

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL CREDIT BASED GRADING SYSTEM

PROGRAMME NAME: AIRCRAFT MAINTENANCE

Name of Scheme OCBC 2020

Implemented from Session

Scheme of Studies and Examinations for: THIRDSEMESTER

Exam Code:

	COURSE TITLE			тн	IEORY	COMI	PONE	NT				PRACTIC	AL CO	OMPON	ENT			
CODE		CODE	LECTUR ES							Ti	<u>×</u>	CONTI NUOUS EVALU ATION	S	ND OF T TERM/ EMESTI ALUAT	ER	CREDIT	CREDIT	GRAND TOTALOF MARKS
COURSE		PAP ER C	Hrs. Per Week	TERM WORK QUIZ,	TE TE	IID RM :ST VO)	THI	EORY	PAPER	THEORY CREDIT	PRACTICAL Hrs. Per Week	LAB. WORK QUIZ,		ACTICA ORAL AMINAT (VIVA)	ION	PRACTCAL CRE	TOTAL CR	ND TOTAL(
				ASSIG NMENT	ı	II	NO.	MARKS	DURATION (Hrs)	뿔	<u> </u>	ASSIG NMENT	NO.	MARKS	DURATION (Hrs.)	PRAC		GRAN
301	STRENGHT OF MATERIALS	6934	04	10	10	10	01	70	3	04	04	20	01	30	3	02	06	150
303	INTRODUCTION TO AERONAUTICS	7300	04	10	10	10	01	70	3	04							04	100
304	BASIC ELECTRICAL AND ELECTRONICS	6933	04	10	10	10	01	70	3	04	04	20	01	30	3	02	06	150
302	THERMAL ENGINEERING	6931	04	10	10	10	01	70	3	04	04	20	01	30	3	02	06	150
305	PROFESSIONAL ACTIVITY										02		GR	ADES T	O BE (GIVEI	1	•
	TOTAL		16	40	40	40	04	280		16	14	60		90		6	22	550

Theory Credits : 16
Practical Credits : 06
Total Credits : 22

Theory Marks : 280
Practical Marks : 90
Quiz, Mid Term, Lab. Work : 180
Total : 550

Minimum Pass Grade in Theory & Practical 'D'

RGPV ((DIPLO	OMA WIN	G)	OBE CURRICULUM FOR THE COURSE	FORMAT-3		Sheet No. 1/3	}				
Branch		ME	CHA	NICAL ENGINEERING	Semester		I	II				
Course	Code			Course Name			BASI ECTRICA ELECTRO	AL AND				
Course	e Outco	ome 1 C	alcı	ılate electrical quantity for give	n electrical circui	t	Teach Hrs	Marks				
Learnin	ng Outo	mme i		e various terms used in electrical e nitive domain)	engineering.		4	5				
Co	ontent	s •	 Concept of electric current, potential and potential difference. Classification of D.C. and A.C. sources. Overview of AC voltage generation, transmission and distribution. Electrical Power, energy and their units. 									
Method	of Asse	essment	Internal : Mid semester Test-1 (Pen paper test)									
Learnin	Learning Outcome 2 Explain fundamentals of D.C. circuit and calculate electrical quantity. (Cognitive domain)							12				
Co	ontent	s •	 Ohm's Law, Concept of resistance, conductance, resistivity, conductivity and their units. Effect of temperature on resistance, Temperature coefficient of resistance. Series, Parallel connections of resistance and their combinations, Simple Numerical. Kirchhoff's Voltage Law, Kirchhoff's Current Law, Simple Numerical 									
Method	of Asse	essment E	xter	rnal: End semester theory examina	tion (Pen paper te	st)						
Learnin	ng Outc	ome 3	1 -	nin fundamentals of A.C. circuit and tity of single phase AC circuit. (Cog		cal	10	12				
Co	ontent	• • •	di De sin Co Co Rl Ao Th sy	oncept of Cycle, Frequency, time per fference. efine Instantaneous value, average nusoidal electrical quantities, form oncept of reactance, impedance and oncept of current, voltage, power in L, RC and RLC Series circuit ctive power, reactive power and ap aree phase AC supply: three phase estem, Relationship between line vo	value, RMS value a factor and peak fa d power factor in A n purely resistive, in parent power. three wire and three three, phase voltage, phase voltage.	ind p ctor C cii ndud	beak valu rcuit. ctive, cap	ne of pacitive, r wire				

Method of Assessment	External: End semester theory examination (Pen paper test)		
Learning Outcome 4	Verify Kirchhoff's laws and determine the electrical quantities for a given electrical circuit. (Psychomotor domain)	10	12
Contents	 Verification of Kirchhoff's current Law and Kirchhoff's vo. Calculate Impedance, power and power factor by measuri each element and current for a given RLC series circuit. 	_	
Method of Assessment	External: End semester practical exam- Performance of task	and viva	a voce
Course Outcome 2	Select an appropriate electrical machine for particular application.	Teach Hrs	Marks
Learning Outcome 5	Describe various parts of the DC machines, explain the working principle and applications of DC generator (Cognitive domain)	8	10
Contents	 Concepts of Electromagnetism, Faraday's Law, Lenz's Law Hand and Right Hand Rule. D.C. Machines: Construction, its main parts & their function classification. D.C. Generator: Working principle, emf equation Types and applications of DC Generators. 		g's Left
Method of Assessment	Internal: Mid semester-I theory examination (Pen paper tes	t)	
Learning Outcome 6	Explain the working principle and choose a DC motor for particular application. (Cognitive domain)	4	6
Contents	 D.C. Motor: Working principle Significance of back emf, torque equation Types and applications of DC motors Need of starter 		
Method of Assessment	External: End semester theory examination (Pen paper test)		
Learning Outcome 7	Describe various parts of the AC machine, explain its working principle and select the AC machine for particular application. (Cognitive domain)	12	12
Contents	 Single Phase Transformer: Construction, working principle transformation ratio, simple numerical. Step up and step down transformers and their application Three-phase Induction motor: Construction, types, principle concept of Slip and applications. Single-phase Induction motor: types of single phase induction start, capacitor run, shaded pole and their applications. 	n. ple of ope	eration,

Method of Assessment	External: End semester theory examination (Pen paper tes	st)	
Learning Outcome 8	Apply field & armature control methods to vary speed of D shunt motor and perform open circuit & short circuit test of single phase transformer to determine losses and efficience (Psychomotor domain)	on	13
Contents	 Field and armature control methods of DC shunt motor Open circuit & short circuit test of single phase transfor 		
Method of Assessment	External: End semester practical exam- Performance of ta	sk and viva	voce
Course Outcome 3	Use electrical measuring instruments and justify the need of the transducers. (Cognitive domain)	Teach Hrs	Marks
Learning Outcome 9	Select an appropriate instrument for measurement of electrical quantities (Cognitive domain)	10	12
Contents	 Classification of Measuring Instruments: Absolute and sinstruments. Indicating, Integrating and Recording inst examples. Working principle and construction of moving iron & rammeter and voltmeter, electrodynamometer type wat type and electronic energy meter. 	ruments w	type
Method of Assessment	External: End semester theory examination (Pen paper te	st)	
Learning Outcome 10	Classify different types of transducer. (Cognitive domain	8	10
Contents	 Transducer: Definition, primary and secondary transducers, analog and digital transducers. Principle and application of Strain gauge, LVDT, Therm Piezoelectric and Photoelectric Transducers. 		e and
Method of Assessment	Internal: Mid semester-II theory examination (Pen paper	test)	
Learning Outcome 11	Measure various electrical quantities by using suitable measuring instruments. (Psychomotor and affective domain)	12	15
Contents	 Measurement of insulation resistance by megger. Measurement of earth resistance by earth tester. Measurement of linear displacement by LVDT. 		
Method of Assessment	Internal: Performance of task, observation and viva voce		
Course Outcome 4	Analyze various electronic devices and circuits.	Teach Hrs	Marks
Learning Outcome 12	Explain concepts of various semiconductor devices and circuits.(Cognitive domain)	8	10

Contents	 Semiconductor PN Junction Diode, Zener diode, PNP an Forward and reverse bias of semiconductor diode. Applications of semiconductor diode, zener diode and t Single phase half wave and full wave rectifier: Circuit d and input-output waveforms. 	ransistor	
Method of Assessment	External: End semester theory examination (Pen paper tes	st)	
Learning Outcome 13	Plot the V-I characteristics of semiconductor diode and measure output voltage of single phase rectifiers. (psychomotor domain)	8	10
Contents	 V-I characteristics of semiconductor diodes. Measurement of output voltage in single phase half was rectifier. 	ve and full	wave
Method of Assessment	External: Performance of task and viva voce		
Course Outcome 5	Select electrical wiring material and apply electrical safety measures.	Teach Hrs	Marks
Learning Outcome 14	Choose electrical wiring materials. (Cognitive domain)	4	5
Contents	 Types of Wiring and their Applications. Size of conductor, Standard Wire Gauge. Electrical Fixtures: switches, fuses, holders, sockets and 	ł MCB's.	
Method of Assessment	Internal: Mid semester test II (Pen paper test)		
Learning Outcome 15	Identify electrical safety measures in various working conditions. (Cognitive domain)	4	6
Contents	 Electric shock, its prevention, effect of electrical curren body and shock treatment. Earthing: Need and types of earthing. 	t on the hu	man
Method of Assessment	External: End semester theory examination (Pen paper tes	t)	

