Scheme of Teaching and Examination for

4th Semester of 3 Years Diploma in Mechanical Engineering

Duration of Semester   :   **14 Weeks**

Student Contact Hours   :   **36 Hrs**

Total Marks   :   **800**

  Effective from : 2017 -18 Session

Sl. No.	Name of Subject	Subject Code	Subject	Teaching Scheme			Examination Scheme					
				L	T	P	Hours of Exam	Full Marks of Subject	Final Exam / committee marks	Internal Assessment	Pass Marks Final / Ext. Exam	Pass Marks in Subjects
1.	Manufacturing Technology	MEC402	Theory	3		-	3	100	80	20	26	40
2.	Fluid Mechanics & Machine	MEC403	Theory	3	-	-	3	100	80	20	26	40
3.	Thermal Engg	MEC404	Theory	3	-	-	3	100	80	20	26	40
4.	Theory of Machine	MEC405	Theory	3	-	-	3	100	80	20	26	40
5.	Electrical Engg	MEC406	Theory	3	-	-	3	100	80	20	26	40
6.	Manufacturing Tech Lab	MEC407	Practical	-	-	2	4	50	40	10		20
7.	Fluid Mechanics & Machine Lab	MEC408	Practical	-	-	2	4	50	40	10		20
8.	Theory of Machine Lab	MEC409	Practical	-	-	2	4	50	40	10	-	20
9.	Thermal Engg Lab	MEC410	Practical			2	4	50	40	10		20
10.	Electrical Engg Lab	MEC411	Practical	-	-	2	4	50	40	10	-	20
11	Professional Practice II	401	Sessional			4		50	30	20		25
	Total Hours of Teaching per week :			**15**		**14**						

Total Marks :   Theory   :   Practical   :   Sessional   :

                L   :   Lecture,   T   :   Tutorial   P   :   Practical

Note: 1. Period of Class hours should be of 1 hrs duration as per AICTE norms.

           2. Remaining Hrs every week has been marked for students for Library and Student Centered Activities.

           3. Drawing / Graphics / Practical / Sessional examinations will be held at parent institution.

           4. Board will depute examiner for Practical examination.

           5. Regarding sessional examination the parent institution will form a three member committee and this committee will examine the sessional records and hold viva of the examinee for 60 % marks allotted to the subject. Marks for remaining 40 % will be provided by the Faculty concerned on the basis of evaluation of each job / work throughout the semester.

Manufacturing Technology

L   T   P   **Total Theory Hrs 42**
                                                     F M 100 Th , 50 Pr

1. Welding   (7)

1.1.   Define and classification of various welding processes.
 1.2.   Gas& Arc welding-Principle,Equipment, applications and types of Flames.
1.3.   Electrode specifications, current setting & use of flux in welding
1.4   Advance welding process- TIG,MIG, Thermit Welding, Submerge Arc Welding,
Plasma Arc Welding, Laser Welding, Ultrasonic Welding, Forge Welding,
Explosive Welding & Cold Pressure Welding.
1.5.   Resistancewelding-Spotwelding,Seamwelding,Projection welding
 1.6.   Weldingdefects and Testing of welding defects
1.7.   Brazingandsoldering:Types,Principles,Applications

2. Casting   (8)

2.1   Introduction and history
 2.2   Patterns-Materialused,types,Patternsallowances,Cores,Core allowances.
 2.3.   Moulding Sand – Types, characteristics and properties of sand.
   2. 4Moulds-Mouldmaterials,Types,Mouldingprocesses
   2. 5   Process and steps in Sand Moulding
2.6Mould making
   a.   Runner and Gating System
   b.   Core, Chaplets and Chills.
   c.   Parts of Mould
2.7Melting practice.Types of furnaces with specific application Cupola furnace,
   Electric arc furnace.
   2.8Specialcasting processes.vizdiecasting,centrifugalcasting, Investmentcasting,
   Continuous casting
2.9Castingdefectsand its remedies

3.   Forging   (6)

3.1   Introduction,
3.2   Press and hammer
3.3   Explain different forging tools, specification and uses
3.4   Describe various forging processes-Dropforging,Upsetforging,stamping,
   Dieforging, pressforging.
3.5   Typesofdies-OpenDie,ClosedDie(SingleImpressionand Multi-impression)
3.6   CloseddieForgingoperations- Fullering,Edging, Bending, Blocking,
      Finishing
3.7   Forging defects and their remedies.

