

TEACHING AND EVALUTION SCHEME

DISPLENE: ELECTRONICS & TELECOMMUNICATION ENIGINEERING

SEMESTER : VI

	Subject	Evolution Scheme							
	Theory & Practical			Theory			Practical		
Sl. No.	Theory	Lecturer	Practical	End Exam	Class Test	Assignment	End Exam	Sessional	Total Marks
1.	Entrepreneurship & Industrial Management.	4	-	80	15	5	-	-	100
2.	Advance Communication Engineering	5	-	80	15	5	-	-	100
3.	Microcontroller , Embedded System & PLCs	5	-	80	15	5	-	-	100
4.	ELECTIVES.	4	-	80	15	5	-	-	100
	(i) Digital Signal Processing (ii)Robotics & Auto Electricity (iii)Nanotechnology (iv)Digital Image Processing						-	-	
	Practical								
1.	Advance Communication Lab	-	4				25	25	50
2.	Microcontroller, Embedded System & PLCS Lab	-	4				25	25	50
3.	Elective Lab. (Any One Lab.) (i)Digital Signal Processing lab (ii)Robotics lab (iii)Digital Image Processing Lab	-	3				25	25	50
4.	Maintenance & Computer Diagnosis Lab	-	3				25	25	50
5.	Simulation Using MATLAB Lab.	-	3				25	25	50
6.	Project Work	-	4				50	50	100
		18	21	320	60	20	175	175	750

ADVANCED COMMUNICATION ENGINEERING

Theory & Tutorial – 5P/W

Examination: 3Hr

Total Theory & Tutorial: 75P

Total Marks: 100

Theory: 80

I.A: 15+5

A: RATIONALE:

The Communication has a wide long history, of application in different technology. This subject deals with different advanced techniques of Communication Engineering. The Microwave Engineering, Rader and Navigation aids an example of Communication system. The Satellite, Mobile and Optical Fiber Communication has today permeated almost every field of modern society. This has been incorporated in this subject.

B: OBJECTIVS:

At the end of the course the students should be able to :

1. Discuss the principles of RADER system and range equation and performance Factor.
2. Draw and explain the block diagram of pulse radar,CW.
3. State the various uses of radar in field of navigation system and aircraft Landing system.
4. Define & Describe Satellite Orbital patterns and elevation(LEO,MEO & GEO) categories
5. Describe Geostationary satellite, satellite earth station & Link Station.
6. Explain the operation of direct broadcast system (DBS) & VSAT system.
7. Discuss the Time Division Multiple Accessing(TDMA) & Code Division Multiple Accessing (CDMA)
8. Compare the advantage and disadvantage of optical fiber metallic cables
9. Describe how light wave propagate to optical fiber
10. Define the modes of propagation and index profile of optical fiber
11. Describe the working principle of LED , Injection Diodes & PIN Diodes & laser.
12. Discuss the operation of Basic Telephone System & Electronic Telephone System.
13. Describe the operation of a PBX.

C: TOPIC WISE DISTRIBUTION OF PERIODS:

Sl.No.	Topics	Periods
1.	Radar & Navigation aids	18
2.	Satellite Communication	17
3.	Optical Fiber Communication	20
4.	Telecommunication System	20

Total= 75**D: COURSE CONTENTS IN TERM OF SPECIFIC OBJECTIVES:****1. RADAR & NAVIGATION AIDS.**

- 1.1 State and explain the simple Radar system.
- 1.2 Derive Radar range equation, types of radar and their application.
- 1.3 Explain the performance factor of radar.
- 1.4 Describe the block diagram of pulsed radar system.
- 1.5 State the function of radar indication and moving target indicator.
- 1.6 Describe the block diagram of C.W radar.
- 1.7 Explain the radar aids to navigator.
- 1.8 Explain aircraft landing system.
- 1.9 Explain the concept of Navigation Satellite System.(NAVSAT) & GPS System.

2. SATELLITE COMMUNICATION.

- 2.1 Define & Describe Satellite Orbital patterns and elevation(LEO,MEO & GEO) categories

- 2.2 Describe the Concept of Geostationary satellite , calculate its height, velocity & round trip time delay & their advantage & disadvantage over other system
- 2.3 State Satellite frequency allocation and frequency bands.
- 2.4 Describe General structure of satellite Link system.
- 2.5 Explain the operation of direct broadcast system (DBS)
- 2.6 Explain the operation of VSAT system.
- 2.7 Define multiple accessing
- 2.8 Discuss the Time Division Multiple Accessing(TDMA) & Code Division Multiple Accessing (CDMA)

3. OPTICAL FIBER COMMUNICATION.

- 3.1 Define optical communication
- 3.2 Compare the advantage and disadvantage of optical fiber metallic cables
- 3.3 Define Electromagnetic Frequency and wave line spectrum
- 3.4 Discuss the block diagram of an optical fiber communication system
- 3.5 Describe the optical fiber construction
- 3.6 Describe how light wave propagate to optical fiber
- 3.7 Explain the following terms: Velocity of propagation, Critical angle, Acceptance angle & numerical aperture
- 3.8 Define the modes of propagation and index profile of optical fiber
- 3.9 Describe the three types optical fiber configuration: Single-mode step index, Multi-mode step index, Multi-mode Graded index
- 3.10 Describe the working principle of LED , Injection Diodes & PIN Diodes.
- 3.11 Describe the working principle of Laser.

4. TELECOMMUNICATION SYSTEM

- 4.1 Discuss the operation of Electronic Telephone System. (Telephone Set)
- 4.3 Discuss the function of switching system.
- 4.3 Discuss the principle of space and time switching.
- 4.4 Discuss the principle of PDH and SDH modes of transmission.
- 4.5 Discuss the operation of ATM , ISDN network.
- 4.6 Discuss the numbering plan of telephone networks (National Schemes & International Numbering)
- 4.7 Describe the operation of a PBX & Digital EPABX.
- 4.8 Describe the operation of Internet Protocol Telephone.