Reference books

1	Basic Electrical Engineering, McGraw Hill	Mittle, V.N. and Mittle, Arvind
	Education, Noida, ISBN: 978-00-705-9357-2	
2	Electrical Circuits (Hindi), Satya Prakashan New Delhi	Suresh Kumar Soni and Umesh Kumar Soni
3	A Text Book of Electrical Technology Vol-I, Vol-II and Vol-IV, S. Chand & Co. Ram-nagar, New Delhi,	Theraja, B. L. and Theraja, A. K;,
4	Electrical Machines, Vol-I, II, Khanna Book Publishing House, New Delhi 2 (ISBN: 978- 9386173-447, 978-93-86173-607)	Bimbhra, P.S.
5	Electrical Measurements and Measuring Instruments, S. K. Kataria and sons, Delhi, ISBN: 9788188458264	Gupta J. B.
6	Electrical Installation Estimating & Costing, S. K. Kataria and sons, Delhi	Gupta J. B.
7	Principles of Electronics, S. Chand Publications, Delhi	V K Mehta and Rohit Mehta

AIRCRAFT MAINTENANCE

INTRODUCTION TO AERONAUTICS

This course forms the first exposure to the discipline of Aircraft Maintenance Engineering. It starts with familiarization of airplanes and helicopters. The subject is built up slowly and steadily by introducing the terminology and basis of flight mechanics, airplane structures, power plant, systems etc. At the end of the subject, the student will be fully acquainted with the basics of Aeronautical engineering.

DETAILED CONTENTS

1. Introduction

Mankind's desire to fly, various efforts in Pre-Wright Brothers era, brief historical sketch, Wright flyer, earlier types of flying machines, development of aeronautics, progress in Aircraft design and applications, different types of heavier than air vehicles along with prominent features. Airplane, Helicopter, Hovercraft, V/STOL machines, modern developments

2. Airplane Aerodynamics

Nomenclature used in Aerodynamics, different parts of airplane, Wing as lifting surface, Types of wing plan forms, Aerodynamic features like Aerofoil pressure distribution, Aerodynamic forces and moments, Lift and Drag. Drag polar, L/D ratio, high lift devices, Airplane performance like Thrust/Power available, climb and glide, maximum range and endurance, take off and landings, Illustrations through sketches/plots.

3. Airplane Stability and Control

Airplane axis system, forces and moments about longitudinal, lateral and vertical axes, equilibrium of forces developed on wing and horizontal tail, centre of gravity, its importance in stability and control. Control surfaces, elevators ,ailerons ,and rudder

4. Airplane Propulsion

Requirement of power, various means of producing power, Brief description of thermodynamics of engines, Piston engines, Jet engines. Engine airframe combinations of various types, their performance, detailed functioning of components of a Piston-Prop engine, use of propellers as means of producing forward thrust, functioning of Jet engine, turbo-prop, turbo-fan, turbo-shaft, Prop-fan, possible locations of power plant on airplane

5. Airplane Structure, Materials and Production

Structural arrangement of earlier airplane, developments leading to all metal aircraft, Strength to weight ratio - choice of aircraft materials for different parts, detailed description of wing, tail and fuselage joints, stress-strain diagrams, plane and space, trusses, loads on airplane components, mechanical properties of materials.

6. Aircraft Instruments

Flight instruments, air speed indicators, altimeters, rate of climb/descent meter, gyro based instruments, engine performance measuring instruments, basic instruments in avionics.

7. Aircraft Systems

Elementary ideas about hydraulic and pneumatic systems, pressurization, temperature control and oxygen system, system integration, accessories, aircraft electrical system: generation and distribution of electricity on board the airplane, flight control system temperature / environment, aircraft fuel system, fire protection, ice and rain protection system.

8. Airplane Design, Types of Certification and Airworthiness

Basic steps in airplane design, airplane specification, part/component wise specification, design and testing forcertification, airworthiness requirements, air safety requirements and standards.

RECOMMENDED BOOKS

- 1. Fundamentals of Flight by YR S Shevell; Prentice Hall, Delhi
- 2. Aircraft Instruments by E H J Pallet; Himalayan Books, Delhi
- 3. Introduction to Flight by John Anderson Jr.; McGraw Hill, Delhi
- 4. Aircraft Electrical Systems by E H J Pallet; Himalayan Books, Delhi
- 5. Jet Engine Manual by E W Somerset Maugham,, BIP Publications, Delhi
- 6. Fundamentals of Flight by Dr. O. P. Sharma and Lalit Gupta, Himalayan Books, Delhi

RGPV (DIPLO BHO		ING)		CULUM FOR THE OURSE	FORMA	Т-3	Sheet No. 1/3					
Branch			Med	chanical Engineer	ring	Semester		IV					
Course	Code	40	1	Course Name	STRENGT	H OF MATI	ERIAL	S					
Course (Outcon	ne 1	Calcul	ate stresses, strain	and strain energy.		Teach Hrs	Marks					
Learning	g Outco	ome 1	Draw	stress strain diagra	m for a given material.		04	05					
Contents Method			Therm ductile		ns viz. tensile, compres and strains, Hook's La le material.								
Assessme		ome 2		ate stresses, strains	s, elastic constants, pringiven condition.	ncipal	06	10					
Contents	ì		Factor of Safety, Elastic Constants, Lateral Strain, Poisson's ratio, Bulk Modulus, Shear Modulus, Volumetric Strain. Relation between elastic constants—Problems on Direct Stresses and Linear Strains, Hook's Law elastic constants. Principal stresses and strains. Mohr's Circle.										
Method of Assessmo				y exam	ar stresses and strains.								
Learning		ome 3	Calcul object		inder given loading for	a given	06	05					
Contents	3		resilier i) Grad	nce; formulae of st dually applied load	nergy or resilience, prograin energy for the foll l, ii) Suddenly applied led on strain energy.	owing cases:							
Method of Assessment				pen test	a on sham energy.								
Course (1e 2	Perfor	m mechanical testi	ing of materials.								
Learning			Descri		test method for a mech	anical	09	20					
Contents	3		Mechanical properties of materials brittleness, creep, ductility, elasticity, hardness, malleability, plasticity, strength, stiffness, toughness, endurance limit, Destructive testing, tensile test, compression test, shear test bending test, hardness test, torsion test, impact test fatigue test, Non- destructive testing methods, visual testing, ultrasonic testing, radiography testing, electromagnetic testing, magnetic particle testing, acoustic emission testing, liquid penetrate testing, leak testing methods										
Method of Assessme					caboratory test by obser	T	<u> </u>						
Learning		ome 2		m a given destruct material.	ive/ non-destructive tes	st for a	36	30					

