

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

B.E- III

Mechanical

Semester -V

MED 501 M Theory of Machine -II

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

1. Static force Analysis: Force, couples Conditions of equilibrium free body diagrams. Analysis mechanisms, spur gears, worm gears.
2. Dynamic force Analysis: Inertia forces Analysis of a floating link, Rotation, Method of virtual work, Dynamic analysis of four link mechanism. Combined static and inertia force analysis of different mechanisms turning moment diagrams fluctuation of energy flywheels.
3. Balancing: Introduction, static balancing, Dynamic balancing, of several masses in different planes balancing of inline engines, V-engines radial engines balancing machines.
4. Governors: Introductions, Types of governors. Sensitiveness of a governe, hunting, isochronisms stability effort and power of governer, controlling force.
5. Gyroscope: Angular velocity, angular acceleration, Gyroscopic couples, Gyroscopic effect on naval ships stability of an automobile, stability of two wheel vehicle.

Practicals: Based on the above syllabus a minimum eight practicals are to be performed

REFERENCES:

1. Rattan S.S : Theory of Machines. Tata McGraw Hill Publishing co. (1994)
2. Rao J.S and Dukkupati R.V: Mechanism and Machine Theory, willey Eastern Ltd (1992)
3. Shigley J.E and Uicker J.J: Theory of Machines and Mechanism, McGraw Hill International Book Cop. (1980)

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B.E- III

Mechanical

Semester -V

MED 502 M Heat & Mass Transfer

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

1. Introduction: Modes of heat transfer, Conductions Convection and Radiations.
2. Conductions: Fourie's law, General Three dimensional heat conductions equations in cartesian cylindrical and spherical co-ordinates one dimensional steady conductions through plane wall, Cylinder and sphere heat sources systems in plane wall and cylinder. Heat transfer from fins of uniform cross section, two dimensional steady state conditions through plane wall. One dimensional unsteady state heat conductions
3. Convections: Free and force convection
 - 3.1: Forced convection Energy integral equation of the boundary layer on flat plane and integral solution for evaluations of heat transfer from a find frictions and heat transfer. Similarity conditions in heat transfer processes, dimensional analysis.
 - 3.2: Free convection for a vertical flat plane Grashoff number impirical number relations and their use fundamentals of boiling heat transfer.
4. Radiations Thermal relations monochromatic and total emissive power basic laws of radiation Radiations shape factors Black grey surfaces Heat Transfer in presence in of re-radiating surfaces.
5. Heat Exchangers Basic type of heat exchangers fouling factors, LMTD .Effectiveness NTU methods of design.
6. dimensional diffusion in gases with one component stationary, Convective mass trnsfer Forced diffusion from a flat Plate, Simultaneous heat and mass transfer.

Practicals: Based on the above syllabus a minimum eight practicals are to be performed

REFERENCES:

1. S.P. Sukhatme Heat transfer. Universities press (India) 1996.
2. J.P. Holman Heat transfer Tata McGraw Hill Book Co. (1992)
3. Eckert and drake Heat and Mass transfer, McGraw Hill (1960)
4. Domkundwar Aror: A Course in HMT Dalpatrai Co.

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B.E- III

Mechanical

Semester -V

MED 503 M Hydraulic Machines

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

1. Introduction: two dimensional flows past bodies Acrofoil lift and Drag.
2. Pumps: Classifications principles of working of different types of pumps pump parameters similarity and model analysis specific speed.
 - 2.1 Centrifugal pumps : Theoretical heat Euler's equations types of impellers flow through blade passage velocity analysis ,energy transfer effect of turbulence and friction H-Q Characteristics diffusion action in volute and diffuser passage losses in centrifugal pumps different efficiency operation of pumps Cavitations in pumps pumps for special applications axial thrust pumps.
 - 2.2 Axial flow Pumps: Construction details, velocity analysis aerofoil theory flow in diffuser characteristics cavitations testing of pumps.
3. Turbines: Different types of turbines constructional details working principles parameter specific speed classifications degree of reactions. Recent development in turbines important hydropower plants in the country.
 - 3.1 Pelton wheels: Simplified theory velocity triangles various loses efficiency best-speed errors simplified theory
 - 3.2 Reaction Turbines : Generalized theory francis velocity triangles variation of velocity along the width of passage Corection for finite number of blades axial flow turbines aerofoil theory flow through spiral casiring speed rising guide apparatus draft tube Cavitation.
 - 3.3 Testing of Turbines: Standard test operating characteristics regulation of turbines

Practicals: Based on the above syllabus a minimum eight practicals are to be performed

REFERENCES:

1. Vasandani V.P: Theory of Hydraulic Machines Khanna publishers (1975)
2. Ramamathan S: Hydraulic Fluid Mechanics and fluid machines Dhanpatt Rai and sons.(1996)
3. Lal Jagdish: Hydraulic Machines Metropolian Books pvt Ltd. (1973)
4. Subramanyam: Theory and applications of fluid mechanics (including hydraulic machines) Tata McGraw Hill Publishing company ltd. (1993)