RECOMMENDED BOOKS:

A. TEXT BOOKS:

- 1. Satellite Communication D.C. Agrawal(khana publishers)
- 2. Optical Fiber comm. Principles and practice John M.Senior.
- 3. Telecommunication and the computer – James Martine
- 4. Microwave Engineering-Rich & Krauch
- 5. Wireless Digital Communication – Rapaport.

B. REFERENCE BOOKS:

- 1. Electronic communication system – G.Kennedy.
- 2. Principle of communication system – Tub & Shilling
- 3. Satellite Comm.- Rebert M.Gagriardi
- 4. Fiber optics handbooks for engineers and scientists-Fredrich C.Allard.
- 5. Optical Fiber Communication by G.Keiser.
- 6. Rader, Sonar & Navigation Engineering by K.K.Sharma.

VI/SEM/ETC/TH-3
MICRO CONTROLLOR, EMBEDDED SYSTEM & PLC
SIXTH SEMESTER

Theory & Tutorial – 5P/W
 Total Theory & Tutorial: 75 P

Examination: 3Hr
 Total Marks: 100
 Theory: 80
 I.A: 15+5

A: RATIONALE:

Computational tools & computing machines are always for technology implementation in field of automation for industries and domestic products. Hence microcontrols, Embedded System & PLCs are integral part of automation and semi-automation machine.

B: OBJECTIVES:

At the end of the course the students should be able to :

- Gate Idea of Embedded System & Different Technology.
- Know the application of Embedded System.
- Know the various peripherals.
- Concept in PLC & its Programming.

C: TOPIC WISE DISTRIBUTION OF PERIODS:

Sl.No.	Topics	Periods
1.	Introduction to Embedded Systems	10
2.	8051 Architecture	10
3.	8051 Addressing Modes & Instruction Set	10
4.	8051 Assembly Language Programming Tools	15
5.	Peripherals	06
6.	Application of Embedded Systems	10
7.	Programmable Logic Controllers(PLCs)	14
	TOTAL	75

D: COURSE CONTENTS IN TERMS OF SPECIFIC OBJECTIVES:

1. Introduction to Embedded Systems

1.1 Embedded Systems Overview

What are they?

A shortlist of embedded systems

Some common characteristics of embedded systems

An embedded system example – A Digital Camera

1.2 Embedded Systems Technologies

Technology – Definition

Technology for Embedded Systems

Processor Technology

IC Technology

Design Technology

1.3 Processor Technology

General Purpose Processors – Software

Single Purpose Processors – Hardware

1.4 Application – Specific Processors

- Microcontrollers
- Digital Signal Processors(DSP)

1.5 IC Technology

Full Custom / VLSI

Semi Custom ASIC (Gate Array & Standard Cell)

PLD (Programmable Logic Device)

2. MICROCONTROLLER 8051 Architecture

Difference between microcontroller & Microprocessor.

Explain the Block diagram of the Architectural of 8051.

Explain the PIN Diagram features of the 8051 core.

Explain the 8051 Programming Model.

Explain the Port Structure & Operation, Timer/Counters, serial Interface & External

Memory.

3. 8051 Addressing Modes & Instruction Set

Explain different addressing modes of 8051.

Explain the different types of Instruction sets of 8051.

Data Transfer

Arithmetic Operations

Logical Operations

Boolean Variable Manipulation

Program Branching

4.8051 Assembly Language Programming Tools.

4.1 Programs using Jump, Loop and Call Instructions

Loop and Jump Instructions

Call Instructions

Time Delay Generation and Calculation

4.2 I/O Port Programming

I/O Programming, Bit manipulation

4.3 Arithmetic Programs

Unsigned Addition and Subtraction

Unsigned Multiplication and Division

Signed number concept and Arithmetic operations

4.4 Logic Programs

Programs using Logic and Compare Instructions

Programs using Rotate and Swap Instructions

BCD and ASCII Application Programs

4.5 Programming using single-bit Instruction

Single-bit Instruction Programming

Programs using Single-bit Operations with CY

Use Instructions which reads the status of input pin and reads internal latch of the output port

4.6 Simple Programs

The addition of 8bit numbers located in two memory addresses

The addition of inputs from 10 different sensors

The determination of the largest temperature value inputted from

A number of temperature sensors

Count the number of sensors which are giving on signals

Write a subroutine that can be used to produced a time delay and which can be set to any value

4.7 Counter / Timer Programming

Programming 8051 Timers

Counter Programming

- 4.8 Serial Communication Programming
 - Basics of Serial communication
 - 8051 Connection to RS232
 - 8051 Serial Communication Programming
- 4.9 Interrupts Programming
 - 8051 Interrupts
 - Programming Timer Interrupts
 - Programming External hardware Interrupts
 - Programming the Serial Communication Interrupt
 - Interrupt Priority in the 8051

5.Peripherals

- 5.1 Define Timers, Counters and Watchdog Timers
 - Pulse width Modulators, LCD Controllers, Keypad controllers
- 5.2 Explain Analog-to-Digital converters
- 5.3 Explain Real- Time Clocks

6. Application of Embedded Systems

- 6.1 Temperature Measuring System
- 6.2 Domestic Washing Machine
- 6.3 Timed Switch
- 6.4 Windscreen-Wiper Motion