	In the state of th	. 1 1	
	Destructive testing, tensile test, compression test, shear t	est bend	ling test,
	hardness test, torsion test, impact test fatigue test,		
Contents	Non- destructive testing methods, visual testing, ultrasonic te	•	
	radiography testing, electromagnetic testing, magnetic partic		
	acoustic emission testing, liquid penetrate testing, leak testin	g metho	ds
Method of	Laboratory test by observation		
Assessment			
Course Outcome 3	Draw CED and DMD for a given beam under leading	Teach	Marks
Course Outcome 5	Draw SFD and BMD for a given beam under loading.	Hrs	IVIAIKS
I ' O ' 1	Describe types of load, shear force, bending moment acting	04	05
Learning Outcome 1	on beams.		
	Definition-Shear Force and Bending Moment, types of beam	s cantile	ver.
Contents	simply supported, overhanging and fixed beams, types of loa		
	beams- point load, uniformly distributed load, uniformly var		
Method of	Theory exam	<u> </u>	,
Assessment			
Learning Outcome 2	Draw shear force, bending moment diagram for a beam	10	15
	under a given loading condition.		
Contents	Bending Moment and its importance -sign convention to draw	w shear	force
Contents	diagram and bending moment diagram- Concept of Maximum		
	moment, Point of Contra-flexure and its importance-Drawing		
	bending moment diagram for Cantilever, Simply Supported		
	to Point Load and U.D.L	Deams 3	abjected
Method of	Theory exam		
Assessment	Theory exam		
Course Outcome 4	Calculate bending stresses for a given beam.	Teach	Marks
Course Outcome 4	Calculate behaving stresses for a given beam.	Hrs	IVICINS
Learning Outcome 1	Explain bending stresses, modulus of section and bending	04	06
Learning Outcome 1	equation.		00
Contents	Position of neutral axis in beams, moment of resistance, Ben	ding eau	ation
Contents	(without proof), Modulus of section for rectangular, hollow in	- 1	
			iai,
	Largular and hollow aircular sections. Reams of uniform stres		
Mathad of	circular and hollow circular sections, Beams of uniform stren		
Method of	Theory exam		
Assessment	Theory exam	ngth,	05
	Theory exam Express relation between bending stress and radius of		05
Assessment Learning Outcome 2	Theory exam Express relation between bending stress and radius of curvature.	ngth,	
Assessment	Theory exam Express relation between bending stress and radius of curvature. Introduction, assumptions in theory of simple bending, bending	ngth, 04 ing stres	S,
Assessment Learning Outcome 2 Contents	Theory exam Express relation between bending stress and radius of curvature. Introduction, assumptions in theory of simple bending, bending relation between bending stress and radius of curvature (form	ngth, 04 ing stres	S,
Assessment Learning Outcome 2 Contents Method of	Theory exam Express relation between bending stress and radius of curvature. Introduction, assumptions in theory of simple bending, bending	ngth, 04 ing stres	S,
Assessment Learning Outcome 2 Contents	Theory exam Express relation between bending stress and radius of curvature. Introduction, assumptions in theory of simple bending, bending relation between bending stress and radius of curvature (form	ngth, 04 ing stres	S,
Assessment Learning Outcome 2 Contents Method of	Theory exam Express relation between bending stress and radius of curvature. Introduction, assumptions in theory of simple bending, bending relation between bending stress and radius of curvature (form	ngth, 04 ing stres	S,
Assessment Learning Outcome 2 Contents Method of Assessment	Theory exam Express relation between bending stress and radius of curvature. Introduction, assumptions in theory of simple bending, bending relation between bending stress and radius of curvature (form Assignment).	04 ing stress nula only	s, y).
Assessment Learning Outcome 2 Contents Method of	Theory exam Express relation between bending stress and radius of curvature. Introduction, assumptions in theory of simple bending, bending relation between bending stress and radius of curvature (form Assignment) Calculate slope, deflection, flexural strength of a given	ngth, 04 ing stres	S,
Assessment Learning Outcome 2 Contents Method of Assessment Learning Outcome 3	Theory exam Express relation between bending stress and radius of curvature. Introduction, assumptions in theory of simple bending, bending relation between bending stress and radius of curvature (form Assignment) Calculate slope, deflection, flexural strength of a given beam.	o4 ing stressnula only	s, y).
Assessment Learning Outcome 2 Contents Method of Assessment	Theory exam Express relation between bending stress and radius of curvature. Introduction, assumptions in theory of simple bending, bending relation between bending stress and radius of curvature (form Assignment Calculate slope, deflection, flexural strength of a given beam. Calculation of slope, deflection, flexural strength of cantil	o4 ing stressnula only	s, y).
Assessment Learning Outcome 2 Contents Method of Assessment Learning Outcome 3	Theory exam Express relation between bending stress and radius of curvature. Introduction, assumptions in theory of simple bending, bending relation between bending stress and radius of curvature (form Assignment) Calculate slope, deflection, flexural strength of a given beam.	o4 ing stressnula only	s, y).
Assessment Learning Outcome 2 Contents Method of Assessment Learning Outcome 3	Theory exam Express relation between bending stress and radius of curvature. Introduction, assumptions in theory of simple bending, bending relation between bending stress and radius of curvature (form Assignment Calculate slope, deflection, flexural strength of a given beam. Calculation of slope, deflection, flexural strength of cantil	o4 ing stressnula only	s, y).
Assessment Learning Outcome 2 Contents Method of Assessment Learning Outcome 3	Theory exam Express relation between bending stress and radius of curvature. Introduction, assumptions in theory of simple bending, bending relation between bending stress and radius of curvature (form Assignment Calculate slope, deflection, flexural strength of a given beam. Calculation of slope, deflection, flexural strength of cantil	o4 ing stressnula only	s, y).

Learning Outcome 4	Calculate stresses using bending equation on a given beam.	08	14							
Contents	Numerical problems on calculation of stresses using bending	g equatio	n							
Method of	Theory exam									
Assessment										
Course Outcome 5	Calculate design parameters of circular shafts and springs	Teach Hrs	Marks							
Learning Outcome 1	Calculate design parameters of a given shaft.	Calculate design parameters of a given shaft. 08 10								
Contents	Definition and function of shaft: Calculation of polar M hollow shafts; Assumptions in simple torsion; Derivation T/J=f _s /R=Gθ/L; Numerical Problems on design of shaft based on strength and	of the	equation							
Method of Assessment	Theory exam									
Learning Outcome 2	Explain springs, its classification and stiffness of a spring.	05	05							
Contents	Classification of springs: Nomenclature of closed coil helical Deflection formula for closed coil helical spring (without destiffness of spring.									
Method of Assessment	Quiz									
Learning Outcome 3	Calculate design parameters of a given spring.	08	10							
Contents	Numerical Problems related to comparison of strength and wand hollow shafts. Numerical problems on closed coil helica safe load, deflection, size of coil and number of coils.									
Method of	Theory exam									
Assessment										

RG	PV (Dinla	ma Wing) Bhopal		SCHEME FOR		Br	anch C	ode	Co	ourse C	ode	CO Code	LO Code	Format No. 4
Ro	COURSE			OUTC	OME	M	0	2	4	0	1	1	1	
		STRENGTH OF	MAT	ERIALS										
CO Des	cription	Calculate stresses,	strain	and strain energy.										
LO Des	cription	Draw stress strain	diagra	am for a given mater	rial.									
					SCHEME O	F STU	DY							
S. No.	Lear	rning Content	Tea	ching –Learning Method	Description of Process	T-L	Teach Hrs.		ract. ut Hrs.	I	LRs Re	quired		Remarks
1	viz. tensil Shear, Cr fatigue str Hook's L curve for	resses and strains le, compressive, rushing, Thermal, resses and strains, aw, Stress- Strain ductile material e material.	teacl dem	onstration, quiz, gnments,	Teacher will exp the contents and provide handout students. Teacher conduct assignment quiz/tutorial to restudents practice knowledge.	s to er will nents/ nake	4		NIL	PPT,		halk board	·	
					SCHEME OF A	SSESS	MENT							
S. No.	Metho	od of Assessment		Description of A	ssessment		imum arks			Resour	ces Re	quired		External / Internal
1	P	aper pen test		udent will be asked ain diagram for a gi		(05		Т	est pape	er + Rat	ing scale		Internal
			AD	DITIONAL INST	RUCTIONS FO	R THE	HOD/	FACU	JLTY (IF ANY	Y)			
					Part of prog	ressive	I							

RG	RGPV (Diploma Wing) Bhopal COURSE NAME STRENGTH OF		SCHEME FOR		Bı	Branch Code			ourse C	ode	CO Code	LO Code	Format No. 4
			OUTC	OME	M	0	2	4	0	1	1	2	
		STRENGTH OF	MATERIALS										
CO Des	cription	Calculate stresses,	strain and strain energy.										
LO Des	cription	Calculate stresses,	strains, elastic constants,	principal stresses	and st	rains for	a giv	ven cond	ition.				
				SCHEME O									
S. No.	Lea	rning Content	Teaching –Learning Method	Description of Process	f T-L	Teach Hrs.		Pract. Fut Hrs.	L	Rs Re	quired		Remarks
1 Factor of Safety, Elastic Constants, Lateral Strain, Poisson's ratio, Bulk Modulus, Shear Modulus, Volumetric Strain. Relation between elastic constants— Problems on Direct Stresses and Linear Strains, Hook's Law elastic constants. Principal stresses		constants, Lateral Strain, oisson's ratio, Bulk demonstration, quiz, assignments, tutorial vill contact tresses and Linear Strains, look's Law elastic teaching, demonstration, quiz, assignments, tutorial vill contact tresses and Linear Strains, look's Law elastic teaching, demonstration, quiz, students tutorial vill contact tresses and Linear Strains, look's Law elastic their kn		the contents and provide handou students. Teach will conduct assignments/	ride handouts to ents. Teacher conduct gnments/ /tutorial to make ents practice				NIL Handouts, cha PPT, text boo video film.			·	
			}	SCHEME OF A	SSESS	MENT							
S. No.	Meth	od of Assessment	Description of A	ssessment		arks			Resour	ces Re	quired		External / Internal
1		Theory exam	Student will be asked to given properties for a groundition.			10		Que	stion pa	nper + r	rating scal	le	External
			ADDITIONAL INSTI	RUCTIONS FO	R THE	HOD/	FAC	CULTY (IF ANY	Z)			
				NII									

CO

RGPV (E	Diploma Wing) Bhopal	SCHEME FOI		Br	anch C	ode	Co	ourse C	ode	CO Code	LO Code	Format No. 4	
`		OUTO	COME	M	0	2	4	0	1	1	3		
COURSE NAME	STRENGTH OF	MATERIALS			'					<u>'</u>			
O Descripti	on Calculate stresses,	strain and strain energy.											
O Description	on Calculate strain end	ergy under given loading	for a given objec	t.									
	<u> </u>		SCHEME O	F STU	DY								
S. No.	Learning Content	Teaching –Learning Method	Description of Process	fT-L	Teach Hrs.		Pract. Tut Hrs.	I	Rs Re	quired		Remarks	
resili resili straii follo i) Gi ii) S iii) nume	in Energy: Strain gy or resilience, proof lence and modulus of lence; formulae of n energy for the wing cases: radually applied load, uddenly applied load, Impact/shock load; erical problems based rain energy.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will exp the contents and provide handour students. Teacher conduct assigning quiz/tutorial to a students practice knowledge.	ts to er will nents/ make	6		NIL	PPT,		halk board	·		
			SCHEME OF A	SSESS	MENT								
S. No. M	lethod of Assessment	Description of A	Assessment		imum arks			Resour	ces Re	quired		External / Internal	
1	Paper pen test	Student will be asked strain energy under gi a given object.			05		Test paper + Rating scale				Internal		
		ADDITIONAL INST	RUCTIONS FO	R THE	HOD/	FAC	ULTY (IF ANY	<u>/)</u>			·	

