NAME OF THE COURSE: CHMICAL PROCESS MATERIALS				
CHEMICAL ENGINEERING DEPARTMENT				
IV SEM				
			HRS	MAX. MARKS
COURSE OUTCOME -1		To identify material properties in chemical plant.		
LEARNING OUTCOME -1		To identify engineering properties of material.	10	10
CONTENTS		Introduction,Mechenical properties of Material-Elasticity,Plasticity,Ductility,Brittleness,Hardness,ToughnessStiffness,ResilienceCreep,Endurance,Strength.		
		Technological properties of Metal-Malleability, Machinability,Weldability,Formability,Castability.		
		Factors affecting the mechanical properties of metal		
COURSE OUTCOME -2		**TO** compare the properties of ferrous and nonferrous alloy.		
LEARNING OUTCOME -1		To explain the Iron Carbon phase diagram.	10	10
CONTENTS		Ferrous materials-		
		Cooling curve for pure iron.		
		Iron carbon equilibrium diagram.		
		Micro constituents of steel and cast iron.		
		Alloys of cast iron and its industrial uses.		
		Alloys of steel and its uses.		
COURSE OUTCOME -2		To compare the properties of ferrous and nonferrous alloy.		
LEARNING OUTCOME -2		To explain the nonferrous alloys and their alloying element.	12	15
CONTENTS		Various alloys of copper and their industrial application.		
		Various alloy of aluminum and their industrial application.		
		Various alloy of nickel and their industrial application		
COURSE OUTCOME -3		To improve properties of materials and test them		
LEARNING OUTCOME -1		To carry out different tests on materials	10	12

CONTENTS		Testing of materials-		
		Tension test by UTM.		
		Compression test by UTM		
		Impact testing		
		Brinell Hardness testing		
COURSE OUTCOME -3		To improve properties of materials and test them		
LEARNING OUTCOME -2		To explain the Heat treatment processes.	10	10
CONTENTS		Heat treatments processes		
		Annealing		
		Normalizing		
		Hardening		
		Quenching		
		Tempering		
COURSE OUTCOME -4		To explain the materials with their application in chemical industry as materials of construction		
LEARNING OUTCOME -1		TO apply plastic ,rubber, ceramic in the industries as materials of construction.	10	15
CONTENTS		**Organic materials**		
		Plastics- Definition, types of plastics and various industrial applications.		
		Rubber- Definition, types of rubber and various industrial applications.		
		Wood- Definition and applications.		
		Ceramic materials- Definition, classification of ceramic materials.		
COURSE OUTCOME -4		To explain the materials with their application in chemical industry as materials of construction		
LEARNING OUTCOME -2		To apply glass ,abrasives ,refectories as material of construction in chemical industries	10	15

CONTENTS		Glass- Definition, various types of glasses and uses.		
		Abrasives- Definitions, various types of abrasives and uses.		
		Refractory- Definition, various types of refractory and uses.		
COURSE OUTCOME -5		TO understand corrosion with its prevention		
LEARNING OUTCOME -1		To prevent the corrosion in chemical industry.	10	10
CONTENTS		**Corrosion**		
		Definition of corrosion		
		Various types of corrosion		
		Factors influencing corrosion		
		Methods of combating corrosion		
COURSE OUTCOME -5		TO understand corrosion with its prevention		
			8	15
LEARNING OUTCOME -2		To select suitable material of construction in chemical industries		
CONTENTS		**Material Selection Criteria for important chemicals**		
		Acids, alkali and organic solvents		

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		C	*0*	*2*				*1*	*1*	

COURSE NAME	Chemical Process Materials
CO Description	To identify material properties in chemical plant.
LO Description	To identify engineering properties of material.

SCHEME OFSTUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Introduction ,Mechanical properties of Material-Elasticity,Plasticity,Ductility,Brittleness,Hardness,ToughnessStiffness,ResilienceCreep,Endurance,Strength. Technological properties of Metal-Malleability, Machinability,Weldability,Formability,Castability.Factors affecting the mechanical properties of metal	Interactive classroom teaching, quiz, assignment, tutorials.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	08	02	Handouts, chalk board, PPT, text book.	

