SCHEME OF INSTRUCTION & EXAMINATION

B.E. IV - YEAR
(PRODUCTION ENGINEERING)

SEMESTER - I

Sl. No.	Syllabus Ref. No.	SUBJECT	Scheme of Instruction		Scheme of Examination		
			Periods per week		Duration In Hours	Maximum Marks	
			L	D/P		Univ. Exam	Sessionals
		THEORY					
1.	MP 401	Production drawing Practice	1	3	3	75	25
2.	ME 402	Metrology & Instrumentation	4	-	3	75	25
3.	ME 404	Operations Research	4	-	3	75	25
4.	ME 355	Control System theory	4	-	3	75	25
5.		ELECTIVE -I	4	-	3	75	25
		PRACTICALS					
1.	MP 431	Manufacturing Engineering Lab.	-	3	3	50	25
2.	ME 432	Metrology & Instrumentation Lab	-	3	3	50	25
3.	MP 433	Computer Aided Production Drawing Lab	-	3	3	50	25
3.	ME 434	Project Seminar	-	3	-	-	25
		Total	**17**	**15**	**-**	**525**	**225**

ELECTIVE – I

ME 403 Finite Element Analysis
ME 406 Neural Networks
ME 407 Automobile Engineering
ME 411 Entrepreneurship
ME 412 Computational Fluid Flows
ME 413 Design for Manufacture
ME 452 Composite Materials
ME 467 Total Quality Management
CE 452 Disaster Mitigation and Management

MP 401

PRODUCTION DRAWING PRACTICE

Instruction 1+3 Periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessional 25 Marks

S.No **Topics/Sub. Topics /Experiments**

UNIT-I

1 Introduction to Production Drawing, Types of Drawings and their uses, Format of drawing sheet, title block.
2 Machine tools elements, Methods of Indicating notes on drawing
3 Limits and Fits: Basic definition of terms, alpha numeric designation of limits/fits, calculate limits
4 Types of fits, Interchangeability and selective assembly
5 Exercises involving selection / interpretation of fits and calculation of limits.

UNIT-II

6 Production Drawing: Conventional practices of indicating tolerances on size and geometrical form, Position.
7 Surface finish, surface treatments
8 Part drawings from assembled drawings 4 Nos – Single tool post, Revolving Centre, Petrol Engine Connecting Rod & Square Tool Post.
9 Specification and indication of the above features on the drawings

UNIT-III

10 Process sheets, tolerances and surface finish obtainable for different processes of Bevel Gear, Flange & Pinion shaft.

Suggested Reading:

1. K.L.Narayana, P.Kannaiah and K.Venkat Reddy, *Production Drawing,* New Age International (P) Ltd. Revised edition 1997.
2. P.Narasimha Reddy, T.A. Janardhan Reddy and C. Srinivas Rao, *Production Drawing Practice,* Hi-Tech Publishers, 2001.
3. R.L. Murthy, *Precision Engineering in Manufacturing,* New Age International (P) Ltd., 1996.
4. R.K. Jain, *Engineering Metrology,* Khanna publishers, 8th edition, 1985.

ME 402

METROLOGY AND INSTRUMENTATION

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

Unit-I

Limits and Fits, ISO system: Fits and Types of interchangeability, Taylor's Principle or plain limit gauges, Use of Plug, Ring and Snap gauges. Indicating type limit gauges. Introduction- Linear and Angular measurements - Slip gauges and End bars - Gauge material and manufacturing methods, Different types of Micrometers, Height gauges, Tomlinson gauges. Precision polygon, Sine bar, Auto collimator,.

Unit-II

Comparators: Dial indicator, Sigma and Mechanical comparator, Free flow and Back pressure type Pneumatic comparator. Application of set jet gauge heads

Optical projector, Chart, screen gauges and measuring methods, Micro gauge bridge lines. Tool maker's Microscope applications,. Measurement of Straightness and- Flatness. Roundness measurement with bench centers and talyround, Coordinate Measuring Machine in components geometries.