4.   RollingandExtrusion   (4)

    4.1 Principlesofrollingandextrusion.
    4.2 Hotandcoldrolling.
    4.3 Introduction to various rolling mills.
    4.4 Methodsofextrusion–Direct,Indirect,backward&impactExtrusion,Hot&Coldextrusion
  processes - advantages,disadvantages andapplications.

5.   Pressworking   (5)

5.1   Typesofpressesandtheir specifications.
5.2 Diesetcomponents.-punchanddieshoe,guidepin, bolsterplate, stripper,stock
      guide,feedstock,pilot.
5.3   Punchanddieclearancesforblankingandpiercing,effectof clearance.
5.4   Pressworkingoperations- cutting,bending,drawing, punching, blanking,notching,
      lancing

6.   Lathe   (4)
      6.1   Principle, types and specification of Lathes
      6.2   Functionsof basic parts and tools.
      6.3   Operations–grooving , Turning,partingoff,Knurling, facing, Boring,
           drilling,threading,stepturning,taperturning.

7.   Drilling, Boring & Reaming   (04)
      7.**1**   **Drilling**
           7.1.1 Introduction, classification of drilling machine& their parts
           7.1.2Drilling accessories
           7.1.3Nomenclature of twist drill
           7.1.4Cutting parameters
      7.**2**   **Reaming**
           7.2.1 Introduction.
           7.2.2 Nomenclature of Reaming tool
      7.**3**   **Boring**
           7.3.1 Introduction, classificationof boring machine and their parts
           7.3.2Counter boring and counter sinking operations

8.   Maintenance & Maintenance Planning   (4)
8.1   Introduction
8.2   Objective of maintenance
8.3   Types – planned and unplanned maintenance
8.4   Repair cycle and repair complexity.
8.5   Equipment history card, work order.

RECOMMENDED BOOKS:
      1. Workshop Technology –Part-I&II ,HazraChoudhury, Media Promoters & Publishers
         Pvt. Ltd.
      2. Workshop Technology, Part – I & II by W.A.S. Chapman, ELBS
      3. Manufacturing Technology by P.N. Rao, TMH

4. Workshop Technology Vol. I & II by B.S. Raghubanshi
5. Workshop Technology by Raghubansi, DhanpatRai& Sons
6. All About Machine Tools by H. Gerling, New Age International (P) Ltd.
7. Manufacturing Engineering and Technology by S. Kalpakijan, Addison-Wesley
    Publishing Co.

List of Practical's:-

1) To make one job on Spot welding machine.
2) One simple job onTIG/MIG welding.
3) Making of one simple wooden Pattern on wood turning lathe.
4) Preparation of green sand mould using single piece and multi-piece pattern with core.
5) Preparation of One simple Job (ex- ring) in forging shop.
6) One job on lathe performing the operations- plain turning, step turning, grooving, knurling, chamfering and thread cutting.
7) One composite job performing the operations-face milling, side and face milling (slotting), drilling /tapping (drilled hole should be perpendicular to slotting operation).
8) One job performing drilling, milling and reaming.
9) Preventive maintenance of Welding machine
10) Preventive maintenance of lathe

Fluid Mechanics & Machine

L   T   P   **Total Theory Hrs 42**
3   2   **PF M   100 Th , 50 Pr**

Contents:Theory

1.Propertiesoffluid   **2**

    1.1   Introduction, types of fluid, fluid mechanics, classification of fluid mechanics.

    1.2   Properties of fluid- Density, Specific gravity, Specific Weight, Specific Volume, Dynamic Viscosity, Kinematic Viscosity, Surfacetension, Capillarity, VaporPressure,Compressibility.

2.FluidPressure&PressureMeasurement   **6**

    2.1   Fluidpressure,Pressurehead,Pressureintensity, buoyancy, metacenter and meta centric height.

    2.2   Concept of absolute vacuum, gauge pressure, atmosphericpressure,absolutepressure.

    2.3   Simpleanddifferentialmanometers,Burden pressuregauge.

    2.4   Total pressure, centerofpressure of plane, regular surfaces immersed in liquid. Horizontally, vertically andinclined.
              (Numericalon Manometers, Total Pressure & Centreofpressure)

3.   **FluidFlow**   **8**

    3.1   Typesoffluidflows

    3.2   Continuityequation

    3.3   Bernoulli'stheorem

    3.4   Venturimeter–Construction, principle of working, Coefficient of discharge, Derivation for discharge throughventurimeter.