7. Programmable Logic Controllers(PLCs)

- 7.1 Draw the block diagram showing the major components of PLC and state each function of each component
- 7.2 Explain the basic operation of PLC
- 7.3 Describe briefly PLC programming
- 7.4 Explain address of inputs, outputs and internal of a PLC
- 7.5 State the difference between a programmable controller and a computer
- 7.6 Explain how a PLC memory is organized
- 7.7 Explain program scan of a PLC
- 7.8 Explain internal instruction of PLC
- 7.9 Program EXAMINE instruction Program a ladder Rung diagram
- 7.10 Program PLC timer
- 7.11 Program PLC as a counter
- 7.12 Understand control instructions of PLC
- 7.13 Understand Data management instruction of PLC
- 7.14 Understand Compute Instruction of PLC
- 7.15 Explain sequences in a program of a PLC
- 7.16 Explain how I/O interface handles numerical data in PLC
- 7.17 Draw the solid state logic control circuit for the following problems and explain
 - a) Motor control circuit to provide sequence control to Motor 1 and Motor 2

REFERENCE BOOKS:

A: TEXT BOOK:

1. Embedded System Frank Vahid & Tony Givaagis.
2. Microcontrollers by Ajaya Deshmukh, TMH.
3. Embedded System by Raj Kamal, TMH.
4. Modern Industrial Electronics Schuher & Mc Name.

B: REFERENCE BOOKS:

Modern Industrial Electronics by Schuler and Mc Namee Industrial Motor Control Fundamentals by Mc Intyre Losee

DIGITAL SIGNAL PROCESSING (Elective)
SIXTH SEMESTER

Theory & Tutorial – 4P/W
Total Theory & Tutorial:60P

Examination: 3Hr
Total Marks: 100
Theory: 80
I.A: 15+5

A: RATIONALE:

Digital signal processing is a technology driven field which dates its growth where Computers and Digital Circuitry became fast enough to process large amount of data efficiently. This subject is concerned with processing discrete-time signals or data sequences. The main objectives of this subject are to provide background and fundamental materials in discrete time system, digital signal processing technique, design procedures of digital filters and discrete Fourier transform.

B: OBJECTIVES:

On completion of the study the students will be able to:

1. Understand signal system & signal processing.
2. Differentiate continuous time & discrete time signals.
3. Explain the concepts of frequency in continuous time, discrete time signals and harmonically related complex exponential.
4. Classify the signals like multi channel, multidimensional, continuous time vs. discrete time signals and continuous valued vs. discrete valued signals.
5. Convert analog signal to digital & vice-versa.
6. State and explain sampling theorem.
7. State and explain quantization of continuous-amplitude signals, sinusoidal signals.
8. Analyze digital signal & system verses discrete time signals & systems.
9. Explain discrete time signals & classify discrete-time signals.
10. Describe discrete time systems will block diagrams, classification & interconnections.
11. Analyze liner invariant systems using different techniques.
12. Describe discrete time system using different equations.
13. Apply Z-transform on LTI systems.
14. Explain discrete Fourier transform, its properties & state its application.
15. Compute first Fourier transform algorithm.

C: TOPIC WISE DISTRIBUTION OF PERIODS:

Sl.No.	Topics	Periods
1.	Introduction	21
2.	Discrete time signals & systems	15
3.	The Z-transform & its application to the analysis of LTI system	12
4.	The Discrete Fourier trans form	12
5.	Fast Fourier Transform & Digital Filters	15
		Total= 75

D: COURSE CONTENTS IN TERMS OF SPECIFIC OBJECTIVES:**1. INTRODUCTION.**

- 1.1 Discuss Signals, Systems & Signal processing.
 - 1.1.1 Explain basic element of a digital signal processing system.
 - 1.1.2 Compare the advantages of digital signal processing over analog signal processing.

1.2 Classify signals

- 1.2.1 Multi channel & Multi dimensional signals.
- 1.2.2 Continuous time versus discrete time.
- 1.2.3 Continuous valued versus discrete valued signals.

1.3 Discuss the concept of frequency in continuous time & discrete time signals.

- 1.3.1 Continuous-time sinusoidal signals.
- 1.3.2 Discrete-time sinusoidal signals.
- 1.3.3 Harmonically related complex exponential.

1.4 Discuss Analog to Digital & Digital to Analog conversion & explain the following.

- 1.4.1 Sampling of Analog signal.
- 1.4.2 The sampling theorem.
- 1.4.3 Quantisation of continuous amplitude signals.
- 1.4.4 Coding of quantized sample.
- 1.4.5 Digital to analog conversion.
- 1.4.6 Quantisation of sinusoidal signals.
- 1.4.7 Analysis of digital systems signals vs. discrete time signals systems.

2. DISCRETE TIME SIGNALS & SYSTEMS.

2.1 State and explain discrete time signals.

- 2.1.1 Discuss some elementary discrete time signals.
- 2.1.2 Classify discrete time signal.
- 2.1.3 Discuss simple manipulation of discrete time signal.

2.2 Discuss discrete time system.

- 2.2.1 Describe input-output of system.
- 2.2.2 Draw block diagram of discrete time system.
- 2.2.3 Classify discrete time system.
- 2.2.4 Discuss inter connection of discrete time system.

2.3 Discuss discrete time time-invariant system.

- 2.3.1 Discuss different technique for the analysis of linear system.
- 2.3.2 Discuss the resolution of a discrete time signal in to impulse.
- 2.3.3 Discuss the response of LTI system to arbitrary I/Ps using convolution theorem.
- 2.3.4 Explain the properties of convolution & interconnection of LTI system.
- 2.3.5 Study systems with finite duration and infinite duration impulse response.

2.4 Discuss discrete time system described by difference equation.

- 2.4.1 Explain recursive & non-recursive discrete time system.
- 2.4.2 Determine the impulse response of linear time invariant recursive system.