Unit-Ill

Surface Roughness Measurements –parameters as per ISO indices. Profilometer, Taylor Hobson Talysurf. Application of Thread metrology - 2 wire and 3 Wire methods, Gear measurement - Gear tooth thickness, Parkinson gear tester, General geometric tests for testing machine tools- Lathe, drill, mill.

Unit-IV

Elements of instrumentation system. Static and Dynamic characteristics. Types of errors. Displacement transducers. LVDT. Strain measurement - Wire and foil type resistance strain gauges. Rosette Gauges. Bonding procedure. Lead resistance compensation. Adjacent arm and self compensating gauges. Proving ring Strain gauge load cells, measurement of axial load and torsion by strain gauges. Piezo electric load cell.

Unit-V

Introduction to Seismic Transducers - displacement and acceleration measurement, Pressure measurement - Bourdon pressure gauge, bulk modulus gauge, pirani gauge, Temperature measurement by thermo couples. Laws of thermo electricity. Types of materials used in thermocouples. Protection tubes Extension wire. Series and parallel circuits. Ambient temperature compensation.

Suggested Reading:

1. I C Gupta-*Engineering Metrology*, Danpat Rai Publications, New Delhi.
2. Rega Rajendra, *Principles of Engineering Metrology*, Jaico Publishing House,Mumbai.
3. V S R Murti, Metrology and Surface Engineering Frontline Publications, 2011
4. R.K Jain, *Engineering Metrology,* Khanna Publications, 1996
5. Doeblin, *Measurement Systems Application and Design*,Tata McGraw Hill, 5thed., 2004.
6. Beckwith, Buck, Lienhard, *Mechanical Measurements,* Pearson Education Asia..

ME 404

OPERATIONS RESEARCH

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

Unit-I

Introduction : Definition and Scope of Operations Research.

Linear Programming: Introduction, Formulation of linear programming problems, graphical method of solving LP problem, simplex method, maximization and minimization, Degeneracy in LPP, Unbounded and, Infeaseable solutions.

Unit-II

Duality : Definition, Relationship between primal and dual solutions, Economic Interpretation, Post optimal of sensitivity analysis, Dual Simplex Method.

Unit-Ill

Transportation Models : Finding an initial feasible solution - North West corner method, Least cost method, Vogel's Approximation method, Finding the optimal solution, optimal solution by stepping stone and MODI methods, Special cases in Transportation problems - Unbalanced Transportation problem.

Assignment Problems : Hungarian method of Assignment problem, Maximization in Assignment problem, unbalanced problem, problems with restrictions, travelling salesman problems.

Unit-IV

Replacement Models : Introduction, replacement of items that deteriorate igoring change in money value, replacement of items that deteriorate considering change in money value with time, replacement of items that fail suddenly - Individual replacement policy, Group replacement policy.

Game Theory: Introduction, 2 person zero sum games, Maximi - Minimax principle, Principle of Dominance, Solution for mixed strategy problems, Graphical method for 2 x n and m x 2 games.

Unit-V

Sequencing Models : Introduction, General assumptions, processing n jobs through 2 machines, processing 'n' jobs through m machines, Processing 2 jobs through m machines.

Queuing Theory : Introduction, single channel - poission arrivals - exponential service times with infinite population & finite population, Multi channel - poisson arrivals - Exponential service times with infinite population.

Introduction to optimization Techniques: Single objective & Multi objective optimization Techniques like G.A, NSGA, P.Q.O. & MPSO Techniques.

Suggested Reading :

1. Hamdy, A. Taha, *Operations Research-An Introduction,* Sixth Edition, Prentice Hall of India Pvt. Ltd., 1997.
2. S.D. Sharma, *Operations Research,* Kedarnath, Ramnath & Co., Meerut, 2009.
3. Hrvey M. Wagner, *Principles of Operations Research,* Second Edition, Prentice Hall of India Ltd., 1980.
4. V.K. Kapoor, *Operations Research* , S. Chand Publishers,New Delhi, 2004.
5. R. Paneer Selvam, *Operations Research* , Second Edition, PHI Learning Pvt. Ltd., New Delhi, 2008.
6. Data Reconciliation by Prof. Shanker Narasimha.

