

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

B.E- II

Mechanical

Semester -III

MED 301 MP Theory of Machine -I

	Lecture	Tutorial	Practical
Teaching Hours	3	0	2
Examination Scheme	100	00	Continuous Evaluations 20
Marks			Examination 30

SYLLABUS:

- 1. Mechanism & Machines:** Introduction to Mechanism & Machines. rigid and resistance body, link, Kinematic pair Types of motion, degrees of freedom, classification of Kinematic pairs, Kinematic Chain, Linkage, Mechanis, Kinematic Inversion of slider crank Chain, Double Slider,- crank Chain Problems.
- 2. Velocity Analysis:** Vektor, Displacement of rigid body Relative Displacement, defination of velocity, Angular velocity, Rotation of Rigid Body, Translation and Rotation of Rigid Body, Relative velocity Method, Instantaneous axes of the motion, properties of Instantaneous center, the Aronhold-kennedy theorem of three centers, velocity Analysis by Instantaneous centers The Line of center method, The link –to - link method, velocity Analysis by Components, velocity Diagrams.
- 3. Acceleration Analysis:** Definition of Acceleration, Radial and transverse Components of Acceleration, The Coriolis component of Acceleration, Examples of Acceleration Analysis, Acceleration Diagrams, Computer aided Kinematic Analysis of Mechanism like Slider Crank Mechanism, Four-Bar Mechanism etc.
- 4. Belts, Ropes, Chains:** Introduction, Belt and Ropes Drives, Open and Crossed belt Drives, Slips, materials for Belts and Rope, Law of Belting, length of belt, Ratio of friction, Driving, Tensions power transmitted, Centrifugal Effect of Belts, Maximum power Transmitted by Belt, initial tension, Creep, Chains, Chains length, Angular speed Ratio, Classification of Chains.
- 5. Gears & Gear Trains:** Introduction, Classification of Gears, Gear Terminology, Law of Gearing, Velocity of Sliding, Forms of teeth, Cycloidal Profile Teeth, Both of Contact, Arc of the contact, Numbers of pairs teeth in contact, Interference in involutes gears, Minimum Number of teeth, Interference between Rack and Pinion, Under cutting, Comparison of Cycloidal and involutes tooth forms, Introduction to Helical, Spiral, Worm, Worm Gear, and Bevel Gears.
- 6. Cams:** Introduction, Types of Cams, Types of Followers Cam Terminology, Displacement Diagrams, Motion of the Followers, Graphical Construction of the Profile.

REFERENCES:

1. Shigley, J.E and Uicker, J.J: Theory of Machines and Mechanisms, McGraw-Hill International Book Co. 1980.
2. Rattan S.S.: Theory of Machines Tata McGraw-Hill Publishing Co. Ltd. New Delhi, 1994.
3. Rao J.S. and Dukkipati R.V: Mechanisms and theory Machines theory, willey Eastern Ltd. 1992.
4. Mabie H.H and Ocvirk, F.W: Kinematic and Dynamics of Machinery,3rd Edition ,John wiley and sons. Inc.1978.
5. Green, W.G: Theory of Machines, 2nd Edition, Blackie, London, 1992.
6. Hollowenko, A.R: Dynamics of Machinery, John wiley and sons. Inc. New York, 1955.

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Mechanical

Semester -III

MED 302 MP Machine Drawing

	Lecture	Tutorial	Practical
Teaching Hours	1	0	4
Examination Scheme	100	00	Continuous Evaluations 20
Marks			Examination 30

SYLLABUS:

1. Screw Thread and Screwed Fastenings.
2. Riveted Joints, Pin Joints, Key and Cutter Joints,
3. Welded Joints,
4. Shaft Couplings,
5. Shaft Bearings, Brackets and Hangers,
6. Pulleys
7. Pipe Joints,
8. Engine Parts: Stuffing Box, Cross Head, Connecting Rods, Cranks, Eccentric etc.

Term –Work: Each Student shall submit a set of Drawing Sheets and Sketch Book Based on the above Syllabus.

REFERENCES:

1. K.R.Gopala Krishna: Machine Drawing, Subhash Publishers, 1995.
2. N.D.Bhatt: Machine Drawing, Charatar Publishing, House, 1995.
3. Sidheswar: Machine Drawing, Tata McGraw-Hill, 1996.
4. R.K.Dhawan: Machine Drawing S.Chand & Company Ltd. 1996
5. G.R.Nagpal : Machine Drawing, Khann Publishers,1994.

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Mechanical

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MED 304 MP Mechanical Technology-I

	Lecture	Tutorial	Practical
Teaching Hours	3	0	4
Examination Scheme	100	00	Continuous Evaluations 40
Marks			Examination 60

1. Casting:

Introduction, Casting Terms: Patterns Allowance, Types of patterns, Moulding 7 Materials Properties and Testing Cores, Types, Chaplets, Co₂ Moulding Gating and Riser System, Definition Elements, Pouring time and Choke area Calculations, Spure Ingates, Gating Rations, Trapping of slag, Riser Designing Cain's Method, Modules, NRL Method, Numericals of riser Design Feeding Distance, Melting, Cupola, Charge Calculations Cleaning of casting, Defects in casting, Product Design, Special Casting Process, Shell Moulding, Die Casting Investment precision Casting. Permenant Moulding, Centrifugal Casting,

2. Metal Working:

True stress, True strain, Plastic Deformation, Hot Working, Hot Working Temperature Cold Working. Rolling, Principles, Equipments, Angle of bite, Calculation for Slip.

