(With effect from the academic. year 2008-2009)

Revised Syllabus for

Mechanical Engineering

Sem III & IV

Scheme for SECOND YEAR ENGINEERING (R-2007)

Semester III

Sr. No.	Subject	Th Hours	Pr Hours	Theory Exam Hours	Theory Marks	TW Marks	P Marks	O Marks	Total Marks
1	Applied Maths III	4	-	3	100	25	-	-	100
2	Strength of Materials	4	2	3	100	25	25	25	175
3	Machine Drawing	3	4	4	100	25	50	-	175
4	Production Processes I	4	-	3	100	25	-	-	125
5	Thermodynamics	3	1	3	100	25	-	25	150
6	Presentation and Communication Techniques	2	2	-	-	50	-	-	50
7	Machine shop Practice I	-	3	-	-	50		-	50
	TOTAL	21	12	-	500	225	75	50	850

CLASS: SE (Mechanical / Automobile)			Semester-III
SUBJECT: **APPLIED MATHEMATICS III**			
Periods per week 1Period of 60 min.	Lecture	4	
	Practical	--	
	Tutorial	1	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	Practical	--	--
	Oral Examination	--	--
	Term Work	--	25
	TOTAL		**125**

Sr. No.	Details	Hrs.
Module 01	**1. Complex Variables** 1.1 Functions of Complex variable 1.2 Continuity (only statement) and derivability 1.3 Analytic Function. Necessary conditions for the function to be analytic (statement of sufficient condition) 1.4 Cauchy Riemann equations in polar coordinates 1.5 Harmonic function and orthogonal trajectories 1.6 Milne-Thomson method to find analytic Function f(z)=u+iv for given u, v, u+v, u-v	08
Module 02	**2. Mapping** 2.1 Conformal mapping 2.2 Standard transformations and Bilinear transformation 2.3 Fixed points and cross ratio	03
Module 03	**3. Complex Integration** 3.1 Regions and Paths in the Z-plane 3.2 Line integral of a function of complex variable 3.3 Cauchy's integral theorem	11

	3.4 Cauchy's integral formula and deduction (without proof) 3.5 Taylor's and Laurent's development (without proof) 3.6 Singularities, poles, residue at isolated singularity and its evaluation 3.7 Residue Theorem	
Module 04	• **Laplace's Transforms** 4.1 Function of bounded variation (statement only) 4.2 Laplace's transforms of 1, t^n, e^{at}, sin(at), cos (at), sinh (at), cosh (at) 4.3 Linearity property, expressions (without proof) for $L[e^{at} f(t)]$, $L[f(at)]$, $L[t^n f(t)]$, $L[f(t)/t]$, 4.4 Periodic functions, Heaviside unit step function, Dirac- delta Function and their Laplace transforms (statement only)	07
Module 05	**5. Inverse Laplace Transforms** 5.1 Linearity property evaluation of inverse Laplace Transforms using theorems and by partial fraction method 5.2 Convolution Theorem (without proof) and Heaviside development 5.3 Application to solve initial and boundary valve problems involving ordinary differential equations with one dependent variable.	07
Module 06	**6. Matrices** 6.1 Types of Matrices. 6.2 Adjoint of a matrix, Inverse of a matrix, Orthogonal and Unitary Matrices. 6.3 Elementary transformations, rank of a matrix. 6.4 Reduction to a normal form. 6.5 System of homogeneous and non homogeneous equations, their Consistency and solution. 6.6 Brief revision of vectors over real field , Inner product, Norm,	12

	Linear dependence and independence, Orthogonality of matrix 6.7 Characteristic polynomial, values and vectors of square matrix 6.8 Characteristic polynomial, Cayley Hamilton Theorem (without proof) Functions of square matrix.	

Theory Examination:

1. Question paper will comprise of total seven question, each of 20 Marks
2. Question one will be compulsory and based on maximum part of syllabus.
3. Remaining questions will be mixed in nature (for example supposed Q.2 has part (a) from module 3 then

   part (b) will be from any module other than module 3)

4. Only five question need to be solved.

In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.

Term Work:

The distribution of marks for term work shall be as follows:

- Tutorial work (One assignment on each module containing 05 problems): 10 Marks.
- Test (at least one): …… 10 Marks.
- Attendance (Tutorial & theory): …… 05 Marks.

TOTAL: …… 25 Marks.

