Session 2005-06

B.Tech. (Eighth Semester) Mechanical Engineering

ME 402 E ENTERPRENURSHIP

L	T	P/D	Total		
3	1		4	Thoory	: 100 Marks
				Sessional	: 50 Marks
				Duration of Exams. : 03 hrs	

UNIT I

Definition and concept, Importance of economics for engineers, present value and future value, Wealth, Goods, Wants, Value and price, capital, money, utility of consumer and producer goods.

Introduction, Elements of cost, Prime cost, Overhead, Factory cost, Total cost, Selling price, Nature of cost, Types of cost. Definition and concept, Causes of depreciation, Methods of calculating depreciation.

UNIT II

Introduction, Nature of selection problem, Nature of replacement problem, Replacement of items which deteriorate, Replacement of machines whose operating cost in crease with time and the value of money also changes with time, methods used in selection of investment and replacement alternatives.

Entrepreneurship, Role of Entrepreneur in Indian economy, Characteristics of an entrepreneur, Types of entrepreneurs, some myths and realities about entrepreneurship

UNIT III

Introduction, Role and scope of small scale industries, concept of small scale and ancillary industrial undertakings, How to start a small scale industry, Steps in launching own venture, procedure for registration of small scale industries, various developmental agencies-their functions and role in industrial and entrepreneurship development, Infrastructure facilities available for entrepreneurship development in India.

Introduction, Requirement of a good product design, product development approaches, Product development process, Elements of concurrent engineering, quality function development, Rapid prototyping, Various controlling agencies involved -their role and formalities for getting clearance before starting individual venture

UNIT IV

Financial concept for small-scale industries, financial requirements Financial support programmer of banks, government financial agencjes, Hire-purchase facilities alternate sources of finance.

The modern concept of marketing, Definitions, functions and principle of marketing, Marketing research, Advertising, Market survey, Pre-feasibility and feasibility of project. Identification and evaluation of business opportunity, risk involved and preparation of business plan.

Tools for evaluation of techno economic feasibility project report, SWOT analysis

Reference and Text Books:

1. The practice of Entrepreneurship
   - By G. G. Meredikh, R.E. Nelson and P.A. Neck
2. Handbook of Entrepreneurship
   - By Rao and Pareek
3. Automobile Engineering
   -By K.M. Gupta, Umesh Publications
3. Engineering Economics
   -By Tarachand
4. Industrial Engineering and Management
   -By Ravi Shankar
5. Industrial Engineering and Organization Management
   -By S.K.Sharma and Sawita Sharma
6. Industrial Engineering and Management
   -By O.P. Khanna

NOTE: In the semester examination, the examiner will set 8 questions in all, at least two questions from each unit, and students will be required to attempt only 5 questions, at least one from each unit

Session 2005-06

B.Tech. (Eighth Semester) Mechanical Engineering

ME 404 E Power Plant Engineering

L	T	P/D	Total		
4	1		5	Thoory	: 100 Marks
				Sessional	: 50 Marks

Duration of Exams. : 03 hrs

UNIT I

Conventional and non-conventional sources of energy; Importance of electrical energy; Geothermal power plants; Tidal power plants; Windmills; Solar power plants; Direct energy conversion systems; Energy sources in India; Recent developments in power plants.

Hydrology: rainfall, runoff, hydrographs, flow duration curves; Site selection for hydro power plants; Classification of hydro power plants; Storage type hydro power plant and its operation; Estimation of power availability; Selection of water turbines; Combination of hydro power plants with steam plants; advantages and disadvantages of hydro power plants.

UNIT II

Analysis of steam power cycles for power plant application; High pressure boilers- La-Mont boiler, Benson boiler, Loeffler boiler; Velox boiler; Super pressure steam power plants; Economizers; Air-preheaters; Super heaters and reheaters; Feed water heaters. General layout of thermal power plant; Site selection for thermal power plant; Coal as fuel, classification of coals, analysis of coal; Coal handling; Dead and live storage; Combustion of coal: coal burning methods, overfeed stokers, underfeed stokers, pulverized fuels and burners. Ash handling and disposal; Dust collectors. Heat balance sheet for thermal power plants.

Introduction; Field of use; Outline of diesel electric power plant; Different systems of diesel power plant; Supercharging of diesel engines; Performance of diesel power plant; Advantages and disadvantages of diesel plants over thermal power plants.

