Semester 8

B. Tech 4th year (8th Semester) Mechatronics

Course No.	Course Title	Teaching Schedule				Allotment Marks				Duration of Exam
		L	T	P	Total	Sessional	Theory	Practical	Total	
MT-402	Data Communication Systems	3	1	-	4	50	100	-	150	3
MT-404	Digital System Design	3	1	-	4	50	100	-	150	3
MT-406	Sound and Noise Control	3	1	-	4	50	100	-	150	3
	Elective III*	3	1	-	4	50	100	-	150	3
	Elective IV*	3	1	-	4	50	100	-	150	3
MT-408	Data Communication Systems Lab	-	-	3	3	25	-	25	50	3
MT-410	The Professional Engineer (Project 2)	-	-	9	9	100	-	100	200	3
MT-412	Digital System Design lab	-	-	3	3	25	-	25	50	3
MT-414	Comprehensive viva	-	-	-	-	50	-	-	50	
MT-416	General Fitness and Professional aptitude (viva-voce)	-	-	-	-	-	-	75	75	
	Total	15	5	15	35	450	500	225	1175	

Students are allowed to use single memory, non-programmable scientific calculator during examination.

ELECTIVE - III

1. MT 418 Non Conventional Manufacturing
2. MT 420 Industrial Robotics
3. MT 422 Manufacturing Management
4. MT 424 Fuzzy Logic & Neural Networks

ELECTIVE - IV

1. MT 426 Management Information System
2. MT 428 Automatic controls
3. MT 430 Digital Image Processing
4. MT 432 Digital Hardware Design

MT - 402
Data Communication Systems

L	T	P
3	1	-

Sessional: 50 Marks
Theory: 100 Marks
Total: 150 Marks
Exam Duration: 3 Hours

Unit 1

Information Theory Concepts: Information source, encoder, transmitter, channel/medium, receiver, decoder and information sink. Information sources, DMS, Entropy, Types of channels, Channel capacity, Capacity of AWGN channels. Conditional and Joint Entropy, Relationship among different entropies,

Source Encoding Techniques- Shannon-Fano coding, Huffman minimum redundancy coding, Conditional and Joint Entropy, Relationship among different entropies, Source coding techniques- Shannon-Fano coding, Huffman minimum redundancy coding.

Unit 2

Flow & Error Control Techniques: Generation and detection of coded signals, Types of Error control strategies-Forward error correction & ARQ, Transmission errors-random and burst error; Error detection methods- Parity checking, Checksum error detection& Cyclic redundancy check. Classification of error control codes-Block code, Convolution code.

Unit 3

Digital Modulation Techniques: ASK,BPSK BFSK,QPSK, MSK , Error probability in BPSK and BFSK,MSK, Error probability in MSK, PCM, Probability of error in PCM system, calculation of signal-to-noise ratio. Classification of noise, calculation of Noise temperature, signal to noise ratio &Noise figure, Performance of receiver in presence of AWGN.

Unit 4

Cellular systems: mobile radio. Overview of communication networks, mobile communications, Cellular Concept, Frequency Reuse, Multiple access technologies TDM, FDM CDMA and OFDM. Trunking and Grade of Service, Cell Splitting and Sectoring, Doppler Spread, Multipath Fading.

Text /Reference Books:

1. F. M. Reza, Information Theory, McGraw Hill.
2. D.C.Aggarwal, Satellite Communications, Khanna Publishers.
3. Theodore S.Rappaport, Wireless Communications Principles and Practice, IEEE Press, Prentice Hall.
4. Simon Haykin, Communication systems, John Wiley & Sons.
5. Sanjay Sharma, Communication Systems, Kataria Sons.

Note:-

Examination :- The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Assignment :- Assignment based upon learning outcomes, as mention below, will be set by lecturer where the student will be required to achieve the LO's as mentioned below. The assessment of assignment will be done based upon the learning made by the student.