References:

1. Matrices : Vasistha
2. A Text Book of Applied Mathematics : P. N. & J. N. Wartikar
3. Higher Engineering Mathematics : B. S. Grewal
4. Advance Engineering Mathematics : E. Kreyszig
5. Complex variables : R. V. Churchil
6. Laplace Tranforms : Schaum series

CLASS: SE (Mechanical / Automobile)			Semester-III
SUBJECT: **APPLIED THERMODYNAMICS**			
Periods per week 1Period of 60 min.	Lecture	4	
	Practical	--	
	Tutorial	1	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	Practical	--	--
	Oral Examination	--	25
	Term Work	--	25
	TOTAL		**150**

Sr. No.	Details	Hrs.
Module 01	**Thermodynamic concepts**: System, surrounding, state, path, property, Reversible and irreversible process, thermodynamic work, heat, temperature, thermal equilibrium, Zeroth law of thermodynamics. **First law of Thermodynamics:** Statement. First law applied to non-cyclic process, Internal energy, Application non flow processes viz. Constant volume, constant Pressure, and constant temperature, adiabatic and polytrophic processes. Heat and work calculations. Application of First law to open systems, flow work, Steady flow energy equation, Work done in steady flow processes in terms of pressure and volume. Throttling process. Joule's porous plug experiment. Joule-Thompson coefficient, SFEE applied to boiler, nozzle, condenser etc.	8
Module 02	**Second law of thermodynamics**: Limitations of first law of Thermodynamics. Heat engine, thermal efficiency, reversed heat engine, coefficient of performance, Kelvin-Planck and Clausius statements and their equivalence. Carnot cycle, Carnot's theorem, Thermodynamic temperature scale.	8
Module 03	**Entropy**-Clausius inequality, Entropy changes for an ideal gas during reversible process, Entropy of isolated system in real processes. Principle of increase of entropy. **Introduction to Availability:** Available and Unavailable energy. AE when heat is withdrawn from a finite reservoir and when heat is withdrawn from an infinite reservoir. Irreversibility.	8
Module 04	**Properties of steam**: Dryness fraction, enthalpy, internal energy and entropy. Steam table and Mollier chart, First law applied to steam processes.	6
Module 05	**Power Cycles**: Vapour power- Rankine cycle, Modified Rankine cycle for improved performance (Reheat, regenerative) **Gas power-** Thermodynamics of Otto, Diesel, semi-Diesel and Brayton cycle. Comparison and representation on P-V, T-S diagram.	8
Module 06	**Thermodynamics of Fluid flow (One dimensional):** Propagation of sound waves through compressible fluids, Sonic velocity and Mach number. Application of continuity, momentum and energy equations for steady state conditions. Steady flow energy equation applied to nozzle. Isentropic flow through ducts of varying cross-sectional area. Effect of varying backpressure	10

	on nozzle performance. Area ratio. Critical pressure ratio. Normal shock, basic equations of normal shock, change of properties across normal shocks. Rayleigh and Fanno lines. Adiabatic flow through constant area duct with friction.	

Theory Examination:

1. Question paper will comprise of total seven question, each of 20 Marks
2. Only five question need to be solved.
3. Question one will be compulsory and based on maximum part of syllabus.
4. Remaining questions will be mixed in nature (for example supposed Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
5. In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.

Term Work:

Term work shall consist of minimum **20** problems covering all the topics and a class test. The distribution of marks for term work shall be as follows:

- Tutorial work (Numerical/assignments): (10) Marks.
- Test (at least one): …… (10) Marks.
- Attendance (Practical & Theory): …….. (05) Marks.

TOTAL: …… (25) Marks.

Oral Examination:

Oral examination will be based on the term work.

Text Books:

1. Engineering Thermodynamics M. A. Saad, Macgraw Hill.
2. Engineering Thermodynamics R. K. Rajput, Lakshmi Publication.
3. Applied Thermodynamics T. D. Eastop and A. McConkey, Addition – Wesley
4. Fundamentals of Compressible fluid flow S. M. Yahya.
5. Thermodynamics J. P. Holman, Macgraw Hill.
6. Engineering Thermodynamics P. K. Nag, Tata Macgraw Hill
7. Fundamentals of Thermodynamics Sonntag, Wiley India

References:

1. Thermodynamics W. C. Raynold, Macgraw Hill and NY.

2. Engineering Thermodynamics Mayhew Y R Rogers GFC – Orient Longman

3. Engineering Thermodynamics M. Achutan, PHI

4. Engineering Thermodynamics J. B. Jones and Dugan, PHI.

5. Thermal Engineering Ballaney.

6. Thermodynamics and Engg. Approach Yunus and Cengel, McGraw Hill, Inc.

7. Engineering Thermodynamics Lyndd Russell, George A Adebiyi Oxford Press.

CLASS: SE (Mechanical / Automobile)			Semester- **III**
SUBJECT: **MACHINE DRAWING**			
Periods per week 1Period of 60 min.	Lecture	3	
	Practical	5	
	Tutorial	--	
		Hours	Marks
Evaluation System	Theory Examination	4	100
	Practical	3	50
	Oral Examination	--	--
	Term Work		25
	TOTAL		**175**

Sr. No.	Details	Hrs.
Module 01	**Solid Geometry:** Intersection of surfaces and Interpretation of solids- Intersection of prism or cylinder with Prism cylinder or cone both solids in simple position only, Primary auxiliary views and aux. projections of simple machine parts. **Machine Elements :** Free hand sketches of M/C elements such as bolts, nuts, washers, studs, tapped holes, Conventional representation of assembly of Threaded parts in external and sectional Conventional representation of assembly of Threaded parts in external and sectional Views.	09
Module 02	**Details and Assembly Drawing:** Introduction to unit assembly drawing steps involved in preparing assembly drawing from details and vice versa. Preparation of details & assembly drawings of Clapper block, Single tool post, Lathe & Milling tail stock, Cotter, knuckle joint, Keys and coupling: Keys-sunk, parallel, woodruff, saddle, feather etc. **Coupling** - simple, muff, Flanged, protected flange coupling, Oldham's coupling, universal Coupling.	07
Module 03	**Preparation of Details & Assembly Drawings of Bearings-** simple, solid, bushes, pedestal, footstep, I.S. conventional representation of ball and bearings.	03
Module 04	**Preparation of Details & Assembly Drawings of** Pulleys-flat belt, V-belt, rope belts fast and loose pulleys, Pipe joints: flanged joints- spigot and gland and stuffing box, expansion joint	06
Module 05	**Preparation of details & assembly drawings of** Valves- Air cock, Blow off cock, Steam stop valve, gates valve, globe valve, non-return valve, I.C Engine parts: piston, connecting rod, cross head and crankshaft.	08
Module 06	**Preparation of details & assembly drawings of** Jigs and fixtures. **Limits fits and tolerances** dimensioning with tolerances indicating various types of fit in details and assembly drawings	06

Theory Examination:

1. Question paper will comprise of total seven questions, each of 20 Marks

2. Only five question need to be solved.

3. Question one will be compulsory and based on maximum part of syllabus.

4. Remaining questions will be mixed in nature (for example supposed Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)

5. In question paper weight age of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.

Practical Examination:

Practical examination will be based on part B of the Term work

Term Work:

A. Total 4 numbers of half imperial drawing sheets

1 Sheet on Module 1minimum 3 problems

1 Sheets on details to assembly of any two topics from Module 2

1 Sheets on details to assembly of any two topics from Module 3

1 Sheet on assembly to details of any unit topics from Module 4

1 Sheets on details to assembly of any two topics from Module 5

1 Sheet detail- assembly of Module 6 with fits and tolerances

B. **Practicals in AUTOCAD**

Computer aided drawing and designing of Assembly, joints, Gears, spring, shaft, pipe fittings, Bearings Jigs and fixtures, I.C. engine parts, pulleys and belts, Limits, fits and tolerances, Rivets ,Preparation of 2-D drawings for machine components (bolts, nuts, flange coupling, connecting rod,) - 3-D modeling - solid, surface, wire frame using standard CAD packages , creation of 2-D drawings from 3-D models using CAD packages, different views, sections, isometric view and dimensioning them - Parametric modeling, creating standard machine parts, connecting rod, flange coupling,.

Minimum Four Print out of problems solved in the practical class to be attached in the Term work (module 2 to 6)

The distribution of marks for term work shall be as follows:

- Journal containing of drawing sheets …….. (10) Marks.
- Test (at least one): …… (10) Marks.

- Attendance (practical & theory): …… . (05) Marks.

TOTAL: ……. (25) Marks.