    3.5   Orifice meter– Construction, Principle of working, hydrauliccoefficients, Derivationfordischargethrough Orificemeter

    3.6   Weir and Notch- Define & Differentiate between weir and notch. (No numerical)

    3.7   Pitottube–Construction,PrincipleofWorking.
        (Simple Numericalonly)

4. FlowThroughPipes   **4**

    4.1   Lawsoffluidfriction(Laminarandturbulent)

    4.2   Darcy'sequation andChezy'sequation forfrictional losses.

    4.3   Minorlossesinpipes

    4.4   Hydraulicgradientandtotalgradientline.

    4.5   Hydraulicpowertransmissionthroughpipe.
        (Numericaltoestimatemajorandminorlosses)

5. Impactofjet   **3**

    5.1   Impact ofjet on fixed vertical, moving vertical flat plates.

5.2   Impactofjetoncurvedvaneswithspecialreferenceto turbines&pumps
(**SimpleNumericalsonworkdoneandefficiency)**

6.   HydraulicTurbines   7

6.1   Layout and classification ofhydroelectricpowerplant.
6.2   Selectionofturbineonthebasisofheadanddischarge available
6.3   Construction andworkingprinciple of Peltonwheel, FrancisandKaplan turbine.
6.4   CalculationofWorkdone,Power, efficiencyofturbine.
6.5   Draft tubes– types and construction, Concept of cavitation inturbines

7.CentrifugalPumps   6

7.1   Construction,principleofworkingandapplications.
7.2   Typesofcasingsandimpellers.
7.3   Conceptofmultistage
7.4   Priminganditsmethods,Cavitation
7.5   Manometrichead,Workdone,Manometricefficiency, Overallefficiency, NPSH.
7.6   PerformanceCharacteristicsofCentrifugalpumps.
7.7   TroubleShooting.
7.8   **Introduction to** submersible and jetpump
(simplenumericals on centrifugal pumps)

8. ReciprocatingPump   6

8.1   Construction,workingprincipleandapplicationsof singleanddouble actingreciprocatingpumps.
8.2   ConceptofSlip,Negativeslip,Cavitationand separation.
8.3   UseofAirVessel.
8.4   Indicatordiagramwitheffectofaccelerationhead&frictionalhead.
8.5   Trouble shooting

(**NoDerivationsandNumericalonreciprocating pumps**.)

RECOMMENDED BOOKS:

1. Hydraulics & Hydraulic Machines by Modi& Seth, Standard Book
2. Hydraulics & Hydraulic Machines by R.K. Bansal
3. Fluid Mechanics by A.K. Jain, Khanna Publishers
4. Hydraulic and Fluid Mechanics by JagadishLal, Metropolitan Book
5. Hydraulics, Fluid Mechanics and Fluid Machines by R.S. Khurmi
6. Fluid Mechanics & Hydraulics Machines by R K Rajput
7. Fluid Mechanics & Hydraulics Machines by Domkundwar
8. Hydraulics Machines by JagadishLal

<u>ListofPractical:</u>

1. Calibration ofBourdenpressuregaugewiththehelpofDeadWeightPressuregauge.

2. Determine the meta centric height of a floating body.

3. VerificationofBernoulli'sTheorem.

4. DeterminationofCoefficientofDischargeofVenturi-meter

5. Determination of Coefficient of discharge, coefficient of Contraction and co-efficient of velocity of orifice meter.

6. Determination of coefficient of discharge through rectangular notch.

7. Determination of coefficient of discharge through triangular notch.

8. To determine minor losses for flow through pipes.

9. Determination of coefficient of friction of flow through pipes.

10. Trial on Pelton/Francis wheel to determine overall efficiency.

11. Trial on centrifugal pump to determine overall efficiency.

12. Trial on reciprocating pump to determine overall efficiency.

CourseName:Diploma in MechanicalEngineering

Coursecode :ME/MH/MI

Semester   :Fourth

Subjecttitle :ThermalEngineering

Subjectcode :