Learning outcomes(LO's)

1) Demonstrate systematic understanding of data communication techniques and Systems.	Knowledge & Understanding
2) Apply appropriate analytical techniques to critically evaluate communication Processes and systems.	Analysis
3) Use simulation models and the key analytical skills to critically evaluate results And relate them to theory.	Application
4) Communicate ideas effectively.	Communication

MT - 404
Digital System Design

L	T	P
3	1	-

Sessional: 50 Marks
Theory: 100 Marks
Total: 150 Marks
Exam Duration: 3 Hours

UNIT-I

DESIGN FOR: Testability, Estimating Digital System Reliability, Transmission lines, Reflections and Transmissions,

COMBINATIONAL CIRCUIT DESIGN: Timing hazards, Static hazards using Maps, Dynamic hazards, Designing hazards free circuits, Barrel shifter design, Simple Floating point encoder

UNIT-II

CLOCKED SYNCHRONOUS STATE MACHINE ANALYSIS: Clocked Synchronous state Machine Design, Designing state machine using state diagram, State machine synthesis using transition lists , State machine design examples, Decomposing State machine, feedback Sequential Circuits, feedback Sequential Circuit design

UNIT-III

SYNCHRONOUS DESIGN METHODOLOGY: Synchronous system structure, Impediment to Synchronous Design, Synchronizer failure and Meta-stability.

UNIT-IV

Finite State Machine, PLD, and FPGA : Finite State Machine: Describe the sequential behavior using a FSM, Example of FSM, Convert a finite state machine to a Controller: a sequential circuit having a register and combinational logic, analytical modeling of Moore and Mealy machine, Introducing Key Symbols used in PLD Design, Programmable Read Only Memory (PROM), Programmable Logic Arrays (PLA), Programmable Array Logic (PAL) or Generic Array Logic (GAL).

TEXT BOOKS:

1. Digital Logic, Applications and Design, J. M. Yarbrough (1997) West Publishing, ISBN 0-314-06675-6.
2. Contemporary Logic Design, R. H. Katz (1994) Benjamin/Cummings, ISBN 0-805-32703-7.

Note:-

Examination :- The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Assignment :- Assignment based upon learning outcomes, as mention below, will be set by lecturer where the student will be required to achieve the LO's as mentioned below. The assessment of assignment will be done based upon the learning made by the student.

Learning outcomes(LO's)

1) design and implement small scale, medium scale and programmable logic devices Applying logic minimisation techniques using boolean algebra, karnaugh maps, function Generators and quine-mccluskey algorithm.	Analysis and Application
2) design digital systems using synchronous sequential logic to implement moore & mealy Type state controllers applying state & logic minimisation techniques using state Reduction & state allocation methods.	Analysis and Application Knowledge & Understanding
3) demonstrate an understanding of advanced logic implementation using fpgas and vhdl Programming language.	Knowledge & Understanding Learning

MT - 406

Sound and Noise Control

L	T	P
3	1	-

Sessional: 50 Marks
Theory: 100 Marks
Total: 150 Marks
Exam Duration: 3 Hours

UNIT-I

Review of sound propagation theory and terminology: Introduction, sound waves, speed of sound waves, amplitude and intensity of sound waves, decibels, sound intensity levels, sound propagation, sound measurement, frequency and frequency bands, complex noise patterns and octave bands, acoustics, psycho acoustics, thresh hold of hearing, loudness, pitch, masking, frequency weighting, types of noises, Noise control: administrative control, engineering control, personal protective devices, employee responsibility, management responsibility, advantages and disadvantages of different protective devices, Physiology of hearing, hearing conservation, problems of noise pollution, impact of noise on human, impact of noise on vegetation, impact of noise on animals, impact of noise on property.

UNIT-II

The human ear, sound measurement, Effect of noise on hearing, mechanism of hearing and Hearing Damage Potential to sound energy, effects of noise on hearing: Non-auditory and Auditory effects, Methods of measuring sound, block diagram of sound level meter, Working of sound level meter, Basic parameters of sound, properties of sound, principle of superposition, interference and diffraction.