3 THE Z-TRANSFORM & ITS APPLICATION TO THE ANALYSIS OF LTI SYSTEM.

3.1 Discuss Z-transform & its application to LTI system.

- 3.1.1 State & explain direct Z-transform.
- 3.1.2 State & explain inverse Z-transform.

3.2 Discuss various properties of Z-transform.

3.3 Discuss rational Z-transform.

- 3.3.1 Explain poles & zeros.
- 3.3.2 Determine pole location time domain behavior for casual signals.
- 3.3.3 Describe the system function of a linear time invariant system.

3.4 Discuss inverse Z-transform.

- 3.4.1 Determine inverse Ztransform by partial fraction expansion.

4 DISCUSS FOURIER TRANSFORM: ITS APPLICATIONS PROPERTIES.

4.1 Discuss discrete fourier transform.

4.1.1 Determine frequency domain sampling and reconstruction of discrete time signals.

4.1.2 State & explain discrete Fourier transformation (DFT).

4.1.3 Compute DFT as a linear transformation.

4.1.4 Relate DFT to other transforms.

4.2 Discuss the property of the DFT.

4.2.1 Discuss periodicity, linearity & symmetry property.

4.2.2 Explain multiplication of two DFT & circular convolution.

5 FAST FOURIER TRANSFORM ALGORITHM & DIGITAL FILTERS.

5.1 Compute DFT & FFT algorithm.

5.2 Explain direct computation of DFT.

5.3 Discuss the radix-2 algorithm. (Small Problems)

5.4 Introduction to digital filters.

5.5 Introduction to DSP architecture, Familazation of different types of processor.

RECOMONDDDED BOOKS:

A . TEXT BOOKS:

1. Digital signal processing principles algorithms & applications by J.G.Proakis & Dimities G. Manolakis, Peason.
2. Digital Signal Processing by Ramesh Babu.

B . REFERENCE BOOKS:

1. Digital signal processing By A.V.Oppenleim & W.Schafer.
2. Digital Signal Processing by S Salivahanan, A Vallavaraj, C Gnanapriya Tata Mc Graw Hill.
3. Digitaisation by B.Somanath Nair, PHI.

ROBOTICS AND AUTO ELECTRONICS(Elective)
SIXTH SEMESTER

Theory & Tutorial – 4P/W
Total Theory & Tutorial:60 P

Examination: 3Hr
Total Marks: 100
Theory: 80
I.A: 15+5

A: RATIONALE:

This course Robotics & Auto Electric is necessary to understand the basic theory of Robotics will play a important role in industrial sector now a days.

B: OBJECTIVS:

On completion of the study the students will be able to:

- Know Basic configuration of Robotics & its working.
- Know Robot Control & Motion Analysis
- Know about programming.
- Know application & Auto Electric.

C: TOPIC WISE DISTRIBUTION OF PERIODS:

Sl.No	Topics	Periods
1.	BASIC CONFIGURATION OF ROBOTICS AND ITS WORKING	12
2.	ROBOT CONTROLLER, SERVO SYSTEMSL	12
3.	ROBOT MOTION ANALYSIS	12
4.	ROBOT PROGRAMMING	12
5.	ROBOT APPLICATION IN MANUFACTURING AND AUTO ELECTRONICS	12
	TOTAL	60

D: TOPIC WISE DISTRIBUTION OF PERIODS:**1. BASIC CONFIGURATION OF ROBOTICS AND ITS WORKING:**

Introduction-definition-basic configuration of robotics and its working-robot components-mainpulator, end effectors, drive system, controller, sensors-mechanical arm –degrees of freedom-links and jhoints-construction of links, types of joint-classification of robots – Cartesian, cylindrical, spherical, horizontal articulated (SCARA), vertical articulated-structural characteristics of robots-mechanical rigidity-effects of structure on – control work envelope and work volume – robot work volumes and comparison-wrist rotations-mechanical transmission, pulleys, belts, gears, harmonic drive-conversion between linear and rotary motion and its devices.

2. ROBOT CONTROLLER, SERVO SYSTEMSL:

Robot controller – level of controller – open loop and closed loop controller-servo systems – microprocessor based control system – robot path control –point to point –continuous path control – sensor based path control – controller programming – actuators – dc servo potentiometers – optical encoders – dc tachometers.

3. ROBOT MOTION ANALYSIS:

Robot motion analysis – robot kinematics – robot dynamics – end effectors – grippers and tools – gripper design – mechanical gripper – vacuum gripper – magnetic grippers – sensors – transducers – tactile sensors – proximity sensors and range sensor – force and moment sensors and its applications

and problems – photoelectric sensors – vision system – image processing and analysis – robotic applications – robot operation aids – teach pendent – MDI and computer control.

4. ROBOT PROGRAMMING:

Robot programming – lead through methods and textual robot languages – motion specification – motion interpolation – basic robot languages – generating of robot programming languages – On – Line & Off-Line programming – robot language structure – basic commands – artificial intelligence and robotics.

5. ROBOT APPLICATION IN MANUFACTURING AND AUTO ELECTRONICS:

Robot application in manufacturing – material handling – assembly finishing – adopting robots to work station – requisite and non – requisite robot characteristics – stages in selecting robot for individual application – precaution for – future of robotics. Sensor for fuel level in tank- engine cooling water temperature sensor – engine oil pressure sensor – speed sensor – air pressure sensor – engine oil temperature sensor – oil pressure warning system – engine over heat warning system – air pressure warning system – speed warning system – door lock indicators.

