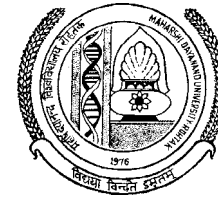# Maharshi Dayanand University
Rohtak

Ordinances, Syllabus and Courses of

Reading for B.Tech **3rd & 4th Semester Mechanical Engineering**

Examination

Session - 2009-2010

MAHARSHI DAYANAND UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATION
B.E. 2nd YEAR (Semester - III) MECHANICAL ENGINEERING)
Modified 'E' Scheme effective from 2009-10

Course No.	Course Title	Teaching Schedule				Marks of Class Work	Marks of Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
Math- 201 - E	**Mathmatics-III** (Common with all branches)	3	1	—	4	50	100	—	150	3 hrs
Hum - 201-E	**Economics** (Common with all branches)	3	2	—	5	50	100	—	150	3 hrs
ME-201-E	**Thermodynamics** (ME, AE)	3	1	—	4	50	100	—	150	3 hrs
ME-203-E	**Strenght of Materials**	3	1	—	4	50	100	—	150	3 hrs
ME-205-E	**Engineering Mechanics**	3	1	—	4	50	100	—	150	3 hrs
ME-207-E	**Machine Drawing**	1	—	4	5	50	—	-	50	3 hrs
EE-213-E	**Electronics Engg.** (ME, CHE)	3	1	-	4	50	100	-5	150	3 hrs
ME-209-E	**Strength of — Materials-I Lab** (ME, AE)	—	-	2	2	25	--	25	50	3 hrs
ME-211-E	**Computer Aided Drafting Lab.**	—	-	2	2	25	--	25	50	3 hrs
	Total	19	6	10	35	450	600	100	1150	

Note :

1. Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.

2. The University examination in the ME-207 E (Machine Drawing) shall not be conducted w.e.f. the session 2006-07 Thus the total marks of the subjects shall be 50 only.

3. The marks for class work as well as practical examination in the subject ME-211E (Computer Aided Drafting Lab. has been increased from 25 marks each to 50 each. Thus the total marks for the subjects shall be 100 in place of 50 from the sesion 2006-07

4. The grand total of semester marks shall be 1150 in place of 1200 marks.

MATH-201-E   MATHEMATICS - III

L	T	P		
3	1	—		

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

Part - A

Fourier Series and Fourier Transforms : Euler's formulae, conditions for a Fourier expansion, change interval Fourier expansion of odd and even functions, Fourier expansion of square wave, saw-toothed wave, half and full rectified wave, half range sine and consine series.

Fourier integrals, Fourier transforms, shifting theorem (both on time and frequency axes), Fourier transforms of integrals, Convolution theorem, Fourier transform of Dirac-delta function.

Part - B

Functions of Complex Variable : Definition, Exponential function, Trignometric and Hyperbolic functions, Logrithmic fucntions. Limit and Continuity of a function, Differenetiability and Analyticity.

Cauchy- Riemann equations, necessary and sufficient conditions for a function to be analytic, polar for of the Cauchy-Riemann equations. Harmonic functions, applications to flow problems. Integration of complex functions. Cauchy- Integral theorem and fourmula.

Power series, radius and circle of convergence, Taylor's Maclaurin's and Laurent's series. Zeroes and singularities of complex functions. Residues. Evaluation of real integrals using residues (around unit and semi circle only).

Part - C

Probability Distributions and Hypothesis tetsing : Conditional probability, Bayes theorem and its applications, expected vaue of a random variable. Properties and application of Binomial, Poisson and Normal distributions.

Testing of a hypothesis, tests of significance for large samples,

Student's t-distributions (application only), Chi-square test of goodness of fit.

Linear Programming : Linear programming problems formulation, Solving linear programming problems using (i) Graphical method (ii) Simplex method (iii) Dual simplex method.

TEXT BOOKS :
1. Advanced Enggg. Mathematics : F Freyszig.
2. Higher Engg. Mathematics :B. S. Grewal.

REFERENCE BOOKS :
1. Advance Engg. Mathematics : R.K. Jain S.R.K. Iyenger.
2. Advance Engg. Mathematics : Michael D. Greenberg.
3. Operation Research : H.A. Taha.
4. Probability and statistics for Engineers : Johnson. PHI

NOTE : Examiner will set eight questions, taking two from Part-A, three from Part-B three from Part-C. Students will be required to attempt five question taking atleast one from each part.

HUM - 201-E   MATHEMATICS

L	T	P		
3	1	—	Class work	: 50 Marks
			Theory	: 100 Marks
			Total	: 150 Marks
			Duration of Exam.	: 3 Hrs.

COURSE OBJECTIVES ; The purpose of this course is to :
1. Acquiant the student in the basic economic concepts and their operational signficance and
2. Stimulate him to tink systematically and objectively about contemporary economic problems.

UNIT - I

Definition of Economics - various definitions, Nature of Economic problem, Production possibility curve Econmic laws ad their nature. relation between Science, Engineering,

Technology and Economics.

UNIT - II

Concept and measurement of utility. Law of Diminishing Marginal Utility, Law of equi-marginal utility - its practical application and importance.