UNIT-III

Noise and vibration: whole body vibration, controlling vibration risks, control measures, hand arm vibrations, ways to reduce vibrations, active vibration control, passive vibration control, industrial noise control. Effects of noise on task performance, Community reaction to noise and the likely effects of introducing a new noise source to a community environment, concept of soundscape..

UNIT-IV

Legal criteria regulations and international standards relating to sound and noise control using ISO(1999) and Occupational Safety and Health Administration (OSHA), beneficial and diagnostic aspects of sound measurements and control, audiometric test, standard threshold shift, benefits of taking audiometric test.

Text Books/ Reference Books

- L Bernak and I Ver (1992) Noise and Vibration Control Engine e ring: Principle s and Applications,John Wily, ISBN 0-471-61751-2
- D A Bies (2002), Engine e ring Noise Control, Spoon press, ISBN 0-419-20430-X
- B S Smith, R J Peters and S Owe n (1996), Acoustics and Noise Control, Addision-Wesley, ISBN058088646

Note:-

Examination :- The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Assignment :- Assignment based upon learning outcomes, as mention below, will be set by lecturer where the student will be required to achieve the LO's as mentioned below. The assessment of assignment will be done based upon the learning made by the student.

Learning outcomes(LO's)

1) Use a so und pressure level meter to obtain measurements in a noisy environment, And will be able to critically interpret results.	Knowledge & Understanding
2) Using mathematical modelling, predict so und pressure levels and community Reaction to noise in arrange of circumstances, making due allowance for the Surrounding surfaces and their acoustic properties, and critically appraise the Limitations of their predictions.	Application Knowledge & Understanding
3) Propose and/or implement noise control procedures in a problem situation Through a real 'case study' and present the results of their work.	Application Enquiry

MT - 408

Data Communication System lab

L	T	P
-	-	2

Sessional Work: 25 Marks
Examination: 25 Marks
Total: 50 Marks
Duration of Exam: 3 Hrs

NOTE:

1. At least ten experiments/ jobs are to be performed/ prepared by students in the semester.

2. At least 8 experiments/ jobs should be performed/ prepared from the below list, remaining 2 may either be performed/ prepared from the above list or designed & set by the concerned institution as per the scope of the syllabus of Data Communication System and facilities available in the institute.

3. For Learning outcomes refer to Data Communication System (MT-402).

List of Experiments

1. Simple Mathematical operations using MATLAB.
2. Write a program using MATLAB to implement Sampling theorem for all Nyquist conditions.
3. Write a program using MATLAB to compute self information content of message with given probability of occurrence & also compute entropy of the given source.
4. Write a program using MATLAB to compute joint, marginal & conditional entropies from given joint probability matrix & verify the relation between them.
5. Write a program using MATLAB to plot BER curves for BPSK, QPSK & QAM digital modulation techniques.
6. Write a program using MATLAB to plot Time division multiplexed & demultiplexed signal.
7. Write a program using MATLAB to implement BPSK modulation technique in communication systems.
8. To detect & correct single bit error in linear block codes using inbuilt functions
9. To transmit a multiplexed output of different frequency message signals through a Single channel using TDM system and recover back the original message signals on kit.
10. To convert an analog signal into a pulse digital signal using PCM system and to convert the digital signal into analog signal using PCM demodulation system on kit.
11. To modulate & demodulate signal using BPSK technique on kit.

Text /Reference Books:

1. F. M. Reza, Information Theory, McGraw Hill.
2. D.C.Aggarwal, Satellite Communications, Khanna Publishers.
3. Theodore S.Rappaport, Wireless Communications Principles and Practice, IEEE Press, Prentice Hall.
4. Simon Haykin, Communication systems, John Wiley & Sons.
5. Sanjay Sharma, Communication Systems, Kataria Sons.

The Professional Engineer (Project-2)
MT 410

L	T	P/D	Total
-	-	9	9

Theory : 100 marks
Sessional : 100 marks
Duration of Exams. : 3 hrs

The student is expected to finish the remaining portion of the project.

The project will be practical and investigative, requiring the student to investigate the existing background, theories and knowledge as applied to a problem in the design and/or operation of an existing or new process or product. By practical measurement, design, implementation and above all, creativity, the student will arrive at a solution based on sound engineering principles. The project will be integrative, deploying and extending the range of skills and knowledge previously and concurrently developed.