Reference Books:

i. Machine Drawing By N. D. Bhatt.
ii. A text book of Machine Drawing By Lakshminarayan & M. L. Mathur. (Jain brother,Delhi).
iii. Machine Drawing By Kamat & Rao.
iv. Machine Drawing By M. B. Shah.
v. A Text book of Machine drawing By R. B. Gupta (Satya Prakasham Tech publication)
vi. Machine drawing By K.I.Narayana, P. Kannaiah, K. Venkata Reddy.
vii. Machine drawing with AutoCAD—Gautam Pohit and Gautam Ghosh (Pearson Education)
viii. Machine drawing By Ajeet Singh (Tata McGraw Hill)

CLASS: SE (Mechanical / Automobile)			Semester- III
SUBJECT: **MACHINE SHOP PRACTICE I**			
Periods per week 1Period of 60 min.	Lecture	--	
	Practical	3	
	Tutorial	--	
		Hours	Marks
Evaluation System	Theory Examination	--	--
	Practical	--	--
	Oral Examination	--	--
	Term Work	--	50
	TOTAL		**50**

Term Work:

1. One job on plain and taper turning.
2. One job on prevision turning, taper turning and screw cutting.
3. One job on shaping machine to make horizontal and inclined surfaces.
4. Two jobs on forging of cutting tools use on lathes.
5. One simple exercise on welding – preparing a component compressive welding joints.

The distribution of marks for term work shall be as follows:

- Laboratory work (experiments): …….. (40) Marks.
- Attendance (practical): …… (10) Marks.

TOTAL: ……. (50) Marks.

CLASS: S.E (Mechanical Engineering)		Semester - III	
SUBJECT: Presentation and Communication Techniques			
Periods per week (each of 60 min.)	Lecture	2	
	Practical	2	
	Tutorial	-	
		Hours	Marks
Evaluation System	Theory Examination	--	--
	Practical examination	--	--
	Oral Examination	--	--
	Term Work	--	50
	Total		50

Detailed Syllabus		Lectures/Week
1.	**Communication in a business organization:** Internal and external communication, Types of meetings, strategies for conducting successful business meetings, documentation (notice, agenda, minutes, resolution) of meetings. Introduction to modern communication techniques. (e-mail, internet, video-conferencing, etc.) Legal and ethical issues in communication (Intellectual property rights: patents, TRIPS, Geographical indications).	**06**
2	**Advanced technical writing**: Report writing: Definition and importance of reports, qualities of reports, language and style in reports, types of reports, formats (letter, memo, project-repots). Methods of compiling data for preparing report. A computer-aided presentation of a technical project report based on survey-based or reference based topic. The topics are to be assigned to a group of 8-10 students. The written report should not exceed 20 printed pages. Technical paper-writing, Writing business proposals.	**08**

3	**Interpersonal skills**: Introduction to emotional intelligence, motivation, Negotiation and conflict resolution, Assertiveness, team-building, decision-making, time-management, persuasion	**04**
4	**Presentation skills**: Elements of an effective presentation, Structure of a presentation, Presentation tools, Audience analysis, Language: Articulation, Good pronunciation, Voice quality, Modulation, Accent and Intonation.	**04**
5	**Career skills**: Preparing resumes and cover letters. Types of Resumes, Interview techniques: Preparing for job interviews, facing an interview, verbal and non-verbal communication during interviews, observation sessions and role-play techniques to be used to demonstrate interview strategies (mock interviews).	**04**
6	**Group discussion**: group discussions as part of selection process. Structure of a group discussion, Dynamics of group behavior, techniques for effective participation, Team work and use of body language.	**04**

Term work: Part-I (25 Marks): Assignments;

2 assignments on communication topics

3 assignments on report-writing

3 assignments on interpersonal skills

2 assignments on career skills

At least one class test (written)

Distribution of term work marks will be as follows:

Assignments : 10 marks

Written test : 10 marks

Attendance (Theory and Practical) : 05 marks

Term work: Part-II (25 Marks): Presentation;

Distribution of term work marks will be as follows:

Project report presentation : 15 marks

Group discussion : 10 marks

The final certification and acceptance of term-work ensures the satisfactory performance of laboratory work and minimum passing in the term-work.

Books recommended:

1. Fred Luthans: Organizational behavior, McGraw Hill
2. Lesikar and Petit, Report writing for business, Tata McGraw Hill
3. Huckin & Olsen, Technical writing and professional communcation, McGraw Hill
4. Wallace & Masters, Personal development for Life & work, Thomson Lerning.
5. Heta Murphy, Effective Business Communication, McGraw Hill
6. Raman and Sharma, Report writing.