UNIT - III

Meaning of Demand, Individual and Market demand schedule. Law of demand, shape of demand curve, Elasticity of demand, measurement of elasticity of demand, factors effecting elasticity of demand practical importance & applications of the concept of elasticity of demand.

UNIT - IV

Meaning of production and factors of production; Law of variable proportions, Returns to scale, Internal and External economics and diseconomics of scale.

Various concepts of cost - Fixed cost, variable cost, average cost, marginal cost, money cost, real cost opportunity cost. Shape of average cost, marginal cost, total cost etc. in short run and long run.

UNIT - V

Meaning of Market, Types of Market - Perfect Competition, Monopoly, Oligoply, Monoplistic Competition (Main features of these markets)

Supply and Law of Supply, Role of Demand & Supply in Price Determination and effect of changes in demand and supply on prices.

UNIT - VI

Nature and charactertistics of Indian economy(brief and elelmentary introduction), Privatization - meaning, merits and demerits. Globalisation of Indian economy - merits and demerits. Elementary Concepts of VAT, WTO, GATT & TRIPS agreement.

TEXT BOOKS :
1. Principles of Economics : P. N. Chopra (Kalyani Publishers).
2. Modern Economic Theory - K.K. Dewett (S. Chand)

REFERENCE BOOKS :
1. A text Book of Economic Theory Stonier and Hague (Longman's Landon).
2. Micro Economic Theory - M.L. Jhingan (S. Chand)
3. Micro Economic Theory - H.L. Ahuja (S. Chand)
4. Modern Micro Economics : S.K. Mishra (Pragati Publications)
5. Economic Theory - A.B.N. Kulkarni & A.B. Kalkundrikar (R. Chand & Co.)
6. Indian Economy : Rudar Dutt & K.P.M. Sundhram

NOTE : Eight questions are to be set atleast one question from each unit and the students will have to attempt to questions in all.

ME - 201-E	THERMODYNAMICS

L	T	P
3	1	—

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

UNIT - I

Basic Concepts : Macroscopic and Microscopic Approaches, Thermodynamic Systems, Surrounding and Boundary. Thermodynamic Property - Intensive and Extensive Thermodynamic Equilibrium, State, Path, Process and Cycle, Quasi- static, Reversible and Irreversible Processes. Working Substance. Concept of Thermodynamic Work and Heat, Equality of Temperature, Zeroth Law of Thermodynamic and its utility. Problems.

UNIT - II

First Law of Thermodynamics : energy and its Forms, Energy and 1st Law of Thermodynamics Internal Energy and Enthalpy, PMMFK, Steady flow energy equation, 1st Law Applied to Non- flow process. Steady Flow Process and Transient Flow Process, Throttling Process and Free Expansion Process, Problems.

UNIT - III

Second law of Thermodynamics : Limitations of First Law, Thermal Reservoir, Heat Source and Heat Sink, Heat Engine, Refrigerator and Heat Pump, Kelvin- Planck and Clasius Statements and their Equivalence, PMMSK. Carnot Cycle, Carnot Heat Engine and Carnot Heat Pump, Carnot Theorem and its Corollaries, Thermodynamic Tempearture Scale. Entropy, Calusius Inequality, Principle of Entropy Increase, Temperature Entropy Plot, Entropy Change in Different processes, Introduction to Third law of Thermodynamics, Problems.

UNIT - IV

Availability and Irreversibility : High and Low Grade Energy, Availiability and Unavailabel Energy, Loss of Available Energy Due to Heat Transfer Through a Finite Teperature Diference; DeadState of a system, Availability of Non- Flow or Closed System, Availability of a Steady Flow System. Helmholtz and Gibb's Functions, Effectiveness and Irreversibility, Second law efficiencies of processes & cycles. Problems.

UNIT - V

Pure substance : Pure Substance and its Properties, Phase and Phase Transformations Vaporization, Evaporation and Boiling, Saturated and Superheat Steam, Solid - Liquid - Vapour Equilibrium, T-V, P-V and P-T Plots During Steam Formation, Properties of Dry, Wet and Superheated Steam, Property Changes During Steam Processes, Temperature - Entropy (T-S) and Enthalpy - Entropy (H-S) Diagrams, Throttling and Measurement of Dryness Fraction of Steam. Problems.

UNIT - VI

Ideal and Real Gases : Concept of an Ideal Gas, Basic Gas Laws, Chacartersitics Gas Equation Avogadro's law and Universal Gas Constant, P-V-T surface of an Ideal Gas. Vander

Waal's Equation of state, Reduced Co-ordinates, Compressibility factor and law of corresponding states. Mixture of Gases, Mass, Mole and Volume Fraction, Gibson Dalton's law, Gas Constant and Specific Heats, Entropy for a mixture of non-reactive gases, Problems.

UNIT - VII

Thermodynamic Relations ; Maxwell Relations, Clapeyron Equation, relations for changes in Enthalpy and Internal Energy & Entropy, specific Heat Capacity Relations Joule Thomson coefficient & inversion curve.

TEXT BOOKS :

1. Engineering Thermodynamics - Jones and Dugan, PHI, New Delhi.
2. Fundamentals of Engineering Thermodynamics - E. Radhakrishnan, PHI, New Delhi.