MT - 412
Digital System Design Lab

L	T	P
-	-	3

Sessional: 25 Marks
Practical : 25 Marks
Total: 50 Marks
Duration of Exam: 3 Hrs

NOTE:

1. At least ten experiments/ jobs are to be performed/ prepared by students in the semester.

2. At least 8 experiments/ jobs should be performed/ prepared from the below list, remaining 2 may either be performed/ prepared from the above list or designed & set by the concerned institution as per the scope of the syllabus of Digital Systems and facilities available in the institute.

3. For Learning outcomes refer to Digital Systems (MT-404).

LIST OF EXPERIMENTS

1. Introduction to demonstrate and understand the VHDL.
2. Write a VHDL script to understand the basic gate realization.
3. Write a VHDL script to understand the more gate realization using behavioral modeling.
4. Write a VHDL script to understand the gates realization using structural modeling.
5. Write a VHDL script to understand the gates realization using dataflow modeling.
6. Write a VHDL script to design the adders.
7. Write a VHDL script to design the subtractor.
8. Write a VHDL script to design the multiplexer and demultiplexer.
9. Write a VHDL script to design the encoder and decoder.
10. Write a VHDL script to design the flip-flops.
11. Write a VHDL script to design the registers and counters.
12. Write a VHDL script to design the Finite State Machine.
13. Introduction to demonstrate and understand the Field Programmable Gate Arrays.

TEXT BOOKS:

1. Digital Logic, Applications and Design, J. M. Yarbrough (1997) West Publishing, ISBN 0-314-06675-6.
2. Contemporary Logic Design, R. H. Katz (1994) Benjamin/Cummings, ISBN 0-805-32703-7.

Non-Conventional Manufacturing
MT 418

L	T	P
3	1	-

Sessional: 50 Marks
Theory: 100 Marks
Total: 150 Marks
Exam Duration: 3 Hours

UNIT I

Unconventional machining processes, Rapid prototyping processes, their classification, considerations in process selection.

Ultrasonic Machining

Elements of process, design of cutting tool, metal removal mechanism, effect of parameters, economic considerations, limitations and applications, surface finish.

UNIT II

Electrochemical Machining

Elements of process, process chemistry, metal removal mechanism, tool design, accuracy, surface finish and work material characteristics, economics advantages, limitations and applications, Electrochemical grinding, debarring and honing, Chemical machining.

Electric Discharge Machining

Principle and mechanism of metal removal, generators, electrode feed control, electrode material, tool electrode design, EDM wire cutting, surface finish, accuracy and applications.

UNIT III

Jet Machining

Principal and metal removal mechanism of abrasive and water jet machining, process variables, design of nozzle, advantages, limitations and applications.

Plasma arc machining, Electron beam machining, laser beam machining, their principles and metal removal mechanism, process parameters, advantages and limitations, applications.

UNIT IV

Laser Beam Machining

Laser Beam Machining Process, principles, pumping processes, emission types-beam control. Applications Ultrasonic Machining Process-working principles-types of transducersconcentrators- nodal point clamping-feed mechanism-metal removal rate- Process Parameters, Applications

Reference and Text Books:

1. Modern machining processes -By P.C. Pandey and M.S. Shan, 1 Ml I.
2. Machining Science -By Ghosh and Mallik, Affiliated East West
3. Nontraditional Manufacturing processes -By G.F. Benedict, Maicel Dekker.
4. Advanced Methods of Machining -By J.A. McGeongh, Chapman and Hall.
5. Electrochemical Machining of Metals -By Rurnyantsev & Davydov, Mir Pub.
6. Rapid prototyping: Principles and applications in Manufacturing
7. *A Text Book: of Production Engineering*, P.C.Sharma,

Note:-

Examination :- The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Industrial Robotics
MT 420

L	T	P
3	1	-

Sessional: 50 Marks
Theory: 100 Marks
Total: 150 Marks
Exam Duration: 3 Hours

UNIT I

Automation and robots, Robot classification, Applications, Robot specifications.
Dot and Cross products, Coordinate frames, , Homogeneous coordinates, Link Coordinates, The arm equation, Five-axis articulated robot (Rhino XR-3), Four-axis SCARA robot (Adept One), Six-axis articulated robot (Intelledex 660).