ME 355

CONTROL SYSTEMS THEORY

(For Production 4/4 I Sem. & Mechanical 3/4 II Sem.)

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

Unit-I

Control Systems Classification: Open Loop & Closed Loop Systems. Mathematical models and Transfer functions from governing equations of mechanical, electrical, hydraulic, pneumatic, thermal systems. AC, DC servomotors & Electromechanical servo systems.

Unit-II

Block diagrams, Block diagram reduction. Signal flow graphs, Mason's gain formula. Transient response. Time domain specifications of 151 and 2nd order systems. Steady state error, Error coefficients, sensitivity Performance indices. Routh criteria.

Unit-III

Routh criteria, Root Locus method. Frequency Response: Bode, Polar plots. Correlation between transient and frequency response, Bandwidth, Experimental determination of transfer functions.

Unit-IV

Nyquist criteria. Gain and phase margins, Lead. Lag and Lead-lag compensator design, PID controller, linearization of Non linear systems.

Unit-V

State - space representation of linear control systems. State transition matrix. Solution of state equations: Zero input response and Zero state response. Concept of controllability and observability.

Suggested Reading:

1. Dorf, R.C., *Modern Control Systems, Addison*-Wesley 1989.
2. M. Gopal, *Con tori Systems,* Tata McGraw Hill, 2004.
3. Ogata, K., *Modern Control Engineering,* Prentice Hall, 2004.
4. Norman S. Nise, *Control Systems Engineering,* John Wiley & Sons, Inc., 2001.

ME 403

FINITE ELEMENT ANALYSIS

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

Unit-I

Introduction to Finite Element Method for solving field problems, Stress and Equilibrium, Boundaiy conditions, Strain, Displacement, Stress-Strain relations.

One dimensional problems:

Finite element modeling coordinates and shape functions, Potential Energy approach: Assembly of Global stiffness matrix and load vector, Finite element equations, Treatment of boundary conditions, Galerkin's approach, Quadratic shape functions.

Unit-II

Analysis of trusses and frames: Element stiffness matrix for a truss member, Analysis of plane truss with two at each node. Analysis of frames with two translations and a rotational degree of freedom at each node, Analysis of Beams: Element stiffness matrix for two nodes (two degrees of freedom per node).

Unit-Ill

Finite element modeling of two dimensional stress analysis with constant strain triangles and treatment of boundary conditions. Finite element modeling of axi-symmetric solids subjected to axi- symmetric loading with triangular elements.

Unit-IV

Two dimensional four nodded iso-parametric elements and numerical integration. Steady state heat transfer analysis: One dimensional analysis of a fin and two dimensional analysis of thin plate, Analysis of circular shaft subjected to torsion.

Unit-V

Dynamic Analysis: Formulation of finite element model, element matrices, Evaluation of Eigen values and Eigen vectors for a stepped bar and a beam, Time dependent field problems: Application to one dimensional heat flow in a rod. Introduction to finite element formulation of three dimensional

problems in stress analysis, Convergence requirements. Introduction to Finite Element Analysis Software.

Suggested Reading:

1. G. Ramamurthy, *Applied Finite Element Analysis,* I.K. International Publishing House Pvt. Ltd., New Delhi, 2009
2. Tirupathi R, Chandraputla and Ashok D Belagundu, *Introduction to Finite Elements in Engineering,* Practice Hall of India, 1997.
3. Rao S S, *The Finite Element Method in Engineering*, Pergamon Press, 1989.
4. Segerlind L J, *Applied Finite Element Analysis*, Wiley Eastern, 1984.
5. Reddy JN, *An Introduction to Finite Element Method,* McGraw-Hill, 1984.

ME 406

NEURAL NETWORKS
(ELECTIVE-I)

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

Unit-I

Introduction: Knowledge - based information processing. A general view of knowledge based algorithm. Neural information processing. Hybrid intelligence. Artificial neuron.

Unit-II

Basic Neural Computation Models: Basic concepts of Neural network - Network properties, node properties, sigmoid functions. System dynamics. Inference and learning algorithm. Data representation. Functional classification models - single layer perceptions. Multilayer perceptions.