TeachingandExaminationScheme

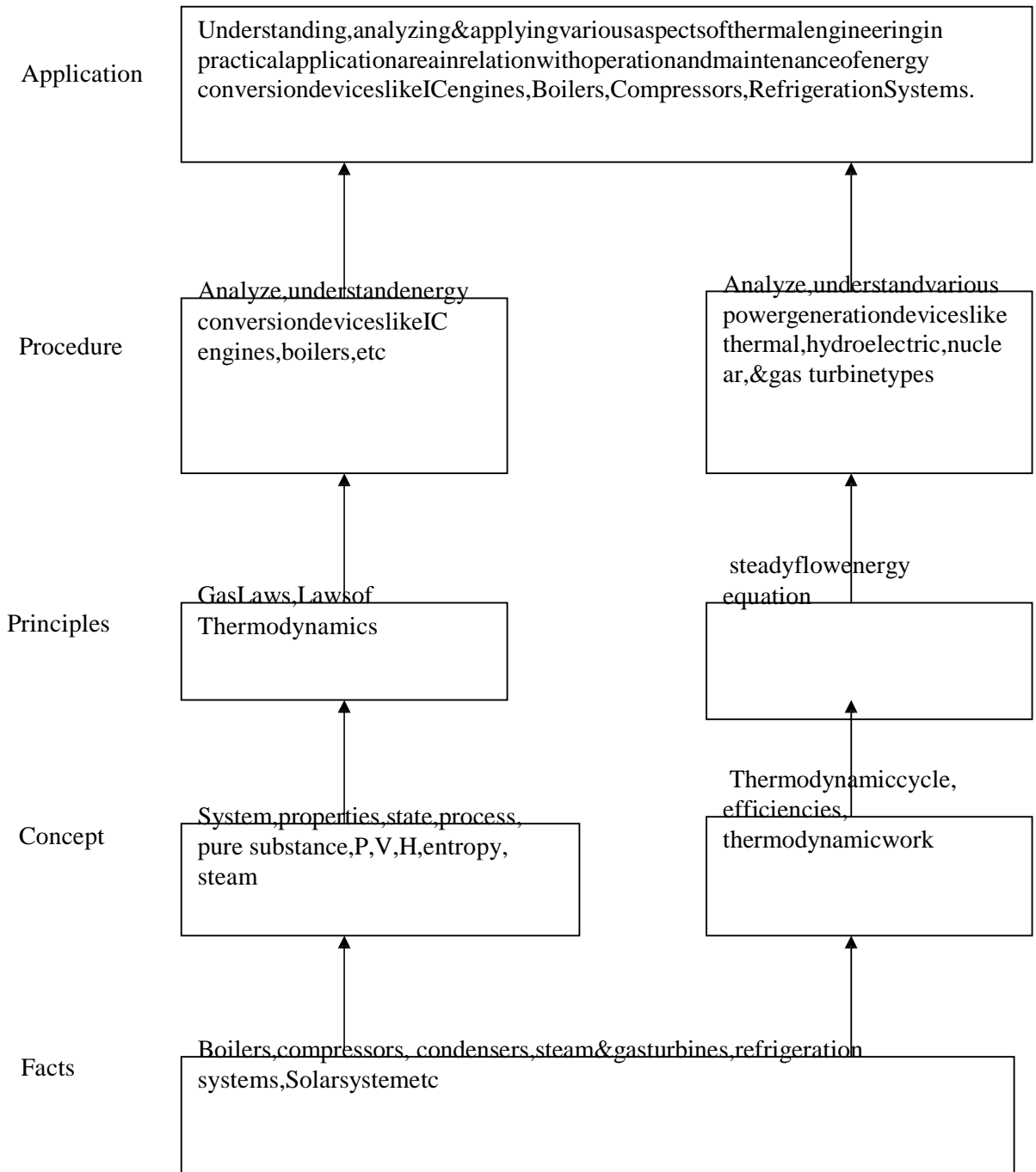| L	T	P		Total Theory Hrs 42
3		2		F M 100 Th , 50 Pr

Rationale:

Mechanicalengineershavetoworkwithvariouspowerproducing&powerabsorbingdeviceslikeboilers,turbines,compressors,pumpsetc.Inordertounderstandtheprinciples, construction&workingofthesedevices,itisessentialtounderstandtheconceptofenergy, work,heat&conversion

betweenthem.HenceitisimportanttostudythesubjectofThermalEngineeringwhichisacoresubject.Itincludesthestudyofvarioussourcesofenergy,basiclaws&conceptofthermodynamics,gaslaws,propertiesofsteam&generation.Heattransfer forms thebasis for different powerengineering application. Boilers   findapplication   in differentprocessindustries.Steamturbinesandcondensersarethemajorcomponentofanysteampower plant.Mechanicalengineershouldunderstandworkingandapplicationofthesedevices.