UNIT II

The Inverse kinematics problem, General properties of solutions, Tool Configuration, Inverse kinematics of Five-axis articulated robot (Rhino XR- 3), Inverse Kinematics of Four-axis SCARA robot (Adept One), inverse kinematics of Six- axis articulated robot (Intelledex 660), and Inverse kinematics of a three-axis planar articulated robot, a robotic work cell.

Workspace analysis, Work envelope of a five-axis articulated robot (Rhino XR-3), Work envelope of a four-axis SCARA robot (Adept One), Workspace fixtures, The pick and place operations, Continuous path motion, Interpolated motion, Straight line motion.

UNIT III

The tool configuration and Jacobean matrix, Joint space singularities, Generalized inverses, Resolved motion rate controls, rate control of redundant robots, rate control using {1)-inverses, The manipulator Jacobean, Induced joint torque and forces.
Lagrange's equation, Kinetic and potential energy, Generalized force, Lagrange-Euler dynamic model, Dynamic model of a two-axis planner articulated robot, Dynamic model of a three-axis SCARA robot, Direct and inverse dynamics, Recursive Newton-Euler formulation, Dynamic model of a one-axis robot (inverted pendulum).

UNIT IV

The control problem, State equations, Constant solutions, Linear feedback systems, Single axis PID control, PD gravity control, Computed torque control, Variable structure control

image representation, template matching, polyhedral objects, shape analysis, Segmentation, Iterative processing, Perspective transformations, Structured Illumination, Camera Calibration.
Task level programming, Uncertainty, Configuration space, Gross motion planning, Grasp Planning, Fine motion planning, Simulation of planar motion.

Reference and Text Books:

1. Industrial Robotics - By M.P. Groover, McGraw Hill
2. Industrial Robotics and Automation - By S.R.Deb Tata McGraw Hill

Note:-

Examination :- The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

MANUFACTURING MANAGEMENT
MT 422

L	T	P
3	1	-

Sessional: 50 Marks
Theory: 100 Marks
Total: 150 Marks
Exam Duration: 3 Hours

Unit I

Manufacturing Systems Designs: Definition, Systems, Subsystems, Systems Approach Fundamentals, Systems Approach for designing, Manufacturing Systems, Systematic Layout Planning (SLP), Computerized Plant Layout-CRAFT, ALDEP, CORELAP, Assembly Line balancing, Problems and solutions of assembly lines, Group Technology & Cellular Systems, Classification & Grouping, overview of FMS. Strategic consideration for comparison of various systems.

Manufacturing Systems Economics: Concept of time value of money, Preparation of time profile of project, Single payment, Equal Series payment, various machine and project selection & evaluation techniques: Payback period, Present worth, Equivalent annual cost, Cost- benefit ratio, Evaluation for both equal & unequal life. Depreciation concept various methods-straight line, declining balance, Sum of the digits, Sinking fund.

Unit II

New Product Development (NPD): Product Development, Customer Need, Strategies for New Product Development, Product life cycle, Product status. Corporate Design Strategies, Japanese Approach to NPD. PUGH total Design approach, PAHL & BEITZ Approach, Project Approach, Cross functional Integration –Design, manufacturing, Marketing, Concurrent Engineering, Modular Design, Standardization Value Engineering & Analysis.

Manufacturing Planning & Control Systems: Overview of Aggregate Planning Models, Linear Decision Rules, Management Coefficient, Direct Search Methods, Master Production Schedule, Modular Bill and Materials, Capacity planning & control, language, medium range, short range capacity planning, Toyota Production System, Just- in Time (JIT), Manufacturing –Philosophy, Elements, KANBAN, effects on layout, workers & vendors, optimized production technology (OPT).