Unit-III

Learning supervised and unsupervised statistical learning. AI learning. Neural network Learning - Back propagation algorithm and derivation. Stopping criteria. Complexity of Learning Generalization.

Unit-IV

Self- organizing Networks: Introduction, The Kohonen algorithm, weight initialization, weight training, associative memories, bi-directional associative memories.

Unit-V

Hopfield Networks: Introduction: The Hopfield model. Hopfield network algorithm. Boltzman's machine algorithm. Neural applications.

Suggested Reading:

1. Limin Fu, *Neural Networks in Computer Intelligence* , Mc-Graw Hill, 1995.'
2. Bart Kosho, *Neural Networks and Fuzzy Systems,* Prentice Hall of lndia, 1994.
3. James A. Freeman, Simulating, *Neural Networks,* Addison Wesley Publications, 1995.

ME 407

AUTOMOBILE ENGINEERING
(ELECTIVE-I)

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

Unit-I

Types of automobiles: Normal, Hybrid and Hydrogen Fuel vehicles. Engine location" and its- components, chasis layout; crank shaft proportion, firing order, piston and piston rings, cylinder liners, valves and operation mechanism, inlet and exhaust manifolds, carburetion and fuel injection system, Mechanical Fuel Injection system & Electronic Fuel Injection system.

Unit-II

Lubricating systems: Wet sump, dry sump and petroil systems.

Cooling systems: Water pumps, radiators, thermostat control anti freezing compounds.

Types of Ignition Systems, Modern Ignition systems, Types of batteries and charging systems, starting motors, lighting and electrical accessories, automobile air-conditioning.

Unit-III

Steering systems: Linkage arrangements and its components modified Ackerman linkage-Wheel alignment, caster and camber. Rack and pinion assembly - Recent Trends.

Wheel and lyres: Tyre construction, specification. Tyre wear and causes, wheel balancing, Types q/'Suspension system, independent suspension, coil and leaf springs, torsion bar, shock absorbers.

Unit-IV

Power Train: Clutches, gear and gearbox manual, semi-automatic and automatic gearboxes. Torque converter, propeller shaft, universal coupling differential, Four-wheel drive system.

Brakes Systems: Description and operation of hydraulic brake, leading and trailing shoe layout, disc brakes, master cylinder, hand brake linkage -Recent Trends.

Unit-V

Maintenance; Pollution control, trouble shooting and servicing procedure overhauling, engine tune up, tools and equipment for repair and overhaul, testing equipment, pollution control technologies used for petrol and diesel engines, types and study of catalytic converters, Euro norms 2 & 3 and Bharat Norms - Recent Trends.

Suggested Reading:

1. CROUSE &Anglin, *AutomotiveMechanics,* TataMcGraw Hill, Publishing Co. Ltd., New Delhi, Tenth Edition - 2004.
2. Kirpal Singh., *Automobile Engineering,* Vol. I & II Standard Publishers, Delhi.
3. Joseph-Heitner, *Automotive Mechanics,* Affiliated East West Pvt. Ltd.
4. C.P. Nakra, *Basic Automobile Engineering,* Dhanpat Rai Publishing Co.(P) Ltd., New Delhi, 2003.

ME 411

ENTREPRENEURSHIP

(ELECTIVE-I)

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

Unit-I

Indian Industrial Environment-competence, Opportunities and Challenges. Entrepreneurship and Economic growth. Small Scale Industry in India, Objectives, Linkage among small, medium and heavy industries. Types of enterprises.

Unit-II

Identification and characteristics of entrepreneurs. Emergence of First generation entrepreneurs, environmental influence and women entrepreneurs. Conception and evaluation of ideas and their sources. Choice of Technology - Collaborative interaction for Technology development.

Unit-Ill

Project formulation, Analysis of market demand, Financial and profitability analysis and Technical analysis, project financing in India.

Unit-IV

Project Management during construction phase, project organization, project planning and control using CPM, PERT techniques. Human aspects of project management. Assessment of tax burden.

Unit-V

Behavioural aspects of entrepreneurs: Personality - determinants, attributes and models. Leadership concepts and models. Values and attitudes. Motivation aspects. Change behaviour. Time Management: Various approaches of time management, their strengths and weaknesses. The urgency addiction and time management matrix.

