analog formats
- 4.4 Know the editing of digital formats
- 4.5 Know the creating custom length sound tracks
- 4.6 Know blending multiple audio tracks
- 4.7 Explain the preparation of publishing of audio and video on Web in Adobe premier
- 4.8 Know the limitations of Adobe Premier

COURSE CONTENTS

1. **Corel Draw**
create and open drawing file, utilization of scrap book, implementation of drawing and shaping the objects, styles and templates, creating special effects, hard copies of the work done.
2. **Photo Shop**
application and limitation, applications of painting, retouching, special effect tools, graphics for creating images, websites and brochures, videos and films
3. **Flash**
application and limitation, various tools, utilization of the tools, animating logos, work with animations, sound track laying, to create web sites.
4. **Adobe Premier**
application and limitation, various tools, editing of analog and digital formats, publishing on web, creating & blending multiple sound tracks

REFERENCE BOOKS

- | | | |
|----|--|-----------------|
| 1. | An introduction to CorelDraw 12.0 | BPB Publication |
| 2. | Introduction to Adobe Photo Shop7.0/CS | BPB Publication |
| 3. | Introduction to FLASH MX | BPB Publication |
| 4. | Introduction to Adobe Premier | BPB Publication |

MEDICAL INFORMATICS & TELEMEDICNE

Subject Title : **Medical Informatics & Telemedicine**
Subject Code : **BM –5306**
Periods Per Week : **04**
Periods per Semester : **60**

TIME SCHEDULE

| SI No. | Major topics | No of periods | Weightage of marks | Short Ques (S) | Essay Ques (E) |
|--------|---|---------------|--------------------|----------------|----------------|
| 1 | Medical Informatics & Artificial Intelligence | 15 | 29 | 3 | 2 |
| 2 | Computer-Assisted Instructions | 15 | 26 | 2 | 2 |
| 3 | Computer-Assisted Surgery | 12 | 24 | 3 | 1.5 |
| 4 | Telemedicine and Telesurgery | 18 | 31 | 2 | 2.5 |
| | Total | 60 | 110 | 10 | 8 |

OBJECTIVES

On completion of the study of the subject a student should be able to comprehend the following:

1.0 Introduction to Medical Informatics and artificial intelligence:

- 1.1 Explain Medical Informatics.
- 1.2 Explain computerized Medical Records.
- 1.3 Explain the role of computers in analyzing ECG, EEG and EMG.
- 1.4 List the prospects of Medical informatics.
- 1.5 Explain the term Artificial Intelligence.
- 1.6 Explain the need for Expert system
- 1.7 Explain an Expert System.
- 1.8 List the advantages of Expert System.
- 1.9 List the applications of Expert System.
- 1.10 Explain the Materials and Methods used in biomedical applications.
- 1.11 Give the need for knowledge Representation.
- 1.12 Explain the methods of knowledge representation.

2.0 Employ Computer Instructions in various medical fields

- 2.1 Give the need for computer assisted medical education.
- 2.2 Explain the utility of simulation in education.
- 2.3 Express the need for virtual reality in medical education.
- 2.4 List the applications of virtual reality.
- 2.5 Explain the concept of Tele – Education and Tele – Monitoring.
- 2.6 Explain the concept of 3D Imaging.
- 2.7 Explain general endoscopy
- 2.8 List the limitations of Endoscopy.
- 2.9 List the Benefits of virtual endoscopy
- 2.10 List the limitations of virtual endoscopy.
- 2.11 List the Applications of virtual environment.

3.0 Employ the computers in Surgery

- 3.1 Name the conventional surgical procedures.
- 3.2 List the limitations of conventional surgery.
- 3.3 Explain the role of computers in surgery.
- 3.4 Explain about 3D Navigation systems.
- 3.5 Employ 3D navigation system in orthopedic Imaging.
- 3.6 Explain Merits and Demerits of Computer Assisted Surgery.
- 3.7 Give the need for surgical simulation.
- 3.8 List the applications of Surgical Simulation.
- 3.9 Overview on Future of Surgical Simulation.

4.0 Principles of Tele – Medicine and Tele surgery

- 4.1 Define Tele-Medicine.
- 4.2 Explain the need for Tele-Medicine.
- 4.3 List the advantages of Tele-Medicine.
- 4.4 Explain Technology – Materials and methods in Telemedicine.
- 4.5 Explain peripheral Devices used in Tele-Medicine.
- 4.6 Explain Telemedicine Systems
- 4.7 Explain the use of Internet in Telemedicine
- 4.8 Explain controversial issues related to Tele-Medicine
- 4.9 Explain reliability of Telemedicine.
- 4.10 Give analysis of expenditure (cost) in Telemedicine.
- 4.11 List the applications of Telemedicine.
- 4.12 Define Tele surgery.
- 4.13 Give the need for tele-surgery.
- 4.14 Distinguish between general surgery and tele-surgery.
- 4.15 Explain Tele-Presence.
- 4.16 Explain Tele-Mentoring.
- 4.17 List the advantages of Tele-Surgery.
- 4.18 List the disadvantages of Tele-Surgery.
- 4.19 Explain about Technology – Material and Methods in Telesurgery.
- 4.20 Compare the technology of telemedicine with that of Tele surgery.
- 4.21 Explain the scope of Tele-Surgery.

COURSE CONTENTS

1. Introduction to Medical Informatics

Need for medical informatics, artificial intelligence, expert system, materials and methods, knowledge representation.

2. Computer – Assisted Instructions:

Computer Assisted medical education, simulation, virtual reality, Tele-education, Tele-monitoring, 3D imaging, virtual endoscopy.

3. Computer – Assisted Surgery

Computer – Assisted surgery, 3D navigation systems, intra-operative imaging, orthopedic 3D navigation system, surgical simulation.

4. Tele – Medicine and Tele surgery

Need for Tele-medicine, peripheral devices in Tele-medicine, Tele-medicine systems, Internet Tele-medicine, controversial issues. Need for Tele-surgery, Tele presence, Tele mentoring, scope of Tele surgery.

REFERENCE BOOKS

- 1. Medical Informatics By Mohan Bansal, Tata McGrah Hill**

PIC MICROCONTROLLER AND APPLICATIONS.

Subject Title : PIC Microcontroller And Applications.
Subject Code : ES – 5306
Periods Per Week : 04
Periods Per Semester : 60

TIME SCHEDULE

| S.N O | Major Topics | No. of periods | Weightage of Marks | Rem embe ring | Unde rstan ding | Appl ying | Anal ysing | Short Type | Essa y Type |
|----------|-------------------------------|-------------------|--------------------------|---------------------|-----------------------|--------------|---------------|---------------|-------------------|
| 1 | PIC Architecture | 20 | 29 | 10 | 10 | - | 9 | 3 | 2 |
| 2 | Programming – PIC | 14 | 26 | 6 | 10 | 10 | - | 2 | 2 |
| 3 | On chip peripherals of PIC | 16 | 29 | 10 | 10 | - | 9 | 3 | 2 |
| 4 | Applications of PIC | 10 | 26 | 10 | 10 | 6 | - | 2 | 2 |
| | Total Periods | 60 | 110 | 36 | 40 | 16 | 18 | 10 | 8 |

OBJECTIVES:

1.0 Explain the Architecture of PIC

- 1.1 Explain the history of PIC Microcontroller.
- 1.2 Explain the Introduction of RISC Processors.
- 1.3 List the features of PIC 18 family.
- 1.4 Compare 8051 and PIC Microcontroller
- 1.4 Give Overview of PIC 16,17,18 series Microcontrollers.
- 1.5 Explain the architecture of PIC 18 with a diagram.
- 1.6 List the on chip modules of PIC.
- 1.7 Discuss about the CPU registers of PIC .
- 1.8 List the I/O ports and pins of PIC.
- 1.9 Explain instruction pipelining in PIC.
- 1.10 State program memory considerations.
- 1.11 Describe the register file structure and use of access bank of PIC 18.
- 1.12 Explain Harvard Architecture in PIC.

2.0 Instruction Set & Programming of PIC

- 2.1 List PIC data formats.
- 2.2 Explain assembler directives.
- 2.3 Explain the addressing modes in PIC.
- 2.4 Explain the instruction set of PIC.
- 2.5 Write simple Programs using instruction set.
- 2.6 Practice port programming.
- 2.7 Name the sources of interrupts in PIC.

- 2.8 Discuss enabling and disabling of interrupts.
- 2.9 Explain the interrupt priority in PIC.
- 2.10 Explain the servicing of critical programs in PIC .

3. On chip peripherals of PIC

- 3.1 Describe the use of Timer 0,Timer 1,Timer 2 in PIC 18.
- 3.2 Account for the need of Prescaler.
- 3.3 Explain the interrupt logic of Timers.
- 3.4 Discuss the SFRs used with Timers.
- 3.5 Discuss Serial Communication in PIC with relevant SFRs.
- 3.6 Explain setting change the baud rate in PIC .
- 3.7 Explain UART data handling circuit
- 3.8 A to D Converter
 - 1 List the Features of A to D converter.
 - 2 Name ADC PINS
 - 3. Explain Register initializations.
- 3.9 SSP Module
 - 1 Discuss SPI Bus.
 - 2 Explain SPI read/ write protocol.
 - 3 Explain Input and output port expansion using SPI.
- 3.10 I2C Bus
 - 1 Explain I2C Operation
 - 2 Discuss the Start and stop conditions of data transfer.
 - 3 Explain theFormat of first byte and message string.
- 3.11 CCP Module
 - Explain,Compare,Capture and PWM modes of CCP Modules.

4.0 Applications and interfacing of PIC

- 4.1 Explain the Interfacing of LCD to PIC Microcontroller.
- 4.2 Describe the key press and detection mechanisms by scanning method and interrupt method .
- 4.3 Explain the interfacing of keyboard.
- 4.4 Interface a stepper motor to 8051 and write program to control and operate the stepper motor
- 4.5 Explain the Interfacing of DAC to PIC.

COURSE CONTENTS:

1. **PIC Architecture** –Over view of PIC family, cpu registers , State program memory consideration, the register file structure and use of access bank of PIC 18.
2. **Programming – PIC** : List PIC data formats , assembler directives , addressing modes in PIC, instruction set of PIC, simple Programs using instruction set , sources of interrupts in PIC, enabling and disabling of interrupts and interrupt priority in PIC
3. **On chip peripherals of PIC** – Timer 0,Timer 1,Timer 2 ,UART, SSP ,I2C, A to D converter and CCP modules.
Applications of PIC - interfacing to stepper motor, DAC and key board.

Reference books

1. Design with PIC microcontrollers – Peatman, PrenticeHall
2. PIC Microcontroller and Embedded Systems. – Muhammad Ali Mazidi.

**COMPUTER HARDWARE AND NETWORKING LAB PRACTICE
(COMMON TO ALL BRANCHES)**

Subject Title : **Computer Hardware & Networking Lab Practice**
Subject Code : **CP/CN/IE/EV/BM/ES - 5307**
Periods per Week : **06**
Periods per Semester : **90**

LIST OF EXPERIMENTS

- 1) Identify motherboard components
- 2) RAM identification, removal, installation.
- 3) Assembling and Disassembling of a PC
- 4) Upgradation of PC.
- 5) CMOS setup.
- 6) Practice on Partition and formatting of Hard disk
- 7) Installation of operating system software (Windows xp / Windows7)
- 8) Installation of device driver software
- 9) Installation of application software (MS-Office 2007/ 2010)
- 10) Print a summary of your system Hardware.
- 11) To recover lost data on hard drive.
- 12) Verify whether Network card is present
- 13) Preparing the UTP cable for cross and straight connections using crimping tool.
- 14) Installation of a switch and connecting systems to a network Hub / switch.
- 15) Configuration of IP Address and Subnet
- 16) Installation of a modem (internal, external or USB) and connecting to internet.
- 17) Implementation of peer to peer network
- 18) Implementation of workgroup network
- 19) Implementation of Wi-Fi Network