UNIT III

Elements of plant; Thermal refinements; Performance of plants; Gas turbine characteristics; Comparison with other plants; Combined steam and gas turbine power plants.

Basic theory and terminology; Nuclear fission and fusion processes; Fission chain reaction; Moderation; Fertile materials; Nuclear fuels; General components of nuclear reactor; Different types of leactors; Breeder reactors; Nuclear power plants in India; Disposal of nuclear waste.

UNIT IV

Introduction; Load curves; Different terms and definitions; Effects of variable loads on power plant design and operation

Cost of electrical energy; Selection of type of generation; selection of generating equipment; performance and operating characteristics of power plants; Load division among generators; Tariffs methods for electrical energy.

Reference and Text Books:

1. Power Plant Engineering
   - By Morse
2. Power Plant Engineering
   - By Domkundwar

3. Power Plant Engineering
   -By P.C. Sharma
4. Power Plant Technology
   -Rv El-Wakil

NOTE: In the semester examination, the examiner will set 8 questions in all, at least two questions from each unit, and students will be required to attempt only 5 questions, at least one from each unit

B.Tech. (Eighth Semester) Mechanical Engineering

ME 406 E Operation Research

L	T	P/D	Total		
3	1		4	Thoory	: 100 Marks
				Sessional	: 50 Marks
				Duration of Exams.	: 03 hours

UNIT I

Development of operations Research, characteristics and scope of operations Research, operations Research in , Models in operations Research, Model Formulation, Types of mathematical models, Limitations of operations Research.

L.P. models, simplex method, the algebra of simplex method. (Minimization and Minimization problems), The big M method, post oplimality analysis, essence of duality theory, Application of sensitivity analysis.

UNIT II

Introduction to model, matrix terminology, Formulation and solution of Transportation model (least cost method, Voyel's Approximation method), Least time transportation problem, Assignment problems.

Introduction to net work logic, Numbering of events (Fulkersen Rule), PERT calculations - Forward path, back-ward path. Slack, probability, comparison with PERT, Critical path, Floats. Project cost, crashing the net work, updating (PERT and CPM).

UNIT III

Introduction, applications of simulation, advantages and limitations of simulation technique, generation of random numbers, Time-flow mechanism, simulation languages.

Steps in decision theory approach, Decision Machinery environment, Decision machining under certainty and uncertainty, Decision machining under condition of risk, Decision trees, Minimum enchained criteria, Advantages and limitations of decision tree solutions, post optimality

Definition of arguments models, comparison with transport model, Mathematical representation of assignment model, Formulation and solution of argument models, variation of the argument model, Alternate optimal solutions

UNIT IV

Introduction, Applications of queuing Theory, Waiting time and idle time costs, single channel queuing theory and multi channel queuing theory with Poisson. arrivals and exponential services, Numerical on single channel and multi channel queuing theory.

Theory of games, competitive games, Rules and Terminology in game Theory, Rules for game theory- saddle point, dominance, mixed strategy (2 x2 games) , mixed strategy (2 x n games or m x 2 games), mixed strategy (3 x3 games), two person zero sum games, n-person zero sum games.

Reference and Text Books:

1. Introduction to operation research
   - By Hillier and Lieberman, McGraw-Hill
2. Operations Research
   - By P.K. Gupta and D.S. Hira
3. Linear Programming
   -By N.P. Loomba

NOTE: In the semester examination, the examiner will set 8 questions in all, at least two questions from each unit, and students will be required to attempt only 5 questions, at least one from each unit

Session 2005-06

B.Tech. (Eighth Semester) Mechanical Engineering

ME 408 E Entrepreneurship (Practical)

P/D	Total		
2	2	Viva-voce	: 25 Marks
		Sessional	: 50 Marks
		Duration of Exams : 3 Hrs	

1. Exercise on assessing the industrial potentiality of any particular area.

Exercise on market survey for product identification and demand estimation of the product.
Exercise on preparation of techno economic feasibility project report.

Presentation and group discussion on techno economic feasibility project report.

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B.Tech. (Eighth Semester) Mechanical Engineering

ME 410 E Project-II

L	T	P/D	Total		
			9	9	

Theory : 75 marks

Sessional : 100 marks

Duration of Exams. : 03 hours

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

Electives (I) and Electives (II) Eight Semesters
(Mechanical Engineering)

ELECTIVE – III

ME 420 E Non Conventional Manufacturing
ME 422 E Industrial Robotics
ME 424 E Manufacturing Management
ME 426 E Total Quality Management
ME 428 E Piping Engineering

ELECTIVE - IV

ME 430 E Energy Management
ME 432 E Management Information System
ME 434 E Pneumatics & Hydraulics Control
ME 436 E Design of Air conditioning Systems
ME 438 E Automatic controls

Elective –III & IV will be offered as departmental elective for Mechanical Engineering Students.