REFERENCE BOOKS :

1. Theory and Problems of Thermodynamics -Y.V.C. Rao, Wiley Eastern Ltd., New Delhi.
2. Engineering Thermodynamics -C P Arora, Tata McGraw Hill
3. Engineering Thermodynamics - P K Nag, Tata Mc Garw Hill

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

ME - 203-E   **STRENGTH OF MATERIALS - I**

L	T	P
3	1	—

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

UNIT - I

Simple Stresses & Strains ; Concept & types of Stresses and strains, Poison's ratio, stresses and strain in simple and compound bars under axial loading, stress strain diagrams, Hooks law, elastic constants & their relationships, temperature stress & strain in simple & compound bars under axial loading Numerical.

UNIT - II

Compound Stresses & Strains : Concept of surface and volumetric starins, two dimensional stress system, conjugate shear at a point on a plane, principle stresses & strains and principal planes, Mohr's circle of stresses, Numerical.

UNIT - III

Shear Force & Bending Moments :Definitions, SF & BM diagrams for cantilevers, simply supported beams with or wothout over-hang and calculation of maximum BM & SF and the point of contra- flexure under (i) concentrated loads, (ii) uniformly distributed loads over whole span or a part of it,(iii) combination of concentrated loads and uniformly distributed loads, (iv) uniformly varying loads and (v) application of moments, relation between the rate of loading, the shear force and the bending moments, Problems.

UNIT - IV

Torsion of Cicular members : Torsion of thin circular tube, Solid and hollow circular shafts, tapered shaft, stepped shaft & composite circular shafts,combined bending and torsion, equivalent torque, effect of end thrust Numericals.

UNIT - V

Bending & Shear Stresses in Beams : Bending stresses in beams with derivation & application to beams of circular,

rectangular, I.T. and channel sections, composite beam, shear stresses in beams with combined bending, torsion & axial loading of beams, Numericals.

UNIT - VI

Columns & Struts : Column under axial load concept of instability and buckling, slenderness ratio, derivation of Euler's formulae for the elastic buckling load, Eulers, Rankine, Gordom's formulae Johnson's empirical formula for axial loading columns and their applications, eccentric compression of a short strut of rectangular & circular sections, Numerical.

UNIT - VII

Slope & Deflection : Relationship between moment, slope & deflection, Mohr's theorem, moment area method, method of integration, Macaulay's method, calculations for slope and deflection of (i) cantilevers and (ii) simply supported beams with or a without overhang under concentrated load, Uniformaly distributed loads or combination of concentrated and uniformly distributed loads, Numerical.

UNIT - VIII

Fixed Beams : Deflections, reactions and fixing moments with SF & BM caculations & diagrams for fixed beams under (i) concentrated loads & uniformly distributed load.

TEXT BOOKS :
1. Strength of Materials - G.H. Ryder - Macmillan, India.
2. Strength of Materials - Andrew Pytel and Fredinand L.Singer, Addison - Wesley.

REFERENCE BOOKS :
1. Strength of Materials - Popov, PHI, New Delhi.
2. Strength of Materials A Rudimentray Approach - M.A. Jayaram, Sapna Book House, Bangalore.

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

ME - 205-E   ENGINEERING MECHANICS

L	T	P
3	1	—

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

UNIT - I

Review of Basic Force Systems :dimensions and units of mechanics, idealization of mecahnics, laws of mecahnics, vector algebra review, moment of a force about a point and axis, the couple and couple moment, addition and subtraction of couples moment of a couple about a line, translation of a force to a parallel position, resultant of a force system, Problems (vector method).

UNIT - II

Equilibrium : Introduction, free body diagram, control volumes, general equations of equilibrium, two point equivalent loading, static in-determinacy, simple truss, method of joints, method of sections, co-planer cable-loading a function of x, coplanar cables - loading the weight of the cable itself, Problems.

UNIT - III

Properties of Surfaces & Moments and Products of inertioa : First moment of an area and the centroid, principal axes, formal definition of inertia quantities, relation between mass-inertia terms and area-inertia terms. translation of coordinate axes, transportation properties of the inertia terms, a brief introduction to tensors, the inertia of ellipsoid and principal moments of inertia, Problems (vector method)

UNIT - IV

Kinematics of Parties and Rigid Bodies : Velocity and acceleration in path and cylindrical coordinates, motion of a particle relative to a pair of translating axes, translation and rotation of rigid bodies, Chasles theorem, moving refrences, velocity and acceleration for different refernces, inertia and coriolis forces. Problems (vector method)

UNIT - V

Particle Dynamics Energy Methods & Momentum Methods : Newton's law for rectangular coordinates & cylindrical coordinates, rectifier translation, central force motion. Newton's law for path variables, work energy equations, work energy equations for a systems of particles, linear and angular momentum equations for a systems of particles. Problems (vector method)

UNIT - VI

Variational Mechanics :Hamiton principle, Lagrange equations, principle of virtual work, methods of minimum potential energy, stability.

TEXT BOOKS :

1. Engineering Mechanics - Statics & Dynamics by I.H. Shames, PHI, New Delhi
2. Engineering Mechanics - Timoschenko

REFERENCE BOOKS :

1. Statics & Dynamics by J.L. Meriam, John Wiley & Sons (P) Ltd. New York.
2. Statics & Dynamics by Beer & Johnson. MGH, New Delhi.

