RGPV (DIPL(BHO)		ING)		CULUM FOR THE DURSE	FORMA	AT-3		Sheet No. 1/3				
Branch		MI	ECHA	NICAL ENGINE	EERING	Semester		Ш	-				
Course	Code	303	3	Course Name		MATERIAL SCIENCE & E	MATERIAL SCIENCE & ENGINEERING						
Course	Outco	ome 1	Explai	in engineering ma	nterials and their prop	erties.		Teach Hrs	Marks				
Learnin	g Outo	come 1	Classi	fy engineering m	aterials on the basis o	f mechanical properties.		05	05				
Contents Introduction to engineering materials, classification of engineering materials and their me						their mechanical	propertie	S					
Method of Paper pen test Assessment													
Learnin	g Outo	come 2	Illustr	ate seven basic cr	ystal systems.			06	08				
Co	ontents	Unit cell and space lattice, seven basic crystal systems- triclinic, monoclinic, orthorhombic, tetragonal, trigonal, hexagonal, and cubic.						onal,					
	ethod o			Theory exam									
Learnin			Explain crystal structures of metallic elements.					05	08				
Co	ontents	3	•		etallic elements: simpanical properties of m	ole cubic, BCC, FCC, HCP and its cetals.	oordination numb	er, crystal	imperfection				
	ethod o					Theory exam							
Course	Outco	ome 2		Explain iron ca	arbon equilibrium dia	gram, TTT curve, heat treatment pr	rocesses	Teach Hrs	Marks				
Learnin	g Outo	come 1	Expla	in solidification, 1	e–crystallization, pha	ase rule, lever rule.		05	05				
Co	ontents	3				ot solidification, dendritic and colu n, phase rule, lever rule and its appl		gregation	of impurities				
Method of Assessment			Paper pen test										

Learning Outcome 2	Interpret Iron-Carbon equilibrium diagram, TTT curve.	08	08				
Contents	Phase transformations—Eutectic Eutectoid, Peritectic, Peritectoid Iron-carbon equilibrium diagram, cooling of carbon steels and its structures, effect of carbon content on mechanical properties of st						
Method of Assessment	Theory exam						
Learning Outcome 3	Explain heat treatment processes for metals.	08	10				
Contents Objectives of heat treatment, thermal processes: annealing, normalizing, hardening and tempering. Hardening process: Surface hardening, flame hardening, case hardening methods and its uses, limitations quenching mediums and their effect on hardness, Hardening defects, hardenability.							
Method of Assessment	Theory exam						
Course Outcome 3	Select ferrous and non ferrous metals and its alloy for engineering materials.	Teach Hrs	Marks				
Learning Outcome 1	Explain properties and uses of ferrous metals and its alloys.	06	10				
Contents	Cast irons, their properties and uses, composition and uses of plain carbon steels, effect of impuritional alloying elements, effects of alloying elements on properties and uses of steels.	es, Alloy	steels and its				
Method of Assessment	Paper pen test						
Learning Outcome 2	Explain properties and uses of non ferrous metals and its alloys.	06	10				
Contents	Copper and its alloy: brass, bronze, gun metal Its composition, Properties and uses. Aluminium and its Alloys: Hindalium, Duralumin, Y-alloy its composition, properties and uses Nickel and its alloy: rine Alegering alloy, rine lead alloy Its composition, Properties and uses						
Method of Assessment	Zinc and its alloy: zinc-Al casting alloy, zinc-lead alloy Its composition, Properties and uses Theory exam						
Course Outcome 4	Explain properties of non metallic materials and plastics.	Teac Hrs	Mar				

Learning Outcome 1	Describe the properties and uses of ceramics, rubbers, glasses	06	08
Contents	Introduction, classification, properties, uses of Ceramic Refractories, Rubbers, g	lasses	
Method of Assessment	Theory exam		
Learning Outcome 2	Compare thermosetting plastic and thermoplastic.	05	06
Contents	Properties, Composition, and uses of plastics: thermosetting plastic and thermoplastic	'	
Method of Assessment	Theory exam		
Learning Outcome 3	Explain plastic processing methods.	06	10
Contents	Types, uses of different plastic processing methods: injection moulding, blow moulding compression moulding, extrusion, forming, casting		
Method of Assessment	Term Work		
Course Outcome 5	Select appropriate metal preservation techniques in a given situation.	Teach Hrs	Marks
Learning Outcome 1	Explain corrosion and its minimization techniques.	04	05
Contents	Nature of corrosion and its causes, methods of minimizing corrosion		
Method of Assessment	Theory exam		
Learning Outcome 2	Describe different metal preservation techniques.	05	07
Contents	Surface coating techniques: hot dipping, electroplating, spraying, diffusion coating, cleaning and	nd finishing of m	etal surfaces.
Method of Assessment	Theory exam		