Part of progressive I

RG	RGPV (Diploma Wing) Bhop OURSE NAME STRENGTH O	oma Wing) Bhopal		E FOR LEAR	NING	Br	anch (Code	C	ourse C	ode	CO Code	LO Code	Format No. 4
	` •	8, 1		OUTCOME		M	0	2	4	0	Code Code 1 2 1	1		
		STRENGTH OF M	IATERIALS											
CO Des	cription	Perform mechanical	testing of materi	ials.										
LO Des	cription	Describe an appropri	iate test method	for a mechanica	l property	of a g	iven m	aterial.						
				SCH	EME O	F STU	DY							
S. No.		Learning Conte	nt	Teaching – Learning Method	Descri I	ption o			ach rs.	Pract /Tut Hrs.		LRs Req	uired	Remarks
1	creep, du malleabil toughnes Destructi test, shea torsion te Non- des testing, u electroma testing, a	cal properties of mater ctility, elasticity, hard lity, plasticity, strength s, endurance limit, ve testing, tensile test r test bending test, har est, impact test fatigue tructive testing metho ltrasonic testing, radio agnetic testing, magne coustic emission testing testing, leak testing n	ness, h, stiffness, t, compression rdness test, test, ds, visual ography testing, etic particle ng, liquid	Interactive classroom teaching, demonstratio n, quiz, assignments, tutorial	Teacher the con- provide students will con- assignn quiz/tut students their kn	tents are hando s. Teac nduct nents/ corial to s practi	nd uts to her make ce ge.	N	IL	09	bo bo	ard, PPT, ok, charts	text s, video	
				SCHEM	E OF A	SSESS	MENT							
S. No.	Metho	od of Assessment	Description	on of Assessme	nt		imum arks			Resour	ces Re	quired		External / Internal
1		ooratory test by observation	appropriate test	asked to select method for a perty of a given		2	20	O	bservat	servation schedule/check-list /rating scales /rubrics				Internal
			ADDITIONAL	INSTRUCTIO	NS FOI	R THE	HOD	'FACU	LTY (IF ANY	()			
				Pa	rt of Lal	o Worl	ζ.							

RGPV (Diplo	oma Wing) Bhopal	SCHEME FOR LEARNING	Br	anch (Code	Co	ourse C	Code	CO Code	LO Code	Format No. 4
	8/ 1	OUTCOME	M	0	2	4	0	1	2	2	
COURSE NAME	STRENGTH OF MAT	ERIALS	'				•	'			
CO Description	Perform mechanical test	ing of materials.									
LO Description	Perform a given destruct	rive/ non-destructive test for a given r	nateria	l.							
		SCHEME O	F STU	DY							

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Destructive testing, tensile test, compression test, shear test bending test, hardness test, torsion test, impact test fatigue test, Non- destructive testing methods, visual testing, ultrasonic testing, radiography testing, electromagnetic testing, magnetic particle testing, acoustic emission testing, liquid penetrate testing, leak testing methods	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/quiz/tutorial to make students practice their knowledge.	NIL	36	Handouts, chalk board, PPT, text book, charts, video film, lab manual.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory test by observation	Student will be asked to perform a destructive test for a given material.	30	Observation schedule/check-list /rating scales /rubrics	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Part of end practical exam

RG	PV (Dinla	oma Wing) Bhopal		R LEARNING	Br	anch C	ode	Co	ourse C	ode	CO Code	LO Code	Format No. 4
NO.	i v (Dipio	mu (ling) bhopui	OUTO	COME	M	0	2	4	0	1	3	1	
	JRSE ME	STRENGTH OF	MATERIALS										
CO Des	cription	Draw SFD and BM	ID for a given beam und	er loading.									
LO Deso	cription	Describe types of l	oad, shear force, bendin	g moment acting o	n beam	S.							
				SCHEME O	F STU	DY							
S. No.	Lear	ning Content	Teaching –Learning Method	Description of Process	T-L	Teach Hrs.		ract. it Hrs.	I	LRs Re	equired		Remarks
1	Learning Content Definition-Shear Force and Bending Moment, types of beams cantilever, simply supported, overhanging and fixed beams, types of load acting on beams- point load, uniformly distributed load, uniformly varying load,		Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will exp the contents and provide handout students. Teacher conduct assignment quiz/tutorial to restudents practice knowledge.	es to er will nents/ nake	4		NIL	PPT,		chalk boar book, chart	1	
				SCHEME OF A	SSESS	MENT							
S. No.	Metho	od of Assessment	Assessment		imum arks			Resour	ces Re	quired		External / Internal	
1	Т	Theory exam	Student will be asked shear force, bending of load acting on a gi	moment, types		5		Que	stion pa	aper + 1	rating sca	le	External
I			ADDITIONAL INST	RUCTIONS FO	R THE	HOD/	FACU	LTY (IF ANY	Y)			1
				NII									

RG	PV (Diplo	oma Wing) Bhopal	SCHEME FOR		Bı	anch C	ode	Co	urse C	ode	CO Code	LO Code	Format No. 4
110	- (- Ip -	, , , g <i>)</i> 2 p	OUTC	OME	M	0	2	2 4	0	1	3	2	
	JRSE ME	STRENGTH OF M	MATERIALS										-
CO Des	cription	Draw SFD and BM	D for given beam under l	oading.									
LO Des	cription	Draw shear force, b	ending moment diagram	for a beam unde	r a give	n loadir	ng co	ondition.					
				SCHEME O	F STU	DY							
S. No.	Lear	rning Content	Teaching –Learning Method	Description o Process	f T-L	Teach Hrs.		Pract. /Tut Hrs.	L	Rs Re	quired		Remarks
1	Bending Moment and its importance -sign convention to draw shear force diagram and bending moment diagram - Concept of Maximum bending moment. Point of Contra-flexure and its importance-Drawing shear force and bending moment diagram for Cantilever, Simply Supported Beams subjected to Point Load and U.D.L		teaching, demonstration, quiz, assignments, tutorial	Teacher will exthe contents an provide handous students. Teach will conduct assignments/quiz/tutorial to students practic their knowledge	d uts to ner make	10		NIL	PPT,		halk board	·	
			\$	SCHEME OF A	SSESS	MENT	1						
S. No.	Metho	od of Assessment	Description of A	ssessment		imum arks		1	Resour	ces Re	quired		External / Internal
1	7	Theory exam	Student will be asked of force, bending momen beam under a given loa condition.	t diagram for a		15		Ques	stion pa	iper + r	ating scal	le	External
			ADDITIONAL INSTI	RUCTIONS FO	R THE	HOD/	FAC	CULTY (I	F ANY	<i>Z</i>)			
				NII	L			<u> </u>					

RG	PV (Diplo	ma Wing) Bhopal	SCHEME FOI		Br	anch C	ode		Cou	Course Code Cod	CO Code	LO Code	Format No. 4	
			Outc	ONIE	M	0	2	4		0	1	4	de Code d d coard, narts,	
	JRSE ME	STRENGTH OF M	MATERIALS											
CO Des	cription	Calculate bending s	stresses for a given beam	l .										
LO Des	cription	Explain bending str	esses, modulus of section	n and bending equ	uation.									
				SCHEME O	F STU	DY								
S. No.	Lear	ning Content	Teaching –Learning Method	Description of Process	T-L	Teach Hrs.		Pract Tut Hi		I	Rs Re	quired		Remarks
1	Learning Content Position of neutral axis in beams, moment or resistance, Bending equation (without proof), Modulus or section for rectangular hollow rectangular, circular and hollow circular sections. Beams of uniform strength,		Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will exp the contents and provide handout students. Teacher conduct assigning quiz/tutorial to a students practice knowledge.	ts to er will nents/ nake	4		NIL		PPT,		halk boar	·	
				SCHEME OF A	SSESS	MENT								
S. No.	Metho	od of Assessment	Description of A	Assessment		imum arks			R	esour	ces Re	quired		External / Internal
1	Т	heory exam	Student will be asked bending stresses, mod for given sections and equation.	ulus of section		6			Tes	t pape	r + Rat	ing scale		External
			ADDITIONAL INST	RUCTIONS FO	R THE	HOD/	FA(CULTY	(II	ANY	Z)			·
				NII										

RG	PV (Diplo	oma Wing) Bhopal		OR LEARNING COME		anch C			ourse C		CO Code	LO Code	Format No. 4
	URSE ME	STRENGTH OF		COME	M	0	2	4	0	1	4	2	
	cription	Calculate bending	stresses for a given bear	m.									
LO Des	cription	Express relation be	etween bending stress ar	nd radius of curvatu	ıre.								
				SCHEME O	F STU	DY							
S. No.	Lear	ning Content	Teaching –Learning Method	Description of Process	f T-L	Teacl Hrs.		Pract. ut Hrs.	I	LRs Re	equired		Remarks
1	in theory bending, relation b stress and	ion, assumptions of simple bending stress, between bending d radius of a (formula only).	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will exp the contents and provide handour students. Teacher conduct assigning quiz/tutorial to a students practice knowledge.	ts to er will nents/ make	4		NIL	PPT,	-	chalk boar bok, chart	·	
	1		1	SCHEME OF A	SSESS	MENT	· · · · · · · · · · · · · · · · · · ·						
S. No.	Metho	od of Assessment	Description of	Assessment		arks			Resour	ces Re	quired		External / Internal
1		Assignment	Student will be asked simple bending to exbetween bending structure.	press relation		05			Resources Required Rubrics/rating scales				Internal
			ADDITIONAL INS	TRUCTIONS FO	R THE	HOD/	FACU	J LTY (IF AN	Y)			