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

ME - 213-E   ELECTRONICS ENGINEERING

L T P   Class work   : 50 Marks
3 1 —   Theory   : 100 Marks
                                 Total   : 150 Marks
                                 Duration of Exam. : 3 Hrs.

UNIT - I : DIODES

P-N junction, P-N junction as a rectifier, V-I Characteristics, Breakdown diodes, Light emitting diodes, Load - Line concept, Clipping - Clamping, rectifiers.

UNIT - II : TRANSISTORS

Operation and Characteristics of a Transistor, Common Emitter, Common Collector and Common Base Configurations of a transistor, Biosing and Transistor as an amplifier and oscilletor.

UNIT - III : OP-AMPS

Basic Characteristics of an OP-AMP Applications of OP-AMP (Inverter, Non-Inverter, Integrator, Differentiator,Logarithmic amplifier, Square wave generator).

UNIT - IV : POWER AMPLIFIERS

Class A, Class B and Class C Amplifiers

UNIT - V : STAQBILISED POWER SUPPLIES

Regulated power supply, series voltage regulator

UNIT - VI : DIGITAL GATES

Binary numbers, OR,AND,NAND, NOR, NOT, EX-OR Gates.

TEXT BOOKS :

Integrated Electronics Milman & Halkias (MGH)

REFERENCE BOOKS :

1. Digital Electronics by R.P. Jain (MGH)
2. Microelectronics- Ramana (MGH)
3. Electronics Principles Malvino, TMH

NOTE : 1. Five out of eight questions are to be attempted

2. At least one question should be set from each unit.

MATH-207-E   MACHINE DRAWING

L T P
1 - 4

Theory	: -
Sessional	: 50 Marks
Total	: 50 Marks

Part - A

Introduction to BIS Specification SP :46 - 1988 Code of Engineering drawing - Limits, fits and Tolerance (Dimentional and Geometrical tolerance), Surface finish representation.

Gear : Gear terminology, I.S. convention representation of assembly of spur gears helical gears, bevel gears, worm and worm wheel.

Part - B

Orthographic views from isometric views of machine parts/ components. Dimensioning Sectioning. Exercises on Copuling, Crankshft, Pulley, Piston and Connecting rod, Cotter and Knuckle joint. Riveted Joint and Weldede Joint

Part - C

Assembly drwing with sectining and bill of materials from given detailed drwings of assemblies Lathe Tail stock, Machine vice, Pedestal bearing, Steam stop valve, Drill jigs and Milling fixture.

NOTE :

1. In the semester examination the examiner will set total six questions in all, taking two questions from each part. The students will be required to attempt three questions in all, taking one question frome each part.

2. The question from Part-A and Part-B will carry 20 marks each. Question from Part-C will carry 60 marks.

TEXT BOOKS :

1. Machine Drwing - N. D. Bhatt and V M Panchal, Charotar Publishing house.

2. A Text Book of Machine Drawing - PS Gill Pub. : S.K. Kataria & Sons.

3. Engineering Graphics with Auto CAD 2002 - James D. Bethune, Pearson Education.

REFERENCE BOOKS :

1. A Text Book of Machine Drawing Laxmi Narayana and Mathur, M/s Jain Brothers, New Delhi.

2. Machine drawing by N. Sidheshwar, Kannaieh, V.S Sastry, TMH, New Delhi.

ME-209-E   STRENGTH OF MATERIAL-I LAB

L   T   P
-   -   2

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

List of Experiments :

1. To Study the Brinell hardness testing machine & perform the Brinell hardness test

2. To Study the Rockwell hardness testing machine & perform the Rockwell hardness test.

3. To Study the Vickers hardness testing machine & perform the Vickers hardness test.

4. To Study the Erichsen sheet metal testing machine & perform the Erichsen sheet metal test.

5. To Study the Impact testing machine and perform the Impact test (Izod & Charpy).

6. To Study the Universal testing machine and perform the tensile test.

7. To perform compression & bending tests on UTM

8. To perform the sheer test on UTM

9. To Study the torsion testing machine and perform the torsion test.

10. To draw shear Force, Bending Moment Diagrams for a simply Supported Beam under Point and Distributed Loads.

11. To determine Mecahnical Advantage and Efficiency of Single and Double Purchase Winch Crab.

12. To determine Mecahnical Advantage and Efficiency of Worm Gear of Single, Double and Triple start.

13. To determine Mecahnical Advantage and Efficiency of Simple and Compound Screw Jack.

14. To find Moment of Inertia of a Fly Wheel.

Note :

1. At least ten experiments are to be performed in the semester.

2. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the concerned institute as per the scope of the syllabus.

EE-219-E   ELECTRONICS ENGINEERING LAB

L   T   P
0   0   2

Class Work	: 25 Marks
Exam	: 25 Marks
Total	: 50 Marks
Duration of Exam.	: 3 Hrs.