BOOKS:

1. Introduction Robotcn by Sala.
2. Mechatronics by R.K.Rajput, Schand.

**NANO TECHNOLOGY(Elective)
SIXTH SEMESTER**

Theory & Tutorial – 4P/W
Total Theory: 60P

Examination: 3Hr
Total Marks: 100
Theory: 80
I.A: 15+5

A: RATIONALE:

Nanoscience and nanotechnology refer to the control and manipulation of matter at nanometer dimensions. The best eco-friendly and efficient processes must learn from nature. When we explore life around us, it is found that organization of nonmaterial is central to biology. Architectures made by organisms are all based on nanoassemblies. Today we know that it is possible to use biological processes to make artificial nanostructures. Chemically synthesized nanostructures have been used at various stages of civilization.

B: OBJECTIVES :

On completion of the study the students will be able to:

- Know the concept of Nanotechnology.
- Know the idea of Nanoscale & Fullerenes.
- Know the idea of Nanotubes, Nanoshell, Nanosensor, Nanomedicine.

C: TOPIC WISE DISTRIBUTION OF PERIODS :

Sl.No.	Topics	Periods
1.	Introduction of Nano	06
2.	Investing and manipulating Materials in the Nanoscale	08
3.	Fullerenes	08
4.	Carbon Nanotubes	08
5.	Self-assembled Monolayer	06
6.	Semiconductor Quantum Dots	06
7.	Nanoshells	06
8.	Nanosensors	06
9.	Nanomedicines	06
	TOTAL	60

D: COURSE CONTENT IN TERM OF SPECIFICATION**1. Introduction of Nano**

1. Why nanotechnology?
2. What are the connections between nanotechnology and biology?
3. What are wet and dry nanotechnologies?
4. What are the historical landmarks in this area?

2. Investing and manipulating Materials in the Nanoscale

Explain the working of electroproduction Microscopies & what does SEM contain.

Explain the concept of Optical Microscopies for Nanoscience and Technology

Explain about X-Ray Diffraction

3. Fullerenes

What is fullerenes and what are their properties?

Explain Synthesis and Purification of Fullerenes

Explain Pressure Effects

Explain Conductivity and Superconductivity in Doped Fullerenes

Explain Optical Properties.

4. Carbon Nanotubes

Define carbon Nanotubes.

Explain Synthesis and Purification

Explain Filling of Nanotubes

Explain Electronic Structure of Carbon Nanotubes & its properties.

What are its Applications

5. Self-assembled Monolayers

What are the various kind of Monolayers.

Explain the structure of Monolayers on Gold

Describe Growth Process

What are Phase Transitions & explain its types.

What is SAMS and its Applications

Define difference type of sensor.

6. Semiconductor Quantum Dots

What are Quantum Dots.

Explain the Synthesis of Quantum Dots & its properties.

Explain Electronic Structure of Nanocrystals

How Do We Study Quantum Dots?

Explain Correlation of Properties with Size

What are its Uses

7. Nanoshells

What are various nanocavity system & give its properties, characteristics & applications.

Name different Types of Nanoshells

Why Nanoshells are made over Dielectric material & nonmetallic Particles.

8. Nanosensors

What is a Sensor?

What are Nanosensors-What Makes Them Possible?

Explain the Order from Chaos-Nanoscale Organization for Sensors

Explain Electrochemical Sensors

Define Sensors Based on Physical Properties

Explain Nanobiosensors-A Step towards Real-time Imaging and Understanding of Biological Events

9. Nanomedicines

Describe the Approach to Developing Nanomedicines

What are the Various Kinds of Nanosystems in Use

Explain Protocols for Nanodrug Administration

Explain Nanotechnology in Diagnostic Applications

Explain Materials for Use in Diagnostic and Therapeutic Applications

BOOKS:

A: TEXT BOOKS:

1. NANO: The Essentials by T.Pradeep, TMH.
2. Nanotechnology by Mark Ratner & D. Ratner, Pearson.

B: RECOMMENDED BOOKS:

1. Nanotechnology by Rakesh Rathi, Schand.

DIGITAL IMAGE PROCESSING (Elective)
SIXTH SEMESTER

Theory & Tutorial – 4P/W
Total Theory & Tutorial: 60P

Examination: 3Hr
Total Marks: 100
Theory: 80
I.A: 15+5

A: RATIONALE:

Digital Image Processing is used for image processing system in day to life. The transforms, enhancement, restoration, segmentation & recognition of images are used for analysis of different images. The data compression technique is also essential for Digital image processing system. This subject helps for remote sensing and digital satellite communications and other fields of electronic and information technology.

B: OBJECTIVES:

On completion of the study the students will be able to:

1. Understand data compression and various thnics.
2. Define Gray level transformation of images.
3. Know techniques of image enchantment, image compression, image segmentation etc.
4. Know elements of image processing system.
5. Know applications of digital image processing.
6. Define object recognition.
7. Understand binary image processing.

C: TOPIC WISE DISTRIBUTION OF PERIODS:

Sl.No.	Topics	Periods
1	INTRODUCTION TO IMAGE PROCESSING SYSTEM	06
2	DTAT COMPRESSION	09
3	FUNDAMENTALS OF IMAGE PROCESSING	15
4	IMAGE ENHANCEMENT	15
5	IMAGE COMPRESSION	15
6	IMAGE SEGMENTATION	15
Total=		75

D: COURSE CONTENT IN TERM OF SPECIFICATION:**1. INTRODUCTION TO IMAGE PROCESSING SYSTEM.**

- Define image sampling and quantisation.
- Define classification of digital images.
- Define application of digital image processing.
- Define wave let based image processing.