Objectives: TheStudentsshouldbeableto:

    1.Knowvarioussourcesofenergy &theirapplications.

    2.Applyfundamentalconceptsofthermodynamicstothermodynamicsystems.

    3.Understandvariouslawsofthermodynamics.

    4.Applyvariousgaslaws&idealgasprocessestovariousthermodynamicsystems.

    5.Calculatepropertiesoftwophasesystembyusingsteamtables/molliercharts.

    6.Explainconstruction&workingofboilers,mountings&accessories.

LearningStructure:

Application

Understanding,analyzing&applyingvariousaspectsofthermalengineeringin practicalapplicationareainrelationwithoperationandmaintenanceofenergy conversiondeviceslikeICengines,Boilers,Compressors,RefrigerationSystems.

Procedure

Analyze,understandenergy conversiondeviceslikeIC engines,boilers,etc	Analyze,understandvarious powergenerationdeviceslike thermal,hydroelectric,nucle ar,&gas turbinetypes

Principles

GasLaws,Lawsof Thermodynamics	steadyflowenergy equation

Concept

System,properties,state,process, pure substance,P,V,H,entropy, steam	Thermodynamiccycle, efficiencies, thermodynamicwork

Facts

Boilers,compressors, condensers,steam&gasturbines,refrigeration systems,Solarsystemetc

Contents: Theory

Chapter	Name of the Topic	Hours	Marks

1.	**Sources of energy**
	
	1.1 Classification of energy sources
	   - Renewable, Non-Renewable
	1.2 Fossil fuels, CNG, LPG.
	1.3 Solar
	  - Flat plate and concentrating collectors.
	  - Solar Water Heater
	  - Photovoltaic Cell, Solar Distillation.
	1.4 Wind, Tidal, Geothermal
	1.5 Biogas, Biomass, Bio-diesel
	1.6 Hydraulic, Nuclear
	1.7 Fuel cell – list of fuel cells
		4	

2	**Ideal Gases** 2.1 Concept of Ideal gas, Charle's law, Boyle's law, Avogadro's law, equation of state, Characteristic gas constant and universal gas constant. 2.2 Ideal gas processes:- -Isobaric, Isochoric, Isothermal, Adiabatic, Polytropic, Isentropic with representation of the processes on P-V and T-S diagram (only simple numericals)	2	

3.	**Fundamentals of Thermodynamics**
	3.1 Concepts of pure substance, types of systems, properties of systems, Extensive and Intensive properties. Point function and path function. units of each , pv=mrT
	3.2 Work and Energy
	  - Thermodynamic definition of work, heat, difference between heat and work, P.E., K.E, Internal Energy, Flow work, concepts of enthalpy, entropy.
	3.3 Laws of Thermodynamic
	  - Zeroth Law, Temperature measurement, principle of energy conservation, irreversibility, Second Law of Thermodynamics, Kelvin Plank, Clausius statements and their equivalence, Concept of perpetual motion machine 1 and 2.
	3.4 Application of Thermodynamic laws
	  -Steady Flow Energy equation and its application to open system like boiler, engine, nozzle, turbine, compressor & conden
		10	

4.	**Steam and Steam Boiler** 4.1 Generation of steam at constant pressure with representation on various charts such as T-H, T-S, H-S, P-H. Properties of steam and use of steam table, Quality of	8	

	steamanditsdeterminationwithSeparatingcalorimeter(no numerical). 4.2Vapour process:- 　-constantpressure,constantvolume,constantenthalpy, constantentropy(numericalsusingsteamtableandMollierchart) ,RankineCycle 4.3SteamBoilers:- 　-Classificationofboilers. 　-Constructionandworkingof 　-Cochran,BabcockandWilcox,La-montandLoeffler boiler.Boilerdraught– natural, forced and mechanical.		
5.	**SteamTurbinesandCondensers** 5.1Steamnozzle:- 　-Continuityequation,typesofnozzles,conceptofMach number,criticalpressure,applicationofsteamnozzles.(simple numerical) 5.2Steamturbine:- 　-Classificationofturbines,Constructionandworkingof Impulseand Reactionturbine. 5.3Compoundingofturbines,Regenerativefeedheating,bleedingofst eam,nozzlecontrolgoverning(withvelocitydiagrams) (No numerical). 5.4Steamcondenser:- 　- Dalton'slawofpartialpressure,functionandclassificationofcond ensers, constructionandworkingofsurfacecondensers.(simple numerical) 5.5Sourcesofairleakage,conceptofcondenserefficiency, vacuumefficiency(nonnumerical). 5.6CoolingTowers. 　-Forcedraught,naturaldraughtand induceddraught.	12	
6.	**HeatTransfer** 6.1Modesofheattransfer:- 　-Conduction,convectionandradiation. 6.2Conductionbyheattransfer 　-Fourier'slaw,thermalconductivity,conduction through cylinder,thermalresistance,composite walls,combined conductionand convection(Simplenumerical) 6.3HeattransferbyRadiation:- 　-ThermalRadiation,Absorptivity,Transmissivity, Reflectivity,Emissivity,black andgraybodies,Stefan-Boltzmanlaw. 6.4HeatExchangers:- 　-Shellandtube,platetype,multiphaseheatexchangers. MaterialsUsedandapplicationsofheatexchangers.	6	
	TOTAL	42	