OBJECTIVES AND KEY COMPETENCIES:

| SI No | Name of the Experiment | Objectives | Key Competencies |
|--------------|---|--|--|
| 1. | Identify motherboard components | Identify various components on the motherboard | Check whether the following are identified: a)Processor b)HDD c)CMOS d)PCI e)IDE f)AGP g)ISA h)NIC etc |
| 2. | RAM identification, removal, installation | Perform RAM installation, removal and identification | Check to a)Install RAM b)Remove RAM |
| 3. | Assembling and Disassembling of a PC | Perform Assembling and Disassembling of PC | Check to a)Assemble PC b)Disassemble PC |
| 4. | Upgradation of PC | Perform upgradation of PC by increasing a) RAM b) HDD | Check to replace the following a)RAM b)HDD |
| 5. | CMOS setup. | Perform CMOS setup for required changes a) Change Date and Time b) Identification of Master / Slave devices c) Change sequence of Booting | Check whether the following are done: a) Change Date and Time b) Identification of Master / Slave devices c) Change sequence of Booting |
| 6. | Practice on formatting of Hard disk | The formatting of HDD by selecting the properties of the required HDD and choose format | Check the formatting of HDD successfully |
| 7. | Installation of operating | Installation of the OS by the | Check whether the OS is |

| | | | |
|----|---|--|---|
| | system software (Windows XP / Windows7) | OS CDROM /DVD | installed |
| 8. | Installation of device driver software | Perform installation of required device driver softwares either for a) NIC b) Chipset c) Audio / video d) Printer | Install a)NIC b)chipset c)Audio / video and other required |
| 9. | Installation of application software (MS-Office 2007/ 2010) | Install MS Office 2007/2010 by MS-Office installation CD /DVD | Check whether the installation is done with a)MS-Office 2007 / MS-Office 2010 |
| 10 | Print a summary of your system Hardware. | Click on properties of My Computer | Check whether the summary of the System Hardware is done for the given system |
| 11 | To recover lost data on hard drive. | (i) Choose appropriate Data Recovery software (ii) Run the Data Recovery software and (iii) Recover the files which are permanently deleted or lost due to virus | Check whether the data is recovered after the data or files are lost due to wrong deletion and virus |
| 12 | Verify whether Network card is present | (i) Verify the Network Interfacing Card (NIC) in appropriate PCI slot | Check whether the NIC is identified properly or not. |
| 13 | Preparing the UTP cable for cross and straight connections using crimping tool. | Perform proper UTP cable preparation with (i) Cross cable and (ii)Straight cable | Check whether the following a)cross cable b)straight cable are done and test with Switch and Computer System |
| 14 | Installation of a switch and connecting systems to a network Hub / switch | Perform the following (i) Connect switch / Hub with power supply and | Check whether proper connections done with |

| | | | |
|----|---|--|---|
| | | networking cables connected to systems (ii) Configure systems in LAN | a)switch b)Connecting to systems c) Check whether the systems are in LAN |
| 15 | Configuration of IP Address and Subnet | Perform the following (i) IP Address (ii) Subnet Address (iii) Gateway IP address (iv) Preferred DNS | Check whether the following are done properly: (i) IP Address (ii) Subnet Address (iii) Gateway IP address (iv) Preferred DNS |
| 16 | Installation of a modem (internal, external or USB) and connecting to internet. | For external Modem: (i) Connect Modem to the system with LAN Cable (ii) Connect to the power supply (iii) Check the proper internet settings For internal Modem: (i) Open system and insert Modem card in the PCI slot (ii) Install Modem driver software (iii) Connect Internet cable to the existing slot on the Modem card | Check for the working of External Modem connected to the internet Check for the working of Internal Modem connected to the internet |
| 17 | Implementation of peer to peer network | Perform peer to peer network | Prepare peer to peer network |
| 18 | Implementation of workgroup network | (i) Configure Workgroup by giving workgroup name (ii) Configure two or more computer systems in the same workgroup | Check workgroup by sharing files / folders in the Workgroup |
| 19 | Implementation of Wi-Fi Network | (i) Open system cabinet (ii) Install Wi Fi Network Card in PCI slot (iii) Install Wireless Adapter card | Check if the system is connected to the existing LAN using WiFi connection |

LIFE SKILLS
(Common to all Branches)

Subject Title : *Life skills*
Subject Code : CP/CN/IE/EV/BM/ES - 5108
Periods per week : 03
Period per semester : 45

TIME SCHEDULE

| SI No. | Major Topics | No. of periods | | |
|--------|--|----------------|-----------|-------|
| | | Theory | Practical | Total |
| 1. | Concept of life skills | 03 | 00 | 03 |
| 2. | Enhancing self esteem | 01 | 02 | 03 |
| 3. | Goal setting | 01 | 02 | 03 |
| 4. | Positive attitude | 01 | 02 | 03 |
| 5. | Managing emotions | 1 1/2 | 4 1/2 | 06 |
| 6. | Stress management | 1 1/2 | 4 1/2 | 06 |
| 7. | Time management | 1/2 | 2 1/2 | 03 |
| 8. | Interpersonal skills | 01 | 02 | 03 |
| 9. | Creativity | 01 | 02 | 03 |
| 10. | Problem solving and Decision making skills | 01 | 02 | 03 |
| 11. | Assertiveness | 1 1/2 | 4 1/2 | 06 |
| 12. | Leadership skills & Team spirit | 1 1/2 | 11/2 | 03 |
| TOTAL | | 15 1/2 | 29 1/2 | 45 |

Note: No Written Examination

The students may be asked to Demonstrate 1 or 2 skills from unit 2 to unit 12.

Marks: Internal – 40; External - 60

OBJECTIVES

Upon the completion of the course the student shall be able to

1.0 Understand the concept of life skills

- 1.1 Define Life skills
- 1.2 Explain need and impact of Life skills programme
- 1.3 List the elements of Life skills
- 1.4 Identify the sources of Life skills

2.0 Understand the concept of Self esteem

- 2.1 Define the term self esteem
- 2.2 Explain the concept of self esteem
- 2.3 List the characteristics of High self esteem
- 2.4 List the characteristics of Low self esteem
- 2.5 Explain the advantages of High self esteem
- 2.6 Explain the behavior patterns of low self esteem
- 2.7 Explain the causes of Low self esteem
- 2.8 List the steps to build a positive self esteem

Practicals

| Exp No | Exercise | Activity (Questionnaire / Game and Role play) |
|--------|-------------------------------|--|
| 1. | Identifying the Behavior | <ul style="list-style-type: none">• Identifying the behavior patterns of low self-esteem people. |
| 2. | Practice Positive Self Esteem | <ul style="list-style-type: none">• Steps to build a positive self esteem |

3.0 Understand the concept of Goal setting

- 3.1 Define the term Goal
- 3.2 Explain the significance of Goal setting
- 3.3 Explain the following concepts
a) Wish b) Dream c) Goal
- 3.4 Explain the reasons for not setting goals
- 3.5 Explain the effective goal setting process
- 3.6 List the barriers to reach goals

Practicals

| Exp No | Exercise | Activity |
|--------|--|---|
| 1 | Differentiate among Wish, Dream and Goal | <ul style="list-style-type: none">• Drawing a picture of Your Self/ Your Country/ Your Society after 10yrs.• Discussion: Setting Personal Goals• Story Telling• Identifying of barriers• Analysis of barriers• Overcoming Barriers |

4.0 Practice positive attitude

- 4.1 Define Attitude
- 4.2 Explain the concept of positive attitude
- 4.3 Explain the concept of negative attitude

- 4.4 Explain the affects of negative attitude
- 4.4 Identify the attitude of self and peers
- 4.5 Explain the effect of peers on self and vice-versa.
- 4.6 List the steps to enhance positive attitude
- 4.7 Explain the strategies to enhance positive attitude

Practicals

| Exp No | Exercise | Activity (Psychological Instrument/ Game & Role play) |
|--------|--|--|
| 1. | Identify Positive attitude | <ul style="list-style-type: none"> • To study & to identify the attitude of self and peers. • List & practice the strategies to enhance positive attitude. |
| 2 | Observe | <ul style="list-style-type: none"> • Positive attitudes of self and Peers • Negative attitudes of self and Peers |
| 3 | Practice Strategies to enhance Positive attitude | <ul style="list-style-type: none"> • Celebrating the success • Listing the successes |

5.0 Practice managing emotions

- 5.1 Explain the concept of emotion
- 5.2 List the different types of emotions
- 5.3 Differentiate between positive and negative emotions
- 5.4 Identify the type of emotion
- 5.5 Explain the causes of different types of emotions.
- 5.6 Implement the methods to manage major emotions (anger / depression)
- 5.7 Define Emotional Intelligence.
- 5.8 Explain the method to enhance emotional Intelligence.

Practicals

| Exp No | Exercise | Activity (Story / simulated situational act /GD & Role play) |
|--------|------------------------------|---|
| 1. | Identify the Type of Emotion | <ul style="list-style-type: none"> • To identify the type and to study the cause of the emotion. |
| 2 | Managing Emotions | <ul style="list-style-type: none"> • Managing major emotions -Anger and Depression |

6.0 Practice stress management skills

- 6.1 Define Stress
- 6.2 Explain the concept of stress
- 6.3 List the Types of stress
- 6.4 Explain the causes of stress
- 6.5 Comprehend the reactions of stress
 - a) Physical b) Cognitive c) Emotional d) Behavioral
- 6.6 Explain the steps involved in coping with the stress by
 - a) Relaxation b) Meditation c) Yoga
- 6.7 Practice the stress relaxing techniques by the 3 methods.
 - a) Relaxation b) Meditation c) Yoga
- 6.8 Comprehend the changing personality and cognitive patterns.

6.9 Observe the changing personality and cognitive patterns.

Practicals

| Exp No | Exercise | Activity(Questionnaire /Interview and practice) |
|--------|-------------------------------|---|
| 1 | Identify the type of stress | <ul style="list-style-type: none"> To study & to identify the type and causes of stress. |
| 2 | Stress –Relaxation Techniques | <ul style="list-style-type: none"> Practice some simple Stress –Relaxation Techniques, Meditation, Yoga. |

7.0 Practice Time management skills

- 7.1 Define Time management.
- 7.2 Comprehend the significance of Time management.
- 7.3 Explain the strategies to set priorities.
- 7.4 List the steps to overcome barriers to effective Time management.
- 7.5 Identify the various Time stealers.
- 7.6 Explain the Time-Management skills.
- 7.7 List different Time-Management skills.
- 7.8 Comprehend the advantages of Time-Management skills.

Practicals

| Exp No | Exercise | Activity (Group work and Games) |
|--------|---------------------------------|--|
| 1 | Identify Time stealers | <ul style="list-style-type: none"> Assign a activity to different Groups –Observe the time of accomplishing the task, Identify the time stealers. |
| 2. | Practice Time-Management skills | <ul style="list-style-type: none"> Perform the given tasks- Games |

8.0 Practice Interpersonal skills

- 8.1 Explain the significance of Interpersonal skills.
- 8.2 List the factors that prevent building and maintaining positive relationships.
- 8.3 Advantages of positive relationships.
- 8.4 Disadvantages of negative relationships

Practicals

| Exp No | Exercise | Activity |
|--------|---------------------------|--|
| 1 | Identify Relationships | <ul style="list-style-type: none"> Positive Relationships, Negative Relationships – Factors that affect them- Through a story |
| 2. | Practice Rapport building | <ul style="list-style-type: none"> Exercises on Rapport building Developing Correct Body Language |

9.0 Understand Creativity skills

- 9.1 Define Creativity
- 9.2 List the synonyms like Invention , Innovatioin, Novelty
- 9.3 Distinguish between Creativity , Invention, innovation, and novelty
- 9.4 Discuss the factors that lead to creative thinking like observation and imitation , improvement etc.

- 9.5 Distinguish between Convergent thinking and divergent Thinking
- 9.6 Explain various steps involved in Scientific approach to creative thinking namely
 a) Idea generation b) Curiosity c) Imagination d)Elaboration e) Complexity
 f). Abstract ion and simplification g). Divergent Thinking h) Fluency i). Flexibility
 j).Persistence k).Intrinsic Motivation l).Risk taking m).Projection/empathy
 n).Originality o). Story telling p). Flow.
 List the Factors affecting the creativity in Individuals.
- 9.7 Give the concept of Vertical thinking and lateral thinking.
- 9.8 Explain the importance of Lateral thinking.
- 9.9 Compare lateral thinking and Vertical thinking

Practicals

| Exp No | Exercise | Activity (Games and Group work) |
|--------|--------------------------|---|
| 1 | Observe any given object | <ul style="list-style-type: none"> Identifying finer details in an object |
| 2. | Imagine | <ul style="list-style-type: none"> Imagining a scene Modifying a story (introduce a twist) Improving a product Finding different uses for a product |
| 3 | Skills | <ul style="list-style-type: none"> Making paper craft |
| 4 | Product development | <ul style="list-style-type: none"> Brain storming session |
| 5 | Developing originality | <ul style="list-style-type: none"> Come up with original solutions for a given problem |

10.0 Understand Problem solving and decision making skills

- 10.1 Define a Problem
- 10.2 Analyze the performance problems
- 10.3 Categorize the problems
- 10.4 List the barriers to the solutions to problems.

Practicals

| Exp No | Exercise | Activity (Brainstorming – checklist technique free association, attribute listing) |
|--------|---|--|
| 1 | Gather the facts and Data and Organizing the information. | <ul style="list-style-type: none"> Information gathering and organizing Identifying the solutions to the problem Identifying the barriers to the solutions Zeroing on Optimum solution |
| 2. | Problem solving | <ul style="list-style-type: none"> Games on Problem solving |

11.0 Understand Assertive and non Assertive behavior

- 11.1 List the 3 types of Behaviors 1. Assertive 2. Non assertive (passive) 3. Aggressive Behaviour 4.Submissive behaviors
- 11.2 Discuss the personality of a person having above behaviours
- 11.3 Explain the usefulness of assertive behavior in practical situations.
- 11.4 Explain the role of effective communication in reflecting assertive attitude
- 11.5 Give examples of Assertive statements a) Assertive request b) assertive NO
- 11.6 Explain the importance of goal setting

- 11.7 Explain the method of Conflict resolution.
 11.8 Discuss the methods of controlling fear and coping up with criticism.