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No.
			M	0	2	3	0	3	1	1	4
COURSE MATERIAL SCIENCE AND ENGINEERING NAME											
CO Description	Explain enginee	Explain engineering materials and their properties.									
LO Description Classify engineering materials on the basis of mechanical properties.											
SCHEME OF STUDY											

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1.	Introduction to engineering materials, classification of engineering materials and their mechanical properties.	Interactive classroom teaching, assignments, quiz, presentation	Teacher will explain the contents and provide handouts to the students; teacher will conduct a quiz and give assignments to practice their knowledge.	05	00	Text book, video lectures, chalk board.	NIL

SCHEME OF ASSESSMENT

S. I	No. Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Paper pen test	Students will be asked to explain any two mechanical properties and the classification of engineering materials.	05	Test paper + rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Part of Progressive test 1

DCDV (D: 1	1177 \ DI 1			nch C	Code	Course Code			CO Code	LO Code	Format No.
		SCHEME FOR LEARNING OUTCOME	M	0	2	3	0	3	1	2	4
COURSE MATERIAL SCIENCE AND ENGINEERING NAME											
CO Description	Explain engine	xplain engineering materials and their properties.									
LO Description	ption Illustrate seven basic crystal 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.	Unit cell and space lattice, seven basic crystal systems- triclinic, monoclinic, orthorhombic, tetragonal, trigonal, hexagonal, and cubic.	Interactive classroom teaching, assignments, quiz, presentation	Teacher will explain the contents and provide handouts to the students, teacher will conduct a quiz and give assignments to practice their knowledge.	06	00	Text book, video lectures, chalk board, Models.	NIL

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 explain unit cell, space lattice and any two basic crystal systems.	08	Question paper + rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

DCDV/D: I	(17.°	COMENTE FOR LEADNING OFFICONE				Course Code			CO Code	LO Code	Format No.
RGPV (Diploma Wing) Bhopal SCHEME FOR LEARNING OUTCOME		M	0	2	3	0	3	1	3	4	
COURSE NAME	MATERIAL S	SCIENCE AND ENGINEERING									
CO Description	Explain engine	eering materials and their properties.									
LO Description	Explain crystal	structures of metallic elements.									

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1.	Crystal structure for metallic elements: simple cubic, BCC, FCC, HCP and its coordination number, crystal imperfections and its effect on mechanical properties of metals.	Interactive classroom teaching, assignments, quiz, presentation,	Teacher will explain the contents and provide handouts to the students; teacher will conduct a quiz and give assignments to practice their knowledge.	05	00	Text book, charts, video lectures, chalk board, models, tables.	NIL

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 explain any one crystal structure and effect of any one crystal imperfection on mechanical properties of metal.	08	Question paper + rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

DCDV (D' 1	1177	pal SCHEME FOR LEARNING OUTCOME M				Course Code			CO Code	LO Code	Format No.
RGPV (Diploma	Wing) Bhopal		M	0	2	3	0	3	2	1	4
COURSE MATERIAL SCIENCE AND ENGINEERING NAME											
CO Description	Explain iron ca	Explain iron carbon equilibrium diagram, TTT curve, heat treatment processes									
LO Description	Explain solidification, re–crystallization, phase rule, lever rule.										

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1.	Process of nucleation and grain growth, ingot solidification, dendritic and columnar structure, segregation of impurities, grain and grain boundaries, Recrystallization, phase rule, lever rule and its applications.	teaching, assignments,	Teacher will explain the contents and provide handouts to the students, teacher will conduct a quiz and give assignments to practice their knowledge.	05	00	Text book, video lectures, chalk board.	NIL

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1.	Paper pen test	Students will be asked to explain re-crystallization, phase rule/lever rule.	05	Test paper+ Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Part of Progressive test I

DCDW (D' 1	117°	ng) Bhopal SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No.
RGPV (Diploma	wing) Bhopai		M	0	2	3	0	3	2	2	4
COURSE MATERIAL SCIENCE AND ENGINEERING NAME											
CO Description	Explain iron ca	Explain iron carbon equilibrium diagram, TTT curve, heat treatment processes.									
LO Description	n Interpret Iron-Carbon equilibrium diagram, TTT curve.										