2. DATA COMPRESSION:

- 2.1 Define Data Compression
- 2.2 Explain Minimum Redundancy Coding, Shannon Fano Algorithm, Huffman

Algorithm,

- 2.3 Explain Adaptive Huffman Coding – Updating, Swapping, Enhancement, Escape Code, Overflow, Rescaling,
- 2.4 Explain Arithmetic Coding.
- 2.5 Dictionary Based Compression – Static Vs Adaptive,
- 2.6 Define Speech Compression & Sampling Variables.
- 2.7 Explain Lossless Compression, Lossy Compression, Silence Compression

3. FUNDAMENTALS OF IMAGE PROCESSING:

- 3.1 What Is Image Processing
- 3.2 What are the Fundamental Steps in Digital Image Processing
- 3.4 Explain Image Acquisition Using Array Simple Image Fundamentals
- 3.5 Explain Image Sampling And Quantization.
- 3.6 Define Relationships between Pixels

4. IMAGE ENHANCEMENT:

What is image enhancement?

Define Gray Level Transformation. (Image Negatives, Log Transformations, Power Law Transformations, Piecewise Linear Transformation Functions)

Define Histograms Processing.

Explain Enhancement Using Arithmetic/Logic Operations.

Explain Image arithmetic (Subtraction, Averaging)

Special Filtering

5. IMAGE COMPRESSION:

Need of Image compression.

Define Basic of color Image Processing.

Define Color Transformation & Smoothing and Sharpening.

Define Coding Redundancy, Interpixel Redundancy, Psychovisual Redundancy.

What are the images Compression Models?

Define The Source Encoder And Decoder

6. IMAGE SEGMENTATION:

Define Morphological Image Processing – Dilation And Erosion.

Define Basic Morphological Algorithms.

What is detections.

What are Detection Of Discontinuities.

What are the methods Point Detection, Edge Detection.

TEXT BOOKS:

1. Rafael C.Gonzalez And Richard E Woods – Digital Image Processing – Second Edition, Pearson Education Pvt. Ltd, New Delhi.
2. Jayaraman; Digital Image Processing TMH (2009)

REF. BOOKS:

1. Marks Nelson And Jean Loup Gailly – The Data Compression Book – Bpb Publications Second Edition,
2. Fundamental of Digital Image Processing by A.K. Jain, PHI

ADVANCE COMMUNICATION LAB.

Period / Week: 4 P/W
Total Contact hrs:60 P

End Exam.: 25
Sectional: 25
Exam. Time: 4 Hours

A: RATIONALE:

In this Lab. The student will know the operation & application of rader trainer, Satelite Trainer, Optical Fiber kit Trainer & EPABX Trainer for various communication Technology including mobile communications.

B: OBJECTIVS:

On completion of this Lab the students will be able to:

- Setup & Know the Optical Fiber Link including analog & digital.
- Measure the losses of Optical Fiber.

C: COURSE CONTENT:

1. Setting up a fiber optic analog & digital link including source & dectctor.
2. Study of losses in Optical Fiber:
 - a. Measurement of propagation loss.
 - b. Measurement of bending loss.
 - c. Measurement of connector loss.
 - d. How connector loss is affected by fiber and quality.
3. Measurement of Numerical aperature.
4. Setting of AM, FM, PWM, Modullator & Demodulator using optical fiber kit.
5. Study the following experiments using EPABX Trainer Kit.
 - a) To study extension to extension call pickup, direct onward dialing, autocall back, auto attendant, dynamic looking, last extension redial, conference call , call forward, simultaneous ringing, pulsing on trunk, follow me tone and DTMF dialing, Messages on hold, extension baring, trunk baring, caller id for extension to extension & trunk lines, individual memory, clobal memory, call waiting call conference
 - b) Study of speech circuit using IC and its interface to line, pulse/tone dialing
 - c) Study to subscriber ringing generation circuit and interface to the line.
 - d) Study of telephone instrument trainer with caller id facility
6. Study of satellite communication Trainer Kit:
 - a. To setup active & passive satellite communication link.
 - b. To study uplinking and downlinking of satellite signals.
 - c. To analyze the analog baseband (Voice & Video) Signals in asatellite link.
 - d. To study the digital baseband signals in a satellite link.
 - e. To setup an analog FM/FDM satellite link.
7. Study of Rader Trainer Kit.
 - a. Study of Doppler shift in Radar.

- b. Speed detection & multiple reflections from object.
 - c. To find out the Time period and frequency of a moving pendulum for different heights.
 - d. To measure the size of moving objects using Radar.
 - e. To measure the distance traveled by moving a object.
8. Study of mobile communication Trainer Kit.
9. Study of ISDN Trainer Kit.
- a. Basic Rate ISDN exchange with Protocol with Protocol Analyzer.
 - b. ISDN Telephone sets.
 - c. ISDN Terminal Adaptors.
 - d. Analog Telephone sets.
10. Visit to Telephone Exchange / Mobile Network / earth station / Rader Station.

VI/SEM/ETC/PR-2

MICROCONTROLLER & EMBEDDED SYSTEM PLC LAB
SIXTH SEMESTER

Theory & Tutorial – 4P/W
Total Theory & Tutorial: 60P

End Examination: 4Hrs
Sessional : 25
Examination: 25
I.A: 15+5

A: MICROCONTROLLER:

1. Write a Simple Assembly Programs for
 - a. Addition b. Subtraction b. Multiplication d. Division
2. Write a Program for
 - a. Bit Digital Output-LED Interface
 - b. 8 Bit Digital Inputs (Switch Interface)
3. Write a Programs for
 - a. 4 x 4 Matrix Keypad Interface
 - b. Buzzer Interface
 - c. Relay Interface
4. Write a Program for character based LCD Interface.
5. Write a Program for Analog to Digital Conversion (On chip ADC)
6. Write a Program for I²C Device Interface.
 - a. Serial EEPROM
 - b. Seven Segment LED Display Interface
 - c. Real Time Clock.
7. Interfacing With Temperature Sensor.
8. Stepper Motor Interface

B: EMBEDDED SYSTEM: HANDS ON EXERCISE BASED ON RTOS.

