RGPV (Diplo	RGPV (Diploma Wing) Bhopal SCHEME FOR LEARNING OUTCOME Branch Code Code Code Code Format No. 4											Format No. 4
COURSE NAME BASICS OF HEAT TRANSFER												
CO 1 Description	CO 1 Description Explain Basic Concepts of Heat Transfer											
LO 1 Description	LO 1 Description Describe heat transfer process and its importance in Industries											
	'	SCHEME OF ST	UDY									

				_			
S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Study of Heat, Energy, work, First law and second law of thermodynamics. Definition of heat transfer and its importance in process Industries.	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.	05		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 to Define heat transfer and its importance in Industries.	10	Question paper + Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal

SCHEME FOR LEARNING OUTCOME

Brar	ich C	ode		Cours Code		CO Code	LO Code	Format No. 4
R	0	1	4	0	4	1	2	

COURSE NAME	Basics of Heat Transfe	r					
CO 1 Description	Explain Basic Concepts	of Heat Transfer					
LO 2 Description	Elaborates Various M	odes 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	Remarks
1	Basic definitions of heat transfer through Conduction, Convection and Radiation, thermal conductivity and effect of temperature on thermal conductivity of different solids, liquids and gases	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.	07		Handouts, chalk board, PPT, text book.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Part of Progressive 1(internal)	Student will be asked to Classify Various Modes of Heat Transfer thermal conductivity and effect of temperature on thermal conductivity	10	Test paper + Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

COURSE NAME Basics of Heat Transfer CO 2 Description Calculate Rate of Heat Transfer in Solids Through Conduction Explain the Fourier's Law of Heat Conduction SCHEME OF STUDY S. No. Learning Content Teaching - Learning Method Method T-1. Process Hrs. /Tut Hrs. LRs Required Remarks Fourier's law of heat conduction with Concepts of Heat transfer rate, Heat flux, Temperature gradient, thermal resistance, thermal conductivity Exception of Make students practice their knowledge. SCHEME OF ASSESSMENT Scheme Maximum Marks Resources Required External Internal Possible of Heat transfer rate Student will be asked about Fourier's law of heat conduction with Concepts of Heat transfer rate Student will be asked about Fourier's law of heat conduction with Concepts of Heat transfer rate Heat flux, Temperature gradient, thermal resistance Scheme Of Assessment Student will be asked about Fourier's law of heat conduction with Concepts of Heat transfer rate Heat flux flux flux flux flux flux flux flux	RGPV	' (Diploma V	Wing) Bhopal	SCHEME FOR		Bra	nch Co	ode	C	ourse C	ode	CO Code	LO Code	Format No.
CO 2 Description Calculate Rate of Heat Transfer in Solids Through Conduction				OUICC	DNIE	R	0	1	4	0	4	2	1	4
S. No.	COUR	SE NAME	Basics of Hea	t Transfer										
S. No. Learning Content Teaching - Learning Method Description of T-L Process T	CO 2 D	escription	Calculate Rat	te of Heat Transfer in S	olids Through Co	onduction	1							
S. No. Learning Content Teaching - Learning Method T-L Process	LO 1 D	Description	Explain the F	ourier's Law of Heat C	onduction									
Theory exame Method T-L Process Hrs. Tut Hrs. Exs Required Remarks					SCHEME (OF STUE	Y							
Fourier's law of heat conduction with Concepts of Heat transfer rate, Heat flux, Temperature gradient, thermal conductivity S. No. Method of Assessment Theory exam Teaching, demonstration, quiz,	S. No.	Learnii	ng Content		_					Ll	Rs Rec	quired	R	emarks
S. No. Method of Assessment Description of Assessment Maximum Marks Resources Required International Student will be asked about Fourier's law of heat conduction with Concepts of Heat transfer rate, Heat flux, Temperature gradient, thermal	1	conduction Concepts transfer rat Heat flux, gradient, resistance,	with of Heat e, Temperature thermal thermal	teaching,	explain the contents and provide handout to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their		7			board,	charts	, video		
S. No. Method of Assessment Description of Assessment Marks Resources Required Internation of Assessment Marks Student will be asked about Fourier's law of heat conduction with Concepts of Heat transfer rate, Heat flux, Temperature gradient, thermal 1 Theory exam Externation of Assessment Marks Resources Required Internation					SCHEME OF A	ASSESSN	1ENT							
Fourier's law of heat conduction with Concepts of Heat transfer rate, Heat flux, Temperature gradient, thermal	S. No.	Method	of Assessment	Description of A	Assessment					Resour	rces R	equired		External / Internal
	1	The	ory exam	Fourier's law of heat of Concepts of Heat tran Heat flux, Temperature	conduction with sfer rate, gradient, thermal	10				Rubric	s/Ratin	ng scale		External
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)				ADDITIONAL INST	FRUCTIONS FO	R THE	HOD/ I	FACU	LTY ((IF ANY	Y)			