B.Tech. (Eighth Semester) Mechanical Engineering
ME 420 E Non-Conventional Manufacturing

L	T	P/D	Total	
4	1	-	5	Theory : 100 marks
				Sessional : 50 marks
				Duration of Exams. : 03 hour

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

Rapid Prototyping

Fundamentals, process chain, physics of processes, principles and process mechanism of SLA, SGC, LOM, FDM and SLS processes, their advantages and limitations, applications of RP processes, RP data formats, STL file format, STL file problems, STL file repair, other translators and formats.

Rapid Tooling Process

Introduction, fundamentals, classification, indirect RT processes, Principles of Silicone Rubber Molding, Epoxy Tooling, Spray Metal Tooling, Pattern for Investment Casting, Vacuum

Casting, and Vacuum forming processes, direct RT processes, Shape Deposition manufacturing, their advantages, limitations and 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 and Davydov, Mir Publis.
2. Rapid prototyping: Principles and applications in Manufacturing

NOTE: In the semester examination, the examiner will set 8 questions in all, at least two question from each unit, and students will be required to attempt only 5 questions, at least one from each unit.

B.Tech (Eighth Semester) Mechanical Engineering
ME 422 E Industrial Robotics

L	T	P/D	total		
4	1		5	Theory	: 100 marks
				Sessional	: 50 marks
				Duration of Exams.	: 03 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: In the semester examination, the examiner will set 8 questions in all, at least two question from each unit, and students will be required to attempt only 5 questions, at least one from each unit

B.Tech (Eighth semester) Mechanical Engineering

ME 424 E MANUFACTURING MANAGEMENT

L	T	P
4	1	-

Theory : 100 Marks
Sessional : 50 Marks
Total : 150 Marks
Duration of Exam: 3 Hrs

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 Maintenance & Reliability: Concept of preventive & breakdown maintenance, maintenance cost, optimal preventive maintenance simple replacement models-individual and group replacement, MAPI - methods, reliability definitions, failure analysis and curve, systems reliability- series parallel, redundancy, methods of improving reliability, MTBF, MTTR, Maintainability, availability, brief concept of terotechnology.

Text books:

1. Operations management – Schoroeder, Mc Graw Hill International
2. 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 :In the semester examination the examiner will set 8 questions, at least two question from each unit. Students will be required to attempt five questions.

Session 2005-06

B. Tech (Eighth Semester) Mechanical Engineering

ME-426 E Total Quality Management

L	T	P/D	Total		
4	1		5	Theory	: 100 marks
				Sessional	: 50 marks
				Duration of Exams.	: 03 hours

UNIT I

Concept of Quality, Quality as the basis of market competition, Historical review, Quality philosophy of Deming, Juran, crossby etc., Obstacles, Integrating productivity and Quality.

Organization of Quality, Quality council, Total Quality Culture, Quality leadership, Quality awards, Total employee involvement, Quality circles, Attitude of top management, executives and workers, Operators responsibility of Quality, causes of operator's errors, Motivation.

UNIT II

Introduction lo TQM, Models for TQM. TQM implementation, Advantages of TQM, Obstacles to TQM, TQM in service sector.

Concepts of Quality function deployment, cause and effect diagram, SWOT analysis, Continuous improvement, PDCA cycle, Supplier partnership, Supplier certification, Pareto diagram, Scalier diagram, Benchmarking, Taquchi's Quality Engineering, Failure mode and effect analysis, Total productive maintenance, Introduction to JIT, JIT Quality management, SQC, SPC.DPR, Kaizen, Six sigma concept.

UNIT III

Introduction to ISO 9000 series of standards, other quality systems, Implementation, Documentation, Internal audits', Registration, Closing Comments.

UNIT IV

Beyond ISO 9000 horizon, Introduction to ISO 14000, Series standards, Concepts of ISO 14001, EMS Benefits, ISO 10011- 10014, Quality systems .