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1.	Phase transformations— Eutectic Eutectoid, Peritectic, Peritectoid Iron-carbon equilibrium diagram, The solidification and cooling of carbon steels and its structures, effect of carbon content on mechanical properties of steel. TTT curve.	teaching, assignments, quiz, presentation	Teacher will explain the contents and provide handouts to the students, teacher will conduct a quiz and give assignments to practice their knowledge.	08	00	Text book, charts, video lectures, chalk board.	NIL

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 draw and explain iron carbon equilibrium diagram or TTT curve	08	Question paper + rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

DCDV/D' I	****	oal SCHEME FOR LEARNING OUTCOME B		Branch Code		Course Code			CO Code	LO Code	Format No.
		SCHEME FOR LEARNING OUTCOME	M	0	2	3	0	3	2	3	4
COURSE NAME	MATERIAL S	ATERIAL SCIENCE AND ENGINEERING									
CO Description	Explain iron-ca	Explain iron-carbon equilibrium diagram, TTT curve, heat treatment processes.									
LO Description	Explain heat treatment processes for metals.										
GOVERN OF GRAIN											

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1.	Objectives of heat treatment, thermal processes: annealing, normalizing, hardening and tempering. Hardening process: Surface hardening, flame hardening, case hardening methods and its uses, limitations and advantages, quenching mediums and their effect on hardness, Hardening defects, hardenability.	Interactive classroom teaching, assignments, quiz, presentation	Teacher will explain the contents and provide handouts to the students, teacher will conduct a quiz and give assignments to practice their knowledge.	08	00	Text book, charts, video lectures, chalk board.	NIL

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 explain one thermal process and one hardening process of heat treatment	10	Question paper + rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

D CDV (D)		oal SCHEME FOR LEARNING OUTCOME M	Branch Code		Course Code			CO Code	LO Code	Format No.	
RGPV (Diploma	Wing) Bhopal		M	0	2	3	0	3	3	1	4
COURSE NAME											
CO Description	Select ferrous	and non ferrous metals and its alloy for enginee	ering n	nateria	als.						
LO Description	Description Explain properties and uses of ferrous metals and its alloys.										
SCHEME OF STUDY											

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1.	Cast irons, their properties and uses, composition and uses of plain carbon steels, effect of impurities, Alloy steels and its alloying elements, effects of alloying elements on properties and uses of steels.	Interactive classroom teaching, assignments, quiz, presentation	Teacher will explain the contents and provide handouts to the students, teacher will conduct a quiz and give assignments to practice their knowledge	06	00	Text book, video lectures, chalk board, tables.	NIL

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1.	Paper pen test	Students will be asked to explain: (1) Properties, composition, uses of one cast iron / carbon steel. (2) One alloying element its effect on properties and uses of steel.	10	Test paper+ Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Part of progressive test II

D CDV (D)				nch (Code	Co	urse	Code	CO Code	LO Code	Format No.
RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME	M	0	2	3	0	3	3	2	4
COURSE NAME	MATERIAL S	CIENCE AND ENGINEERING									
CO Description	Select ferrous	ering n	nateria	als.							
LO Description	LO Description Explain properties and uses of non ferrous metals and its all										

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1.	Copper and its alloy: brass, bronze, gun metal its composition, properties and uses. Aluminum and its alloys: Hindalium, Duralumin, Y-alloy its composition, properties and uses Nickel and its alloy: nickel-molybdenum, nickel-chromium Its composition, Properties and uses Zinc and its alloy: zinc-Al casting alloy, zinc-lead alloy its composition, Properties and uses	Interactive classroom teaching, assignments, quiz, presentation.	Teacher will explain the contents and provide handouts to the students; teacher will conduct a quiz and give assignments to practice their knowledge.	06	00	Text book, video lectures, chalk board, tables.	NIL

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 describe composition, properties and uses of any two metals /alloys.	10	Question paper + rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

DCDV/	D:1	W:	SCHEME FOR LEARNING OUTCOME				Branch Code			urse (Code CO Co		CO Code LO Code		
KGPV (Dipioma	Wing) Bhopal	SCHEM	HEME FOR LEARNING OUTCOME			0	2	3	0	3	4	1	4	
	JRSE ME	MATERIAL S	CIENCE	AND ENGINEERING									'	-	
CO Desc	cription	Explain proper	ties of non	metallic materials and p	lastics.										
LO Desc	cription	Describe the pro	operties an	d uses of ceramics, rubbe	ers, glasses.										
				SC	HEME OF	STUI	ΟY								
S. No.	I	earning Conter	nt	Teaching –Learning Method	Descript	tion of T-L Process				Teac Hrs		Pract. Fut Hrs.	LRs Required	l Remarks	
1.		tion, classifications, uses of cerami	·	Interactive classroom teaching,	Teacher w	-			ıte	06		00	Text book, vide lectures, chalk	o NIL	

SCHEME OF ASSESSMENT

knowledge.

to the students, teacher will

assignments to practice their

conduct quiz and give

board.

assignments, quiz,

presentation

refractories, rubbers, glasses.