Unit III

Forecasting Methods: Forecasting Framework, Forecasting cost and accuracy, Forecasting Uses and Methods – Delphi, Exponential Smoothing, Forecasting Errors – MAD, Regression Methods-Linear Model for single & multiple variables, Brief idea of computerized forecasting systems.

Material Requirements Planning (MRP): Definition of MRP systems. MRP versus Order point, MRP Elements, Types of MRP – MRP I & II. Structured Bill of Materials. Regenerative & Net change MRP, Operating an MRP, Integration of Production & Inventory Control.

Unit IV

Value Engineering: Origin of Value Engineering, Meaning of value, value analysis and value engineering, uses of value engineering, when to apply value analysis, reason of unnecessary cost, difference between value analysis and other cost reduction techniques, steps in value analysis. Phases and constituents elements of each phase. FAST technique, Ten commandments(principles of value analysis) of value engineering

Text books:

1. Operations management – Schoroeder, Mc Graw Hill International
2. Industrial Engineering and production management – Martand Telsang, S. Chand & Company, New Delhi.
3. Production operations management – chary, TMH, New Delhi.

Reference books:

1. Production Operations Management – Adam & Ebert, PHI, New Delhi
2. Operational Management –Monks, Mcgraw Hill, Int.
3. Production & Operations Management – I. Hill, Prentice Hall Int.
4. Production Planning & Inventory Control – Narasimham etal, PHI, New Delhi
5. Production & Operation Management- Panneerselvam, PHI, New Delhi
6. Managing for Total Quality-Logothetis, PHI, New Delhi
7. Concept of Reliability Engineering –L.S. Srinath, Affiliated East West.
8. Revolutionizing Product Development – Wheelwright & Clark, Free press.
9. Management In Engineering – Freeman-Ball & Balkwill, PHI, New Delhi.
10. Production & operations management – Martinich, John Wiely , New Delhi.
11. The goal by Eliyahu M. Goldratt & Jeff Cox, Productivity Press India Ltd,, Bangalore
12. Toyota Production System by Taichi Ohno, Productivity Press India Ltd, Bangalore

Note:-

Examination :- The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Fuzzy Logic and Neural Networks
MT 424

L	T	P
3	1	-

Sessional: 50 Marks
Theory: 100 Marks
Total: 150 Marks
Exam Duration: 3 Hours

UNIT I

Neural Networks: Fundamental of neural network, overview of biological Neuro-system, Mathematical Models of Neurons, ANN architecture, Learning Methods, Learning Paradigms-Supervised, Unsupervised and reinforcement Learning, ANN training Algorithms-perceptions, Training rules, Delta, Back Propagation Algorithm, Multilayer Perceptron Model, Radial Basis functions, Hopfield Networks, Associative Memories, Applications of Artificial Neural Networks.

UNIT-II

Fuzzy sets: Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Extension principle and fuzzy relations Fuzzy Logic: Fuzzification and defuzzification, Membership Function, Linguistic Variables, Linguistic hedges, Fuzzy rules and reasoning, lamda cut-sets. Arithmetic operations on Fuzzy numbers.

UNIT-III

Fuzzy Inference System: Fuzzy Modeling, Mamdani Fuzzy model, TSK Fuzzy model, Fuzzy Controller, Industrial Applications.
Introduction of Neuro-Fuzzy Systems, Architecture of Neuro Fuzzy Networks, Hybrid learning algorithms, Neuro-fuzzy Control.

UNIT-IV

Introduction to Evolutionary Techniques: Genetic Algorithm, Basic Concepts, Flow Chart of GA, Genetic representations (Encoding), Initialization and Selection, Genetic Operators, Mutation, Generational Cycle, Convergence of GA and Applications.