Practicals

| Exp No | Exercise | Activity (Simulated situational act) |
|--------|--------------------------|---|
| 1 | Observation of behavior | <ul style="list-style-type: none"> Identifying different personality traits from the body language |
| 2. | Practicing assertiveness | <ul style="list-style-type: none"> Write statements Reaction of individuals in a tricky situation <ul style="list-style-type: none"> Facing a Mock interview Detailing the characteristics of peers setting goals – Games like throwing a coin in a circle Giving a feedback on a)Successful program b) Failed project Self disclosure |
| 3 | Skills | <ul style="list-style-type: none"> Dealing with a critic Saying NO Dealing with an aggressive person |
| 4 | Simulation | <ul style="list-style-type: none"> Role play- skit <ol style="list-style-type: none"> Assertive statements goal setting self disclosure |

12.0 Practice Leadership skills

- 12.1 Explain the concept of leadership
 12.2 List the Traits of effective leader
 12.3 Distinguish between Managing and leading
 12.4 List the 3 leadership styles
 12.5 Compare the above styles of leadership styles
 12.6 Discuss choice of leadership style
 12.7 Explain the strategies to develop effective leadership.
 12.8 Explain the importance of Decision making
 12.9 Explain the procedure for making effective decisions.

Practicals

| Exp No | Exercise | Activity (Games and Group work) |
|--------|----------------------------|---|
| 1 | Observation | <ul style="list-style-type: none"> Questionnaire |
| 2. | Identification of a Leader | <ul style="list-style-type: none"> Give a task and observe the leader Discuss the qualities and his /her leadership style Ask the other members to identify the leadership qualities Reflection on the self |

| | | |
|---|----------------------|---|
| 3 | Skills | <ul style="list-style-type: none"> • Decision making – followed by discussion |
| 4 | Building Team spirit | <ul style="list-style-type: none"> • Motivation – Intrinsic and Extrinsic Training- Communication- Challenge |

Competencies for Practical Exercises

| S.No | Title | Competency |
|------|--|---|
| 1. | Concept of life skills | <ul style="list-style-type: none"> • Explain need and impact of Life skills |
| 2. | Enhancing self esteem | <ul style="list-style-type: none"> • Follow the steps to build a positive self esteem |
| 3. | Goal setting | <ul style="list-style-type: none"> • Practice the effective goal setting process |
| 4. | Positive attitude | <ul style="list-style-type: none"> • Practice the steps to enhance positive attitude. • Observe the effects of peers on self and vice-versa. |
| 5. | Managing emotions | <ul style="list-style-type: none"> • Practice the steps to manage emotional intelligence • Identify different types of emotions • Exercise control over Emotions |
| 6. | Stress management | <ul style="list-style-type: none"> • Practice stress management techniques |
| 7. | Time management | <ul style="list-style-type: none"> • Practice Time management techniques |
| 8. | Interpersonal skills | <ul style="list-style-type: none"> • Identify positive and Negative Relations |
| 9. | Creativity | <ul style="list-style-type: none"> • Lead a small group for accomplishment of a given task. • Build positive relationships. |
| 10. | Problem solving and decision making skills | <ul style="list-style-type: none"> • Identify the various Problem solving and decision making skills • Make appropriate Decision |
| 11. | Assertive and non Assertive behavior | <ul style="list-style-type: none"> • Practice Assertive and non Assertive behavior |
| 12. | Leadership skills | <ul style="list-style-type: none"> • Exhibit Leadership skills |

COURSE CONTENT

1.0 Concept of life skills

Definition of life skills, Need and impact of life skills programme

2.0 Enhancing self esteem

Concept, Characteristics of high and low self esteem people, Advantages of high self esteem, Causes of low esteem- Identification of behavior patterns of low self esteem – Practice session of Questionnaire / Game -Steps to build a positive self esteem – Practice session of Role play

3.0 Goal setting

Significance of goal setting, Concepts of Wish, Dream, and Goal Identify Wish, Dream, and Goal and differentiate among them Reasons for not setting the goals, Barriers to reach goals, Identify Barriers Effective goal setting process & Practice Effective goal setting

- 4.0 Positive attitude**
concept ,affects of negative attitude,attitude of self and peers,effect of peers on self and vice-versa, steps to enhance positive attitude,strategies to enhance positive attitude
- 5.0 Managing emotions**
Problem-definition, performance problems ,Categorize the problems, barriers to the solutions to problems.
- 6.0 Stress management**
concept of stress, Types of stress, causes of stress, reactions of stress, coping with the stress, stress relaxing techniques, changing personality and cognitive patterns
- 7.0 Time management**
Definition, significance of various Time stealers, Time management, strategies to set priorities, steps to overcome barriers, Time-Management skills- its advantages.
- 8.0 Interpersonal skills**
Significance of Interpersonal skills,positive relationships- Advantages, negative relationships- Disadvantages
- 9.0 Creativity**
Definition, Invention, Innovation, Novelty,creative thinking , observation and imitation , improvement,Expertise ,skill, and motivation, components of Creativity ,Convergent thinking and divergent Thinking, various steps involved in Scientific approach to creative thinking namely , Factors affecting the creativity in Individuals, Vertical thinking and lateral thinking.
- 10.0 Problem solving and decision making skills**
Definition, performance problems –analysis, categorizing,barriers to the solutions to problems.
- 11.0 Assertive and non Assertive behavior**
Types of Behaviors – their characteristics, need for controlling and avoiding aggressive behaviors, making and refusing an assertive request – their evaluation, importance of goal setting, method of giving feed back.
- 12.0 Leadership skills**
Concept , importance, Role of a Leader in an Organization, Traits of effective leader, Managing and leading, leadership styles-their Comparison, theories of leadership, strategies to develop effective leadership, importance of Decision making, concept of ethical leadership and moral development.

REFERENCES

- 1.Robert NLussier, Christopher F. Achua Leadership: Theory, Application, & Skill development: Theory, Application.

INTERNET TECHNOLOGIES LAB PRACTICE

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| Subject Title | : | Internet Technologies Lab Practice |
| Subject Code | : | CP - 5309 |
| Periods per Week | : | 04 |
| Periods per Semester | : | 60 |

LIST OF EXPERIMENTS

(A) HTML & JAVA SCRIPT:

1. Create a HTML page that uses the tags like head, title, body etc.
2. Create a HTML page that uses frames and different presentation formats, colors.
3. Create a HTML page with a table consisting of a header, body and footer.
4. Create a HTML page with a form containing various controls.
5. Create a style sheet to set the background color, position and dimensions of a HTML element.
6. Create a simple XML file that contains student data.
7. Write JavaScript code using arithmetic operators.
8. Write JavaScript code to implement sorting.
9. Write JavaScript code that uses recursion.
10. Write JavaScript code that displays date in various formats.

B) JAVA

1. Write programs using Java built-in functions using all data types.
2. Write programs using conditional statements and loop statements.
3. Write a program to read data from keyboard.
4. Write a program to create class and objects.
5. Write programs using constructors.
6. Write a program to illustrate usage of command line arguments.
7. Write programs using concept of overloading methods.
8. Exercise on inheritance.
9. Write a program using the concept of method overriding.
10. Exercise on importing packages.
11. Exercise on interfaces.
12. Exercise on exception handling.
13. Exercise on multithreading and thread priorities.
14. Exercise on applets

OBJECTIVES AND KEY COMPETENCIES

| Exp. No. | Name of the experiment | Objectives | Key Competencies |
|----------|--|---|--|
| 1 | Create a HTML page that uses the tags like head, title, body etc. | Create the HTML page with a title and some content in the body. | <ol style="list-style-type: none"> 1) Identify the editor required for writing HTML 2) Add the tags with relevant content 3) Save the file 4) Open the file in a browser 5) Test the results |
| 2 | Create a HTML page that uses frames and different presentation formats, colors. | Create the HTML page with multiple frames so that content in each frame will have different format and colors. | <ol style="list-style-type: none"> 1) Identify the tags for creating multiple frames 2) Add some content to the frames and use different formats, colors for each frame. 3) Save the file 4) Open the file in a browser 5) Test the results |
| 3 | Create a HTML page with a table consisting of a header, body and footer. | Create the HTML page with a table and that table should have a header, body and footer. | <ol style="list-style-type: none"> 1) Identify the tags for creating the table 2) Add header, body and footer to the table. 3) Put some content in each section of table 4) Save the file 5) Open the file in a browser 6) Test the results |
| 4 | Create a HTML page with a form containing various controls. | Create the HTML page with a form and add some controls like textbox, label to the form. | <ol style="list-style-type: none"> 1) Identify the tags to add a form and controls 2) Add the form and put some controls in it. 3) Save the file 4) Open the file in a browser 5) Test the results |
| 5 | Create a style sheet to set the background color, position and dimensions of a HTML element. | Create a style sheet which contains selectors to set the background color, position and dimensions of a HTML element. | <ol style="list-style-type: none"> 1) Identify the editor required for creating CSS 2) Add selectors to set the background color, position and dimensions of an element. 3) Save the CSS file 4) Link the CSS file to a valid HTML page. 5) Save the HTML page 6) Open the HTML page in a browser 7) Test the results |

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| 6 | Create a simple XML file that contains student data. | Create an XML file with some student information. | <ol style="list-style-type: none"> 1) Identify the information to put in the XML file 2) Identify the editor for creating XML file 3) Add relevant tags and put the content 4) Save the XML file. 5) Open the XML file in a browser which had XML parsing capability. 6) Test the result and verify the information. |
| 7 | Write JavaScript code using arithmetic operators. | Write JavaScript code using arithmetic operators like calculation of simple interest. | <ol style="list-style-type: none"> 1) Understand the significance of Client-side scripting. 2) Understand the process of combining JavaScript and HTML. 3) Create a HTML file. 4) Add HTML elements to read Principal, Rate of interest, Time period and to calculate Simple interest. 5) Write the logic for calculating Simple interest 6) Save the HTML file. 7) Open the HTML page in a browser 8) Test the results 9) Resolve the errors if any through debugging |
| 8 | Write JavaScript code to implement sorting. | Write JavaScript code to implement sorting like reading an array of 'n' numbers and sorting them in ascending order. | <ol style="list-style-type: none"> 1) Create a HTML file 2) Add elements to read array and to sort. 3) Write the logic for sorting using iterative and conditional statements. 4) Save the HTML file. 5) Open the HTML page in a browser 6) Test the results 7) Resolve the errors if any through debugging |

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| 9 | Write JavaScript code that uses recursion | Write JavaScript code that uses recursion like calculation of the factorial. | <ol style="list-style-type: none"> 1) Create a HTML file 2) Add elements to read number and to calculate factorial. 3) Write the logic using recursion 4) Save the HTML file. 5) Open the HTML page in a browser 6) Test the results 7) Resolve the errors if any through debugging |
| 10 | Write JavaScript code that displays date in various formats. | Write JavaScript code that display date in various formats like DD-MM-YYYY, DD/MM/YYYY etc. | <ol style="list-style-type: none"> 1) Create a HTML file 2) Write the logic to display date information 3) Save the HTML file. 4) Open the HTML page in a browser 5) Test the results |

(B) JAVA PROGRAMS

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| 11 | Write programs using Java built-in functions using all data types. | <ol style="list-style-type: none"> (a) Write programs using the primitive data types. (b) Display the data. | <ol style="list-style-type: none"> (a) Identify the data types. (b) Use println() method. (c) Compile the program. (d) Rectify the errors. (e) Observe the output. |
| 12 | Write programs using conditional statements and loop statements. | <ol style="list-style-type: none"> (a) Write program using if statement. (b) Write program using while, do and for constructs. | <ol style="list-style-type: none"> (a) Identify the differences between C, C++ and Java. (b) Compile the program and rectify the errors. (c) Observe the output. |
| 13 | Write a program to read data from keyboard. | <ol style="list-style-type: none"> (a) Write a program to give values to variables interactively through the keyboard. (b) Write program using different data types. | <ol style="list-style-type: none"> (a) Use different data types. (b) Use readLine() method. (c) Use println() method. (d) Observe the output. |
| 14 | Write a program to create class and objects. | <ol style="list-style-type: none"> (a) Write a program to create a class and create objects. | <ol style="list-style-type: none"> (a) Create class. (b) Declare methods. |

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| | | (b) Write a program to create class and access class members. | (c) Create objects. (d) Write main method. (e) Access class members. |
| 15 | Write programs using constructors. | (a) Write a program using default constructor. (b) Write a program using parameterized constructor. | (a) Declare and define constructor. (b) Call default constructor. (c) Call parameterized constructor. |
| 16 | Write a program to illustrate usage of command line arguments. | Write a program to illustrate usage of command line arguments. | (a) Use command line arguments. (b) Run the program. (c) Observe the output. |
| 17 | Write programs using concept of overloading methods. | (a) Write a program to illustrate method overloading. (b) Write a program to illustrate method overloading using constructors. | (a) Observe method overloading. (b) Overload constructor methods. |
| 18 | Exercise on inheritance. | Write a program to illustrate single inheritance. | (a) Create base class. (b) Write base class constructor. (c) Create derived class. (d) Use <i>extends</i> keyword. (e) Use <i>super</i> keyword. (f) Write derived class constructor. |
| 19 | Write a program using the concept of method overriding. | Write a program using the concept of method overriding. | (a) Use method overriding. (b) Use <i>this</i> keyword. |