Suggested Reading:

1. Vasant Desai, *"Dynamics of Entrepreneurial Development and Management"*, Himalaya Publishing House, 1997.
2. Prasanna Chandra, *"Project-Planning, Analysis, Selection, Implementation and Review"*, Tata Mcgraw-Hill Publishing Company Ltd. 1995.
3. Stephen R. Covey and A. Roger Merrill, *"First Things First"*, Simon and Schuster Publication, 1994.
4. G.S. Sudha, *"Organizational Behaviuor"*, 1996.
5. Robert D. Hisrich, Michael P. Peters, *"Entrepreneurship"*, Tata Me Graw Hill Publishing Company Ltd., 5th Ed., 2005.

ME 412

COMPUTATIONAL FLUID FLOWS

(ELECTIVE-I)

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

Unit-1

Review of the basic fluid dynamics: Continuity, Momentum and Energy equations-Navier Stokes equations, Reynolds and Favre averaged N-S equations. Heat transfer conduction equations for steady and un-steady flows, Steady convection -diffusion equation

Unit-II

Introduction to turbulence, Mixing length model, K-epsilon turbulence model. Classification of Partial differential equations - Elliptic, parabolic and hyperbolic equations. Initial and boundary value problems

Unit-III

Concepts of Finite difference methods-forward, backward and central difference. Finite difference solutions-Parabolic partial differential equations-Euler, Crank Nicholson, Implicit methods. Errors, consistency, stability analysis -Von Neumann analysis. Convergence criteria.

Unit-IV

Elliptical partial differential equations- Jacobi, Gauss Seidel and ADI methods. Viscous incompressible flow, Stream function-Vorticity method Introduction to grid generation-Types of grid-O,H,C.

Unit-V

Introduction to finite volume method. Finite volume formulations for diffusion equation, convection diffusion equation. Solution algorithm for pressure velocity coupling in steady flows Staggered grid, simple.
Algorithm

Suggested Reading:

1. Pradip Niyogi, Chakrabartty S K, Laha M K, *Introduction to Computational Fluid Dynamics,* PearsonEducation,2005.
2. Muralidhar K, SundararajanT, *Computational Fluid Flow and Heat Transfer*, Narosa Publication House, New Delhi, 2003

3. Chung TJ, *Computational Chiid Dynamics,* Cambridge University Press, New York, 2002.
4. John D Anderson, *Computational Fluid Dynamics*, Me Graw HillInc., New York, 2003.
5. Patankar S V, *Numerical Heat Transfer and Fluid flow*, Hemisphere Publishing Company, New York, 1980.
6. H.K.Versteeg, W. Malalasekara, *An Introduction to Computational Fluid Dynamics,* Pearson Education, 2nd Ed.2007.

ME 413

DESIGN FOR MANUFACTURE
(ELECTIVE-I)

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Introduction: General design principles for manufacturability, strength and mechanical factors, mechanisms selection, evaluation method, geometrical tolerances, tolerances control and utilization. Economic Use of Raw Materials: Ferrous steel, hot rolled steel, cold finished steel, stainless steel, non ferrous materials aluminium, copper, brass, non metallic materials, plastics, rubber and composites.

UNIT-II

Metallic Components Design: Metal extrusion, metal stamping, fine blanking, four slide parts, spring and wire forms, spun metal parts, cold headed parts, extruded parts, tube and section bends, rolled formed parts, power metal parts, forging electro forming parts, specialized forming methods, turned parts, machined round holes, drilled parts, milled parts.

UNIT-III

Metallic Components Design: Planned shaped and slotted parts, screw threaded contoured and internal ground parts, center less ground, electrical discharged, rolled furnished parts, electro chemical and advanced machine parts, Sand cast, diecast, investment cast and other cast products.

UNIT-IV

Non Metallic Component Design: Thermosetting plastic, injection moduled and rotational moulded parts, blow moulded, welded plastic articles, ceramics.

Assembled Parts Design: Welded parts, arc, resistance, brazed and soldered parts, gear box assembly, bearing assembly.