References:

1. James A. Anderson " Introduction to Neural Networks", Prentice Hall India.

2. H.J. Zimmermann " Fuzzy set theory & its Applications ", Allied Publishers Ltd.

3. Nil Junbong " Fuzzy Neural Control Principles & Algorithm", PHI.

4. N.K. Bose " Neural Network Fundamental with Graphics ", TATA McGraw Hill.

5. Klir George J. " Fuzzy sets and Fuzzy Logic Theory and Applications", PHI.

6. J.M Zurada , " Introduction to Artificial Neural Network" , Jaico Publishers

7. S. Rajasekaran, "Neural Network, Fuzzy Logic and Genetic Algorithms", PHI Learning India 2011

8. S. N. Sivanandam, S.N. Deepa, "Principles of Soft Computing", Wiley India.

Note:-

Examination :- The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Management Information System
MT 426

L	T	P
3	1	-

Sessional: 50 Marks
Theory: 100 Marks
Total: 150 Marks
Exam Duration: 3 Hours

UNIT I

Concept of Management Information System, types of systems, Quality of information, value of information, Needs of information by different levels of management, Integrates system, Data and Information, factors influencing MIS and characteristics of MIS, Technology and Structure of MIS, role of Management Information System in decision making, concept of Distributed Data bases, Decision Support System: Concept, components, and classification of MIS, process of constructing a Decision Support System, concept of group decision support system

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UNIT II

Use of Management Information System for strategic advantage, Role of Information System for strategy, Role of Management Information System to break business barriers, Business Process Reengineering (BPR), Use of Management Information System for improvements in business performance and quality and enhancing quality of products and services

UNIT III

System Development Methodologies, Planning for Management Information System, Detailed design of Management Information System, Analysis and design of Information System, Assessment of hardware and software, System development life cycle, Testing of system, Methods of conversion, Documentation. Decision Making Systems and Modeling, Sensitivity Analysis, Simulation, Operations Research Technique

UNIT IV

Implementation Strategies for MIS, Enterprise Resource Planning, Executive Information System, Implementation of Executive Information System , Customer Relationship Management, Artificial Intelligence, Virtual Reality, Fuzzy logic, Neural Network. Challenges in implementation of MIS

Text Books:

1.. Management Information System by W.S. JawadeKar - Tata McGraw Hill.
2.. Brien, James, Management Information System, Tata McGraw Hill, Delhi.
3.. Kanter, J., Management Information System, PHI, Delhi
4.. Stair, Principles of Management System, Thomson Learning, Bombay.

Note:-

Examination:- The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Automatic Controls
MT 428

L	T	P
3	1	-

Sessional: 50 Marks
Theory: 100 Marks
Total: 150 Marks
Exam Duration: 3 Hours

Unit I

Introduction And Applications: Types of control systems ; Typical Block Diagram :Performance Analysis; Applications – Machine Tool Control, Boiler Control, Engine Governing, Aerospace Control, Active Vibration Control; Representation of Processes & Control Elements – Mathematical Modeling, Block Diagram Representation, Representation of Systems or Processes, Comparison Elements; Representation of Feedback Control systems
– Block Diagram & Transfer Function Representation, Representation of a Temperature, Control System, Signal Flow Graphs, Problems. Types Of Controllers: Introduction: Types of Control Action; Hydraulic Controllers; Electronic Controllers; Pneumatic Controllers; Problems.

Unit II

Transient And Steady State Response: Time Domain Representation; Laplace Transform, Representation; System with Proportional Control; Proportional – cum – Derivative control; Proportional – cum – Integral Control; Error Constants; Frequency Response Analysis: Introduction; Closed and Open Loop Transfer Function; Polar Plots; Rectangular Plots; Nichols Plots: Equivalent Unity Feed Back Systems; Problems.

Unit III

Stability Of Control Systems: Introduction; Characteristic Equation; Routh's Criterion; Nyquists Criterion, Gain & Phase Margins, Root Locus Method: Introduction; Root Ioci of a Second Order System; General Case; Rules for Drawing Forms of Root Ioci; Relation between Root Locus Locations and Transient Response; Parametric Variation; Problems.

Unit IV

Introduction – Concepts of state, state variables and state model– State model of linear systems– system realization - State space representation using physical, phase and canonical variables - diagonal canonical form-Jordan canonical form diagonalization- Time domain solution of state equation-State transition matrix - Laplace transform solution of state equations - Derivation of transfer function from the state model - Controllability and Observability; Basics of state feedback controllers and observers.