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| 20 | Exercise on importing packages. | Write a program to create and use a package. | (a) Create package. (b) Use of access specifiers. (b) Use package. (c) Use <i>import</i> keyword. |
| 21 | Exercise on interfaces. | Write a program to illustrate multiple inheritance using interfaces. | (a) Define interface. (b) Use <i>extends</i> keyword. (c) Use <i>implements</i> keyword. (d) Access interface variables. |
| 22 | Exercise on exception handling | (a) Write a program to illustrate exception handling. (b) Write a program to illustrate exception handling using multiple catch statements. | (a) Use try – catch. (b) Use multiple catch blocks. (c) Use finally statement. |
| 23 | Exercise on multithreading and thread priorities. | (a) Write a program to create a thread by extending the thread class. (b) Write a program to create a thread by implementing the runnable interface. (c) Write a program to illustrate thread priorities. | (a) Use <i>extends, new</i> . (b) Use run() and start() methods. (c) Observe thread execution. (d) Use <i>implements runnable</i> interface. (e) Use setPriority() and getPriority() methods. |
| 24 | Exercise on applets. | Write a program to create an applet. | (a) Use <applet>...</applet> tag. (b) Add applet to html file. (c) Run the applet. |

COMMUNICATION & MICROWAVE LAB

Subject Title : **Communication & Microwave Lab**
Subject Code : **CN 5309**
Hours/Week : **06**
Hours/Semester : **90**

List of experiments

1. Measurement of radiation pattern of half wave dipole
2. Measurement of radiation pattern of yagi -uda antenna
3. Standing waves and observe their maxima and minima on transmission line using frequency domain method.
4. Measure VSWR, reflection coefficient, return loss in a transmission line.
5. Mode characteristics of klystron oscillator
6. the characteristics of Gunn oscillator
7. Measurement of VSWR by using klystron oscillator
8. Measurement of frequency and wavelength of unknown microwave source
9. Measurement of the impedance of unknown load.
10. measurement of characteristics of directional coupler
11. measurement of characteristics of magic Tee
12. Design of subscriber line.
13. Demonstrate of speech circuit using IC and its interface to the line
14. Demonstrate of DTMF and pulse dialling circuit
15. Demonstrate of Dual tone ring generator circuit using IC and its interface
16. Demonstrate of interfacing circuit

List of experiments

| Exp No | Name of the Experiment | competencies | Key competencies |
|--------|---|---|--|
| 1. | Measure the radiation pattern of half wave dipole | 1.To identify the half wave dipole 2. To identify the materials used in antenna construction 3. Observe different blocks in antenna training system 4. Observe input power in dB and frequency 5. Adjust input power in dB and frequency 6. Observe the received signal 7.Measure electric field strength in different directions 8.Draw the directional pattern of antenna. | 1.Construct the antenna 2.Calculate the dimensions for a given frequency 3. Plot the radiation pattern electric field strength vs angle |
| 2. | Measure the radiation pattern of Yagi-Uda antenna | 1.To identify the Yagi-Uda antenna 2. To identify the materials used in antenna construction 3. Identify various elements of antenna 4.Assemble the antenna | 1. identifying yagi-uda antenna and its elements 2.Assembling the antenna 3.Calculating the dimensions for a given frequency 4. To perform the experiment |

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| | | <p>6. observe different blocks in antenna training system</p> <p>7. Observe input power in dB and frequency and adjusting input power in dB and frequency</p> <p>8. Measure electric field strength in different directions</p> <p>9. Observe the directional pattern of yagi uda antenna.</p> | <p>as per procedure</p> <p>5. Plot the radiation pattern electric field strength vs angle</p> |
| 3. | Observe their maxima and minima on transmission line using frequency domain method. | <p>1. Observe transmission line analyzer and its front panel</p> <p>2. observe standing waves in CRO (XY mode) by terminating transmission line analyzer with different loads</p> | <p>1. To perform the experiment as per procedure</p> <p>2. to draw standing waves and observe maxima and minima positions</p> |
| 4 | Measurement of VSWR, reflection coefficient in transmissinline | <p>1. Observe transmission line analyzer and its front panel</p> <p>2. observe standing waves in CRO (XY mode) by terminating transmission line analyzer with different loads</p> <p>3. measure VSWR by adjusting attenuator</p> | <p>1. To perform the experiment as per procedure</p> <p>2. to calculate VSWR and reflection coefficient by using chart and formule</p> |
| 5 | Plot the mode characteristics of klystron oscillator | <p>1. Observe different blocks in klystron bench</p> <p>2. Observe power supply requirements of klystron oscillator</p> <p>3. Observe the output of klystron oscillator</p> <p>4. Measure the frequency of oscillations by using direct frequency meter</p> <p>5. Measure the output power and frequency by varying repeller voltage</p> | <p>1. To perform the experiment as per procedure</p> <p>2. Plot the mode characteristics output power vs repeller voltage</p> <p>3. Plot frequency vs repeller voltage</p> <p>4. Count the number of modes</p> <p>5. Measure change in frequency for every mode</p> |
| 6. | Plot the characteristics of gunn oscillator | <p>1. Observe different blocks in gunn oscillator bench</p> <p>2. Observe power supply requirements of gunn oscillator</p> <p>3. Measure the gunn current by varying bias voltage</p> <p>4. Observe the output of gunn oscillator at negative resistance region</p> <p>5. Measure the frequency of oscillations by using direct frequency meter</p> <p>5. Measure the output power and by varying frequency</p> | <p>1. Plot the characteristics of gunn current vs bias voltage</p> <p>2. Plot the output power vs frequency</p> <p>3. Count the number of modes</p> <p>4. Measure change in frequency for every mode</p> |
| 7. | Measurement of VSWR | <p>1. Observe different blocks in klystron bench</p> | <p>1. Measure the VSWR for open, short and matched</p> |

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| | | <p>2. Observe the VSWR meter</p> <p>3. Observe the output by adjusting the klystron oscillator at suitable mode</p> <p>4. Measure VSWR in VSWR meter for different loads</p> | load |
| 8. | Measurement of frequency of oscillations and wave length | <p>1. Observe different blocks in klystron bench</p> <p>2. Observe the VSWR meter</p> <p>3. Observe the output by adjusting the klystron oscillator at suitable mode</p> <p>4. Measure the frequency of oscillations by using direct frequency meter</p> <p>5. Measure the distance between first minima and second minima by connecting short</p> | <p>1. Calculate guided wave length, free space wave length and frequency of oscillations</p> <p>2. Compare calculated frequency of oscillations with direct measured frequency</p> |
| 9. | Measurement of unknown impedance | <p>1. Observe different blocks in klystron bench and VSWR meter</p> <p>3. Observe the output by adjusting the klystron oscillator at suitable mode</p> <p>4. Measure the frequency of oscillations by using direct frequency meter</p> <p>5. Measure the distance at first minima and second minima and measure the VSWR by connecting short</p> <p>6. Measure the distance at first minima and second minima and measure the VSWR by connecting unknown impedance</p> | <p>1. Calculate guided wave length, free space wave length</p> <p>2. Calculate unknown impedance using smith chart</p> |
| 10. | Measurement of characteristics of directional coupler | <p>1. Observe different blocks in klystron bench and directional coupler</p> <p>2. Observe the output by adjusting the klystron oscillator at suitable mode</p> <p>3. Measure the output power at port2, port3 by connecting port1 of directional coupler to klystron bench</p> <p>4. Measure the output power at port1, port4 by connecting port2 of directional coupler to klystron bench</p> | <p>1. calculate insertion loss, coupling factor, and directivity of directional coupler</p> |
| 11- | Measurement of characteristics of magic tee | <p>1. Observe different blocks in klystron bench and magic tee</p> <p>2. Observe the output by adjusting the klystron oscillator at suitable mode</p> <p>3. Measure the output power at port2, port3 and port4 by connecting port1 of magic tee to klystron bench</p> <p>4. Measure the output power at port1, port4 and port3 by connecting port2 of</p> | <p>1. Calculate insertion loss, isolation of magic tee</p> |

| | | magictee to klystron bench | |
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| 12 | Design of subscriber line | <ol style="list-style-type: none"> 1. Observe different blocks of EPABX 2. Observe how the subscriber is connected to exchange 3. Observe loop(T-tip,R-ring) 4.Observe initiating call, sending number, dial pulsing, connecting the phone, ringing call, answering the call, talking and ending the call | <ol style="list-style-type: none"> 1. Observe initiating call, sending number, dial pulsing, connecting the phone, ringing call, answering the call, talking and ending the call |
| 13 | Study of speech circuit using IC and its interface to the line | <ol style="list-style-type: none"> 1. Observe initiating call, sending number, dial pulsing, connecting the phone, ringing call, answering the call, talking and ending the call different blocks of EPABX,speech circuit 2. Observe connection of speech circuit to telephone line by a bridge rectifier 3. Identify ringing signal,ring back signal and voice signal on CRO | <ol style="list-style-type: none"> 1. Identify ringing signal, ring back signal and voice signal on CRO 2. Draw the ringing signal, ring back signal and voice signal |
| 14 | Study of DTMF and pulse dialling circuit | <ol style="list-style-type: none"> 1. Identify the frequencies that represent 16 alpha numerical characters on telephone circuit 2. Observe DTMF signal 3. Observe dialled pulses | <ol style="list-style-type: none"> 2. Observe DTMF signal and dialled pulses on CRO 2. Draw DTMF signal and dialled pulses |
| 15 | Study of Dual tone ring generator circuit using IC and its interface | <ol style="list-style-type: none"> 1. Observe the central office applies ringing signal to the line after switching has completed the connection 2. Observe relay that is energised by the switch | <ol style="list-style-type: none"> 1. Observe ring signal on CRO 2. Draw ring signal |
| 16 | Study of interfacing circuit | <ol style="list-style-type: none"> 1. Observe local loop(subscriber loop or line side interface if the call is with in exchange) 2. Observe trunk side interface | <ol style="list-style-type: none"> Observe ring on signal on CRO when called subscriber is connected |

MEASUREMENTS & POWER ELECTRONICS LAB PRACTICE

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| Subject Title | : Measurements & Power Electronics Lab Practice |
| Subject code | : IE-5309 |
| Periods/week | : 06 |
| Periods/semester | : 90 |

Rationale: Industrial electronics lab is included in the sixth semester to make the students industry ready by giving them practical inputs and making them experiment with power electronic devices which are in wide usage in industry. This helps the students to get better job opportunities and work with confidence.

LIST OF EXPERIMENTS:

1. Identification of SCR, TRIAC, DIAC, SUS, SCS, MOSFET, IGBT, LASER, UJT, HEAT SINKS, OPTO COUPLERS, and interpreting their specifications
2. To plot the characteristics of SCR
3. To Plot the characteristic of TRICA and DIAC
4. To plot the characteristic of UJT and determine the intrinsic standard off ration
5. To plot the characteristic of MOSFET and determine the gate source threshold voltage
6. To vary the speed of a 1 phase ac motor using TRICA-DICA phase control
7. To implement a square wave inverter circuit with centre tapped transformer and power MOSFET
8. Varying the speed of a small DC motor using Pulse Width Modulation
9. Extension of ammeter
10. Conversion of Ammeter to Voltmeter.
11. Construction of series type ohm meter
12. Measurement of Amplitude, frequency and phase angle using CRO
13. Find phase angle and frequency by constructing Lissajous patterns
14. Construction of A/D converter
15. Construction of D/A converter
16. Testing of various ICs using IC tester
17. Testing of various transistors using Transistor tester