Term work

RG	PV (Diploi	ma Wing) Bhopal		R LEARNING	Bı	anch C	ode	C	ourse C	Code	CO Code	LO Code	Format No. 4
	- (2-p-0-	(g) 2 · pus	OUTC	COME	M	0	2	4	0	1	4	3	
	JRSE ME	STRENGTH OF	MATERIALS										1
CO Des	cription	Calculate bending	stresses for a given beam	1.									
LO Des	cription	Calculate slope, de	flection, flexural strengt	h of a given beam.									
				SCHEME O	F STU	DY							
S. No.	Lear	ning Content	Teaching –Learning Method	Description of Process	T-L	Teach Hrs.		ract. it Hrs.	I	LRs Re	quired		Remarks
1	deflection of cantilev	on of slope, , flexural strength ver and simply beams for point JDL.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will exp the contents and provide handout students. Teacher conduct assignment quiz/tutorial to restudents practice knowledge.	s to er will nents/ nake	8		NIL	PPT,		halk board	· 1	
		1		SCHEME OF A	SSESS	MENT	<u>'</u>						
S. No.	No. Method of Assessment Description			Assessment		arks			Resour	ces Re	quired		External / Internal
1	Pa	nper pen test	Student will be asl slope, deflection, flex given beam under giv	tural strength of a		10		To	est pape	er + Rat	ing scale		Internal
			ADDITIONAL INST	RUCTIONS FO	R THE	HOD/	FACU	LTY (IF AN	Y)			<u> </u>
				Part of prog	ressive	II							

RG	RGPV (Diploma Wing) Bhopa	SCHEME FOL		Bı	anch C	ode	Со	urse C	ode	CO Code	LO Code	Format No. 4	
	` •	87 1	OUTO	COME	M	0	2	4	0	1	4	4	
	JRSE ME	STRENGTH OF	MATERIALS		'			'			'		
CO Des	cription	Calculate bending	stresses for a given beam	l.									
LO Des	cription	Calculate stresses u	using bending equation o	n a given beam.									
		1		SCHEME O	F STU	DY							
S. No.	Lear	rning Content	Teaching –Learning Method	Description of Process	T-L	Teach Hrs.		Pract. Fut Hrs.	I	Rs Re	quired		Remarks
1		al problems on on of stresses using equation	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will exp the contents and provide handout students. Teacher conduct assignment quiz/tutorial to restudents practices knowledge.	ts to er will nents/ nake	8		NIL	PPT,	,	halk boar bok, chart	·	
			l	SCHEME OF A	SSESS	MENT							
S. No.	Metho	od of Assessment	Description of A	Assessment		arks]	Resour	ces Re	quired		External / Internal
1	Theory exam		Student will be asked stresses using bending given beautiful stresses as a stresses using bending the stresses as a stresse as a stresses as a stresse as a stresses as a stresse as a stresses as a stresse as a stresses as a stresses as a st	g equation on a		14		Те	st pape	er + Rat	ing scale		External
			ADDITIONAL INST	RUCTIONS FO	R THE	HOD/	FAC	CULTY (I	F ANY	Y)			·
				NII	-								

RG	PV (Diplo	oma Wing) Bhopa	l	SCHEME FOR		Bı	anch C	ode	Co	ourse C	ode	CO Code	LO Code	Format No. 4
	- · (I	, , , g , p		OUTC	OME	M	0	2	4	0	0 1 5 LRs Required	1		
	URSE ME	STRENGTH OF	MAT	ERIALS										
CO Des	cription	Calculate design p	arame	ters of circular shaf	ts and springs									
LO Des	cription	Calculate design p	arame	ters of a given shaf	t.									
					SCHEME O	F STU	DY							
S. No.	Lear	rning Content	Tea	ching –Learning Method	Description of Process	T-L	Teacl Hrs.		ract. ut Hrs.	I	LRs Re	quired		Remarks
1	Learning Content Definition and function of shaft: Calculation of polar M.I. for solid and hollow shafts; Assumptions in simple torsion; Derivation of the equation T/J=f _s /R=Gθ/L; Numerical Problems on design of shaft based on strength and rigidity		teach demo	onstration, quiz, nments,	Teacher will exp the contents and provide handour students. Teacher conduct assignm quiz/tutorial to a students practice knowledge.	ts to er will nents/ nake	8	0		PPT,		halk board	·	
					SCHEME OF A	SSESS	MENT							
S. No.	Method of Assessment Description of Assessm						imum arks			Resour	ces Re	quired		External / Internal
1	7	Γheory exam		ident will be asked sign parameters a gi			10		Т	est pape	er + Rat	ting scale		External
			AD	DITIONAL INST	RUCTIONS FO	R THE	HOD/	FACU	JLTY (IF ANY	Y)			
					NII									

RGPV (Diploma Wing) Bhopal	ma Wing) Bhonal				Br	anch C	ode	Co	urse C	ode	CO Code	LO Code	Format No. 4
.i (2.p.	ma (mg) bhopu		OUTC	OME	M	0	2	4	0	1	5	2	
URSE ME	STRENGTH OF	MAT	ERIALS										
cription	Calculate design p	arame	ters of circular shaf	ts and springs									
cription	Explain springs, it	s class	ification and stiffne	ess of a spring.									
				SCHEME O	F STU	DY							
No. Learning Content Classification of springs: Nomenclature of closed		Tea	ching –Learning Method	Description of Process	T-L	Teach Hrs.			I	Rs Re	quired		Remarks
Nomencle coil helic Deflectio closed co (without	ssification of springs: menclature of closed helical spring; lection formula for sed coil helical spring thout derivation);		ning, onstration, quiz, nments,	the contents and provide handout students. Teache conduct assignment quiz/tutorial to reconstructions.	s to er will nents/ nake	5	N	NIL	PPT,	text bo		*	
				SCHEME OF A	SSESS	MENT							
Metho	od of Assessment		Description of A	ssessment		-		1	Resour	ces Re	quired		External / Internal
	Quiz	spr	ings, its classification	-		05		Rubrics/rating scales					Internal
	URSE cription cription Lear Classifica Nomencl coil helic Deflectio closed co (without a stiffness of	Cription Calculate design p Cription Explain springs, it Learning Content Classification of springs: Nomenclature of closed coil helical spring; Deflection formula for closed coil helical spring (without derivation); stiffness of spring. Method of Assessment	Cription Calculate design parame Cription Explain springs, its class Learning Content Classification of springs: Nomenclature of closed coil helical spring; Deflection formula for closed coil helical spring (without derivation); stiffness of spring. Method of Assessment Quiz Stu- spring Strength OF MAT. Tea Tea Learning Content teach demondance demondance served demondance serv	URSE STRENGTH OF MATERIALS cription Calculate design parameters of circular shafe cription Explain springs, its classification and stiffned Learning Content Classification of springs: Nomenclature of closed coil helical spring; Deflection formula for closed coil helical spring (without derivation); stiffness of spring. Method of Assessment Description of A Student will be asked	STRENGTH OF MATERIALS	Company Comp	PV (Diploma Wing) Bhopal OUTCOME M OUTCOME M OUTCOME M O OUTCOME M OUTCOME M OUTCOME M OUTCOME M OUTCOME M OUTCOME OUTCOME N OUTCOME OUTCOME OUTCOME N OUTCOME OUTCOME N OUTCOME OUTCOME OUTCOME OUTCOME OUTCOME OUTCOME	Calculate design parameters of circular shafts and springs	STRENGTH OF MATERIALS	PV (Diploma Wing) Bhopal OUTCOME M 0 2 4 0 RSE ME STRENGTH OF MATERIALS Cription Calculate design parameters of circular shafts and springs cription Explain springs, its classification and stiffness of a spring. SCHEME OF STUDY Learning Content Classification of springs: Nomenclature of closed coil helical spring; Deflection formula for closed coil helical spring (without derivation); stiffness of spring. SCHEME OF STUDY Teaching —Learning Method Process Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge. SCHEME OF ASSESSMENT Method of Assessment Description of Assessment Maximum Marks Resour Rubrics	OUTCOME OUTCOME M 0 2 4 0 1 IRSE ME STRENGTH OF MATERIALS Cription Calculate design parameters of circular shafts and springs Cription Explain springs, its classification and stiffness of a spring. SCHEME OF STUDY Learning Content Teaching — Learning Method Process Interactive classroom teaching, demonstration, quiz, assignments, colosed coil helical spring; (without derivation); stiffness of spring. M 0 2 4 0 1 M Calculate design parameters of circular shafts and springs SCHEME OF STUDY Description of T-L Teach Hrs. /Tut Hrs. LRs Resources Resou	PV (Diploma Wing) Bhopal SCHEME FOR LEARNING OUTCOME M 0 2 4 0 1 5 JRSE ME STRENGTH OF MATERIALS cription Calculate design parameters of circular shafts and springs cription Explain springs, its classification and stiffness of a spring. SCHEME OF STUDY Learning Content Classification of springs: Nomenclature of closed coil helical spring; Deflection formula for closed coil helical spring (without derivation); stiffness of spring. SCHEME OF ASSESSMENT Method of Assessment Description of T-L Process Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge. SCHEME OF ASSESSMENT Method of Assessment Description of Assessment Maximum Marks Resources Required Rubrics/rating scales	SCHEME FOR LEARNING OUTCOME SCHEME FOR LEARNING OUTCOME M 0 2 4 0 1 5 2 STRENGTH OF MATERIALS Cription Calculate design parameters of circular shafts and springs cription Explain springs, its classification and stiffness of a spring. SCHEME OF STUDY Calculate design parameters of circular shafts and springs