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1.	Theory exam	Students will be asked to explain any two of non metallic materials.	08	Question paper + rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

DCDV (D: 1	***				Branch Code			Code	CO Code	LO Code	Format No.
RGPV (Diploma	Wing) Bhopai	SCHEME FOR LEARNING OUTCOME		0	2	3	0	3	4	2	4
COURSE NAME	MATERIAL SO	CIENCE AND ENGINEERING									
CO Description	Explain propert	ies of non metallic materials and plastics.									
LO Description	Compare thermo	osetting plastic and thermoplastic.									

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remark s
1.	Properties, Composition, and uses of plastics: thermosetting plastic and thermoplastic	Interactive classroom teaching, assignments, quiz, presentation	Teacher will explain the contents and provide handouts to the students, teacher will conduct quiz and give assignments to practice their knowledge.	05	00	Text book, video lectures, chalk board, tables.	NIL

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 compare thermosetting plastic and thermoplastic.	06	Question paper + rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

DCDV/D' I	****			nch (Code	Co	ourse	Code	CO Code	LO Code	Format No.
RGPV (Diploma	Wing) Bhopai	SCHEME FOR LEARNING OUTCOME		0	2	3	0	3	4	3	4
COURSE NAME	NAME				·						
CO Description	O Description Explain properties of non metallic materials and plastics.										
LO Description	Explain plastic p	processing methods.									
		SCHEME OF	T STU	DY							

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1.	Types, uses of different plastic processing methods: injection moulding, blow moulding compression moulding, extrusion, forming, casting.	Interactive classroom teaching, assignments, quiz, presentation.	Teacher will explain the contents and provide handouts to the students; teacher will conduct a quiz and give assignments to practice their knowledge.	06	00	Text book, video lectures, chalk board.	NIL

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1.	Quiz	Students will be asked to explain one plastic processing method.	10	Quiz + rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Term work

D.C.DV.	D: 1	****	COLLENA	SCHEME FOR LEADNING OUTCOM		Bra	nch C	Code	Co	urse (Code	CO Cod	e LO Code	Format No.
RGPV (Diploma Wing) Bhopal		SCHEM	THEME FOR LEARNING OUTCOME				2	3	0	3	5	1	4	
	JRSE ME	MATERIAL S	CIENCE	AND ENGINEERING										
CO Desc	cription	Select appropria	ate metal p	reservation techniques in	a given situ	ation.								
LO Desc	cription	Explain corrosi	on and its	minimization techniques.										
				SC	HEME OF	STU	DΥ							
S. No.]	Learning Conter	nt	Teaching –Learning	Descript	ion of	T-L	Proce	ss	Teac		Pract.	LRs Required	l Remarks

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1.	Nature of corrosion and its causes, methods of minimizing corrosion.	Interactive classroom teaching, assignments, quiz, presentation	Teacher will explain the contents and provide handouts to the students, teacher will conduct quiz and give assignments to practice their knowledge.	04	00	Text book, charts, video lectures, chalk board.	NIL

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 list causes of corrosion and methods of minimizing corrosion.		05	Question paper + rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal So						Branch Code			Co	urse	Code	CO Code		le LO Code	Format No.
			SCHEN	CHEME FOR LEARNING OUTCOME			0	2	3	0	3		5	2	4
COURSE NAME		MATERIAL S	CIENCE	AND ENGINEERING				ı							
CO Description Select appropriate metal preservation techniques in a given situation.															
LO Description Describe differe			ent metal	preservation techniques.											
				SC	HEME OF	STU	DY								
S. No.]	Learning Conter	nt	Teaching –Learning Method	Descript	ption of T-L Process				Teach Pract Hrs. /Tut H		hariiina X 2 X. I		Remarks	
1. Surface coating techniques: h dipping, electroplating, spray diffusion coating, cleaning an finishing of metal surfaces.		oraying, g and	Interactive classroom teaching, assignments, quiz, presentation	Teacher will explain the contents and provide handouts to the students, teacher will conduct a quiz and give assignments to practice their knowledge					05 00		Text book, charts, video lectures, chalk board.		NIL		
	'			SCHE	ME OF AS	SESS	MEN'	T							
S. No.	Meth	od of Assessmen	t	Description of As			ment			Maximum Marks		Resources Required		External / Internal	
1.		Γheory exam		dents will be asked to exp nnique.	tal pre	servat	tion	07				Question paper + rating scale		External	
	1		ADI	DITIONAL INSTRUCT		THE	HOD	/ FA(CUL	TY (I	F AN	Y)			
					NIL										