List of Practicals:

1. Collection of technical data and specification of photovoltaic cell by referring to manufacturers catalogues.
2. Study ofheattransferandconceptofheatexchanges.
3. Study of solarwaterheatingsystem.
4. Reportonvisittowindpowergenerationplant/biogasplant/hydraulicpower .plant.
5. Calculationofthermalconductivityofasolidmetallicrod.
6. VerificationofStefan-Boltzman'slaw
7. Study and compare various heat exchangers suchas radiators, evaporators, condensers,plateheatexchangersetc.
8. Tracethefluegaspathandwater-steamcircuitwiththehelpofboilermodelandwriteareport.
9. Study of Babcock and Wilcox Boiler/Lancashire Boiler.
10. Determination of change in velocity of steam with steam nozzle.

Books Recommended

Sr. No.	Author	Title	Publication
01	R. K.Rajput	ACourseinThermalEngineering	LaxmiPublication,Delhi
02	P.L.Ballaney	ACourseinThermalEngineering	KhannaPublishers
03	R. S.Khurmi	AtextbookofThermal Engineering.	S.Chand&co.Ltd.
04	DomkundwarV.M.	ACourseinThermalEngineering	DhanpatRai&Co.
05	P.K.Nag	EngineeringThermodynamics	TataMcGrawHill
06	R. S.Khurmi	Steam Table &Mollier Diagram	S.Chand&co.Ltd.
07	Yunus A Cengel	Thermodynamics	

5

Theory of Machine

L T P
3 2

Total ThHrs 42
F M 100 Th , 50 Pr

Contents:Theory

Chapter	NameoftheTopic	Hours	Marks
1.	**FundamentalsandtypesofMechanisms** KinematicsofMachines:- DefinitionofKinematics,Dynamics,Statics,Kinetics,Kinematiclink,KinematicPairanditstypes,constrainedmotionanditstypes,Kinematicchainanditstypes,Mechanism,inversion,machineandstructure. InversionsofKinematicChain. • Inversionoffour barchain,coupledwheelsof Locomotive&Pentograph. • InversionofSingleSliderCrank chain-RotaryI.C. Enginesmechanism,Whitworthquickreturnmechanism, • Introduction to InversionofDoubleSliderCrankChain-Oldham'sCoupling. Common Mechanisms. • GenevaMechanism. • Ackerman'sSteeringgearmechanism. (No numericals)	6	
2.	**VelocityandAccelerationinMechanism** 2.1 Conceptofrelativevelocity, angular velocity and angular accelerationof a point on a link. 2.2 Velocity and acceleration of points and links in mechanisms – relative velocity and instantaneous center method (simple numericals based on analytical method). 2.3 Klein's construction to determine velocity and acceleration of piston of a reciprocating engine.	2	
3.	**CamsandFollowers** 3.1 • Concept,definitionandapplicationofCamsandFollowers. • ClassificationofCamsandFollowers. • Differentfollowermotionsandtheirdisplacementdiagramslikeuniformvelocity,SHM.	6	