Forging, Principles, Flow stresses, Strain, Extrusion, Principles, Hot & Cold Extrusion, wire Drawing , Principle, Tube Drawing , Sheet Metal Working, Definition of various operation, like shearing, Blanking piercing, Trimming, Shaving etc.

3. Gas Welding:

Principles Types of gases used, Types of flames, Welding Techniques, Edge Preparation. Equipments, Torch, Regulators, Welding Filler roads, Gas Cutting, Principles of Torch, Precautions and safety.

4. Electric Arc Welding:

Principles, A.C./D.C Welding Edge Preparation Equipment, A.C./D.C Machine, Welding Electrodes, Types Designations and Selection, Manual Metal Arc Welding, Carbon Arc Welding, Inert Gas Shielded Arc Welding, TIG & MIG, Submerged Arc Welding, Atomic Hydrogen Arc Welding, Plasma Arc Welding, Stud Arc Welding, Arc Cutting.

5. Resistance:

Principles, Heat Balance, Electrodes, Spot Welding, Seam Welding, Projection Welding, Upset Welding, Flash Welding.

6. Fusion Welding Processes:

Thermit Welding, Electro Slag Welding, Electron Beam and Laser Beam Welding. Forge Welding, Friction Welding, Diffusion Welding, and Explosion Welding.

REFERENCES:

1. Manufacturing Technology, P.N.Rao, and TMH.Edition.
2. Principles of Metal casting, Heine and Roshenthal.
3. Foundry Technology, Raghuvanshi.
4. Work-shop Technology, Hajra Choudhary

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MED 305 MP Mechanical Measurements

	Lecture	Tutorial	Practical
Teaching Hours	3	0	2
Examination Scheme	100	00	Continuous Evaluations 20
Marks			Examination 30

- 1. Basic Concepts:** Concept, Definitions of terms, Calibration, standards, and Units, Generalized Block diagrams of Measuring Systems, Input Output, Configuration of measuring systems.
- 2 Errors in Measurements:** Types of errors, Gross errors, Systematic errors, Random Errors, Central Value, Histogram, Deviation, Standard and Deviation and Variance, Normal Distribution Curve, Probables error.
- 3. Pressure Measurements:** Types of Measurement Devices, Manometers, Dead Weight Tester, and Bourdon Tube pressure Gauge, Diaphragms and Bellows, Low Pressure Measurement. The McLeod Gauge, Pirani Thermal Conductivity Gauge, Knudsen Gauge, Ionization Gauge, Selection of pressure measuring Devices, for specific Applications Calibration of pressure measuring Devices.
- 4. Temperature Measurements:** Temperature Scales, Ideal gas Thermometer, Temperature Measuring Devices, Bi-Metallic Strip, Electrical Resistance Thermometer, Thermistors and Thermocouples, Laws of thermocouple and their Application, Construction and calibration of Thermocouples, Radiation Pyrometers, Total Radiation Pyrometers, Temperature Measurements in high Speed flow.
- 5. Flow Measurements:** Flow Measurements by drag effects, Rotameter, Hotwire Anemometers, Magnetic flow meters Flow visualization, Techniques, Shadowgraph, Interferometer, Laser Doppler Anemometers, Pitot tube, Constructional Features, Calibration Obstructed meters, orifice, and venturi Nozzle and their Calibration.
- 6. Force, Torque, and Speed Measurements:** Basic Methods of force Measurement, Scales and Balances, Elongating sensing Elements, Measurement of Torque of on Rotating shaft, stress and strain, Strain Measurement, measurement of strain gauge outputs, Electric resistance strain gauge, Rosettes, speedometer, stroboscope, power absorbing and power transmitting dynamometers, prony brake and eddy current dynamometers, Ballast circuits, Wheatstone bridge, gauge factor, temperature compensation.
- 7. Miscellaneous Measurements**
Measurement of motion and vibration, Principle of seismic instrument, gas analyzer, introduction to air pollution sampling and measurement, Unit of pollution measurement, Air pollution standard, Gas sampling technique, combustion product measurement.

References:

- 1 Holman J. P., "Experimental methods for engineers", Mcgraw Hill Book Co. New Delhi, 1988.
- 2 A. K. Shawnay, "A Course in mechanical measurements and instrumentation", Dhanpat Rai & Sons, Delhi.
- 3 B. E. Jones, "Instrumentation, Measurement and Feedback", Mcgraw hills Co. Ltd., New Delhi.

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MED 306 MP Industrial Organisation Maintenance & Safety

	Lecture	Tutorial	Practical
Teaching Hours	3	0	0
Examination Scheme	100	00	Continuous Evaluations 00
Marks			Examination 00

- 1. Industrial Organisation:** Basic Concept of Industrial Organisation, objectives of business, forms of business organisation, Industrialisation in India, Industrial finance, principal of scientific management.
- 2. Factory Organisation & Management:** Nature & Scope of factory management plant location, Factory building, L ay out Automation.
- 3. Maintenance:** Types of maintenance & their applications organisation of maintenance department, Industrial maintenance documentations & computer application, methods of costing depreciation etc.
- 4. Industrial safety: General** safety rules, safe guards, factory acts, procedure for handing & repairing accident cases, first aid treatment, function of safety personnel. General safety precautions.

REFERENCES:

1. S.A. Sharlekar, C. Mallikharjuna & Rao, A text book on industrial organisation & management, (Himalaya publishing house – B' bay) . 1994.
2. G. Aswathappa, "Factory Organisation & Management", (Himalaya Publishing House – B' bay) 1990.
3. H.P. Garg, "Industrial Maintenance" (S. chand. & co.Ltd. Delhi) 1990.
4. Anthony Kelly, "Maintenance planning & control", 1984.