Suggested Books:

1. Total Quality Management: By Bosterfied el al. Pearson Education India, 2001.
2. The Essence of Total Quality Management: By Johan Bank, Prentice Hall of India 2000.
3. Managing for Total Quality: By Logothelis Prentice Hall of India, 2000.
4. Total Quality Management: By Sundra Raju, Tala Mcgraw Hills publishing company, 1997.
5. TQM and ISO 9000: By K.C. Arora, S.K. Kalaria & Sons 2000.
6. ISO 9000 Quality System: By Dalde & Saurabh, Standard Publishing, 1994.

NOTE: In the semester examination, the examiner will set 8 questions in all, at least two question from each unit, and students will be required to attempt only 5 questions, at least one from each unit

B.Tech. (Eight Semester) Mechanical Engineering

ME428 E Piping Engineering

L	T	P/D	Total	
4	1	-	5	

Theory : 100 marks
Sessional : 50 marks
Duration of Exams. : 03 hours

UNIT I

Basics of fluid mechanics: viscosity, pressure, head, and hydraulic gradient, types of fluid flow, Remolds number. Euler's equation of motion, continuity equation, Bernoulli's equation, Gas laws and compressibility factor.

Determination of pipe size and pressure losses, thrusts in pipe line, water hammer in pipeline, design of gas pipeline, measurement of flow in pipes, Transportation of solid materials through pipelines.

UNIT II

Selection of materials, physical properties of pipe materials, recommended pipe materials

Standards and specifications, steel pipes, steel pipe fittings, cast iron pipes, cast iron fittings, joining of cast iron pipes, tubes of other materials, design of flanges and flanged joints

UNIT III

Load on structural supports, supporting structures of pipeline, pipe supports design considerations, platforms and ladders, foundation, supporting span of overhead pipe line, stiffening ribs, pipe clamping and supporting devices, flexible hanger supports

Valves, function of valves, valve materials and method of construction, pressure drop involves, valve size, Types of valves, valve fittings.

Codes and standards, piping construction, welding joints in pipe line, welding processes used in pipe fabrication, preparation of pipe edged,

UNIT IV

Piping systems, pipe expansion, methods of compensation, thermal force calculation, Permissible equivalent stresses by additional external loads, expansion devices, calculation of anchor force using a bellow, bellow material and life, use of hinged compensators

Kellogg method, Method of analysis, multi-line pipeline with two-fixed end

Corrosion control In critical task, corrosion process, types of corrosion, fluid and cavitation corrosion.

Reference and Text Books:

1. Handbook of piping design - By Sahu, New age Int. Pubs.
2. Design of piping systems - By Kellogg, Wiley & sons

NOTE: In the semester examination, the examiner will set 8 questions in all, at least two question from each unit, and students will be required to attempt only 5 questions, at least one from each unit

B. Tech (Eighth Semester) Mechanical Engineering

ME 430 E ENERGY MANAGEMENT

L	T	P	Total			
4	-	1	-	5	Sessional Marks :	50 Marks
					Theory :	100 Marks
					Duration of Exams:	3 Mrs.

UNIT I

Inerlialion phase, audit and analysis phase, implementation phase, general methodology for building and site energy audit, site survey, methodology, site survey-electrical system, steam and water systems, building survey methodology, basic energy audit instrumentation, measurement for building surveys.

General principles, the requirements for human comfort, description of typical systems-dual duct HVAC system. Multi zone HVAC systems, variable and volume systems, terminal repeat system, evaporative systems, package system, basic principle governing HVAC system, package system, basic principle governing HVAC system operation, energy management opportunities in HVAC systems, modeling of heating and cooling loads in buildings, problems.

UNIT II

General principles, illumination and human comfort, basic principles of lighting system, typical-illumination syst3em and equipment, fundamentals of single phase and 3 phase A.C. circuits, energy management opportunities for lighting systems, motors and electrical heat, electrical and analysis and their parameters, peak, demand control, problems.

General principles, process heat, combustion, energy saving in condensate return, steam generation and distribution, automotive fuel control, hot water and water pumping, direct and indirect fired furnaces over, process electricity, other process energy forms-compressed air and manufacturing processes, problems.

UNIT III

General consideration, life cycle costing, break-even analysis, cost of money, benefit/cost analysis, pay back period analysis, prospective rate of to return, problems.

Environmental conformation, passive design, conservation building envelope design consideration, integration of building system, energy storage problems.