	3.2Drawingofprofileofradialcamofroller followerwithandwithoutoffsetwithreciprocatingmotion (graphicalmethod).		
4.	**PowerTransmission** BeltDrives-flatbelt,V–belt&itsapplications,material forflatandV-belt,angleoflap,beltlength.Slipandcreep.Determinationofv elocityratio,ratiooftightsideandslacksidetension,centrifug altensionandinitialtension,conditionformaximumpowertra nsmission(Simplenumerical) •ChainDrives– Advantages&Disadvantages,SelectionofChain&Sprocket wheels,methodsoflubrication. •GearDrives– Spurgearterminology,typesofgearsandgeartrains,trainvalu e&Velocityratiofor compound,revertedandsimpleepicyclesgeartrain,methods oflubrication,Lawofgearing. (simple numerical) •RopeDrives–Types, applications,advantages&	8	
5.	**FlywheelandGovernors** • Flywheel-Concept,functionandapplicationofflywheelwiththehelpo fturningmomentdiagramforsinglecylinder4-Stroke I.C.Engine(noNumericals).Coefficientof fluctuationofenergy,coefficientoffluctuationofspeedandi tssignificance. • Governors-Types,concept,functionandapplication&TerminologyofG overnors.(numericals on Watt governor only)	6	
6.	**Brakes,Dynamometers,Clutches&Bearings** BrakesandDynamometers • Functionofbrakesanddynamometer,typesofbrak esandDynamometers,comparisonbetweenbrakesand dynamometer. • Constructionandworkingofi)shoebrake,ii)Band Brake,iii)Internalexpandingshoebrakeiv)DiscBrake. • ConceptofSelfLocking&Selfenergizingbrakes. • Numericalproblemsto findbrakingforceandbraking torqueforshoe*brake.* • Constructionandworkingofi)RopeBrakeDynam	10	

	ClutchesandBearing • Clutches-UniformpressureandUniformweartheories. • FunctionofClutchand itsapplication,Constructionand workingofSingleplateclutch,Introduction to Multi-plateclutch,CentrifugalClutch, ***Coneclutchand Diaphragmclutch.***(Simplenumericalonsingleplate clutch). • Bearings–i)SimplePivot,ii)CollarBearing**.**Torque& powerlostinfriction(no derivation).Simplenumericals		
7.	**Balancing&Vibrations** • Conceptofbalancing.Balancingofsinglerotatingmass. State the causes and effect of unbalance. • Conceptandterminologyusedinvibration,causesof vibrationsinmachines,theirharmfuleffectsandremedies.	2	
8.	**Gyroscope (Introduction only)** • Gyroscopic motion • Gyroscopic torque • Gyroscopic effects • Application of Gyroscope	2	
	Total	42	

RECOMMENDED BOOKS:
1. The Theory of Machines by Thomas Bevan, CBS Publishers & Distributors
2. Theory of Machine by Saha, Jadavani
3. Theory of Machine by P. L. Ballaney
4. Theory of Machine by R.S. Khurmi
5. Theory of Machine by Abdullah Shariff, DhanpatRai& Sons
6. Theory of Machines by SS Ratan
7. Theory of Machine by J E Shigley

List of Practical:

1. To find the ratio of time of cutting stroke to the time of return stroke for quick return mechanism of a shaper machine.
2. Sketch & describe working of bicycle free wheel sprocket mechanism.
3. To find out the height of all types of Governors through Universal Governor Apparatus.
4. Determine the radius of rotation of fly ball for different speed of governor and draw a graph between radius of rotation versus speed.
5. Study of different types of CAM and follower through models.
6. Determination of power transmitted by any belt drive using any one dynamometer.
7. Dismantling and assembly of multi-plate clutch of two-wheeler.
8. Balancing of several masses rotating in a single plane by graphical method.
9. Study of gyroscopic model
10. Study of different types of gears, gear trains and drives through models.

EE101:Basic Electrical Engineering

L   T   P   **Full Marks 100 (T) + 50(Pr)**
3   2

Objectives:
This is a foundation course to understand the basic principles and behavior of electrical circuits, electrical power apparatus and utilization of electrical energy.

Electrical Engg Fundamentals &Theorems   Module-1 (12 Hours)
Introduction to electrical circuits: Essence of electricity, Electric field, electric current, potential and potential difference, electric power, basic circuit components, ohm's law, Ideal and Practical Sources, Source Conversion, independent and dependent sources, Energy Stored in Inductor and Capacitor, series, parallel and series and parallel circuit.

DC Networks: Laws and Theorems applicable to DC networks (KCL & KVL, Node voltage & Mesh current analysis, Delta-Star & Star-Delta conversion, Superposition principle, Thevenin& Norton theorem),Transients in R-L and R-C circuits with DC excitation, Simple problems.

Introduction to Magnetic Circuits: Introduction to Electromagnetism, B-H curve, Permeability, Reluctance, Solution of magnetic circuits, Hysteresis and Eddy current loss.