List of experiments with objectives and key competencies

| Exp no | Name of the experiment | objectives | Key competencies |
|--------|---|---|--|
| 1 | Identification of SCR, TRIAC, DIAC, SUS, SCS, MOSFET, IGBT, LASER, UJT, HEAT SINKS, OPTO COUPLERS, and interpreting their specifications | <ol style="list-style-type: none"> 1. Identify the SCR , TRIAC , DIAC 2. Identify various SCR family device and their symbol 3. Reading the data sheet and identifying the terminals 4. Note down the typical application from the data sheet | <ol style="list-style-type: none"> 1. Identify the SCR family devices and observing their size and shape with regard to their power rating 2. Noting down the importance specification from data sheet |
| 2 | <p>To plot the characteristics of SCR</p> <ol style="list-style-type: none"> a) identify the terminals by observation b) identify the terminals by testing with DMM and analogy meter c) demonstrate that SCR remains in ON state once triggered d) Demonstrate three methods of switching off SCR. e) Observe the difference between power SCR and low current SCR f) Design a simple burglar alarm circuit using SCR and test it. | <ol style="list-style-type: none"> 1. identify the SCR and its package 2. Estimate SCR rating by observation 3. Test the SCR using meter 4. Interpret SCR specification from data sheets 5. Explain the behaviour of SCR 6. Use SCR in project | <ol style="list-style-type: none"> 1. Plot the characteristic and interpret the graph of TRICA and DICA 2. Determine the turn ON voltage holding current and triggering |
| 3 | <p>To Plot the characteristic of TRICA and DIAC</p> <ol style="list-style-type: none"> a) Demonstrate that TRICA can be trigged by positive and negative pulses b) Demonstrate methods of switching of TRIAC c) Observe the difference between power TRICA and low current TRICA | <ol style="list-style-type: none"> 1. Identifying terminals by observation 2. Identifying terminals by testing with DMM and analogue meter 3. Identify TRICA and its package 4. Estimate TRICA rating by observation 5. Test the TRICA using meter 6. Interpret specification from datasheets 7. Verify the behaviour of TRICA 8. Verify the behaviour of DICA experimentally | <ol style="list-style-type: none"> 1. Plot the characteristic and interpret the graph of TRICA and DICA 2. Determine the turn ON voltage holding current and triggering 3. Current of TRICA and |

| | | | DICA |
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| 4 | <p>To plot the characteristic of UJT and determine the intrinsic standard off ration</p> <p>a) a)Identify the terminals by observation</p> <p>b) b)Identify the terminals by testing with DMM and analogue meter</p> <p>c) construct a relaxation oscillator and</p> <p>i. Observe the output waveforms on CRO</p> <p>ii. Connect a speaker in the output and observe</p> <p>d) Simulate the same in pspice</p> | <ol style="list-style-type: none"> 1. Identifying UJT and its package 2. Interpret specification from datasheets 3. Test the TRICA using digital multimeter 4. Verify the behaviour of UJT 5. Use UJT in simple applications 6. Use pspice for simulation | <ol style="list-style-type: none"> 1. Plot the characteristic and interpret the graph of UJT 3. Determine the intrinsic standard off ration of UJT 4. construct UJT relaxation oscillator and test 5. Pspice simulations of UJT relaxation oscillator |
| 5 | <p>To plot the characteristic of MOSFET and determine the gate source threshold voltage</p> <p>a) a)Identify the terminals by observation</p> <p>b) b)Identify the terminals by testing with DMM and analogue meter</p> <p>c) c)Implement a MOSFET switch and control a 6V lamp using NAND gate</p> | <ol style="list-style-type: none"> 1. Identifying MOSFET and its package 2. Interpret specification from datasheets 3. Test the MOSFET using digital multimeter 4. Verify the behaviour of MOSFET 5. Interfacing with digital circuit | <ol style="list-style-type: none"> 1. Plot the characteristic and interpret the graph of MOSFET 2. Determine the gate to source threshold voltage 3. Interfacing with digital circuit |
| 6 | <p>To vary the speed of a 1 phase ac motor using TRICA-DICA phase control</p> <p>a) a)construct the speed control circuit and test the performance</p> <p>b) observe the wave forms at the gate terminal and load</p> <p>c) Replace the motor with a 230V incandescent lamp</p> <p>d) d)construct a simple lamp controller using moc3011 and TRICA</p> | <ol style="list-style-type: none"> 1. Construct the simple phase control circuit 2. Testing the controller 3. Drawing inferences from the waveform 4. Observe the variation in the speed 5. Appreciate the use of phase control circuit for lamp dimming application | <ol style="list-style-type: none"> 1. Constructing a phase control circuit 2. testing the circuit with a multimeter 3. observing the variation in waveform with change in resistance (pot) |
| 7 | To implement a square wave | 1. Construct the simple inverter | 1. Constructing |

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| | <p>inverter circuit with centre tapped transformer and power MOSFET</p> <ol style="list-style-type: none"> Observer the output wave forms Plot the regulation characteristics | <p>circuit</p> <ol style="list-style-type: none"> Testing the inverter Drawing inferences from the graph Realise the need for heat sink Calculating maximum output power | <p>the inverter circuit</p> <ol style="list-style-type: none"> Testing the inverter performance parameter |
| 8 | <p>Varying the speed of a small DC motor using Pulse Width Modulation</p> | <ol style="list-style-type: none"> Constructing PWM controller circuit Testing the circuit performance parameters Observing the PWM wave form Plot the graph between voltage and speed | <ol style="list-style-type: none"> Understand the principle of PWM for speed control Observe the PWM waveform on CRO |
| 9. | <p>To study the PMMC meters</p> <ol style="list-style-type: none"> To convert an ammeter into Voltmeter To Extend the range of voltmeter using multiplier To Measure current using voltmeter To extend the range of ammeter using a shunt To observe the Loading effect of volt meter on high impedance circuit Open and identify the following parts <ol style="list-style-type: none"> Permanent magnet Coil Former Phosphor bronze springs Pointer , Multiplier / Shunt etc | <ol style="list-style-type: none"> To identify the PMMC meters and observe the linear scale. Measure meter Resistance noting down full scale deflection current. Calculation of Multiplier and shunt values observe the loading effect and understand the need for high input impedance. measuring current using voltmeter. | <ol style="list-style-type: none"> Identify PMMC meters Understanding the importance of high input impedance of voltmeter extend the range of meters |

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| 10 | <p>Measurements using CRO (both analogue and Digital)</p> <p>a) Measurement of Voltage amplitude, b) frequency and c) phase angle</p> <p>b) Measure the signal amplitude a) when the signal level is in milli Volts b) Signal level is above 80V</p> <p>c) Observe and measure Amplitude and Frequency of the standard signal provided on CRO</p> <p>d) observe and measure Amplitude and Frequency of Different wave forms provided in the function generator</p> <p>e) Observe the characteristics of a Pulse on CRO</p> <p>f) Connect a RC Series circuit to the function generator to create Phase difference and measure the same using lissajous patterns</p> | <p>a) To use various controls and select appropriate ranges on analog and Digital CROs</p> <p>b) Testing the BNC Cable before applying the signal</p> <p>c) Observing Positive and Negative peaks of a wave form.</p> <p>d) Measure the amplitude and frequencies of small and high level signals using CRO Probes</p> <p>e) Measuring phase angle by lissajous pattern method and interpreting them</p> <p>f) Experimentally verifying the concept of Phase angle in circuits involving RC elements. and observing the effect of variation of R and C on the phase angle at different frequencies</p> | <p>a) To measure the Amplitude , Frequency and phase angles of given Signals and also observe the waveform for its shape and Distortion.</p> <p>b) To know the Pulse parameters and Observing them on CRO</p> |
|----|---|--|---|

FILM & T.V. PRODUCTION LAB

Subject Title : **Film & T.V. Production lab**

Subject Code : **EV-5309**

Periods per Week : **06**

Periods per Semester : **90**

List of Experiments

1. Familiarization of T.V. production equipment
2. Know the techniques of camera movements and shots.
3. Know script writing and screen play writing.
4. Know the lighting techniques (indoor and outdoor)
5. Make a continuity film.
6. Make a documentary
7. Make a short film.
8. Know the editing techniques.
9. Familiarization of sound recording equipment
10. Know the dubbing methods
11. Practice background music recording (Rerecording) & special effects
12. Do the mixing
13. Know the optical recording

MEASUREMENTS & TEST EQUIPMENT LABORATORY PRACTICE

Subject Title : MEASUREMENTS & TEST EQUIPMENT LABORATORY PRACTICE
Subject code : BM-5309
Periods/week : 03
Periods/semester : 45

Rationale: Measurement & Test Equipment Lab is included in the fifth semester to make the students industry ready by giving them practical inputs and making them experiment with electronic devices which are in wide usage in industry. This helps the students to get better job opportunities and work with confidence.

LIST OF EXPERIMENTS:

1. Extension of ammeter
2. Conversion of Ammeter to Voltmeter.
3. Construction of series type ohm meter
4. Construction of shunt type ohm meter
5. Measurement of Amplitude , frequency and phase angle using CRO
6. Find phase angle and frequency by constructing Lissajous patterns
7. Construction of A/D converter
8. Construction of D/A converter
9. Testing of various ICs using IC tester
10. Testing of various transistors using Transistor tester

List of experiments with objectives and key competencies

| Ex p no. | Name of the experiment | objectives | Key competencies |
|----------------|---|---|--|
| 1. | To study the PMMC meters a) To convert an ammeter into Voltmeter b) To Extend the range of voltmeter using multiplier c) To Measure current using voltmeter d) To extend the range of ammeter using a shunt e) To observe the Loading effect of volt meter on high impedance circuit f) Open and identify the following parts a) Permanent magnet b) Coil c) Former d) Phosphor bronze springs e) Pointer , Multiplier / Shunt etc | a) To identify the PMMC meters and observe the linear scale. b) Measure meter Resistance c) noting down full scale deflection current. d) Calculation of Multiplier and shunt values e) observe the loading effect and understand the need for high input impedance. f) measuring current using voltmeter. | a) Identify PMMC meters b) Understanding the importance of high input impedance of voltmeter c) extend the range of meters |

| | | | |
|----|--|--|---|
| 2. | <p>Measurements using CRO (both analogue and Digital)</p> <p>a) Measurement of Voltage amplitude, b) frequency and c) phase angle</p> <p>b) Measure the signal amplitude a) when the signal level is in milli Volts b) Signal level is above 80V</p> <p>c) Observe and measure Amplitude and Frequency of the standard signal provided on CRO</p> <p>d) observe and measure Amplitude and Frequency of Different wave forms provided in the function generator</p> <p>e) Observe the characteristics of a Pulse on CRO</p> <p>f) Connect a RC Series circuit to the function generator to create Phase difference and measure the same using lissajous patterns</p> | <p>a) To use various controls and select appropriate ranges on analog and Digital CROs</p> <p>b) Testing the BNC Cable before applying the signal</p> <p>c) Observing Positive and Negative peaks of a wave form.</p> <p>d) Measure the amplitude and frequencies of small and high level signals using CRO Probes</p> <p>e) Measuring phase angle by lissajous pattern method and interpreting them</p> <p>f) Experimentally verifying the concept of Phase angle in circuits involving RC elements. and observing the effect of variation of R and C on the phase angle at different frequencies</p> | <p>a) To measure the Amplitude , Frequency and phase angles of given Signals and also observe the waveform for its shape and Distortion.</p> <p>b) To know the Pulse parameters and Observing them on CRO</p> |
| | | | |

EMBEDDED SYSTEMS & MATLAB

Subject Title : Embedded systems & MATLAB Lab
Subject Code : ES – 5309
Periods Per Week : 06
Periods Per Semester : 90

| S. No. | EXPERIMENT | No. of Periods |
|--------|--|----------------|
| 1. | Understanding C cross compiler | 10 |
| 2. | Simple programs using arithmetic operations, logical operations, conditional statements and loops. | 15 |
| 3. | Simple programs using functions, pointers, arrays. | 15 |
| 4. | Programming using C library functions | 05 |
| | Total | 45 |

TIME SCHEDULE (A) EMBEDDED SYSTEMS

LIST OF EXPERIMENTS:

1. Understanding C cross compiler
 - i. Familiarization of C cross compiler
 - ii. Know the limitations of C cross compiler
 - iii. Demonstration of creating the program on EDITOR.
 - iv. Familiarization with project settings.
 - v. Demonstration of compiling the program.
 - vi. Demonstration of building the program.
 - vii. Familiarization of running the program using simulator.
2. Simple programs using arithmetic operations
3. Simple programs using logical operations
4. Simple programs using conditional statements.
5. Simple programs using loops.
6. Simple programs using functions.
7. Simple programs using pointers.
8. Simple programs using arrays.

9. Programming the timers.
10. Programming using C library functions.

Note: burning the programs on to embedded processors is a must.

List of Experiments , Objectives & Competencies

| Exp No | Name of the Experiment | Objectives | Key Competencies |
|--------|--|--|--|
| 1 | Understanding C cross compiler | Familiarization of C cross compiler Demonstration of building the program. Familiarization of running the program using simulator | Observing the software development tools and conversion of the assembling files into others |
| 2 | Simple programs using arithmetic operations, logical operations, conditional statements and loops. | a) Practicing all programming instructions and directives b) Implementation of the program c) Providing the data d) Verification of the result. | a) Observing the output and verification of the result with theoretical values b) Improving programming methodology |

(B)MATLAB

LIST OF EXPERIMENTS:

1. Getting started with MATLAB
2. Working With Matrices
3. Working With Mathematical Expressions
4. Loading the Data
5. Plot simple graphs using fplot()
6. Plot simple graphs using ezplot()
7. Plot the Unit impulse, Unit Step and ramp signals and lable them
8. Sampling of a Signal
9. Gain Experience with MATLAB tools
10. Convolution of two given signals & sequences

11. Filtering of a Signal
12. Find FT & IFT of a given signal
13. Finding of FFT & IFFT
14. Find Z-T & IZT of a given Sequence

List of Experiments , Objectives & Competencies

| Exp No | Name of the Experiment | Objectives | Key Competencies |
|--------|--|--|--|
| 1 | Getting started with MATLAB | To Know about the lab | Identify the starting and Quitting into Matlab |
| 2 | Working With Matrices | To work with Matrices | Can able to work with Matrices and Arrays |
| 3 | Working With Mathematical Expressions | To work with variables,numbers,operators & functions | Able to know the work with Mathematical functions |
| 4 | Loading the Data | To use the Load Command | Able to use the data |
| 5 | Plot simple graphs using fplot() | Plot the simple Graphs | Able to Plot the simple Graphs,labeling & Naming the Axes |
| 6 | Plot simple graphs using ezplot() | Plot the simple Graphs | Able to Plot the simple Graphs, labeling & Naming the Axes between the limits and can learn to plot for Expressions also |
| 7 | Plot the Unit impulse, Unit Step and ramp signals and lable them | To Plot the Unit impulse, Unit Step and Ramp signals | Able to Plot the signals and know the differences |
| 8 | Sampling of a Signal | To Know the Sampling ,Nyquist rate of sampling | Able to know the sampling, Nyquist rate of sampling,Over sampling and their effects |
| 9 | Gain Experience with MATLAB tools | Using the Tool Matlab boxes | Able to know how to use different tool boxes |

| | | | |
|----|--|---|--|
| 10 | Convolution of two given signals & sequences | Find the Convolution of two given signals and plot them | Able to know the Convolution of two given signals and resultant plot & able to correlate the results with theory |
| 11 | Filtering of a Signal | Filter the given signal | Able to know the output if you filter the signal after adding noise |
| 12 | Find FT & IFT of a given signal | To Know FT & IFT | Able to to Know FT & IFT |
| 13 | Finding of FFT & IFFT | To Find the FFT and IFFT of given sequence | Able to know the FFT and IFFT of given sequences |
| 14 | Find Z-T & IZT of a given Sequence | To Find the Z-T and IZT of given sequence | Able to know the Z-T and IZT of given sequences |