List of Experiments :

1. Study of V-I Characteristics of Diode.

2. Study of a Clipping and Clamping circuits.

3. Study of a Half wave rectifier.

4. Study of a full wave rectifier.

5. Study and Analysis of a Transistor in Common Emitter Configuration.

6. Study of OP-AMP as Inverter and Comparator

7. Study of OP-AMP as Differentiator.

8. Study of OP-AMP as Integrator.

9. Study of OP-AMP as Square wave generator.

10. Realization of TruthTables of AND, OR, NOT Gates.

11. Realization of TruthTables of NAND, NOR, Ex-OR Gates.

Note :

1. At least ten experiments are to be performed in the semester.

2. At least seven experiments should be performed from the above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

ME-211-E   COMPUTER AIDED DRAFTING LAB.

L   T   P
-   -   2

Sessional   : 50 Marks
Practical   : 50 Marks
Total   : 100Marks
Duration of Exam. : 4 Hrs.

The students will be required to carry out the following exercises using educational softwares (Auto Cad-2002, I-DEAS, Pro-Engineer etc.) :

1. Setting up to drwaing environment by setting drawing limits, drawing units, naming the drawing, naming layers, setting line types for different layers using various type of lines in engineering drawing, saving the file with .dwg extension.

2. Layout drwing of a building using different layer and line colors inclduing all Buidling details Name the details using text xommands, Make a title Block.

3. To Draw Orthographic protection Drwaings (Front, Top and side) of boiler safety valve giinbg name the various components of the valve.

4. Make an Isometric dimensioned drawing of a connecting Rod using isometric grid and snap.

5. Draw quarter sectional isometric view of a cotter joint.

6. Draw different types of bolts and nuts with internal and external threading in Acme and square threading standards. Save the bolts and nuts as blocks suitable for insertion.

7. Draw 3D models by extrding simple 2D objects, dimension and name the objects.

8. Draw a spiral by extruding a circle.

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SCHEME OF STUDIES & EXAMINATION
B.E. 2nd YEAR (Semester - III) MECHANICAL ENGINEERING)
Modified 'E' Scheme effective from 2009-10

Course No.	Course Title	Teaching Schedule				Marks of Class Work	Marks of Examination		Total Marks	Duration of Exam
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ME-203-E	**Strenght of Materials**	3	1	—	4	50	100	—	150	3 hrs
ME-205-E	**Engineering Mechanics**	3	1	—	4	50	100	—	150	3 hrs
ME-207-E	**Machine Drawing**	1	—	4	5	50	—	-	50	3 hrs
EE-213-E	**Electronics Engg. (ME, CHE)**	3	1	-	4	50	100	-5	150	3 hrs
ME-209-E	**Strength of — Materials-I Lab (ME, AE)**	—	-	2	2	25	--	25	50	3 hrs
ME-211-E	**Computer Aided Drafting Lab.**	—	-	2	2	25	--	25	50	3 hrs
	Total	19	6	10	35	450	600	100	1150	

Note :

1. Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.

2. The University examination in the ME-207 E (Machine Drawing) shall not be conducted w.e.f. the session 2006-07 Thus the total marks of the subjects shall be 50 only.

3. The marks for class work as well as practical examination in the subject ME-211E (Computer Aided Drafting Lab. has been increased from 25 marks each to 50 each. Thus the total marks for the subjects shall be 100 in place of 50 from the sesion 2006-07

4. The grand total of semester marks shall be 1150 in place of 1200 marks.

HUM - 202-E   FUNDAMNETALS OF MANAGEMENT

L   T   P
3   1   —

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

UNIT - I

Meaning of managemnt. Definitions of Management. Characteristics of Management v.s. Administration Management - Art, Science and Profession.Importance of Management Development of Management thoughts principles of Management.The Management Functions. Inter- relationship of Managerial functions.

UNIT - II

Nature and Significance of staffing. Personnel Management . Functions of personnel Management planning Process of manpower planning. Recruitmnet.Selection :protection -Seniority Vs. Merit Training - objectives and types of training.

UNIT - III

Production Management :Definition, Objectives, Fuinctions and scope, production Planning and Control : Its significance, stages in production planning and control. Brief introduction to the material management , inventory control; its importance and various methods.

UNIT - IV

Marketing Management - Definition of marketing concept, objectives & Functions of marketing. Marketing Research - Meaning : definition : objectives : Importance :Limitations : Process : Process Advertising - Meaning of advertising objectives, fuicntions, criticism.

UNIT - V

Introduction of Financial Management, Objectives of Financial Management , Functions and Importance of Financial **Management** . Brief Introduction to the concept of capital structure and various sources of finance.

BOOKS RECOMMEDED :

TEXT BOOKS :
1. Principles and Practice of Management - R.S. Sharma, N.S,. bhalla (Kalyani Publishers).
2. Organisation and Management - R.D. Aggarwal (Tata Mc Graw Hill)

REFERENCE BOOKS :
1. Principles & Practice of Management - L.M. Prasad (Sultan Chand & Sons)
2. Management -Harold, Koontz and Cyrilo Donell (Mc Graw Hill)
3. Marketing Management - S.A. Sherlikar (Himalaya Publsihing House, Bombay).
4. Financial Management - I.M. Pandey(Vikas Publishing House New Delhi).
5. Management - James A.F. Stoner & R. Edward Freeman, PHI.

NOTE : Eight questions are to be set atleast one question from each unit and the students will have to attempt to questions in all.