CLASS: SE (Mechanical / Automobile)			Semester-III
SUBJECT: **PRODUCTION PROCESS - I**			
Periods per week 1Period of 60 min.	Lecture	4	
	Practical	--	
	Tutorial	--	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	Practical	--	--
	Oral Examination	--	--
	Term Work	--	25
	TOTAL		**125**

Sr. No.	Details	Hrs.
Module 01	Classification of Manufacturing Process, Ferrous and non-ferrous metals and their alloys used in engineering, their properties and uses. Manufacturing of pig iron, cast iron , wrought iron and steels. **Remelting furnaces:** such as Cupola, pit-furnace oil fired, gas and electric furnaces, their size, capacity, suitability, construction and working. **Pattern making and Foundry**: Materials used for pattern making, Types of pattern, Pattern allowances, core box, core prints and cores. **Moulding Methods**: Hand and Machine moulding techniques Principle of gating, principle of risering, solidification of casting, Defects of casting and inspection of casting.	12
Module 02	**Lathes**: type of lathes, their construction and working, operation of lathes, screw cutting on C lathe, attachments and accessories used on lathe, type of tools, cutting speed, feed, depth of cut and machining time. Capstan and turret lathes, tooling for simple jobs. Elementary treatment of modern lathe such as single spindle and multi-spindle Automats. NC and CNC machines, machining centers.	06
Module 03	**Milling Machines**: types of machines, horizontal, universal, vertical, Cutters and their applications, Operation on milling machines, Use of dividing head and circular table. Direct, simple, compound, differential and angular indexing and helical milling operation. Table feed in milling. Work holding devices.	06
Module 04	**Drilling Machines**: Types of machines, Types of drillings, operations such as drilling, boring, reaming, spot facing, counter boring, counter sinking and tapping. Drill speeds and feeds. Plaining machines, shaping machines and slotting machine: Various types, construction and working, operations and tools, field of application, quick return	10

	mechanism and feed mechanisms of these machines. **Grinding:** Grinding machines such as pedestal, cylindrical surface, centre less and tool and cutter grinder. Operations on the above mentioned machines. Grinding wheel, selection and specifications. Dressing and truing of grinding wheels. Finishing operations such as lapping and honing.	
Module 05	**Welding And Joining Processes**: Riveting, soldering and brazing. Fusion welding, gas and arc welding, sub merged arc welding – insert gas welding – Electric slag welding – CO_2 welding – thermit welding. Welding Equipments. Pressure welding – solid phase welding – resistance welding, friction welding. Process capability and applications. Weld joints- types edge preparations – welding fixtures. Weldability – designs, process and metallurgical considerations – testing and improvement of weldability – microstructure of weld – welding defects.	08
Module 06	**Powder Metallurgy** Principle, process, applications, advantages and disadvantages of powder metallurgy, Processes of powder making and mechanisms of sintering. **Non-Destructive Techniques** Dye Penetrant, Magnetic, Electrical, Ultrasonic and Radiographic non-destructive testing methods. **Non conventional machining processes:** (Only basic principles, machines and application).,Electrical discharge machining (EDM).Electrochemical machining (ECM) ,Ultrasonic machining (USM) ,Laser beam machining (LBM),Electron beam machining (EBM), Plasma arc machining (PAM)	06

Theory Examination:

1. Question paper will comprise of total seven question, each of 20 Marks
2. Only five question need to be solved.
3. Question one will be compulsory and based on maximum part of syllabus.
4. Remaining questions will be mixed in nature (for example supposed Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
5. In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.

Term Work:

Term work shall consist of minimum **06** assignments covering all the topics and a class test. The distribution of marks for term work shall be as follows:

- Assignments: …….. (10) Marks.
- Test (at least one): …… (10) Marks.
- Attendance (Theory): …… (05) Marks.

TOTAL: …… (25) Marks.

Text Books:

Workshop Technology By W. A. J. Chapman part I, II & III

A Textbook of Foundry Technology by M. Lal

Production Technology by R. C. Patel and C. G. Gupta Vol I, II.

Manufacturing Processes & materials for Engineers by Doyle.

Production Technology by HMT

Production Technology by Raghuvanshi

Production technology by Jain & Gupta.

Elements of workshop Technology Hazra Chaudhary Vol I, II.

Manufacturing Process by Roy A. LINDBERG.