AC Fundamentals   Module-2 (6 Hours)
Single-Phase AC Circuits: Single-phase EMF Generation, Average and Effective value of periodic ac signals, Peak factor & Form factor, Phasor and Complex representation of sinusoids, Power factor,complex power.

Three-Phase AC Circuits: Comparison between single-phase and three-phase systems, three phase EMF Generation, Line and Phase quantities in star and delta networks,

Transformers   Module-3 (8 Hurs)
Single-Phase Transformers: Construction and principle of operation, EMF Equation, Transformation ratio, Practical and Ideal transformers, Transformer losses, Brief idea on Transformer Phasor diagram and transformer rating, Auto transformer.
Introduction to 3 phase transformer

D C Machines   Module-4 (8 Hours)
D.C. Machines: Principle of operation, construction, classification of DC machines, EMF equation of DC generator, Speed Equation of DC Motor. Series , shunt and compound dc moters.

AC Machines & Power system   Module – 4 (8 Hours)
Induction Motors: Introduction to Single-phase and Three-phase Induction Motors, Concept of Slip. Synchronous motors and special types of ac motors.

Power Systems: Introduction to generation, transmission and distribution of AC Power, basic idea on grounding, and safety, illumination

Text/reference books:
1. Rizzoni,Principles and Applications of Electrical Engineering., McGrawHill

2. Hughes, "Electrical & Electronic Technology", Ninth Edition Pearson Education.
3. V.D.Toro, "Basic Electrical Engineering", Prentice-Hall of India.
4. B.L.Theraja, A.K.Theraja, "A textbook of Electrical Technology" S.Chand. Ltd.
5. Rajendra Prasad, "Fundamentals of Electrical Engineering", PHI,
6. 6.D P khothari and I J Nagratha "Basic electrical engineering" 2nd ed, TMH.
7. N.N.ParkerSmith,"Problems in Electrical Engineering", CBS Publisher

EE401 Basic Electrical Technology Laboratory
Experiments
1. Connection and measurement of power consumption of various lamps.
2. Measurement of armature and field resistance of DC machine.
3. V-I Characteristics of incandescent lamps and time fusing current characteristics of a fuse.
4. Calculation of current, voltage and power in series R-L-C circuit excited by single phase AC supply and calculation of power factor.
5. Study of various parts of DC machine.
6. Study of single phase induction motor and fan motor.
7. Verification of superposition, Thevenin's and Norton's theorem.
8. Study of single phase energy meter.
9. Open circuit and short circuit test of single phase transformer.
10. Study of solar photo voltaic system.

Subject Title : Professional Practices-II   **Subject Code : 401**

Rationale:

Most of the diploma holders join industries. Due to globalization and competition in the industrial and service sectors the selection for the job is based on campus interviews or competitive tests.

While selecting candidates a normal practice adopted is to see general confidence, ability to communicate and their attitude, in addition to basic technological concepts.

The purpose of introducing professional practices is to provide opportunity to students to undergo activities which will enable them to develop confidence. Industrial visits, expert lectures, seminars on technical topics and group discussion are planned in a semester so that there will be increased participation of students in learning process.

Objectives:

Student will be able to:

1. Acquire information from different sources
2. Prepare notes for given topic
3. Present given topic in a seminar
4. Interact with peers to share thoughts
5. Prepare a report on industrial visit, expert lecture

Sl	Activity Heads	Activities	Suggested Hrs
1	Acquire information from different sources	Topic related to the branch and current area of interest i.e. articles in internet on which research or review is undergoing may be decided for the students group. The group may be restricted to maximum 5 students. Literature survey from Internet , print media and nearby practices may be undertaken. Minimum of 10 to 15 papers may be suggested for reading to get an overview and idea of matters.	12
2	Prepare notes for given topic	Making review or concept to be penned down in form of a article .(the article or review may be of 8 – 10 pages length in digital form of 12 font size in Times New Roman font)	4
3	Present given topic in a seminar	A seminar or conference or work shop on branch related topic is to be decided and all students in group of 5-6 students may be asked to present their views.	4

| 4 | Interact with peers to share thoughts | A power point presentation of the article prepared in stage 2 may be presented before the classmates and faculty members. | 4 |
| 5 | Prepare a report on industrial visit, expert lecture | A topic on best practices and product / software development may be assigned to the student group. The group may be asked to prepare a survey, come to opinion making and list out the activities to develop the activities with SWOT analysis. | 12 |