UNIT IV

Energy management principle involving computers, basics of computer use, analysis-engineering and economic calculations, simulation, forecast, CAD/CAM controls - microprocessor and minicomputers, building cycling and control, peak demand limiting and control: industrial power management, problems.

Text Book:

1. Energy Management Principles by Criag B. Smith, Published by Pergamon Press.
2. Energy systems and developments – Jyoti Parikh, Oxford University Press.

Reference Books:

Energy – resources, demand and conservation with reference to India – Chaman Kashkari, Tata Mc Graw Hill Co. Ltd.

Integrated renewable energy for rural development – Proceedings of Natural solar energy convention, Calcutta.

NOTE: In the semester examination, the examiner will set 8 questions in all, at least two question from each unit, and students will be required to attempt only 5 questions, at least one from each unit

ME 432 E MANAGEMENT INFORMATION SYSTEM

L	T	P/D	Total		
4	1		5	Theory	: 100 marks
				Sessional	: 50 marks
				Duration of Exams.	: 03 hums

UNIT I

What is MIS? Decision support systems, systems approach, the systems view of business, MIS, MIS organization within the company management organizational theory and the systems approach. Development of organizational theory, management and organizational behavior, management information and the system approach.

Evolution of an information systems, basic information systems, decision making and MIS, MIS as a technique for making programmed decision assisting information systems (r) strategic and project planning for MIS : General business planning, appropriate MIS planning-general, MIS planning -details.

UNIT II

Define the problems, set system objectives, establish system constraints, determine information needs, determine information sources, develop alternative conceptual ;designs and select one document the system concept, prepare the conceptual ;design report.

UNIT III

Inform and involve the organization, aim of detailed design, project management of MIS detailed design, identify dominant and trade off criteria, define the subsystems, Sketch the detailed operating subsystems and information flow. Determine the degree of automation of each operation, inform and involve the organization again, inputs, and processing, early system testing, software, hardware and tools, propose an organization to operate the system, document the detailed design, revisit the manager -user.

UNIT IV

Plan the Implementation , acquire floor space and plan space layouts, organize for implementation, develop, procedures for implementation, train (ho operating personnel, computer related acquisitions, develop forms for data collection and information dissemination, develop the files, test the system, cutover, document the system, evaluate the MIS control and maintain the system (r). Pitfalls in MIS development : Fundamental weakness, soft spots in planning, design problems, implementation: The TARPIT.

Text Books:

I. Management Information system by W.S. JawadeKar - Tata McGraw Hill.

NOTE: In the semester examination, the examiner will set 8 questions in all, at least two questions from each unit, and students will be required to attempt only 5 questions, at least one from each unit

Session 2005-06

B. Tech (Eighth Semester) Mechanical Engineering

ME 434 E Pneumatics & Hydraulics Control

L	T	P/D	Total		
4	1	-	5	Theory	: 100 marks
				Sessional	: 50 marks

Duration of Exams. : 03 hours

UNIT I

Hydraulic systems, pneumatic systems, uses of fluid power, fluid power at work, standard symbols for hydraulic & pneumatic components -ANS
Graphical symbols -composite symbols.
Pressure applied in one direction, pressure applied in both directions, pressure applied and intensified in both directions, advantages of pressure boosters installation, causes of failure of boosters, maintenance
Positive displacement or pressure type reciprocating compressors, velocity or dynamic type compressors, location and installation, air intake, after cooler, air receivers, safety valves, compressor regulators or controls planning a compressed air plant, compressor selection.

UNIT II

Petroleum base fluids, synthetic base fluids, quantity requirement, maintenance, selection of hydraulic fluid, specific weight, viscosity, Say-bolt universal viscometer, viscosity problems, viscosity index, lubricating value, pour point, oxidation and contamination.
Rigid pipe, semi-rigid, flexible piping, general features of piping installation, planning a compressed air distribution system, Installation of rigid, semi-rigid and flexible piping - manifolds, causes of piping failures.
General features, air filters, pressure regulators, lubricators, combination units, protection of filters and lubricator bowls, mufflers.

UNIT III

Two-way valves, manual control, manual operation, mechanical operation, electrical operation, pilot control, installation, causes of failure, repair & maintenance, three way valves, actuation, maintenance of three way valves four way valves, installation & maintenance.
Types of flow control, parts names, installation causes of failure, repair and maintenance, pressure relief valves, sequence valves, unloading valves, other types of pressure controls.
General types, characteristics of air motors, General features of pneumatic tools, drills, hammers, hoists, rock drills and paving breakers.