RGPV (Diploma Wing) Bhopal SCHEME FOR LEARNING OUTCOME Branch Code | Course Code | Code |

COURSE NAME	Dasies of Heat Transfer
CO 2 Description	Calculate Rate of Heat Transfer in Solids Through Conduction

LO 2 Description | Calculate The Overall Heat Transfer Coefficient for Different | Materials Using Fourier's Law

SCHEME	OF STUDY
	Or BIUDI

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	One dimensional steady heat transfers through Conduction in plane walls, composite walls or slabs, Hollow Cylinders or tubes, Critical radius of insulation for pipes and Electrical analogy. Overall heat transfer coefficient Uth.	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.	07		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 to Solve simple numerical using Fourier's law of heat conduction	10	Question paper + Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RG	PV (Diplo	ma Wing) Bhopa	1	SCHEME FOR		В	ranch	ı Co	ode	Co	urse	Cod	e	CO Code	LO Code	Format No. 4
	- (F	(g) F	_	OUTCO	JME	K	?	0	1	4	4 0 4			2	3	
	URSE AME	Basics of Heat T	ransfe	er		-					ı					1
CO2 De	escription	Calculate Rate of	f Heat	t Transfer in Solids T	hrough Con	duction										
LO3 De	escription	To Determine T	herma	al Conductivity of Gi												
					SCHEME O	F STUDY	Z									
S. No.	Learr	ning Content	Te	aching –Learning Method	Description Proce		Tea Hr:		Pra /T Hi	ut		LR	s R	equired		Remarks
1	Fourier's law of heat conduction with Concepts of Heat transfer rate, Heat flux, Temperature gradient ,thermal resistance, thermal conductivity		teach	active classroom ning, demonstration, assignments, ial. Teacher wil demonstrate procedure o experiments students wil through pra		the f lab . The l learn	ab Γhe earn		10		bo	ard,]	PPT	chalk T, text book, leo film.		
				SCI	HEME OF A	SSESSM	ENT									
S. No.	Metho	d of Assessment		Description of Asses	ssment	Maxim Marl	-			Re	sour	ces l	Req	uired		External / Internal
1		oratory test by bservation		ndent will be asked To ne thermal conductivity metal rod.		15		Observation schedule/ check-list / rating scale / rubrics			External					
			ADD	OITIONAL INSTRUC				AC	CULT	Y (II	AN	Y)				1
					Part of externa	al practica	ıl									

RGPV (Diploma Wing) Bhopal	
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SCHEME FOR LEARNING OUTCOME

Bran	ich C	ode	Cours	se Coo	de	CO Code	LO Code	Format No. 4
D	n	1	1	a	1	2	1	

COURSE NAME	Basics of Heat Transfer
CO3 Description	Calculate Rate of Heat Transfer for Given Process Through Convection
LO1 Description	Explain Newton's Law of Heat Transfer Through Convection

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Definition of Convection heat transfer phenomenon, Free Convection and Forced Convection (definitions only), Newton's Law of Heat Transfer, convective heat transfer coefficient, Individual and Overall heat transfer coefficient	demonstration, quiz, assignments, tutorial.	Teacher will demonstrate the procedure of lab experiments. The students will learn through practice.	07		Handouts, chalk board, charts, video film, virtual lab.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Term work	Student will be asked to Describe Newton's law of heat transfer in convection	10	Question paper + Rating scale	internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diplo	oma Wing) Bhopal	SCHEME FOR LEARNING	Bra	nch (Code	C	our	se C	Code	Code	Code	Format No. 4
r (P · · · · g)		OUTCOME		0	1	4	4	0	4	3	2	
COURSE NAME	NAME Basics of Heat Transfer											
CO3 Description	Calculate Rate of Heat T	ransfer for Given Process Through	Conve	ction								
LO2 Description Solve Simple Numerical Problem Related To Newton's Law Of Heat Transfer.												
	COMPARE OF CHAINA											

CO

LO

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Newton's Law of convective heat transfer, Individual and Overall heat transfer coefficient	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.	07		Handouts, chalk board, PPT, text book, charts, video film.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	External / Internal	
1	Theory exam	Student will be asked to Solve simple numerical problem related to Newton's law of heat transfer	10	Question paper + Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Dip	loma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Br R	anch	Co	de 1	Co	urse (Code	CO Code	LO Code	Format No. 4
COURSE NAME	Basics of Heat Transfer		A			1	4	<u> </u>	7	<u> </u>	<u> </u>	
CO3 Description												
LO3 Description	fer Co-Efficient in Convection.											