CLASS: SE (Mechanical / Automobile)			Semester- III
SUBJECT: **STRENGTH OF MATERIALS**			
Periods per week 1Period of 60 min.	Lecture	4	
	Practical	2	
	Tutorial	--	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	Practical	2	25
	Oral Examination	--	25
	Term Work	--	25
	TOTAL		**175**

Sr. No.	Details	Hrs.
Module 01	**STRESS AND STRAIN:-** Definition, Stress strain, tensile and compressive stresses, shear stress-Elastic limit, Hooke's law, Poisson's ratio, modulus of elasticity, modulus of rigidity, bulk modulus, yield stress, ultimate stress, factor of safety, state of simple shear, relation between elastic constants, volumetric strain, volumetric strain for tri-axial loading, deformation of tapering members, deformation due to self weight, bars of varying sections, composite sections, Temperature stresses.	08
Module 02	**SHEAR FORCE AND BENDING MOMENT IN BEAMS:** Axial force, shear force and bending moment diagrams for statically determinate beams including beams with internal hinges for different types of loading, relationship between rate of loading, shear force and bending moment.	08
Module 03	**STREESES IN BEAMS:-** Theory of pure bending, Assumptions, Flexural formula for straight beams, moment of resistance, bending stress distribution , Section moduli for different sections, beams of uniform strength , Flitched beams, Principle axes, Principle moment of inertia. **Direct and bending stresses**, Core of section, Chimneys subjected to wind pressure. **SHEAR STRESSES IN BEAMS :** Distribution of shear stress across plane sections used commonly for structural purposes, shear connectors	08
Module 04	**TORSION**: Torsion of circular shafts – solid and hollow, stresses in shaft when transmitting power, Shafts in series and parallel. **STRAIN ENERGY** , Resilience, proof Resilience, Strain energy stored in the member due to gradually applied load, suddenly applied load, impact load, strain energy stored due to shear. Strain energy due to bending, Strain energy due to Torsion.	08
Module 05	**DEFLECTION OF BEAMS**: Deflection of cantilevers, simply supported and over hanging beams using double integration and Macaulay's methods for different types of loadings **THIN CYLINDRICAL AND SPHERICAL SHELLS:** Stress and strain in thin Cylinders and spheres due to internal pressure, Cylindrical shell with hemispherical ends.	08

Module 06	**PRINCIPLE STRESSES:** General equations for transformation of stress, principal planes and principal stresses, maximum shear stress, determination using Mohr's circle, maximum principal & max. Shear stress theory of failure, Combined Bending and Torsion, Equivalent Bending moment and equivalent torque. **COLUMNS AND STRUTS:** Buckling load, Types of end conditions for column, Euler's column theory and its Limitations, Ranakin Gordon Formula.	08

List of Experiments:

1. Tension test on mild steel bar (stress- strain behavior, modulus determination)
2. Test on tor-steel
3. Test on cast iron (transverse, tension)
4. Shear test on mild steel, cast iron, brass
5. Torsion test on mild steel bar/cast iron bar
6. Brinell hardness test
7. Rockwell hardness test
8. Izod impact test/Charpy test
9. Flexural test on beam (central point load)
10. Flexural test on beam (two point load) (Plotting of load deflection curve & finding value of E for experiment no. 9&10)

Theory Examination:

1. Question paper will comprise of total seven question, each of 20 Marks
2. Only five question need to be solved.
3. Question one will be compulsory and based on maximum part of syllabus.
4. Remaining questions will be mixed in nature (for example supposed Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
5. In question paper weight age of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.

Practical and Oral Examination:

Practical and oral examination will be based on one experiment performed from the list of experiment given in the syllabus and the oral will based on the same experiment.

Term Work:

Term work shall consist of minimum **07** experiments, assignments min^{m} 24 problems (4 problems on each module) and written test. The distribution of marks for term work shall be as follows:

- Laboratory work (experiments/assignments): …….. (10) Marks.
- Test (at least one): …… (10) Marks.
- Attendance (practical & theory): …….. (05) Marks.

TOTAL: …… (25) Marks.

Text Books:

1. Mechanics of Structures Vol.-1 SB Junnakar & shah, Charotar Publishers

2. Strength of Materials S. Ramamarutham

3. Engineering Mechanics Timoshenko & Young, Tata McGraw Hill

4. Mechanics of Materials EP Popov, Prentice Hall of India

5. Strength of Materials W.A. Nash Schaum's outline series, Tata McGraw Hill

References:

1. Mechanics of Materials James Gere-Thompson Learning

2. Mechanics of Materials Ferdinand P Beer, E Russell Johnson, Jr.John Dewolf, McGraw Hill International

3. Theory of Elastic Stability Timoshenko & Gere, Tata Mcgraw Hill

4. Strength of Materials G.H. Ryder MACMILLAN

5. Strength of Materials R. Subramaniam OXFORD

6. Strength of Materials A Practical Approach (Volume-I) D. S. Prakash Rao Univrsity Press

7. Mechanics of Materials Riley Wiley India