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B.E- III

Mechanical

Semester -V

MED 504 M Mechanical Technology-II

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

1. Machine Tools: Introduction, classification primary cutting motion, feed and auxiliary motions gearing diagrams Transmissions ratio of drives.
2. Lathe gearing diagram –mechanisms operations tools and too angles setting if machines for various jobs special attachments.
3. Capstan and Turret – Mechanism Tool holders, attachments, Types of tools tool lay out process layouts.
4. Shaper, planer Slotter –principles processes gearing diagrams mechanisms cutting parameters work holding Method tools.
5. Drilling and Boring Machines –Types gearing diagrams mechanisms attachments, accessories, tools.
6. Milling –Types gearing diagrams of column and knee type milling machines operations up and down milling holding of tool and works, cutters and angles Attachments mechanisms.
7. Grinding –Importance of finishing process ,types of machines and operation gearing diagrams mechanism attachments and accessories wheel designation mounting and balancing introduction to microfinishing process such as honning ,lapping superfinishing
8. Broaching –purpose, processes classification and attachments, Tools.
9. Introductions to jigs and fixtures principles of location and clamping types of jigs, Field applications, types of fixtures and their uses.

Practicals: Based on the above syllabus a minimum eight practicals are to be performed

REFERENCES:

1. R.K.Jain, Production Technology, Khanna publishers (1993)
2. H.S.Bawa work-shop Technology Vol-II Tata McGraw Hill (1995)
3. S.K.Hajrachowdhary: Work-shop Technology Vol-II Media promoters &publication pvt Ltd. (1992)
4. B.D.Arora Work-shop Technology Vol-II Satya Prakashan (1988)

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B.E- III

Mechanical

Semester -V

MED 505 M Thermodynamics-II

	Lecture	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme	100	25	Continuous Evaluations 00
Marks			Examination 00

1. Availability and Energy: Basic Concept available and un available energy in a cycle and in a process Helmholtz and gibb's functions energy second law analysis of boilers turbines heat exchangers etc.
2. Thermodynamic relations and Equilibrium: The Maxwell relations clausis –clapeyron equation joule-Thomson Co-efficient relationships involving specific heats.
3. Real Gases: Equations of state for real gases viral co-efficient Vander wall's equations parameters reduced pressure temperature and volume.
4. Reactive mixtures (Combustion) Combustion Equation Stochrometric air excess air fuel ratio by volume and by weight enthalpy of formation Enthalpy and internal energy of combustion adiabatic flame temperature equilibrium constants Fugacity and activity.
5. Vapour Power cycles: Simple steam power cycles Rankine cycles efficiency actual vapour cycle process Comparison of ranking and Carnot cycles
6. Gas Power cycles: Carnot cycles, stiarlingcycle, Ericsson. Air standard cycles. Otto cycles Diesel cycles, Duel cycles, Brayton cycles, Air-standard cycles, for jet propussion.
7. Refrigeration Cycles: Simple vapour compression cycle multistage vapour compression cycle absorption refrigeration cycles.

REFERENCES:

1. Saad M.A: Thermodynamics for engineers, Prentice Hall (1969)
2. Haung F.F: Engineering Thermodynamics Mac million publishing co. inc. (1976)
3. Holman J.P: Thermodynamics Tata McGraw Hill Book Co. (1976)
4. Obert E.F: Concept of thermodynamics, Tata McGraw Hill (1960)
5. Zeemansky M.W &van Ness, H.C Basic Engg. Thermodynamics Tata McGraw Hill Book Co. (1966)

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B.E- III

Mechanical

Semester -V

MED 506 M Elements of Mechatronics

	Lecture	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme	100	25	Continuous Evaluations 00
Marks			Examination 00

1. Introduction to Mechatronics definition industrial applications, building blocks of Mechatronics
2. Sensor and Transducers classification, Resistive (potentiometer strain gauge, thermistor, Sensitive, thermometers) Inductive (LVDT etc.) Piezoelectric, optical (LED Photo – detectors) optical encoders etc. Ultrasonic transducers (flow measurements Distance measurements etc.) noise in measurements.
3. Motion Control: Drives and Actuators (Hydraulic Pneumatics Electric etc.) and their control motion converters (fixed ratio type invariant motion profile type variators etc.)
4. Elements of electronic devices semiconductor theory junction diode and transistor characteristics signal amplifiers operational amplifiers signal conditioning signals.
5. Introduction to Digital circuits Boolean Function- AND, OR, NOT, NAND, NOR Exclusive –OR and equivalence gates, combinational Circuits Concept of sequential circuits.
6. Electronic system Design: Block diagram approach to analog –to-digital and digital-to-analog converters timer and counters units, Microprocessor basics.

REFERENCES:

1. D.A.Bradley, D.Dawson, N.C Burd &A.J.Loader Mechatronics Electronics and products and process Chapman &Hall (1991)
2. John pipenger Tykers Industrial hydraulic Mc- GrawHill (1973)
3. E.W.Reeds, L.S.Lasman, Fluid power with MP control an introduction, prentice Hall (1967)
4. A.K.Sawney, Electric and Electronics Measurement and Instrumentation.
5. K. Mehta Elements of Electronics (1995)