SCHEME OFASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Pen paper test	Student will be asked to explain Properties of material	10	Test paper + Rating scale	internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Nil

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		C	*0*	*2*				*2*	*1*	

COURSE NAME	Chemical Process Materials
CO Description	**TO** compare properties of ferrous and nonferrous alloy.
LO Description	To explain the Iron Carbon phase diagram.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Ferrous materials- Cooling curve for pure iron. Iron carbon equilibrium diagram. Micro constituents of steel and cast iron. Alloys of cast iron and its industrial uses. Alloys ofsteel and its uses.	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.	08	02	Handouts, chalk board, PPT, textbook.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External
1	theory exam	Student will be asked to explain ferrous material and its alloys.	10	Question paper +Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Nil

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. 4
		C	*0*	*2*				*2*	*2*	

COURSE NAME	Chemical Process Materials
CO Description	To compare the properties of ferrous and nonferrous alloy.
LO Description	To explain the nonferrous alloys and their alloying element.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Various alloys of copper and their industrial application. Various alloy of aluminum and their industrial application. Various alloy of nickel and their industrial application.	Interactive classroom teaching, demonstration, quiz, assignments, Tutorial, presentation.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	09	03	Handouts, chalk board, charts, , lab.	

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 explain nonferrous material and their industrial application.	15	Question paper +Rating scale	external

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Nil

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code	Course Code	CO Code	LO Code	Format No. **4**
		C 0 2		*3*	*1*	

COURSE NAME	Chemical Process Materials
CO Description	To improve properties of materials and test them.
LO Description	To carry out different tests on materials

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Testing of materials- Tension test by UTM. Compression test by UTM Impact testing Brinell Hardness testing	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.	08	02	Handouts, chalk board, PPT, textbook,	

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 Testing of materials.	12	Question paper +Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Nil

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		C	*0*	*2*				*3*	*2*	

COURSE NAME	Chemical Process Materials
CO Description	To improve properties of materials and test them.
LO Description	To explain the Heat treatment processes.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	**Heat treatments processes** Annealing Normalizing Hardening Quenching Tempering	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.	08	02	Handouts, chalk board, PPT, text book.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Pen Paper test	Student will be asked to describe heat treatment processes.	10	Test paper + Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Nil

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		C	*0*	*2*				*4*	*1*	

COURSE NAME	Chemical Process Materials
CO Description	**T**o explain the materials with their application in chemical industry as materials of construction.
LO Description	TO apply plastic ,rubber, ceramic in the industries as materials of construction.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	**Organic materials** Plastics- Definition, types of plastics and various industrial applications. Rubber- Definition, types of rubber and various industrial applications. Wood- Definition and applications. Ceramic materials- Definition, classification of ceramic materials.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial.	Teacher will explain the contents andprovide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	08	02	Handouts, chalk board, charts.	

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 plastic,rubber and ceramics.	15	Question paper +Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Nil

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		C	*0*	*2*				*4*	*2*	

COURSE NAME	Chemical Process Materials
CO Description	**T**o explain the materials with their application in chemical industry as materials of construction
LO Description	To apply glass ,abrasives ,refectories as material of construction in chemical industries.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Glass- Definition, various types of glasses and uses. Abrasives- Definitions, various types of abrasives and uses. Refractory- Definition, various types of refractory and uses.	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	08	02	Handouts, chalk board, PPT, text book, charts.	

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 explain use of glass and refractory material.	15	Question paper +Rating scale	external

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Nil

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		C	*0*	*2*				*5*	*1*	

COURSE NAME	Chemical Process Materials
CO Description	TO understand corrosion with its prevention.
LO Description	To prevent the corrosion in chemical industry.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	**Corrosion** Definition of corrosion Various types of corrosion Factors influencing corrosion Methods of combating corrosion	Interactive classroom teaching, demonstration, quiz, assignments, tutorial. lab demonstration	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	08	02	Handouts, chalk board, PPT, text book, charts.	

SCHEME OFASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Pen paper test	Student will be asked describe industrial corrosion.	10	Test paper + Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IFANY)

Nil

	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		C	*0*	*2*				*5*	*2*	

COURSE NAME	Chemical Process Materials
CO Description	TO understand corrosion with its prevention
LO Description	To select suitable material of construction in chemical industries.

SCHEME OFSTUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	**Material Selection Criteria for important chemicals** Acids, alkali and organic solvents	Interactive classroom teaching, demonstration, quiz, assignments, tutorial. lab demonstration	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	06	02	Handouts, chalk board, PPT, text book, charts,	

SCHEME OFASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Theory Exam	Student will be asked to explain material selection criteria for important chemicals.	15	Question paper +Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IFANY)

Nil