UNIT-V

Assembled Parts Design: Retension, bolted connection, screwed connections, flanged connections, centered connections, press fitted connections, surface finishing, plated

parts, heat treated parts, NC machining, group technology, low cost automation, computer aided manufacture, product design requirements.

Case Studies: Identifications of economical design and redesign for manufacture

Suggested Reading:

1. James G. Bralla, *Hand book of product design for Manufacturing* McGraw Hill Co., 1986
2. K.G. Swift *Knowledge based design for Manufacture* , Kogan page Limited, 1987.

ME 452

COMPOSITE MATERIALS

(ELECTIVE-I)

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Introduction: Definition and classification of Composites (PMC, MMC, CMC), FRP Composites, Fiber Reinforcements: Fiber Types and its properties, Fiber Forms, Matrix materials and its properties: Thermoset Matrices, Thermoplastic Matrices, Applications of Composite Materials.

UNIT-II

Manufacturing Processes: Hand-Lay-up, Prepreg Lay-up, Bag Molding, Autoclave processing, Compression Molding, Resin Transfer Molding, Pultrusion, Filament Winding, Gel time test for resins, Curing Cycle. Measurement of basic composite properties: Fiber and matrix tests, Tensile test, Compressive test, in-plane shear test, interlaminar shear test, flexure test.

UNIT-III

Micromechanics of Composites:

Basic Concepts: Volume and Mass fraction, Heterogeneous, Anisotropic, Orthotropic, Transversely Isotropic and Isotropic Materials.

Mechanical Properties: Prediction of Elastic constants, micromechanical approach, Stress Partitioning Parameter, Halpin-Tsai equations.

Thermal Properties: Thermal Expansion, Moisture Expansion, Transport Properties.

UNIT-IV

Macromechanics of Composites:

Elastic constants of a lamina, relations between engineering constants and reduced stiffness and compliances, variation of lamina properties with orientation, Classification of Laminated composites, analysis of laminated composites, stresses and strain with orientation, Interlaminar stresses and edge effects.

UNIT-V

Strength of Orthotropic lamina: Tensile and compressive strength of national fiber" composites, fracture modes in compos: es, delamination failure, Maximum stress theory, Max.mum S Tsai-Hill Criterion, Tsai-Wu Criterion. Laminate strength: Hrst Ply Failure, Fiber Failure, Timcated-MaMmum-Strain Criterion.

Suggested Reading:

1. Ronald F.Gibson *Principles of Composite Materials Mechanics* McGraw-Hill, Inc, 1994.
2. Krishna, K,Chewla, *Composite Materials,* Springler *-Verlag. 1987.*
3. Carl T.Herakovich, *Mechanics of Fibrous Compsoites,* John Wiley Sons Inc. 1998.
4. Ever J. Barbero, *Introduction to Composite Materials,* I Taylor & Francis, 1999.
5. Jones, R.M., *Mechanics of Composite Materials*, UcGrw-1 Co., 1967.

ME 467

TOTAL QUALITY MANAGEMENT

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

Unit-I

Strategic Quality Management: Quality policies, quality goals, obstacles to achieving successful strategic quality management.. Organization for quality role of {Top. middle, work force teem (Quality Circles). Developing, a quality work culture - Maslow need theory, Herzbeg 2 factor theory, theory X, Y & Z. Methods to create and maintaina awareness of quality, provide evidence of management leadership, types of self development and empowerment programmes, methods of participations means of inspiring action, recognition and rewards. Supplier quality rating plans (lot plot plan, OC curve, parento analysis) assignment of supplier capability, Methods of evaluating supplier products, contract management (Joint economic plan, join technological forecasting).

Unit-II

Design for quality: Basic functional requirements of quality, Design for (reliability, safety cost and product performance) concurrent engineering (DFMA) value engineering. Support for quality improvement processes (Block diagram, brain storming, cause effect analysis, pareto analysis) Quality function deployment, reliability analysis, failure rate, failure pattern of complex products (bath tub curve) weibull distribution relationship between part and the system exponential reliability, availability, FMEA (Fracture mode and Effect Analysis) Design for experiments: Factorial experiments, construction fractional designs.