Term work

RG	RGPV (Diploma Wing) Bhopal			R LEARNING	Br	anch C	ode	Co	urse C	ode	CO Code	LO Code	Format No. 4
			OUTO	COME	M	0	2	4	0	1	5	3	
	JRSE ME	STRENGTH OF	MATERIALS								'		
CO Des	cription	Calculate design pa	arameters of circular shat	fts and springs									
LO Des	cription	Calculate design pa	arameters of a given sprin	ng.									
				SCHEME O	F STU	DY							
S. No.	Lear	rning Content	Teaching –Learning Method	Description of Process	fT-L	Teach Hrs.	LRs Required			Remarks			
1	strength solid an Numerica closed co find safe	al Problems to comparison of and weight of ad hollow shafts. al problems on oil helical spring to e load, deflection, oil and number of	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will expended the contents and provide handour students. Teacher conduct assigning quiz/tutorial to a students practice knowledge.	ts to er will nents/ make	8	0	Handouts, chalk board PPT, text book, charts video film.		·			
				SCHEME OF A	SSESS	MENT							
S. No.	Metho	od of Assessment	Description of Assessment			imum arks]	Resour	ces Re	quired		External / Internal
1		Theory exam	Student will be asked to calculate design parameters a given spring.		10		Test paper + Rating sc				ting scale		External
			ADDITIONAL INST	RUCTIONS FO	R THE	HOD/	FACU	J LTY (1	F ANY	Y)			
				NII									

RGPV (DIPLOM WING) BHOPA		OBE CURRICULUM FOR	R THE COURSE	FORMAT-3	Sheet No. 1					
Branch		MECHANICAL ENGI	NEERING	Semester	III					
Course Code	302	Course Name	THERMAL ENGI	NEERING						
Course Outcome 1	Exp	lain renewable sources of en	nergy		Teah. Hrs	Marks				
Learning Outcome 1	Clas	ssify renewable and non-rene	2	3						
Contents		Definition and Classification of energy sources- Renewable and Non-Renewable, Examples of renewable and non renewable sources.								
Method of Assessment	Pape	Paper-Pen Test (Part of Prg 1)								
Learning Outcome 2		tch the schematic diagram of eration.	f solar, bio-gas, tid	al, geothermal power	8	10				
Contents	sola	Flat plate and concentrating solar collectors, their application. Photovoltaic Cell, Solar Distillation system, solar cooker. Wind energy horizontal and vertical wind mill, site selection for wind energy power plants, introduction to Tidal energy, Geothermal energy, Biogas energy, Bio-gas plant.								
Method of Assessment	The	ory Exam								
Learning Outcome 3	Iden	ntify components of Solar sy	stems		9	8				
Contents		nonstration of components cillation system, solar cooker	-	d concentrating solar	collectors. Photov	voltaic Cell, Solar				
Method of Assessment	Lab	oratory Test by Observation	(Part of LW)							

Course Outcome 2	Solve simple problems based on basic concepts of thermodynamics, and its laws.	Teach Hrs	Marks					
Learning Outcome 1	Explain thermodynamic systems, properties, processes, cycles, gas equation and modes of heat transfer.	6	7					
Contents	Concept of thermodynamic System– definition, classification and applications, State, processes, cycles, Properties- Intensive and Extensive with examples, Point and Path function, Concept of Work and Heat, Definitions: Enthalpy, Internal energy, Entropy, Specific heat at constant pressure (C_p), specific heat at constant volume (C_v), relation between C_p & C_v , characteristic gas equation, Universal gas constant, Definition of quasistatic process, flow work, Modes of Heat transfer - definition and types.							
Method of Assessment	Paper-Pen Test (Part of Prg 1)							
Learning Outcome 2	Solve given problems based on thermodynamic systems, properties and gas equation.	4	10					
Contents	Numerical problems based on Thermodynamic System, Properties, gas ec	juation.						
Method of Assessment	Theory Exam							
Learning Outcome 3	Solve given problems based on the laws of thermodynamics.	8	10					
Contents	Laws of thermodynamics- Zeroth law, concept of work and heat, statement of first law- internal energy, enthalpy, relationship between heat transfer, work transfer and change in internal energy, Concept of conservation of mass and control volume, Steady and steady flow energy equation (without proof). Limitation of first law. Second law – Clausius and Kelvin-Planck Statements, concept of heat pump, refrigerator, heat engine, thermal efficiency, COP, reversible process, factors which make a process irreversible, Carnot cycle, its efficiency and limitation, Clausius inequality, entropy							
Method of Assessment	Theory Exam							

Course Outcome 3	Solve numerical problems based on thermodynamic processes, air standard cycles.	Teach.Hrs	Marks					
Learning Outcome 1	Compare thermodynamic processes, air standard cycle using P-V and T-S diagram.	8	10					
Contents	Thermodynamic processes- Definition, classification and representation on P-V and T-S diagram for Constant pressure, Constant volume, Constant Temperature, Adiabatic, Polytropic, throttling processes. Thermodynamic cycle – definition, classification- reversible and irreversible cycles, Air Standard Cycles: Carnot cycle, Otto Cycle, Diesel Cycle, Dual Cycle, their representation on P-V and T-S diagrams							
Method of Assessment	Paper-Pen Test (TW)							
Learning Outcome 2	Calculate mean effective pressure, work done, efficiency for a given Air Standard cycle.	7	10					
Contents	Problems on calculation of work done, change in internal energy, heat transfer, change in entropy for thermodynamic processes. Problems on calculation of Mean Effective Pressure, work done, air standard efficiency for Air Standard cycle.							
Method of Assessment	Theory Exam							
Course Outcome 4	Explain steam generation processes, steam generators.	Teach. Hrs	Marks					
Learning Outcome 1	Solve given problems based on thermodynamic properties of steam.	9	10					
Contents	Two Phase System: Pure substance, steam as a two phase system, its representation on P-V, T-S plane for isobaric, isochoric, isothermal, isentropic, polytrophic, throttling process, dryness fraction of steam, methods of determination of dryness fraction separating and throttling calorimeter. Steam tables, Mollier's diagram and its uses for calculation of changes in properties of steam such as enthalpy, internal energy, entropy; heat, work in various processes.							

Method of Assessment	Paper-Pen Test (Part of Prg 2)						
Learning Outcome 2	Determine dryness fraction using throttling, separating calorimeters.	6	12				
Contents	Experimental determination of dryness fraction using separating, throttling calorimeter.						
Method of Assessment	Laboratory Test by Observation (Part of LW)						
Learning Outcome 3	Explain construction, working of a given steam generator. 9						
Contents	Steam Generator- Definition, classification, construction, working, mountings and accessories of (a) low pressure boilers- Babcock and Wilcox boiler, Lancashire boiler (b) high pressure boilers - La-Mont, Velox boiler.						
Method of Assessment	Theory Exam						
Learning Outcome 4	Identify components, mountings, accessories of a given steam generator.	24	18				
Contents	Demonstration of steam generator components, mountings and accessorie	es.					
Method of Assessment	Laboratory Test by Observation (Part of Practical Exam)						
Course Outcome 5	Explain steam nozzles, steam turbines, steam condensers.	Teach.Hrs	Marks				

Learning	Explain construction, working of steam nozzle, steam turbine, steam	10	10
Outcome 1	condenser.	10	10
Contents	Steam nozzle- construction, working Flow of steam through convergent-d Steam turbine –classification, construction, working principle with line d turbine, reaction turbine-Parsons turbine, velocity diagram of impulse turbines. Pressure compounding, velocity compounding, pressure-velocity Steam condenser- classification construction and working.	iagram of a Impulse tue, reaction turbine. Co	
Method of Assessment	Theory Exam		
Learning Outcome 2	Solve given problems based on discharge and area of nozzle.	4	10
Contents	Flow of steam through convergent-divergent nozzle, Friction in a nozzle, Critical pressure ratio (no derivation), Calculation of cross sectional ar discharge.(simple problems)	-	•
Method of Assessment	Theory Exam		
Learning Outcome 3	Identity components of D- Laval and Parsons Turnine		12
Contents	Demonstration of the components of De-Laval and Parsons steam turbine.		1
Method of Assessment	Laboratory Test by Observation (Part of Practical Exam)		