Reference Books:

Getting started with MATLAB by Rudra Pratap, Oxford university Press

RDBMS LAB PRACTICE

Subject Title : **RDBMS Lab Practice**
Subject Code : **CP-5310**
Periods per week : **05**
Periods per Semester : **75**

- 1 Know installation of Oracle
- 2 Exercise on creating tables
- 3 Exercise on inserting records
- 4 Exercise on updating records
- 5 Exercise on modifying the structure of the table
- 6 Exercise on Select command
- 7 Exercise on querying the table using clauses like WHERE, ORDER, IN, AND, OR, NOT
- 8 Exercise on creating and deleting of indexes
- 9 Exercise on various group functions
- 10 Exercise on Number functions, character functions, conversion functions and date functions
- 11 Exercise on set operators
- 12 Exercise on sub queries
- 13 Exercise on Joins
- 14 Exercise on various date and number format models
- 15 Exercise on Sequences
- 16 Exercise on synonyms
- 17 Exercise on views
- 18 Exercise on creating tables with integrity constraints
- 19 Write programs using PL/SQL control statements
- 20 Exercise on PL/SQL cursors
- 21 Exercise on PL/SQL exception handling
- 22 Exercise on Procedures
- 23 Exercise on Functions
- 24 Exercise on Recursion
- 25 Exercise on Triggers
- 26 Exercise on Packages

RDBMS LAB PRACTICE

| Sl.No | Name of the Experiment | Objectives | Key Competencies |
|-------|-------------------------------|--|---|
| 1 | Know installation of Oracle | Perform the following: <ol style="list-style-type: none"> i. To identify the version of Oracle being installed ii. To understand the RAM and HDD requirements for Oracle installation iii. To comprehend the installation steps correctly iv. Setting up of Oracle Administrative Password v. Configuring the Oracle database after post-installation steps of Oracle viz configuring administrative rights for performing vi. To login to Oracle as administrator account and Oracle user account | <ul style="list-style-type: none"> ❖ Observe Oracle version being installed ❖ Observe the RAM & HDD requirements ❖ Rectify for any Oracle installation errors ❖ Able to login as Administrator and as Oracle user account |
| 2 | Exercise on creating tables | Perform the following: <ol style="list-style-type: none"> i. To login with Oracle user account ii. To give correct syntax for table creation iii. To give correct data type for the required fields with appropriate size iv. To display the structure of the table | <ul style="list-style-type: none"> ❖ Correct Table creation syntax errors ❖ Correct the wrong data types and inappropriate sizes for the respective fields ❖ Check for displaying the structure of the table |
| 3 | Exercise on inserting records | Perform the following: <ol style="list-style-type: none"> i. Check for the required table present already ii. To insert the records correctly iii. To display the records correctly | <ul style="list-style-type: none"> ❖ Correct syntax errors for Insertion of record ❖ Check for insertion of proper values for the required fields ❖ Verify the correct values pertaining to the record are inserted in the required table ❖ Check for displaying of the records correctly |

RDBMS LAB PRACTICE

| Sl.No | Name of the Experiment | Objectives | Key Competencies |
|-------|---|---|--|
| 4 | Exercise on updating records | Perform the following: i. Check for the required table present already ii. To update the records correctly iii. To display the updated records | <ul style="list-style-type: none"> ❖ Correct syntax errors for updation of record ❖ Check for updation of proper values for the required fields ❖ Check for displaying of the updated records correctly |
| 5 | Exercise on modifying the structure of the table | Perform the following i. To identify the required table present in the system already ii. To add new column iii. To display the records correctly | <ul style="list-style-type: none"> ❖ Correct syntax errors in modifying the structure of the table ❖ Check whether required field is newly added to the existing table ❖ Check for displaying of the modified table correctly |
| 6 | Exercise on Select command | Perform the following i. To identify the required table present already ii. To display the records in the required table | <ul style="list-style-type: none"> ❖ Check for syntax error in usage of Select command ❖ Check whether Select command is given correctly to display all the records |
| 7 | Exercise on querying the table using clauses like WHERE, ORDER, IN,AND, OR, NOT | Perform the following: i. To use the Select command ii. To use the clauses WHERE, ORDER, IN,AND, OR, NOT alongwith Select command on the given records in the table | <ul style="list-style-type: none"> ❖ Check for syntax error in usage of Select command with appropriate clauses ❖ Check whether Select command alongwith appropriate clause is given correctly for the required condition ❖ Check the usage of clauses WHERE, ORDER, IN,AND, OR, NOT alongwith Select command appropriately |
| 8 | Exercise on creating and deleting of indexes | Perform the following i. To create index on a single column in a Table | <ul style="list-style-type: none"> ❖ Check for syntax error in usage of Index command ❖ Check for creation of index on single column |

RDBMS LAB PRACTICE

| Sl.No | Name of the Experiment | Objectives | Key Competencies |
|-------|---|--|--|
| | | ii. To create index on more than one columns in the Table iii. To drop the index | index ❖ Check for creation of index on more than one columns (Composite Index) ❖ Check for the usage of dropping the index |
| 9 | Exercise on set operators | Perform the following i. To use set command ii. To use set command along with WHERE condition | ❖ Check for syntax error in the usage of SET command ❖ Check for usage of SET command for updating values based on certain condition on few records |
| 10 | Exercise on sub queries | Perform the following i. To use Select command ii. To use appropriate Operators - IN | ❖ Check for the syntax error in usage of sub queries ❖ Check for the correctness of the usage of appropriate operators used |
| 11 | Exercise on Joins | Perform the following i. To create two tables ii. To use the common field if two tables are used iii. To know different types of Join | ❖ Check for the correctness of the syntax used for joining ❖ Check if the join is created between two tables ❖ Check if self join is created |
| 12 | Exercise on various date and number format models | Perform the following: i. To use date formats correctly ii. To use number formats correctly | ❖ Check for the syntax of the date formats ❖ Check for the syntax of the number formats |
| 13 | Exercise on Sequences | Perform the following i. Create a sequence ii. Usage of sequence alongwith NEXTVAL() | ❖ Check for the syntax of Sequence ❖ Check for the usage of sequence variable alongwith NEXTVAL() |
| 14 | Exercise on synonyms | Perform the following: i. Create Synonym for a Table, View, Sequence etc. ii. Using of Synonym | ❖ Check for the syntax of Synonym ❖ Check for the correctness of implementation of Synonym |

RDBMS LAB PRACTICE

| Sl.No | Name of the Experiment | Objectives | Key Competencies |
|-------|--|---|--|
| 15 | Exercise on views | <p>Perform the following</p> <ol style="list-style-type: none"> i. Create View for a certain collection of records in a Table ii. Query the View | <ul style="list-style-type: none"> ❖ Check for the syntax correctness of View ❖ Check for the correctness of the implementation of View |
| 16 | Exercise on creating tables with integrity constraints | <p>Perform the following</p> <ol style="list-style-type: none"> i. Create primary key ii. Create Foreign key or referential integrity constraint iii. Create NOT NULL constraint iv. Create UNIQUE Key constraint v. Create CHECK constraint | <ul style="list-style-type: none"> ❖ Check for the syntax errors in usage of all types of Integrity constraints ❖ Check whether different types of Integrity constraints are used |
| 17 | Exercise on PL/SQL Implicit cursors | <p>Perform the following</p> <ol style="list-style-type: none"> i. Know different types of cursors- Implicit and Explicit cursors ii. Use appropriate attributes of Implicit Cursor for checking updations iii. | <ul style="list-style-type: none"> ❖ Check for the syntax errors in using attributes ❖ Check whether all the attributes relevant to implicit cursors are used ❖ Check for proper conditions using appropriate attributes to test whether updations are performed |
| 18 | Exercise on PL/SQL Explicit cursors | <p>Perform the following</p> <ol style="list-style-type: none"> i. Know different types of cursors- Implicit and Explicit cursors iv. Create Explicit cursors by declaration v. Open the Explicit cursor vi. Fetch the data vii. Close the Explicit cursor viii. Use appropriate attributes of Explicit cursor for checking updations | <ul style="list-style-type: none"> ❖ Check for the syntax errors in using attributes ❖ Check whether all the attributes relevant to explicit cursors are used ❖ Check for proper conditions using appropriate attributes ❖ Check for proper conditions using appropriate attributes to test whether updations are done |
| 19 | Write programs using PL/SQL control statements | <p>Perform the following</p> <ol style="list-style-type: none"> i. To use IF .. ELSE statements ii. To use iterative statements – Simple loop, While Loop, For | <ul style="list-style-type: none"> ❖ Check for the syntax of IF.. ELSE statements ❖ Check for the syntax of all iterative statements |

RDBMS LAB PRACTICE

| Sl.No | Name of the Experiment | Objectives | Key Competencies |
|-------|---|--|---|
| | | Loop | |
| 20 | Exercise on PL/SQL in built exception handling | Perform the following i. Know about types of exception handling ii. To handle built-in exceptions | <ul style="list-style-type: none"> ❖ Check for handling of inbuilt exceptions ❖ Check for raising of user defined exception ❖ Check for handling of user defined exception with appropriate error messages |
| 21 | Exercise on PL/SQL in user defined exception handling | Perform the following i. To declare user defined exception ii. To raise user defined exception iii. To handle user defined exception | <ul style="list-style-type: none"> ❖ Check for declaration of user defined exception ❖ Check for proper raising of exceptions ❖ Check for proper handling of user defined exception with appropriate error messages |
| 22 | Exercise on Procedures | Perform the following i. To know the concept of stored procedures ii. To declare procedures iii. The type of parameters IN, IN OUT, OUT iv. To call procedures from other procedures | <ul style="list-style-type: none"> ❖ Check for proper declaration of procedures ❖ Check for syntax of parameters and its type ❖ Check for proper calling of procedures |
| 23 | Exercise on Functions | Perform the following i. To know the concept of stored functions ii. To declare function with return data iii. To call functions from other functions | <ul style="list-style-type: none"> ❖ Check for proper declaration of function ❖ Check for syntax of parameters and its data type ❖ Check for proper return data type from the functions ❖ Check for variable assignment to get the returned value from the function |
| 24 | Exercise on Recursion | Perform the following i. To know the concept of stored functions and stored procedures ii. To call the procedure and function by itself | <ul style="list-style-type: none"> ❖ Check for the syntax of stored function or procedure ❖ Check for calling the function or procedure in |

| RDBMS LAB PRACTICE | | | |
|--------------------|------------------------|--|---|
| Sl.No | Name of the Experiment | Objectives | Key Competencies |
| | | ii. To place a condition to terminate from calling itself | the same function / procedure ❖ Check for the condition to terminate from calling itself |
| 25 | Exercise on Triggers | Perform the following i. To know the concept of Trigger ii. To know the types of Triggers iii. To know about Row level trigger and Statement level trigger iv. To know the hierarchy of trigger is fired | ❖ Check for the syntax of Trigger ❖ Check for proper declaration of when the trigger is to be fired |
| 26 | Exercise on Packages | Perform the following i. To know the concept of Package specification ii. To know the concept of Package body specification iii. To know the usage of package elements | ❖ Check for the syntax of Package specification ❖ Check for the syntax of Package body specification ❖ Check for the proper usage of Package elements |

MATLAB

Subject Title : **MATLAB**
Subject Code : **CN 5310**
Periods per Week : **3**
Periods per Semester : **45**

List of Experiments, Objectives & Competencies

| Exp No | Name of the Experiment | Objectives | Key Competencies |
|--------|---------------------------------------|--|---|
| 1 | Getting started with MATLAB | To Know about the lab | Identify the starting and Quitting into Matlab |
| 2 | Working With Matrices | To work with Matrices | Can able to work with Matrices and Arrays |
| 3 | Working With Mathematical Expressions | To work with variables, numbers, operators & functions | Able to know the work with Mathematical functions |
| 4 | Loading the Data | To use the Load Command | Able to use the data |

| | | | |
|----|--|---|--|
| 5 | Plot simple graphs using fplot() | Plot the simple Graphs | Able to Plot the simple Graphs, labeling & Naming the Axes |
| 6 | Plot simple graphs using ezplot() | Plot the simple Graphs | Able to Plot the simple Graphs, labeling & Naming the Axes between the limits & can learn to plot for Expressions also |
| 7 | Plot the Unit impulse, Unit Step and ramp signals and lable them | To Plot the Unit impulse, Unit Step and Ramp signals | Able to Plot the signals and know the differences |
| 8 | Sampling of a Signal | To Know the Sampling ,Nyquist rate of sampling | Able to know the sampling, Nyquist rate of sampling, Over sampling and their effects |
| 9 | Gain Experience with MATLAB tools | Using the Tool Matlab boxes | Able to know how to use different tool boxes |
| 10 | Convolution of two given signals & sequences | Find the Convolution of two given signals and plot them | Able to know the Convolution of two given signals and resultant plot & able to correlate the results with theory |
| 11 | Filtering of a Signal | Filter the given signal | Able to know the output if you filter the signal after adding noise |
| 12 | Find FT & IFT of a given signal | To Know FT & IFT | Able to to Know FT & IFT |
| 13 | Finding of FFT & IFFT | To Find the FFT and IFFT of given sequence | Able to know the FFT and IFFT of given sequences |
| 14 | Find Z-T & IZT of a given Sequence | To Find the Z-T and IZT of given sequence | Able to know the Z-T and IZT of given sequences |

Reference Books: Getting started with MATLAB by Rudra Pratap, Oxford university Press

MICROCONTROLLER AND APPLICATIONS LAB PRACTICE

Subject Title : Microcontroller and Applications Lab Practice

Subject Code : IE - 5310

Periods per Week : 03

Periods per Semester : 45

Rationale: Microcontroller and Applications lab Practice is included in the same semester to ensure continuity and give an opportunity for the students to reinforce their theoretical knowledge by practically verifying in the laboratory. It is mainly intended to implement the programming methodology in assembly language programming using either MCS kit or simulation software on computer system.