9. To Study and Implement Multitasking. Write a Simple Program with Two Separate LED Blinking Tasks.
10. Study and Implement Priority Scheduling and OS Time Delay Functions by writing 3 different UART Transmitting Tasks.
11. Implement OS Real Time Multitasking by writing a multitasking program with the tasks.
 - a. Interface RTC and Display on LCD First Line Continuously.
 - b. Interface ADC and Display on LCD second line continuously.
12. Implement OS Real Time Multitasking by implementing three tasks.
 - a. Read the Key input and display on seven segment LED
 - b. Read the ADC analog input and Plot the Corresponding signal on a graphical LCD.
 - c. Generate a PWM single with Xon Time and Yoff Time.

13. Interface a Stepper motor and control the speed of rotation by implementing RTOS delay functions.

C: Programming PLC

- Introduction to ladder diagram
- Communication between PLC and pc
- a Single motor on / off control
- b Interlock control of two motors
- c water level control with three sensors
- d Three speed control of a motor
- e Timer on –delay / off-delay of a motor

VI/SEM/ETC/PR-3

ELECTIVE Lab. SIXTH SEMESTER

Theory & Tutorial – 3P/W
Total Theory & Tutorial: 45P

End Examination: 4Hrs
Sectional : 25
Examination: 25

N.B.: The students have chose any one of Laboratory.

A: ROBOTICS LAB(ELECTIVE PRACTICAL)

1. Robot system connection and component recognition.
2. Robot operation, moving the various axis continuous and intermittent motion.
3. Write programs off-line
 - a. Homing operation
 - b. Recording positions
 - c. Writing programs for pick and place at least five programs.
4. Continue writing programs off-line with score base levels.
5. Use of loops and subroutines with programs.
6. Programs using XYZ Coordinates.
7. Teaching positions via XYZ co-ordinates.
8. Measurement of Robot characteristics.
 - a. Measurement of Robot work envelop.
 - b. Measurement of Robot of motion.
 - c. Measurement of Repeatability.
9. Study of Vision system in robot.
10. Use of Vision system for pick and place programming.
11. Practicals connected with various Transducer.
12. Practicals connected with various solecoid.
13. Practicals connected with Photo sensor.
14. Practicals connected with proximity switch.
15. Practicals connected with stepper motor.

B: DIGITAL IMAGE PROCESSING (ELECTIVE Lab.)

1. Write a program to add two 16 bit numbers.
2. Write a program to subtract two 16 bit numbers.
3. Write a program to multiply two 16 bit numbers.
4. Write a program to glow LEDs by selecting switches.
5. Write a program to read an analog input using analog to digital converter in start stop mode.

6. Write a program to read an analog input using ADC in continuous conversion mode using ADC Interrupt.
7. Write a program to generate a three phase fixed pwm using event manager.
8. Write a program to generate a three phase fixed pwm using event manager.
9. Write a program to generate a Fixed Sine PWM.
10. Write a program to generate pwm and vary the frequency of PWM using Potentiometer.
11. Write a program to vary the speed of DC motor by vary the duty cycle of PWM and tabulate the speed of the motor with respect to Duty cycle.

EQUIPMENT REQUIRED

1. 2407 DSP Kit,10Nos.

VI/SEM/ETC/PR-4

**MAINTENANCE & COMPUTER DIAGNOSIS LAB
SIXTH SEMESTER**

No. of Periods :3 P/W
Total Periods: 45P

Exam. : 4Hours.
Sessional :25
Examination :25

1. Switches, Indicators and connectors of PC: Identification of front panel indicators and switches in a computer system of table top/tower case model and also identification of rear side connectors.
2. PC system layout: Draw a Computer system layout and Mark the positions of SMPS, Mother Board, FDD, HDD, and CD-Drive / DVD-Drive add on cards in table top/tower models systems.
3. Mother Board Layout: Draw the layout of Pentium IV or Pentium Dual core or Pentium Core2 DUO mother board and mark Processor, chip set ICs. RAM, Cache, Xtal, cooling fan, I/O slots and I/O ports and various jumper settings.
4. CMOS Setup Program:
 1. Changing the Standard settings.
 2. Changing advanced settings (BIOS and Chipset features)
5. Installation of FDD:
 1. Install and configure an FDD in a computer system.
 2. Floppy drive diagnostics/servicing.
6. USB pen drives and I-pods.
 1. Connect and enable a pen drive or I-pod to HDD.
 2. Format the pen drive or I-pod.
 3. Copy files and folders from pen drive I-pod to HDD.
 4. Copy files and folders from HDD to pen drive or I-pod.
7. HDD Installation:
 1. Install the given HDD.
 2. Configuration in CMOS-Setup program
 3. Partition the HDD using fdisk.
 4. Format the Partitions.
8. Printer Installation & Troubleshooting:
 1. Installing and checking a Dot-Matrix Printer.
 2. Installing and checking an Ink jet / Laser Printer.
 3. Possible problems and troubleshooting.
9. Modem Installation:
 1. Install and configure a Modem in a windows PC.
 2. Check the working condition of modem with pc.
10. DVD Multi-recorder drive installation:
 1. Install a DVD Multi-recorder drive in a PC.
 2. Configure using device driver.

3. Check the read / write operation using a cd / dvd.

11. Installation of Scanner:

1. Connect the given scanner with a PC.
2. Configure the scanner with driver.
3. Check the scanner by scanning a page / a portion in a page.

12. Familiarize: Scandisk, recent Anti-virus software and recent PC Diagnostic software.

13. Assembling a PC: Assemble a Pentium IV or Pentium Dual Core Pentium Core2 Duo System with necessary peripherals and check the working condition of the PC.