ME - 202-E   MANUFACTURING TECHNOLOGY

L T P
3 1 —

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

UNIT - I

Metal Casting Processes : Advantages and limitations , sand mold making procedure. Patterns and Cores : Pattern materials pattern allowances, types of pattern, color coding. Molding materisl : Molding sand composition, sand preparation, sand properties and testing, Sand molding processes.

UNIT - II

Cores : Types of cores, core prints, chaplets and chills, gating systems : Gates and gating systems risers. Melting practice : Cupola, charge calculations. Casting cleaning and casting defects; Fettling defects in castings and their remedies, methods of testing of castings for their soundness.

UNIT - III

Special Casting Processes :Shell molding, precision casting,permanent mold casting, die casting, centrifugal casting, continuous casting.

UNIT - IV

Metal Formaing processes : Nature of plastic deformation, hot working and cold working. principles of rolling, roll passes, roll pass sequences. Forging : Forging operations, smith forging, drop forging, press forging, forging defects.

UNIT - V

Extrusion and other processes : Extrusion principle, hot extrusion, wire drwing, swaging, tube making. Sheet metal opeartions :Press tools operations, hearing action, drawing dies, spinning, bending, stretch forming embossing and coining.

UNIT - VI

Gas and Are Welding : Classification : Oxy - acetylene welding equipment and techniques. Electric are welding : Electrodes, manual metal are welding inert gas shielded are welding, tungsten inert gas welding (TIG), metal inert gas welding(MIG) submerged are welding (SAW)

UNIT - VII

Resistance Welding : principles, resistance spot welding resistance seam wedling upset welding, flash welding.

UNIT - VIII

Other Welding Processes :Introduction thermit welding, electro slag welding electron beam welding, forge, friction welding, diffusion welding, brazing and soldering.

TEXT BOOKS :
1. Principles of Manufacturing Materials & Processes - Campbell J.S. Publishers - Mc Graw Hill
2. Manufacturing Science - Ghosh A; Malik A.K. East - West Press Pvt. Ltd. New Delhi.

REFERENCE BOOKS :
1. Foundry Technology - K.P. Sinha, D.B. Goel, Roorkee Publishing House
2. Welding and Welding Technology, Richard L. Little tata Mc Graw Hill Ltd.
3. Principle of Metal casting - Rosenthal, Tata Graw Hill, New Delhi.
4. Manufacturing Processes and Systems : Ostwald Phillip F., Munoz Jairo, John Wiley & Sons.
5. Manufacturing technology - Foundry, Forming and Welding - P.N. Rao, Tata Mc Graw Hill.
6. Elements of Manufacturing Processes - B.S. Nagendra Parasher, R.K. Mittal, PHI N. Delhi.

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

ME - 204-E   MATERIAL SCIENCE

L T P
3 1 —

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

UNIT - I

Crystallography : Review of crystal structure, space lattice, crystal panes and crystal directions, co-ordination number, number of atoms per unit cell, atomic packing factor, Numericals related to crystallography.

UNIT - II

Imperfection in metal crystals ; Crystal imperfections and their classifications, point defects, line defectsm, edge & screw dislocations, surface defcts, volume defcts & effects of imperfections on metal properties.

UNIT - III

Solid solutions and phase diagram : Introduction to single and multiphase solid solutions and types of solid solutions, importance and objectives of phase diagram, systems,phase and structural constituents cooling curves, unary & binary phase diagrams, Gibb's phase rule. Lever rule, eutectic and eutectoid systems, peritectic and peritectoid systems, iron carbon equilibrium diagram and TTT diagram.

UNIT - IV

Hear Treatment : Principles,purpose, classification of heat treatment processes, annealing normalizing stress relieving, hardening, tempering, carburizing, nitriding, cyaniding, flame and induction hardeinng. Allotropic transformation of iron and steel, Properties of austenite, ferrite, pearlite, martensite.

UNIT - V

Deformation of Metal : Elastic and plastic deformation, mecahnism of plastic deformation twinnng convential and true stress strain curves for polycrystalline materials, yield point phenomena, strain ageing, work hardening, Bauschinger efects, season cracking, Recovery, re-crystallization and grain growth.

UNIT - VI

Failures of metals : failure analysis, fracture, process of fracture, types of fracture, fatiguem characteristics of fatigue limit, mechamism of fatigue, factors affecting fatigue

UNIT - VII

Creep & Corrosion : definition and concept, creep curve, mechanism of creep, impact of time and tempearture on creep, creep fracture, creep testing and prevention aganist creep. Corrosion : Mechanism and effect of corrosion, prevention of corrosion.

UNIT - VIII

Plastic, Composite and Ceramics : Polymers, formation of polymer, polymer structure and crystallinity, polumers to pastic types, reinforced particles stregthened and dispersion strengthened composties, Ceramic materisl : Types of ceramics, properties of ceramic, ceramic forming techniques, mechanical behaviour of ceramic.