TIME SCHEDULE

| S. No. | EXPERIMENT | No. of Periods |
|---------------|--|-----------------------|
| 1. | Demonstration of Microcontroller trainer kit hardware and and establishing connections to PC | 6 |
| 2 | Demonstration of Microcontroller simulation software KEIL/SPJ/MOD51 and all its components/menus | 7 |
| 2. | Simple programs using data transfer, arithmetic, logical and branch / jump instructions | 10 |
| 3. | Programs using Timers and interrupts | 12 |
| 4. | 8051 Interfacing | 10 |
| | Total | 45 |

LIST OF EXPERIMENTS

1. Familiarization of 8051 Microcontroller kit hardware and usage
2. Demonstration of Microcontroller software KEIL/SPJ/MOD51
3. Simple programs using MCS Assembly language and handling types of data formats and addressing modes
4. Write simple programs using Arithmetic instructions
5. Write simple programs using Logical Instructions
6. Write simple programs using Jump and Loop instructions
7. Write simple programs using Timers and Interrupt instructions
8. Connecting LEDs to a port and glowing it (continuously ON and Alternately ON/OFF)
9. Configuring one port as input and another port as output
10. Traffic controller
11. Serial data handling
12. Generating waveforms
13. Small project
 - a. Simple calculator
 - b. Function generator

| Expt. No. | Experiment Name | Competencies | Key Competencies |
|--------------------------------|--|---|---|
| Programming experiments | | | |
| 1 | Familiarise with Microcontroller kit - hardware | <ol style="list-style-type: none"> 1. Identify the components on the Microcontroller Kit 2. Identify the various Connectors used with the kit 3. Know the connections of the kit 4. Switch ON and observe the display. | <ol style="list-style-type: none"> 1. Understanding the kit details 2. Drawing inference and writing report about the Kit |
| 2 | Using Microcontroller simulation software KEIL/SPJ/MOD51 | <ol style="list-style-type: none"> 1. Understand the IDE environment 2. Understand the sequence of steps to open and create new project 3. Selection of components from pop-up menus 4. Understand method of debugging 5. Method of compiling 6. Observing results 7. Saving project | <ol style="list-style-type: none"> 1. Using Microcontroller Software KEIL/SPJ 2. Writing report on software usage |
| 3 | Simple programs using MCS Assembly language and handling types of data formats and | <ol style="list-style-type: none"> 1. Writing programs for handling Binary, Hex, Decimal and Octal data 2. Data access using different addressing | <ol style="list-style-type: none"> 1. Data handling capacity 2. Writing report on data handling, and mis-handling |

| | | | |
|---|---|--|--|
| | addressing modes | modes 3. Execute and observe the results | |
| 4 | Write simple programs using Arithmetic instructions | 1. Knowledge of arithmetic instructions 2. Knowledge of addressing modes 4. Writing programs for all arithmetic operations 5. Data access using different addressing modes 6. Execute and observe the results | 1. Capacity to analyse arithmetic operation instructions 2. Capacity to handle data from various locations 3. Writing report of the inferences |
| 5 | Write simple programs using Logical Instructions | 1. Knowledge of Logical instructions 2. Knowledge of addressing modes 3. Writing programs for all Logical operations 4. Data access using different addressing modes 5. Execute and observe the results | 1. Capacity to analyse Logical operation instructions 2. Capacity to handle data from various locations 3. Writing report of the inferences |
| 6 | Write simple programs using Jump and Loop instructions | 1. Knowledge of Jump and Loop instructions 2. Knowledge of addressing modes 3. Writing programs for all Jump and Looping operations 4. Execute and observe the results | 1. Capacity to analyse Jump and Loop operation instructions 2. Capacity to handle data from various locations 3. Writing report of the inferences |
| 7 | Write simple programs using Timers and Interrupt instructions | 1. Knowledge of Timers and Interrupt instructions 2. Knowledge of addressing modes 3. Writing programs for all Timers and Interrupt instructions operations 4. Data access using different addressing modes 5. Execute and observe the results 6. | 1. Capacity to analyse Timers and Interrupt operation instructions 2. Capacity to handle data from various locations 3. Writing report of the inferences |
| Interfacing and Applications experiments | | | |
| 8 | Connecting LEDs to | 1. Knowledge of port | 1. Capacity to analyse |

| | | | |
|----|--|--|---|
| | a port and glowing it (continuously ON and Alternately ON/OFF) | <ul style="list-style-type: none"> configuration 2. Knowledge of data transfer instructions 3. Knowledge of loop instructions | <ul style="list-style-type: none"> Timers and Interrupt operations and instructions 2. Handling interfacing with ports 3. Writing report of the inferences |
| 9 | Configuring one port as input and another port as output | <ul style="list-style-type: none"> 1. Knowledge of port configuration 2. Knowledge of data transfer instructions 3. Knowledge of loop instructions | <ul style="list-style-type: none"> 1. Capacity to analyze configuring ports as IOs 2. Handling interfacing with ports 3. Writing report of the inferences |
| 10 | Traffic controller | <ul style="list-style-type: none"> 1. Knowledge of port configuration 2. Knowledge of data transfer instructions 3. Knowledge of loop instructions 4. Knowledge of timer instructions 5. Knowledge of jump instructions | <ul style="list-style-type: none"> 1. Capacity to analyse configuring ports as input and out put 2. Handling interfacing with ports 3. Writing report of the inferences drawn from application |
| 11 | Serial data handling | <ul style="list-style-type: none"> 1. Knowledge of port configuration 2. Knowledge of data transfer instructions 3. Knowledge of loop instructions 4. Knowledge of timer instructions 5. Knowledge of jump instructions | <ul style="list-style-type: none"> 1. Capacity to analyse configuring ports as input and out put 2. Handling interfacing with ports 3. Writing report of the inferences drawn from application |
| 12 | Generating waveforms | <ul style="list-style-type: none"> 1. Knowledge of port configuration 2. Knowledge of data transfer instructions 3. Knowledge of loop instructions 4. Knowledge of timer instructions 5. Knowledge of jump instructions | <ul style="list-style-type: none"> 1. Capacity to analyse configuring ports as input and out put 2. Handling interfacing with ports 3. Writing report of the inferences drawn from application |
| 13 | Small project a. Simple calculator b. Function generator | <ul style="list-style-type: none"> 1. Problem definition 2. Identifying requirements 3. Complete knowledge of 8051 ports, registers and instruction set 4. Burning the software on EPROM | <ul style="list-style-type: none"> 1. Understand how to develop a project 2. Project report writing |

Multimedia-I Lab

Subject Title : Multimedia-I Lab

Subject Code : EV-5310

Periods per Week : 06

Periods per semester : 90

List of Experiments

1. Familiarization of COREL DRAW, its shortcuts
2. Perform the operation of implementing drawing and shaping of objects
3. To work with styles and templates
4. To organize the objects
5. To create styles and templates
6. To create special effects
7. Familiarization of PHOTO SHOP, its short cuts.
8. To perform painting and patching
9. To generate graphics for creating images
10. To generate graphics for websites, brochures
11. Familiarization of conversion of black and white picture into colour picture.
12. To generate graphics for videos
13. Familiarization of FLASH its features.
14. Familiarization of tweening (shape, motion) in FLASH
15. Familiarization of Action script in FLASH
16. To post sound track laying
17. To create website
18. Editing of captured video in Adobe Premier
19. To blend multiple audio tracks

ANALYTICAL & BIO INSTRUMENTATION LAB PRACTICE

Subject title : **Analytical Instrumentation Lab Practice**
Subject Code : **BM-5310**
Periods Per Week : **06**
Periods Per Semester : **60**

| S.No. | Major Topics | Periods |
|-------|---|-----------|
| 1. | Principle of Spectrophotometer, Colorimeter, Flame Photometer, centrifuge and incubator | 10 |
| 2. | Principle of Electrophoresis, Densitometer, Chromatography | 10 |
| 3. | Principle of pH meter, Conductivity meter | 10 |
| 4. | Principle of Biochemical Analyzer | 10 |
| 5 | Transducers | 10 |
| 6 | Electrodes & amplifiers | 5 |
| 7 | Biomedical recorders | 5 |
| | Total | 60 |

List of Experiments

1. To observe transmittance and absorbance of various sample solutions and measure the concentration using Spectrophotometer in the visible light region.
2. To observe transmittance and absorbance of various sample solutions and measure the concentration using Spectrophotometer in the ultra-violet region.
3. To observe transmittance and absorbance of various sample solutions and measure the concentration for various filters using Colorimeter.
4. To observe the separation of solution and sediment by using centrifuge
5. To perform an experiment to demonstrate the Principle of Electrophoresis
6. To perform an experiment to demonstrate the Principle of Densitometer
7. To perform an experiment to demonstrate the Principle of Chromatography
8. To measure the pH of various sample solutions using pH meter
9. To perform an experiment to demonstrate the Principle of Conductivity meter
10. To measure concentration of a sample solution by end point mode using automated biochemical analyzer
11. To measure concentration of a sample solution by two point mode using automated biochemical analyzer
- 12 To measure concentration of a sample solution by kinetic mode using automated biochemical analyzer

| S.No. | Name of the Experiment | Objectives | Key Competencies |
|-------|---|--|---|
| 1. | Spectrophotometer Visible light region | <ol style="list-style-type: none"> 1. Familiarization with the Equipment. 2. Identify the monochromators, light sources used 3. Identify Visible light wavelength ranges 4. Identify the type of | <ol style="list-style-type: none"> 1. Perform the experiment as per the Procedure 2. Noting down the readings at different wavelengths. |

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| | | <ul style="list-style-type: none"> 5. Cuvettes used 5. Preparation of sample solution 6. Calibration with standard solutions 7. Principle of Spectrophotometer 8. Cleaning the cuvettes after use. | <ul style="list-style-type: none"> 3. Calculating concentration with the obtained readings 4. Inferences |
| 2. | Spectrophotometer with UV region | <ul style="list-style-type: none"> 1. Familiarization with the Equipment. 2. Identify the monochromators, light sources used 3. Identify UV and Visible light wavelength ranges 4. Identify the type of Cuvettes used 5. Preparation of sample solution 6. Calibration with standard solutions 7. Principle of Spectrophotometer 8. Cleaning the cuvettes after use. | <ul style="list-style-type: none"> 1. Perform the experiment as per the Procedure 2. Noting down the readings at different wavelengths. 3. Calculating concentration with the obtained readings 4. Inferences |
| 3. | Colorimeter | <ul style="list-style-type: none"> 1. Familiarization with equipment 2. Principle of colorimeter 3. Identify the type of monochromator, light source used 4. Identify the type of cuvette used. 5. Preparation of sample solution 6. Calibration with standard solutions 7. Cleaning of the cuvette after the use | <ul style="list-style-type: none"> 1. To perform experiment as per the Procedure 2. Note down the readings at different wavelengths. 3. Calculating concentration with the obtained readings 4. Inferences |
| 4. | Centrifuge | <ul style="list-style-type: none"> 1. To understand the working of centrifuge 2. Preparation of sample solution 3. Mounting the sample solution test tubes in | <ul style="list-style-type: none"> 1. To perform the experiment as per procedure 2. Observing the sediment and analyzing |