Text Books:

1. Theory & Applications of Automatic Controls by B.C. Nakra, Published by New Age International Pvt. Ltd. Publishers, New Delhi 1998.
2. Modern Control Engg. By Ugata, Prentice Hall of India, New Delhi.
3. Norman S Nise, "Control Systems Engineering", 5th edition, Wiley publications, 2009.
4. Madan Gopal andNagrath.I.J, "Control Systems Engineering", 5th edition, New Age International, 2011.
5. Benjamin C Kuo andFarid Golnaraghi, "Automatic Control Systems", 8th edition, Wiley Publications, 2007.

Reference Books:

1. Automatic Control Systems by Kuo' Published by Prentice Hall of India, New Delhi.
2. Control System Engineering, I. J. Nagrath and M. Gopal, New Age International limited.

Note:-

Examination :- The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Digital Image Processing
MT 430

L	T	P
3	1	-

Sessional: 50 Marks
Theory: 100 Marks
Total: 150 Marks
Exam Duration: 3 Hours

UNIT I:

DIGITAL IMAGE FUNDAMENTALS: Introduction, image model, sampling and Quantization, relationship between pixels, imaging geometry, photographic film, discrete, Fourier transform, properties of two dimensional Fourier transform, fast Fourier transform.

UNIT II:

IMAGE ENHANCEMENT AND COMPRESSION: Enhancement by point processing, spatial filtering and enhancement in the frequency domain, pseudo color image processing, image compression models, error free compression, image compression standards.

UNIT III:

IMAGE RESTORATIONS: Degradation, models, diagonalizations of matrices, inverse filtering, interactive estorations, geometric transformations.
IMAGE SEGMENTATION: Detection of discontinuities, edge linking and boundary detection, thresholding, region orienting segmentation.

UNIT IV:

REPRESENTATIONS AND RECOGNITION: Representations schemes, boundary descriptors, regional descriptors, morphology, recognition and interpretation, basics.

TEXT BOOKS

1. Rafael c. Gonzalez and Richard E. Woods, digital image processing, Addison Wesley publishing company, 1987

REFERENCES

1. William K. Pratt, digital image processing, John Wiley and sons, 1978
2. Jain, Fundamentals of digital image processing, PHI, 1996
3. Barrie W. Jervis , “digital signal processing (Pearson education India)
4. Prokis, “ digital signal processing” (PHI)

Note:-

Examination :- The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Digital Hardware Design
MT 432

L	T	P
3	1	-

Sessional: 50 Marks
Theory: 100 Marks
Total: 150 Marks
Exam Duration: 3 Hours

UNIT I: Combination Circuit Design: Adders Substractor, BCD Adder code converters, 7-segment display, designing using multiplexer, demultiplexer, decoder, encoder. Design of two level NAND only and NOR only networks, Design of multilevel NAND only NOR gate networks.

UNIT II: Synchronous Sequential ckt Design: Flip-flop, FSM. Sequence detector, party checker & Detector and different applicator of sequential ckts, state table state diagram. Moose & mealy sequential ckt with state diagram reduction of state table using merger graph method & moose method, computing M/C, limitation & capabilities of seq. Ckt.

UNIT III: Asynchronous Sequential ckt. : FSM, Racer, state table & flow table diagram, compatibility chart state assignment in Asynchronous ckt.

UNIT IV Iterative networks: iterative networks, design of parity checker, comparator, design of pattern detector, state machine design with SM charts, state machine charts, derivation of SM charts, memories: read only memory, ROM applications, Read write memories, static RAM, Dyanmic RAM, Structure and Timings.

References:

1. Z.Kohavi by Switching & System (McGraw Hill)
2. R.P.Jain By Digital Electronics & Microprocessor (McGraw Hill)
3. W.Fletcher :- An Engineering Approach to Electronic Design (PHI)
4. Floyd: - Digital Fundamentals (UBS)
5. Morris Mano:- Digital Logic &Computer Design(PHI)

Note:-

Examination :- The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.