TEXT BOOKS :

1. Elements of Materials Science and Engineering : Van Vlack, Wesley Pub. Comp.

2. Manufacturing Science - Ghosh A; Malik A.K. East - West Press Pvt. Ltd. New Delhi.

REFERENCE BOOKS :

1. Foundry Technology - K.P. Sinha, D.B. Goel, Roorkee Publishing House

2. Welding and Welding Technology, Richard L. Little tata Mc Graw Hill Ltd.

3. Principle of Metal casting - Rosenthal, Tata Graw Hill, New Delhi.

4. Manufacturing Processes and Systems : Ostwald Phillip F., Munoz Jairo, John Wiley & Sons.

5. Manufacturing technology - Foundry, Forming and Welding - P.N. Rao, Tata Mc Graw Hill.

6. Elements of Manufacturing Processes - B.S. Nagendra Parasher, R.K. Mittal, PHI N. Delhi.

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

ME - 206-E   STRENGTH OF MATERIAL

L   T   P
3   1   —

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

UNIT - I

Strain Energy & impact Loading : defintions, expressions for starin energy stored in a body whn load is applied (i) gradualy (ii) suddenly and (iii) with impact, strain energy of beams in bending, beam deflections, strain energy of shfts in twisting , enegry methods in determining spring deflection, Castiglinao's & Maxwell's theorems, Numericals

UNIT - II

Therories of Elastic Failue ; Various theories of e;astic falures with derivations and graphical representations, applivcations to problems of 2-dimensional stress system with (i) Combined direct loading and bending, and (ii) combined torsional and direct loading, Numericals.

UNIT - III

Unsymmetrical bending :properties of beam cross section, product of inertia, ellipse of inertia, slope of the neutral axis, streses & deflections, shear centre and the flexural axis Numericals.

UNIT - IV

Thin Walled Vessels : Hoop & Longitudinal Stresses & strains in cylindrical & spherical vessels & their derivations under internal pressure, wire would cylinders, Numericals.

UNIT - V

Thick Cylinders & Spheres : Derivation of Lame's equations , radial & hoop stresses and strains in thick, and compound cyliders and spherical shells subjected to internal fluid pressure

only, wire wound cylinders, hub shrunk on solid shft, Numericals.

UNIT - VI

Rotating Rims Siscs : stresses in uniform rotating rings & discs, rotating dises of unifom strength, stresses in (i) rotating rims, neglecting the effcet of spokes (ii) rotating cylinders, hollow cylinders & solids cylinders, Numericals.

UNIT - VII

Bending of Cuved Bars :STRESES IN BARS of initial radius of curvature, bars in initial small radius of curvature, streses in crane hooks, rings of circuits & trapezoidal sections, deflection of curved bars & rings, deflection of rings by Castigliano's theorem stresses in simple chain link, deflection of simple chain links, Problems.

UNIT - VIII

Springs ; Stresses in open coiled helical spring subjected to axial loads and twisting copules, leaf springs, flat spiral springs, concentric springs Numericals.

TEXT BOOKS :

1. Strength of Materials - G.H. Ryder Third Edition in SI Units 1969 Macmillan, India

2. Mechanics of Materials - (Metric Edition) Ferdinand P. Beer and e. Russel Johnston, Jr. Second Edition, Mc Graw Hill.

REFERENCE BOOKS :

1. Book of Solid Mechanics - Kazmi, Tata M Cgraw Hill

2. Strength of Materials- D.S. Bedi- S.Chand & Co, Ltd.

3. Advanced Mecahnics of Solids and Structures - N. Krishan Raju and D.R. Gururaje - Narosa Publishing house.

4. Strength of Materials- Andrew Pytel and Fredinand L. Singer fourth Edition, Int. Student Ed. Addison - Wesley Longman.

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

ME - 208-E   FLUID MECHANICS

L	T	P		
3	1	—	Class work	: 50 Marks
			Theory	: 100 Marks
			Total	: 150 Marks
			Duration of Exam.	: 3 Hrs.

UNIT - I

Fluid Properties and Fluid Statics : Concept of Fuid and flow, ideal and real fluids continuum concept, properties of fluids, Newtonian and non-Newtonian fluids Pascal's law, hydrostatic equation, hydrostatic forces on plane and curved surfaces, stability of floating and submerged bodies, relative equilibrium, Problems.

UNIT - II

Fluid Kinematics : Eulerian and Lograngian description of fluid flow : stream, streak and path lines; types of flows, flow rate and community equation, diffrential equation of continuity in cylindrical and polar coordinates, rotation, vorticity and circulation stream and potential fucntions, flow net, Problems.

UNIT - III

Fluid Dynamics ; Concept of system an control volume, Euler's equation, Bernoulli's equation, venturimeter, orifeirs, orificemeter, mouthpieces, kinetic and mementum correction factors. Impuse momentum relationship and its applications, Problems.

UNIT - IV

Potential Flow : Uniform and vertex flow, flow past a Rankin half body, source, sink source sink pair and doublet, flow past a cylinder with and without circulation problems.

UNIT - V

Viscous Flow : Flow regimes and Reynold's number, relationship between shear stress and pressure gradient, uni-

directional flow between staionary and moving parallel plates movement of piston in a dashpot, power absorted in bearings problems.

UNIT - VI

FlowThrough Pipes : Major and minor losses inpips, Hagen Poiseuilli law, hydraulic gardient and total ebergy line, series and parallel connection of pipes, branched pipes, equivalent pipe, power transmission through pipes, Problems.