Unit-III

Technical tools for quality: Comparison of two methods: observation of data, distribution, statistical analysis, chi square test, F test. T test. Hypothesis testing significance testing, linear correlation and regression. Analysis of variance (ANOVA). 4 factor ANOVA experiment 2 levels. Analysis of means. Techniques for on line quality:: Data collection plan, variable an attribute charts, interpreting the control charts, charts for drifting processes, mufti variant charts, alternatives to statically process controls. Techniques for offline quality control: Background to Taguchi method (Quality loss and loss function, controllable factor and non controllable factors in parameter performance, tolerance design. Taguchi

Analysis Techniques: Net variation and contribution ratio, estimation of process performance. Accumulating analysis, performance measures-avoiding means variance dependents, choosing noise performance measure, minute analysis and life testing Taguchi tolerance design and tolerance (re) design.

Unit-IV

Quality Information System: Scope of quality information system. Different between QIS and MIS. Creating new software (steps, types, defects) reports on quality (operational and executive reports) Features of QIS software. Software for inspection.

Inspection System: Operational sorting and correction sorting. AQL, LTPD, AOQL. Non destructive test. Audit systems: (quality improvement planning and implementation, describing quality function, process control system. Control of measurement system, material identification and control, drawing and specification control, process corrective action) the concept of POKAYOKE.

Unit-V

Measure of customer needs: The need to measure customer satisfaction. Importance of proper packaging, customer processing and installation of product, dealing with customer complaints, using weibull analysis, field feed back, parameter to measure customer (Dis) satisfaction. Problems with the customer satisfaction system. Beyond TOM: Difficulties in implementing TOM system, rating your quality system. JIT system, the people side of TOM. system integration, Kansei engineering and flexibility in manufacturing.

Suggested Reading:

1. H. G. Menon. *TOM in view Production Manufacturing,* Me Graw Hill, Publishers.
2. N. G. Logothetis, *Managing for total quality.*
3. J.M. Juran& Frank Gryna, *Quality planning and analysis.*

CE 452

DISASTER MITIGATION AND MANAGEMENT

(ELECTIVE-I)

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Introduction - Natural, human induced and human made disasters international decade of disaster reduction.

UNIT-II

Natural Disasters - Hydrometereological based disasters - Trophfcal cyclones, floods, drought and desertification - Zones Geographical based disasters - Earth quake, Tsunammis, Landslides and avalanches.

UNIT-III

Human induced hazards - chemical industrial hazards, major power breakdowns, traffic accidents, etc.

UNIT-IV

Use of remote sensing and GISI disaster mitigation and management

UNIT – V

Rich and vulnerability to disaster - mitigation and management options warning and forecasting

Suggested Reading:

1. Rajib, S and Krishna Murthy, R. R (2012) *Disaster Management global Challenges and Local Solutions* Universities Press, Hyderabad.
2. Navele, P & Raja, C. K (2009), *Earth and atmospheric Disasters Management, Natural and Manmade*, B. S. publications, Hyderabad.
3. Fearn-Banks, K (2011), *Crises computations approach: A case book approach. Route ledge Publishers*, Special Indian Education, New York & London.
4. Battacharya, T. (2012), *Disaster Science and Management,* Tata McGraw hill Company, New Delhi.

MP 431

MANUFACTURING ENGINEERING LAB

(For Semester-I Production only)

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

Part-1: Computer Aided Manufacturing Practice

1. Facing, turning, step turning, taper turning, contouring etc. on CNC lathe machine.
2. Pocketing and contouring on CNC milling machine.
3. Simulation and development of NC code using any CAM software.
4. Programming for integration of various CNC machines, robots and material handling systems.

Part-2: Manufacturing Practice

One / two of the following items have to be manufactured by a group of maximum three members using all the production processes as far possible and assembly techniques with fits and tolerances using CAD system. Various exercises have to be allotted to different groups of students by the Head of the Dept. / Lab Coordinator.