14. Install and Configure Windows NT2003 operating system in a PC.

15. Construct Network by connecting one or two computer with a Windows NT2003 Server.

16. Install and Configure LINUX operating system in a PC.

17. Construct Network by connecting one or two computer with a LINUX Server.

18. Configure the network by connecting one or two computer with a LINUX Server.

19. Add / Remove devices using Hardware Wizard.

20. Add and Manage User Profile, Set permission to the users both in Windows NT 2003 / LINUX.

N.B. DIAGONIS SOFTWARE WILL BE USE FOR MAINTAINANCE OF COMPUTER

EQUIPMENT REQUIRED

Sl.No.	Name of the Equipments	Range	Required Nos.
1	Pentium IV		5
2	Pentium Dual Core		2
3	iPod		4
4	USB Pen Drive		4
5	Printer Inkjet / Laser		2
6	DVD RW		5
7	Scanner		1
8	Windows server 2003		1
9	Linux		1
10	DIAGONIS SOFTWARE		1

**SIMULATING USING MATLAB
SIXTH SEMESTER**

Period / Week: 3 P/W
Total Contact hrs:45 P

End Exam.: 25
Sectional: 25
Exam. Time: 4 Hours

- 1.1 Introduction to MATLABS & its various instructions.
- 1.2 Program for Representation of Basic Signals (Unit impulse, Unit step, Ramp, Exponential, Sine, Cosine)
- 1.3 Program for Discrete Convolution (Linear Convolution, Circular Convolution)
- 1.4 Program for Sampling Theorem
- 1.5 Program for Fast Fourier Transform
- 1.6 Program for Butterworth Analog Filters(Low pass, High Pass, Band Pass, Band stop)
- 1.7 Program for amplitude modulation
- 1.8 Program for frequency modulation

BOOK:

1. Electrical & ETC Lab. Practical – S.S.Panda.

PROJECT WORK
SIXTH SEMESTER

Theory & Tutorial – 4P/W
Total Theory & Tutorial: 60 P

End Examination: 4Hrs
Sectional : 50
Examination: 50

A: RATIONALE:

The Project work is intended to integrate the knowledge, skills and attitudes developed after completion of subjects for developing competency in a particular specialized job. In this activity the role of teachers is a facilitator or co-ordinator. The student will select a topic, perform design work, place the indents and get the raw materials either from the department or from the local market and implement the design. The leadership quality, coordination of job and maintaining a good communal harmony is important factor of activity. It is the process, which is to be evaluated along with students knowledge and their dedication. The success of the project is no doubt the goal but the group activity will also be critically evaluated.

B: OBJECTIVS:

On completion of the Project Work the students will able to:

1. Select a suitable project work.
2. Design the job.
3. Prepare job schedule.
4. Select and Indent the materials.
5. Procure material.
6. Exhibit co-opertative attitude towards the peer group.
7. Develop leadership.
8. Develop cost awareness.
9. Develop attitude for proper utilization of time.
10. Develop marketing strategies.
11. Develop quality consciousness.

C: COURSE CONTENT:

1. The students should be divided into group of 4 or 5 students. Each faculty should guide one group & he should that act as project guide. The students should select the projects of advanced topic of their own choice (Hardware /Software) in consultation with project guide.
2. The sessional records should be maintained and evaluated by a team of faculty members and the final marks awarded by the team.
3. In the end examination, a team of External Examiners and Internal examiner will evaluate students.
4. Suggested Project activity.

The Project Work:

1. A practical project needs to be taken . The steps involved in the project work are:
 - a. Identification of the project.
 - b. Problem definition.
 - c. Gathering information / Data needed for the project.
 - d. Selection of best solution.
 - e. Selection and collection of suitable material .
 - f. Planning and fabrication.
 - g. Testing.
 - h. Preparing a detailed project report.

2. The Project report should have the following features.

- a. Introduction.
 - b. Name and feature of the project
 - c. Block diagram of the project.
 - d. Circuit diagram and its brief descriptin
 - e. Flow chart
 - f. Components layout.
 - g. Printed circuit pattern or layout diagram of the circuit.
 - h. Front panel and cabinet drawing.
 - i. Components list
 - j. Cost estimation of the project
 - k. Power Supply.
 - l. Testing points and waveforms if any
 - m. Operation and maintence procedure
 - n. Suggestion for improvement if any
 - o. Operation and maintenance procedure.
 - p. Electrical safty information
 - q. Electrical safty information
3. The internal and final evaluation marks have to be awarded on the basis of the above features along with viva-voce at the end.
 4. Evaluation based on:
 - a. Work done during Semester for Project.
 - b. Testing & Working of Project.
 - c. PPP Seminar Presentation.

5. Students may be adviced to do the project in the following related areas.

A: Minor project (at least any two projects)

Develop a power supply related project.

- (a) Develop a simple IC based project.
 - (b) Develop a simple Audio power project.
 - (c) Develop an RF related project.
 - (d) Develop a simple Electronics Chime / Sound generation Circuit.
- Develop any protective Circuit.

(e) Develop any Telephone System /Communication system related project

(f) Preparation of PCB.

N.B.: The Minor project must be course related .

B: Major project (at least any one projects)

a. The project based on Following topics

- Microcontroller Based
- Power Electronics & Industrial Control based.
- Communication / Mobile / Satellite based.
- Robotics Based.
- Mechatronics Based
- Embedded System Based
- Industrial Application Based

N.B : Any other Project may also be carried out in consultation with the Project guide as per suitability. Each project report must contain the technical data of live components i.e. Transistor., ICs etc and pin diagrams of the such devices, PCB layout diagram & component layout diagram etc.