R	GPV (Di	oloma Wing)	SCHEM	E FOR	Branch Code			Course Code			CO LO Code Code		1	
	` -	opal		LEARNING OUTCOME			2	3	0 2		1 1 F		Format No. 4	
COUR	SE NAME	Thermal Engine	eering											
CO De	scription	Explain renewable	sources of energy											
LO Des	scription	Classify renewable	e and non-renewable energy so	ources.										
			SCH	IEME OF STUDY										
S. No.	Learı	ning Content	Teaching –Learning Method	Description of T-I Process				ach rs.		act. t Hrs.	R	LRs Require	Remarks	
1	energy source non-renewab	nd classification of ces- renewable and ble, examples of nd non renewable	Interactive classroom teachings, demonstration, quiz.	Teacher will explain the contents and provide handouts to students. Teacher will conduct a quiz to make students practice their knowledge.				2 0		cha PP	ndouts, lk board Γ, text ok, chart eo film.			
			SCHEM	IE OF ASSESSME	NT									
S. No.	Method of	f Assessment	Description	on of Assessment			Maximur Marks					esource equire		
1	Paper-pen te		Student will be asked to list renewable and non renewable energy sources.						03			st paper ing scal		
		ADI	DITIONAL INSTRUCTION	ONS FOR THE HO	D/ FA	CUI	TY (I	F A	NY)					
			Part	t of Progressive – 1										

SCHEME FOR LEARNING OUTCOME

Branch Code			Co	ourse Co	CO Code	LO Code	
M	0	2	3	0	2	1	2

Format No. 4

COURSE NAME	Thermal Engineering
CO Description	Explain renewable sources of energy
LO Description	Sketch the schematic diagram of solar, bio-gas, tidal, geothermal power generation.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Flat plate and concentrating solar collectors, their application. Photovoltaic cell, solar distillation system, solar cooker. Wind energy horizontal and vertical wind mill, site selection for wind energy power plants, introduction to tidal energy, geothermal energy, biogas energy, bio-gas plant.	Interactive classroom teachings, demonstration, quiz.	Teacher will explain the contents and provide handouts to students. Teacher will conduct a quiz to make students practice their knowledge.	8	0	Handouts, chalk board, PPT, text book, charts, video film.	NIL

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Theory exam	Student will be asked to describe and sketch schematic representation of any one of tidal energy, solar energy, geothermal energy, bio-gas plant.	10	Question paper + Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

SCHEME FOR LEARNING OUTCOME

Branch Code			Co	ourse Co	CO Code	LO Code	
M	0	2	3	0	2	1	3

Format No. 4

CO Description Explain renewable sources of energy

LO Description Identify components of solar systems

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Demonstration of components of	Lab demonstration,	Teacher will explain the contents	0	9	Handouts, chalk	NIL
	flat plate and concentrating solar	hands on practice, lab	and provide handout to students.			board, PPT,	
	collectors. Photovoltaic cell, solar	assignments.	Teacher will demonstrate the			manual, charts,	
	distillation system, solar cooker.		components in lab. Students will			video film,	
	•		learn through practice.			models, virtual	
						lab	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory test by observation	Student will be asked to identify components of solar systems.	8	Observation schedule/check-list /rating scales /rubrics	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Part of Lab Work

SCHEME FOR LEARNING OUTCOME

В	ranch Co	de	Course Co		de	CO Code	LO Code
M	0	2	3	0	2	2	1

Format No. 4

COURSE NAME	Thermal Engineering
CO Description	Solve simple numerical problems based on basic concepts of thermodynamics and its laws.
LO Description	Explain thermodynamic systems, properties, processes, cycles, gas equation and modes of heat transfer.

SCHEME OF STUDY

S. No	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remark
1	Concept of thermodynamic system— definition, classification and applications, state, processes, cycles, properties— intensive and extensive properties with examples, point and path function, concept of work and heat, definitions: enthalpy, internal energy, entropy, specific heat at constant pressure (c_p) , specific heat at constant volume (c_v) , relation between c_p and c_v , characteristic gas equation, universal gas constant, definition of quasi-static process, flow work, modes of heat transfer - definition and types.	Interactive classroom teachings, demonstration, quiz.	Teacher will explain the contents and provide handouts to students. Teacher will conduct a quiz to make students practice their knowledge	6	0	Handouts, chalk board, PPT, text book, charts, video film.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximu m Marks	Resources Required	External / Internal
1	Paper-pen test	Student will be asked to explain basic concepts of thermodynamics from the learning content.	7	Test paper + Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Part of Progressive – 1

RGPV (Diploma Wing)
Bhopal

SCHEME FOR LEARNING OUTCOME M

Bı	ranch Co	de	Co	ourse Co	de	CO Code	LO Code	
1	0	2	3	0	2	2	2	Format N

Dilopui											
COURSE NAME	Thermal Engineering										
CO Description	Solve simple numerical problems based on basic concepts of thermodynamics and its laws.										
LO Description Solve a numerical problem based on thermodynamic systems, properties and gas equation.											

SCHEME OF STUDY

S.No	Learning Content	Teaching –	Description of T-L	Teach	Pract.	LRs	Remark
5.110	Learning Content	Learning Method	Process	Hrs.	/Tut Hrs.	Required	Kelliai K
1	Numerical problems based on thermodynamic	Interactive	Teacher will explain the	4	0	Handouts,	
	system, properties, gas equation.	classroom teaching,	contents and provide			chalk	
		demonstration, quiz,	handouts to students.			board,	
		assignments.	Teacher will conduct a			PPT, text	
			quiz and give assignments			book,	
			to make students practice			charts,	
			their knowledge.			video	
						film.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Theory exam	Students will be asked to solve two numerical problems based on thermodynamic systems, properties and gas equation.	10	Question paper + Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

SCHEME FOR LEARNING OUTCOME M

Branch Code			Co	ourse Co	CO Code	LO Code		
M	0	2	3	0	2	2	3	

Format No. 4

COURSE NAME	Thermal Engineering
CO Description	Solve simple numerical problems based on basic concepts of thermodynamics and its laws
LO Description	Solve a numerical problem based on the laws of thermodynamics.

SCHEME OF STUDY

S. No	Learning Content	Teaching – Learning Method	Description of T- L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remark
1	Laws of thermodynamics- Zeroth law, concept of work and heat, statement of first law- internal energy, enthalpy, relationship between heat transfer, work transfer and change in internal energy, Concept of conservation of mass and control volume, Steady and steady flow energy equation (without proof). Limitation of first law. Second law – Clausius and Kelvin-Planck Statements, concept of heat pump, refrigerator, heat engine, thermal efficiency, COP, reversible process, factors which make a process irreversible, Carnot cycle, its efficiency and limitation, Clausius inequality, entropy	Interactive classroom teaching, demonstration, quiz, assignments.	Teacher will explain the contents and provide handout to students. Teacher will conduct a quiz and give assignments to make students practice their knowledge.	8	0	Handouts, chalk board, PPT, text book, charts, video film.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Theory exam	Student will be asked solve two numerical problems based on learning content.	10	Question paper+ Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal		$\begin{array}{c c} \textbf{SCHEME FOR} & & \textbf{Branch O} \\ \textbf{LEARNING OUTCOME} & M & 0 \end{array}$		Branch Code			Course Code		CO Code	LO Code	4	
				0	2	3	0	2	3	1	Format No. 4	
COURSE NAME	Thermal Engineering	hermal Engineering										
CO Description	Solve numerical problems	lve numerical problems based on thermodynamic processes, air standard cycles.										
LO Description	Describe thermodynamic	Describe thermodynamic processes, air standard cycle using P-V and T-S diagram										

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remark
1	Thermodynamic processes- definition, classification and representation on P-V and T-S diagram for constant pressure, constant volume, constant temperature, adiabatic, polytropic, throttling processes. Thermodynamic cycle – definition, classification- reversible and irreversible cycles, Air standard cycles: Carnot cycle, Otto cycle, Diesel cycle, Dual cycle, their representation on P-V and T-S diagrams.	Interactive classroom teaching, demonstration, quiz, assignment.	Teacher will explain the contents and provide handouts to students. Teacher will conduct a quiz and give assignments to make students practice their knowledge	8	0	Handouts, chalk board, PPT, text book, charts, video film.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
	Paper-pen Test	Student will be asked to describe two thermodynamic processes and one air standard cycle using P-V and T-S diagram.	10	Test paper + Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Term Work

SCHEME FOR LEARNING OUTCOME

Branch Code			Co	ourse Co	CO Code	LO Code	
1	0	2	3	0	2	3	2

Format No. **4**

COURSE NAME	Thermal Engineering	
CO Description	Solve numerical problems based on thermodynamic processes, air standard cycles.	
LO Description Calculate mean effective pressure, work done, efficiency for a given air standard cycle.		

SCHEME OF STUDY

S. No	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remark
1	Numerical problems on calculation of work done, change in internal energy, heat transfer, change in entropy for thermodynamic processes. Problems on calculation of mean effective pressure, work done, air standard efficiency for air standard cycle.	Interactive classroom teachings, demonstration, quiz.	Teacher will explain the contents and provide handouts to students. Teacher will conduct a quiz to make students practice their knowledge.	7	0	Handouts, chalk board, PPT, text book, charts, video film.	