1. V block with U clamp
2. Dial test indicator stand
3. Simple Jig
4. Simple fixture
5. Simple die set
6. Simple tail stock mechanism
7. Lathe tool post
8. Milling Machine Arbor
9. Pipe vice
10. Paper Punch (double punch)
11. Hydraulic Cylinder
12. Gear box (Spur, Helical or Worm)

ME 432

METROLOGY AND INSTRUMENTATION LAB

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

1. Measurement with inside, outside and depth micrometers.
2. Measurement with height gauges, height masters, etc.
3. Measurement of Linear and Angular dimensions with Tool Maker's Microscope - Flat specimens plain, cylindrical specimens with centers and threaded components
4. Measurement with - Dial Indicator / Electrical Comparator / Mechanical Comparator / Dial Bore Gauges, etc.
5. Measurement of angles with Sinebar, Bevel protractor and Precision level, Block level, etc.
6. Measurement of roundness errors with bench centres.
7. Geometrical tests on Lathe machine.
8. Measurement of flatness errors (surface plate) with precision level.
9. Measurement with optical projector.
10. Checking machined components with plug gauges, adjustable snap gauges, indicating gauges, etc.
11. Force measurement with strain gauge type load cell / proving ring / piezoelectric load cell etc.
12. Temperature measurement with thermocouples

MP 433

COMPUTER AIDED PRODUCTION DRAWING LAB

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

PART DRAWINGS: Prepare the part drawings with production drawing details of the following assemblies using modeling softwares solid works / Solid Edge / CATIA/ProE/Auto CAD-MDT/ N_X

Sheet No.	Topic
1	Steam Engine Cross Head
2	Steam Engine Connecting Rod End
3	Non Return Valve
4	Blow – off cock
5	Drill Jig (Plate type)

Suggested Reading :

1. K. L. Narayana, P. Kannaiah and K. Venkat Reddy, *Production Drawing, N*ew Age International (P) Ltd. Revised edition 1997.
2. P. Narasimha Reddy, T.A. Janardhan Reddy and C. Srinivas Rao, *Production Drawing Practice,* Hi-Tech Publishers, 2001.

ME 434

PROJECT SEMINAR

Instruction 3 Periods per week
Sessional 25 Marks

The objective of the project seminar is to actively involve the student in the initial work required to undertake the final year project. It may comprise of:

- Problem definition and specifications.
- A broad understanding of the available techniques to solve a problem of interest.
- Presentation (Oral and Written) of the project.

The Department can initiate the work related to project allotment at the end of III year II semester and complete it in the first two weeks of the fourth year I semester.

First 4 weeks of IV year 1st semester will be spent on special lectures by faculty members, research scholar speakers from industries and R&D institutions. The objective of these talks is to be expose students to real like / practical problems and methodologies to solve them.

A seminar schedule will be prepared by the coordinator for all the students. It should be from the 5th week to the last week of the semester and should be strictly adhered to,

Each student will be required to

1. Submit a one page synopsis of the seminar to be delivered for display on notice board.
2. Give a 20 minutes presentation followed by 10 minutes discussion.
3. Submit a technical write up on the talk delivered.

At least two teachers will be associated with the evaluation of the project seminar for the award of the Sessionals marks which should be on the basis of performance on all the three items stated above.

Note: Three periods of contact load will be assigned to each project guide

SCHEME OF INSTRUCTION & EXAMINATION

B.E. IV - YEAR
(PRODUCTION ENGINEERING)

SEMESTER - II

Sl. No.	Syllabus Ref. No.	SUBJECT	Scheme of Instruction		Scheme of Examination		
			Periods per week		Duration In Hours	Maximum Marks	
			L	D/P		Univ. Exam	Sessionals
		THEORY					
1.	ME 409	Tool Design	4	-	3	75	25
2.	ME 461	Production and Operations Management.	4	-	3	75	25
3.		ELECTIVE – II	4	-	3	75	25
4.		ELECTIVE – III	4	-	3	75	25
		PRACTICALS					
1.	ME 481	Seminar	-	3	-	-	25
2.	ME 482	Project*	-	6	Viva Voce	Gr*	50
		Total	**16**	**9**	**-**	**300**	**175**

Excellent / Very Good / Good / Satisfactory / Unsatisfactory.