UNIT - VII

Boundary Layer Flow : Boundary layre concept, displacemnt, momentum and energy thickness, von-karman mometum integral equatiomn ;limaner anmd turbulent boundary layer flows, drag on a flat plate, boundary layer separation and control. Streamlined and bluff bodies, lift and drag on a cylinder and an airfoil, Problems.

UNIT - VIII

Turbulent Flow : Shear stres in turbulent flow : Prandtl mixing length hypothesis hydraulicaly smooth and rough pipes, velocity distribtuion in pipes, friction coefficients for smooth and rough pipes, Problems.

TEXT BOOKS :

1. Fluid Mechanics - Streeter V L and Wylie E B, Mc Graw Hill
2. Mechanics of Fluid - I H Shames, Mc Graw Hill

REFERENCE BOOKS :

1. Introduction to Fluid Mecahnics and fluid Machines - S.K. Som and G. Biswas TMH

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

ME - 212-E   MATERIALS SCIENCE LAB.

L	T	P			
-	-	2	Sessional	: 25 Marks	

Exam   : 25 Marks
Total   : 50 Marks
Duration of Exam. : 3 Hrs.

List of Experiments :

1. To Study crystal structures of a given specimen
2. To Study crystal imperfections in a given specimen
3. To Study microstrctures of metals/ alloys
4. To prepare solidification curve for a given specimen.
5. To Study heat treatment proceses (hardening and tepering) of steel specimen.
6. To Study microstructure of heat treated steel.
7. To Study thermo-setting of pastics.
8. To Study the creep behaviour of a given specimen
9. To Study the mechanism of chemical corrosion and its protection.
10. To Study the properties of various types of plastics
11. To Study Bravais lattics with th ehelp of models
12. To Study crystal structures and crystals imperfections using ball models.

Note :

1. At least ten experiments are to be performed in the semester.
2. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the concerned institute as per the scope of the syllabus.

ME - 214-E   FLUID MECHANICS LAB

L   T   P   Sessional   : 25 Marks
\-   -   2   Exam   : 25 Marks
                   Total   : 50 Marks
                   Duration of Exam. : 3 Hrs.

List of Experiments :

1. To determine the coefficient of impact for vanes.

2. To determine the coefficient of discharge of an orificemeter.

3. To determine the coefficient of discharge of North (V and rectangular types)

4. To determine the friction factor for the pipes.

5. To determine the coefficient of discharge of venturimeter

6. To determine the coefficient of discharge, contraction & velocity of an orifice.

7. To verify the Bernoullis Theorem

8. To find critical reynold number for a pipe flow.

9. To determine the meta- centric height of a floating body.

10. To determine the minor losses due to sudden enlargement, sudden contraction and bends.

11. To show the velocity and pressure variation with radius in a forced vertex flow.

Note :

1. At least ten experiments are to be performed in the semester.

2. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the concerned institute as per the scope of the syllabus.

ME - 216-E   ENERGY CONVERSION ALB

L   T   P   Sessional   : 25 Marks
\-   -   2   Exam   : 25 Marks
                   Total   : 50 Marks
                   Duration of Exam. : 3 Hrs.

List of Experiments :

1. To study low pressure boilers and their accessories and mountings

2. To study high pressure boilers and their accessories and mountings

3. To prepare heat balance sheet for given boiler

4. To study the working of impulse and reaction steam turbines.

5. To find dryness fraction of steam by separating and throtting calorimeter.

6. To find power out put & efficiency of a steam turbine.

7. To find the condenser effiociencies.

8. To study and find columetric efficiency of a reciprocatting air compressor.

9. To study cooling tower and find its efficiency.

10. To find calorific value of a sample of fuel using Bomb calorimeter.

11. Calibration of Thermometers and pressure gauges.

Note :

1. At least ten experiments are to be performed in the semester.

2. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the concerned institute as per the scope of the syllabus.

ME - 218-E MANUFACTURING PRACTICE

L	T	P			
-	-	3			

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

List of Experiments :

1. To make a patten for a given casting with all the necessary allowances, parting line, running system details. Prepare the mold and make the casting the casting Investigate th ecasting defects and suggest th eremedial measures.

2. To make a component involving horizontal and vertical and study the welding defects and sugets their remnedies.

3. To prepare a job on surface grinder/ cylindrical grinder and measure the various parametres of the finished piece.

4. To cut extrenal threads on a lathe.

5. Manufacturs and assmebly of a unit consisting of 2 to 3 components to have the concept of tolerances and fits (shaft and bush assmebly or shaft, key and bush assembly or shaft, key and bush assembly or any suitable assmebly).

6. Leveling of machine tools and testing their accuracy.

7. Disaassembly and assmebly of small assemblies such as tail stock, bench vice, screw jack etc.

8. development and manufacture of complex sheet metal components such as funnel etc.

9. Multi slot cutting on miling machjine by indexing.

10. Drilling and boring of a bush.

11. Modelling of 3 D runer system and creation of drawing for manufacturing of the casting patterns.

12. Developments oif blank size for complex sheet metal components using CAD/ CAE software and compare results with manual calculation method..

Note :

1. At least ten experiments are to be performed in the semester.

2. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the concerned institute as per the scope of the syllabus.