SCHEME OF ASSESSMENT

S.	Method of	Description of Assessment	Maximum	Resources	External /
No.	Assessment		Marks	Required	Internal
1	Theory exam	Student will be asked to solve one numerical problem to calculate mean effective pressure, work done, efficiency of any air standard cycle.	10	Question paper + Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

SCHEME FOR LEARNING OUTCOME M

Branch Code			Co	ourse Co	CO Code	LO Code		
M	0	2	3	0	2	4	1	

Format No. 4

COURSE NAME	Thermal Engineering
CO Description	Explain steam generation processes, steam generators.
LO Description	Solve a given numerical problem based on thermodynamic properties of steam.

SCHEME OF STUDY

S. No.	Learning Content	T-L Method	Description of T- L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remark
	Two Phase System: Pure substance, steam as a two phase system, its representation on P-V, T-S plane for isobaric, isochoric, isothermal, isentropic, polytrophic, throttling process, dryness fraction of steam, methods of determination of dryness fraction separating and throttling calorimeter. Steam tables, Mollier diagram and its uses for calculation of changes in properties of steam such as enthalpy, internal energy, entropy; heat, work in various processes.	Interactive classroom teaching, demonstration, quiz, assignment	Teacher will explain the contents and provide handouts to students. Teacher will conduct a quiz and give assignments to make students practice their knowledge.	9	0	Handouts, chalk board, PPT, text book, charts, video film.	

SCHEME OF ASSESSMENT

S.	Method of	Description of Assessment	Maximum	Resources	External /
No.	Assessment		Marks	Required	Internal
	Paper-pen test	Student will be asked to solve a given numerical problem based on properties of steam.	10	Test paper + Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Part of Progressive – 2

RG	PV (Dipl	oma Wing)	SCHEM	E FOR LEAD	RNING	Br	anch Co	ode	Co	ourse Co	ode	CO Code	LO Code	4
	Bho	_		OUTCOME		M	0	2	3	0	2	4	2	Format No. 4
COUR	RSE NAME	Thermal Engineer	ring			·L	1			I				
CO De	escription	Explain steam genera	ation processes, ste	eam generators.										
LO De	escription	Determine dryness fr	action using throt	tling, separating calo	rimeters.									
				SCHEME (OF STUDY									
S. No.		Learning Conter	nt	T-L Method	_	tion of	ion of T-L				Prac Fut H		LR Requi	
1	-	l determination of o	•	demonstration, hands on practice	Teacher will explain the contents and provide handout to students. Teacher will demonstrate the procedure of lab experiments. The students will learn through practice.			0	6		Handouts chalk boar PPT, chart video filn apparatus.		pard, arts, lm,	
				SCHEME OF A	ASSESSMEN'	Т								
S. No.	Method of Assessmen		Descripti	on of Assessment			N	Iaxii Mai	num rks	Re	esour	ces R	Require	d External / Internal
1	Laboratory to by observation	· · · · · · · · · · · · · · · · · · ·					l. 12	Observation schedule/cl scales /rubi				check-	-list /rat	Internal
		ADI	DITIONAL INS	TRUCTIONS FO	R THE HOD)/ FA(CUL	ΓΥ (]	IF AN	Y)				
				Part of La	ab Work									

RGPV (Diploma	Wing)
Bhopal	

SCHEME FOR LEARNING OUTCOME

1	Branch Code Course Code					CO Code	LO Code
M	0	2	3	0	2	4	3

Format No. 4

COURSE NAME	Thermal Engineering
CO Description	Explain steam generation processes, steam generators.
LO Description	Explain construction, working of a steam generator.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract./Tut Hrs.	LRs Required	Remark
1	Steam generator- definition, classification, construction, working, mountings and accessories of (a) low pressure boilers-Babcock and Wilcox boiler, Lancashire boiler (b) high pressure boilers - La-Mont, Velox boiler.	teachings, demonstration, quiz.	Teacher will explain the contents and provide handouts to students. Teacher will conduct a quiz to make students practice their knowledge.	9	0	Handouts, chalk board, PPT, text book, charts, video film.	

SCHEME OF ASSESSMENT

S.	Method of	Description of Assessment	Maximu	Resources	External /
No.	Assessment		m Marks	Required	Internal
1	Theory exam	Student will be asked to classify boilers, explain construction, working of one boiler.	10	Question paper + Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma		SCHEME FOR LEARNING			Branch Code			(Course Code	e CO Code		LO Code	Format No. 4
Wii	ng) Bhopal	JO	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$					3	0	2	4	4	
	URSE NAME	Thermal Engineering	ng		-		•						
CO Description Explain steam gener			on processes, steam	generators.									
LO De	scription	Identify components, r	nountings, accessorie	es of a given	steam g	generat	tor.						
			SCH	EME OF	STUDY	7							
S. No.	Learnii	ng Content	T-L Method	Descri	ption o	ption of T-L Process		SS	Teach Hrs.		act. t Hrs.	LRs Require	Remark d
1.	Demonstration o	f steam generator tings and accessories.	Lab demonstration,	Teacher v	de hand	out to)	24		Handouts, chalk board PPT, text	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maxi mum Marks	Resources Required	External / Internal
1.	Laboratory test by observation	Student will be asked to identify components, mountings and accessories of a given boiler.	18	Observation schedule/check-list /rating scales /rubrics	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma	SCHEME FOR LEARNING		Branch Code			Course Code			LO Code	
Wing) Bhopal OUTCOME M 0 2 3 0 2 5 1 Format No. 4										
COURSE NAME	Thermal Engineering									
CO Description	Explain steam nozzles, steam turbines, steam condensers.									
LO Description Explain construction, working of steam nozzle, steam turbine and steam condenser.										

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remark
	Steam nozzle- construction, working Flow of steam through convergent-divergent nozzle Steam turbine –classification, construction, working principle with line diagram of a Impulse turbine-De Laval turbine, reaction turbine-Parsons turbine, velocity diagram of impulse, reaction turbine. Compounding of turbines. Pressure compounding, velocity compounding, pressure-velocity compounding Steam condenser- classification construction and working.	Interactive Classroom teaching, demonstration, quiz	Teacher will explain the contents and provide handouts to students. Teacher will conduct a quiz to make students practice their knowledge	10	0	Handouts, chalk board, PPT, text book, charts, video film.	

SCHEME OF ASSESSMENT

S.	Method of	Description of Assessment	Maximum	Resources	External /
No.	Assessment		Marks	Required	Internal
	Theory exam	Student will be asked to explain construction, working of a steam nozzle or turbine or condenser.	10	Question paper + Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Suitably mix the content in assessment to justify maximum marks 10

RGPV (Diploma	Wing)
Bhopal	

SCHEME FOR LEARNING OUTCOME

	LO Code	CO Code	Course Code			Branch Code		
Forma	2	5	2	0	3	2	0	M

COURSE NAME	Thermal Engineering					
CO Description	Explain steam nozzles, steam turbines, steam condensers.					
LO Description Solve a given numerical problem based on discharge and area of nozzle.						

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remark
1	Flow of steam through convergent-divergent nozzle, friction in a nozzle, discharge of steam through nozzles, critical pressure ratio (no derivation), calculation of cross sectional areas at throat and exit for maximum discharge.(simple problems).	Interactive classroom teachings, demonstration, quiz.	Teacher will explain the contents and provide handouts to students. Teacher will conduct a quiz to make students practice their knowledge.	4	0	Text book, charts, chalk board, PPT	

SCHEME OF ASSESSMENT

S.	Method of	Description of Assessment	Maximum	Resources	External /
No.	Assessment		Marks	Required	Internal
1	Theory exam	Student will be asked to calculate discharge, cross sectional area and critical pressure ratio for flow through a given convergent-divergent nozzle.	10	Question paper + Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

SCHEME FOR LEARNING OUTCOME

Bı	ranch Coo	de	Course Code			CO Code	LO Code	
M	0	2	3	0	2	5	3	

Format No. 4

COURSE NAME	Thermal Engineering
CO Description	Explain steam nozzles, steam turbines, steam condensers.
LO Description	Identify components of D- Laval and Parsons Turbine.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remark
1	Demonstration of the components of	Lab demonstration,	Teacher will explain the	0	6	Handouts,	
	De-Laval and Parsons steam turbine.	hands on practice.	contents and provide handouts			chalk board,	
		_	to students. Teacher will			PPT, charts,	
			demonstrate the components in			video film,	
			lab. The students will learn			manual, virtual	
			through practice.			lab, models.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory test by	Student will be asked to identify components of De-Laval	12	Observation	External
	observation	and Parsons Turbine		schedule/check-list /rating scales /rubrics	

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

LIST OF EXPERIMENTS OF THERMAL ENGINEERING

S.No.	Name of Experiment	Duration
1	Identify components of solar systems.	3
2	Write a Report on visit to solar power/wind mill / biogas plant / hydraulic power plant to document the specifications of components and power generation capacity, draw schematic arrangement.	6
3	Determine dryness fraction of steam using Throttling calorimeter.	3
4	Determine dryness fraction of steam using separating calorimeter.	3
5	Identify components of Babcock and Wilcox, Lancashire boiler	6
6	Identify components of La-Mont and Velox Boilers	6
7	Draw the flue gas path and water steam circuit with the help of boiler model and write a report	3
8	Identify mountings and accessories in Boiler.	3
9	Write a Report on visit to Dairy / thermal power plant to document specifications of boiler, list mountings and accessories.	6
10	Identify components of Impulse turbine (De-Leval)	3
11	Identify components of Reaction Turbine (Parson's Turbine)	3