UNIT IV

Gear type motors, Vane type motors, piston type motors, split speed, Schematic diagrams of various types of pneumatic and hydraulic circuits, common causes of failure, dirt, heat, misapplication, improper fluids, faulty installation, maintenance, improperly designed circuits.
Control systems, differential sensing or error-detecting devices, types of servo systems, characteristics of servo-systems.

Reference and Text Books:

1. Pneumatics and Hydraulics
   -By Stewart, Taraporevala Sons & Co. Pvt. Ltd,
2. Industrial Hydraulics
   -By Pippinger & Hicks, McGraw Hill, New York.
3. Hydraulic and Pneumatic Power for Production

-By H.L. Stewart, Industrial Press Inc, New York.

4. Hydraulic Servo Systems
   -By M. Guillon.

NOTE: In the semester examination, the examiner will set 8 questions in all, at least two question from each unit, and students will be required to attempt only 5 questions, at least one from each unit

B. Tech (Eighth Semester) Mechanical Engineering
ME- 436E DESIGN OF AIR CONDITIONING SYSTEMS

Sessional : 50 Marks
Theory : 100 Marks
Total : 150 Marks
Duration of Exam: 3 Hrs.

L T P
4 1 -

Unit I Application of Air Conditioning: Medium and large sized buildings, industrial air conditioning, residential air conditioning, air conditioning of vehicles and aircrafts.

Psychometry: Psychometric chart, combined heat and mass transfer, adiabatic saturation, enthalpy potential. Air Conditioning Load: Comfort and design conditions, thermal transmission, infiltration and ventilation loads, heating and cooling loads, solar radiation properties, periodic heat transfer through walls and roofs.

Unit II Air Conditioning Systems: Thermal distribution systems, classic single-zone systems, outdoor air control, single-zone system design, multiple-zone systems, terminal reheat systems, dual duct or multizone system, variable air-volume systems, hydronic systems, unitary systems, passive air conditioning systems.

Unit III Vapour Compression Cycle: Compressors: Reciprocating, rotary, screw, scroll vane and centrifugal compressors. Condensers and evaporators – heat transfer, pressure drop, extended surfaces, condensing capacity, condenser design, boiling in shell and tubes, evaporator performance, defrosting methods. Expansion devices – capillary tube design, constant pressure expansion valve, float valves, superheat controlled thermostatic expansion valve.

Refrigerants: Primary and secondary refrigerants, halocarbons, azeotropes, ozone depletion, eco friendly refrigerants.

Unit IV Equipment Design: Fan and duct systems, fan laws, air-distribution in rooms, ventilation systems, diffusers and induction, fan coil units. Cooling and dehumidifying coils – Heat and mass transfer, moisture removal, coil performance, Controls: Pneumatic, electric and electronic controls, thermostats, dampers, outside air control, freeze protection, humidistat, acoustics and noise control.

Text Books :

Refrigeration and air conditioning – W.F. Stoecker, J.W. Jones, McGraw Hill Book Co.
2. Air conditioning Engineering – W.P. Jones, Edward Arnold

Reference Books:

Hand book of air conditioning system design – Carrier Air conditioning Co., McGraw Hill Book co
2. Thermal Environmental Engg. – James L. Threlkeld, Prentice Hall, Inc
Refrigeration and Air conditioning – C P Arora, Tata McGraw Hill Pub. Co Ltd.
4. Refrigeration and Air conditioning – P L Ballaney, Khanna Publishers

Note : In the semester examination, the examiner will set eight questions, at least two questions from each unit. The students will be required to attempt only 5 questions.

ME- 438 E AUTOMATIC CONTROLS (THEORY AND APPLICATIONS)

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Sessional Marks : 50
Theory Marks : 100
Total Marks : 150
Duration of Exam : 3 hrs.

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 Digital Control System : Introduction; Representation of Sampled Signal; Hold Device; Pulse Transfer Function; Block Diagrams; Transient Response; Routh's Stability Criterion; Root Locus Method; Nyquists Criterion; State Space Analysis of Control Systems: Introduction; Generalized State Equation; Techniques for Deriving System State – Space Equations; Transfer Function from State Equations; Solution of State Vector Differential Equations; Discrete Systems; Problems.

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.

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 : In the semester examination, the examiner will set eight questions in all, at least two questions from each unit & students will be required to attempt only 5 questions.