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| | | <p>centrifuge</p> <ol style="list-style-type: none"> Observe the separation of solvent and solute Safety precautions while operating the equipment | |
| 5. | Electrophoresis | <ol style="list-style-type: none"> Familiarization with electrophoresis instrument Principle of electrophoresis Preparation of electrolyte solution Observation of segmentation of sample components on filter paper Analyze the filter paper using densitometer | <ol style="list-style-type: none"> To perform the experiment as per the procedures Records number of components present in the sample by the segments formed on filter paper. Measures the concentration of the components using densitometer Inferences Applications |
| 6. | Densitometer | <ol style="list-style-type: none"> Familiarization with densitometer Principle of densitometer Preparation of filter paper for measuring Calibration using oily filter paper Mounting the filter paper on densitometer Measuring optical densities of segments formed on filter paper | <ol style="list-style-type: none"> To perform the experiment as the procedure Notes the optical density for different components Calculates concentration of different components Inferences |
| 7. | Chromatography | <ol style="list-style-type: none"> Principle of chromatography Preparation of sample solution Preparation of filter paper to create two different phases Observes | <ol style="list-style-type: none"> To perform the experiment as per the Procedure Calculates concentration Inferences Applications |

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| | | segmentation of components on the filter paper | |
| 8. | pH meter | <ol style="list-style-type: none"> 1. Familiarization with pH meter 2. Principle of pH meter 3. Preparation of Buffer solution 4. Identify the solution as acid or basic (with litmus paper) 5. Calibration with buffer solution 6. Measure pH for the given sample solutions. 7. Maintenance of pH electrodes | <ol style="list-style-type: none"> 1. Writes Procedure 2. Noting down pH for given different solutions. 3. Inferences |
| 9. | Conductivity meter | <ol style="list-style-type: none"> 1. Familiarization with conductivity meter 2. Principle of conductivity meter 3. Preparation of sample solution 4. Calibration with standard solution 5. Maintenance of conductivity cell | <ol style="list-style-type: none"> 1. Writes procedure 2. Records the conductivity of given sample solution 3. Inferences 4. Applications |
| 10. | Biochemical Analyzer in End Point Mode | <ol style="list-style-type: none"> 1. To understand the working of biochemical analyzer in end point mode 2. Principle of Biochemical analyzer 3. Selecting suitable modes 4. Selecting filters 5. Calibration using standard solutions 6. Preparation of solution 7. Measuring transmittance and absorbance percentage 8. Cuvette placing and cleaning | <ol style="list-style-type: none"> 1. To perform the experiment as per the procedure 2. Recording %T and %A by changing in end point modes 3. Calculates concentration 4. Inferences |

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| 11. | Biochemical Analyzer in Two Point Mode | <ol style="list-style-type: none"> 1. To understand the working of biochemical analyzer in end point mode 2. Principle of Biochemical analyzer 3. Selecting suitable modes 4. Selecting filters 5. Calibration using standard solutions 6. Preparation of solution 7. Measuring transmittance and absorbance percentage <p>Cuvette placing and cleaning</p> | <ol style="list-style-type: none"> 1. To perform the experiment as per the procedure 2. Recording %T and %A by changing in end point modes 3. Calculates concentration 4. Inferences |
| 12 | Biochemical Analyzer in Kinetic Mode | <ol style="list-style-type: none"> 1. To understand the working of biochemical analyzer in end point mode 2. Principle of Biochemical analyzer 3. Selecting suitable modes 4. Selecting filters 5. Calibration using standard solutions 6. Preparation of solution 7. Measuring transmittance and absorbance percentage <p>Cuvette placing and cleaning</p> | <ol style="list-style-type: none"> 1. To perform the experiment as per the procedure 2. Recording %T and %A by changing in end point modes 3. Calculates concentration 4. Inferences |

Biomedical Instrumentation lab Practice

List of the Experiments

1. To perform an experiment to demonstrate the working of capacitive transducer
2. To perform an experiment to demonstrate the working of Piezo electric transducer
3. To measure the strain gauge factor using Strain gauge transducer
4. To obtain the relationship between resistance and temperature using RTD

5. To obtain the characteristics of Thermistors
6. To perform an experiment to demonstrate the working of Thermocouple
7. To perform an experiment to demonstrate the working of potentiometric transducer
8. To obtain characteristics of LVDT
9. To perform an experiment to demonstrate the working of Photo transducer
10. To measure Half-cell potential.
11. To measure off-set potential
12. To demonstrate the working of different bio electrodes
13. To verify the operation and obtain output voltage of differential amplifier
14. To verify the operation and obtain voltage gain of instrumentation amplifier
15. To record ECG waveform using ECG Recorder
16. To perform an experiment to demonstrate the working of digital CRO

| Exp No | Name of the Experiment | Objectives | Key competencies |
|--------|--------------------------|--|--|
| 1 | Capacitive transducer | <ol style="list-style-type: none"> 1. Know the principle of capacitive transducer 2. Make the circuit connections 3. Identify the capacitive transducer 4. To identify different modules 5. Know the variations of output signal w.r.t variations in 'd' 'a'. | <ol style="list-style-type: none"> 1. Performs the experiment as per the procedure 2. Noting down the observations 3. Draws inferences |
| 2 | Piezoelectric transducer | <ol style="list-style-type: none"> 1. Identify the suitable transducer 2. Make the circuit connections 3. Know the principle of piezoelectric transducer 4. Know about piezoelectric materials | <ol style="list-style-type: none"> 1. Performs the experiment as per the procedure 2. Noting down the observations 3. Draws inferences 4. Record variations in output voltage w.r.t change in external force |
| 3 | Strain gauge transducer | <ol style="list-style-type: none"> 1. Identify various modules 2. Know the principle 3. Make the circuit connections 4. Observe the | <ol style="list-style-type: none"> 1. Perform experiment as per the procedure 2. Note down the observations 3. Measure the |

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| | | <p>variations in resistance w.r.t various weights</p> <ol style="list-style-type: none"> 5. Know the linearity between weights & strain | <p>percentage of linearity</p> <ol style="list-style-type: none"> 4. Plot the graph between weights & strain 5. Calculate the gauge factor |
| 4 | Characteristics of RTD | <ol style="list-style-type: none"> 1. To identify various modules 2. Know the principle 3. Make the circuit connections 4. Know the variations in resistance with various input temperatures 5. Convert temperature in °C to kelvins | <ol style="list-style-type: none"> 1. Perform experiment as per the procedure 2. Note down the observations 3. Plot the graph between R&T 4. Draws inferences |
| 5 | Thermistors | <ol style="list-style-type: none"> 1. Identify various modules 2. Know the principle 3. Make the circuit connections 4. Know the variations in resistance with various input temperatures 5. Know the principle of NTC | <ol style="list-style-type: none"> 1. Perform experiment as per the procedure 2. Note down the observations 3. Plot the graph between R&T 4. Draws inferences |
| 6 | Characteristics of thermocouple | <ol style="list-style-type: none"> 1. To identify various modules 2. Know the principle 3. Make the circuit connections 4. To maintain different temperatures at two different junctions 5. Know about the dissimilar materials used | <ol style="list-style-type: none"> 1. Perform experiment as per the procedure 2. Note down the observations 3. Record the variation in output voltage w.r.t change in junction temperatures 4. Plot graph between temperature difference & output voltage |
| 7 | Potentiometric | <ol style="list-style-type: none"> 1. Identify various | <ol style="list-style-type: none"> 1. Perform experiment |

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| | transducer | <p>modules</p> <ol style="list-style-type: none"> 2. Know the principle 3. Make the circuit connections 4. Know the change in output voltage with change in resistance | <p>as per the procedure</p> <ol style="list-style-type: none"> 2. Note down the observations 3. Plot the characteristics between resistance and temperature 4. Draws inferences |
| 8 | LVDT | <ol style="list-style-type: none"> 1. Identify various modules 2. Know the principle 3. Make the circuit connections 4. Note down the constructional details & specifications 5. Know the no.of secondary windings and their inter connection 6. Identify null voltage and know it's significance 7. Observe the linear variation of the graph on either side of null point | <ol style="list-style-type: none"> 1. Perform the experiment as per the procedure 2. Note down the observations 3. Plot the characteristics between displacement and voltage |
| 9 | Photo transducer | <ol style="list-style-type: none"> 1. Identify various modules 2. Know the principle 3. Make the circuit connections 4. Observe the change in output voltage ,current, w.r.t variation in input light | <ol style="list-style-type: none"> 1. Perform experiment as per the procedure 2. Note down the observations 3. Plot the characteristics between output voltage ,current w.r.t change in input light 4. Draws inferences |

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| 10 | Measurement of Half cell potential | <ol style="list-style-type: none"> 1. Identify various modules 2. Know the principle 3. Make the circuit connections 4. Know about halfcell potentials of various electrodes 5. Preparation of electrolyte solution 6. Measure output voltage between electrode & electrolyte solution using DMM | <ol style="list-style-type: none"> 1. Measure the half cell potential for various electrodes 2. Preparation of report |
| 11 | Measurement of off-set potential | <ol style="list-style-type: none"> 1. Identify various modules 2. Know the principle 3. Make the circuit connections 4. Preparation of electrolyte solution 5. Measure output voltage between two electrodes using DMM 6. Minimization of off-set with two similar electrodes | <ol style="list-style-type: none"> 1. Measure the half-cell potential for various electrodes 2. Minimize off-set voltage by using two similar electrodes 3. Report Preparation |
| 12 | Study of different bio electrodes | <ol style="list-style-type: none"> 1. Identify various electrodes available 2. Applications of various electrodes 3. Maintenance of electrodes | <ol style="list-style-type: none"> 1. Identify the application of each electrode 2. Mount the electrode in correct location |
| 13 | Differential amplifier | <ol style="list-style-type: none"> 1. Identify the circuit 2. Know the equation for output voltage 3. Make the circuit connections | <ol style="list-style-type: none"> 1. Perform experiment as per the procedure 2. Note down the observations 3. Measure the output voltage for different |

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| | | 4. Vary input voltages using potentiometer V_a & V_b | inputs using DMM 4. Compare theoretical & practical voltages |
| 14 | Instrumentation amplifier | <ol style="list-style-type: none"> 1. Identify the circuit 2. Know the equation for output voltage 3. Make the circuit connections 4. Vary input voltages using potentiometer V_a & V_b 5. Make out the differences between differential & instrumentation amplifier | <ol style="list-style-type: none"> 1. Perform experiment as per the procedure 2. Note down the observations 3. Measure the output voltage and overall gain for different inputs using DMM 4. Compare theoretical & practical voltages |
| 15 | Measurement of ECG using ECG recorder | <ol style="list-style-type: none"> 1. Identify the type of recorder 2. Observe the front panel controls 3. Know the principle of ECG recorder 4. Load the ECG roll paper into machine 5. Stylus adjustment 6. Calibration 7. Connect the patient electrode probe 8. Identify various lead configuration | <ol style="list-style-type: none"> 1. Record the ECG from various leads as per the procedure 2. Identify various ECG parameters in ECG waveform 3. Report preparation |
| 16 | Digital CRO | <ol style="list-style-type: none"> 1. Identify the front panel controls 2. Observe the variation in frequency by varying the time period 3. Observe the variation in amplitude by varying the voltage 4. Calculate the frequency & amplitude of output signal | <ol style="list-style-type: none"> 1. Measure the output signal parameters by using CRO 2. Identify the difference between conventional & digital CRO |

PIC MICROCONTROLLERS & APPLICATIONS LAB PRACTICE

Subject Title : PIC microcontrollers & Applications Lab Practice

Subject Code : ES – 5310

Periods Per Week : 03

Periods Per Semester : 45

TIME SCHEDULE

| S. No. | EXPERIMENT | No. of Periods |
|---------------|---|-----------------------|
| 1. | Demonstration of PIC Microcontrollers trainer kit and using MPLAB simulator on Desk Top Computer systems. | 03 |
| 2. | Simple programs using arithmetic, logical, bit, port and branch, and loop instructions | 30 |
| 3. | Programs using interfacing devices | 12 |
| | Total | 45 |

List of experiments

1. Understanding MPLAB Simulator.
 - i. Familiarization of MPLAB simulator.
 - ii. Demonstration of creating the program on EDITOR.
 - iii. Demonstration of compiling the program.
 - iv. Demonstration of building the program.
 - v. Familiarization of running the program using simulator.
2. Practice programs using arithmetic instructions
3. Practice programs using logic instructions.
4. Practice programs using BIT manipulation instructions.
5. Practice programs using I/O ports.
6. Interface an LCD to PIC micro controller
7. Interface a key board to PIC micro controller.
8. Interface a stepper motor to PIC micro controller.
9. Interface a traffic light controller to PIC micro controller.
10. Interface RTC to PIC micro controller.

List of Experiments, Objectives & Competencies:

| Exp No: | Name of the Experiment | Objectives | Key Competencies |
|---------|--|--|---|
| 1 | Demonstration of PIC Microcontroller trainer kit and Desk Top Computer system using appropriate software | Familiarization of trainer kit and Assembler software on computer system | Observing the software development tools and conversion of the assembling files into others |
| 2 | Simple programs using data transfer, arithmetic, logical , bit ,port , branch and loop instructions of PIC Microcontrollers. | <p>(i) Practicing all assembling language instructions and directives</p> <p>(ii) Implementation of the program</p> <p>(iii) Providing the data in the respective memory locations</p> <p>(iv) Verification of the result.</p> | <p>a) Observing the output and verification of the result with theoretical values</p> <p>b) Improving programming methodology</p> |
| 3 | Programs using interfacing devices | Familiarization of trainer kit and usage of Interfacing units on the trainer system | <p>a) Observing the output and verification of the result with theoretical values</p> <p>b) Improving programming methodology</p> |