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Definition of Convection	Interactive classroom	Teacher will	05	07	Handouts, chalk board,	
	heat transfer phenomenon,	teaching, demonstration,	demonstrate the			PPT, text book, charts,	
	Free Convection and	quiz, assignments,	procedure of lab			video film.	
	Forced Convection	tutorial.	experiments. The				
	(definitions only), Newton's		students will learn				
	Law of Heat Transfer,		through practice.				
	convective heat transfer						
	coefficient						

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 determine heat transfer co-efficient by Natural convection.	15	Observation schedule/ check-list / rating scale / rubrics	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Part of external practical

CO LO **Branch Code Course Code SCHEME FOR LEARNING** Code Code Format No. 4 RGPV (Diploma Wing) Bhopal **OUTCOME** R 0 1 4 0 4 4 1 **COURSE NAME Basics of Heat Transfer CO4 Description Calculate Rate Of Heat Transfer Through Radiation. LO1 Description Define Basic Terms Related to Radiation** SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Concepts of radiation, Emission of radiation Wavelength of radiation, Emissive power, Black body, Gray body, White body Opaque body	quiz, assignments,	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	05		Handouts, chalk board, PPT,text book, charts, video film, virtual 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 Define Radiation related terms.	10	Question paper + Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

CO LO **SCHEME FOR LEARNING Branch Code** Course Code Code Code Format No. 4 RGPV (Diploma Wing) Bhopal **OUTCOME** R 0 4 2 **COURSE NAME Basics of Heat Transfer** Calculate Rate Of Heat Transfer Through Radiation. **CO4 Description LO2 Description Explain Various Laws of Radiations SCHEME OF STUDY** Pract. **Teaching** –**Learning Description of T-L Teach** S. No. **Learning Content** /Tut LRs Required Remarks Method Hrs. **Process** Hrs. 08 Absorptivity, reflectivity Teacher will explain the Handouts, chalk board, Interactive classroom and transmissivity, black, teaching, demonstration, contents and provide PPT, text book, charts, white and grey body, quiz, assignments, handouts to students. video film. emissive power, emissivity, Teacher will conduct virtual lab. tutorial. Kirchhoff's law, Planck's assignments/ law, Wien's displacement quiz/tutorial to make law. Stefan-Boltzmann law. students practice their intensity of radiation. knowledge. SCHEME OF ASSESSMENT Maximum External / S. No. **Method of Assessment Description of Assessment Resources Required**

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Nil

Student will be asked to Explain

Radiations related Laws

Part of Progressive 2

Marks

10

Test paper + Rating scale

Internal

Internal

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING	Brar	ich C	ode	Cou	rse C	Code	CO Code	LO Code	Format No. 4
		OUTCOME		0	1	4	0	4	4	2	
COURSE NAME	Basics of Heat Transfer										
CO4 Description	Calculate the rate of hea	Calculate the rate of heat transfer for the given process through Radiation									
LO3 Description	n Solve Simple Problems Related to Heat Transfer Through Radiation										

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Intensity of radiation, radiation heat exchange between black bodies, shape factor, electrical analogy, radiation heat exchange between gray bodies, Radiosity, irradiation, radiation shields.	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.	06		Handouts, chalk board, PPT, text book, charts, video film, virtual 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 Solve simple problems related to heat transfer through Radiation.	10	Question paper + Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Part of term work

R	GPV (Diplo	ma Wing) Bhop	al		OR LEARNIN	NG 1	Bran	ch C	ode	Cour	se (Code	CO Code	LO Code	Format No. 4
	` 1	8/ 1		OUI	ГСОМЕ		R	0	1	4	0	4	5	1	
COURSE NAME Basics of Heat Transfer															
CO5 Description Analyze Heat Exchangers															
LO1 De	scription	Explain Differen	nt Types	of Heat Exchange	ers.										
					SCHEME O	F STUDY									
S. No.	Learn	ing Content		ing –Learning Method	Description Proce			ach rs.		act. Hrs.		LR	s Requir	ed	Remarks
1	Types of heat exchanger based on flow pattern, function and construction pouble pipe heat exchanger Counter flow, Parallel flow, Shell and tube heat exchanger 1-1 Interactive classroom teaching, demonstration, quiz, assignments, tutorial. Teacher teaching, demonstration, quiz, assignments, tutorial.		Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practicetheir knowledge.		05 -				Handouts, chalk board, PPT, text book charts, video film, virtual lab.		book,				
				SC	CHEME OF A	SSESSME	NT								ı
S. No.	Method	of Assessment	D	escription of Asso	essment	Maximu Marks				Resou	ırce	s Req	uired		External / Internal
1	Semina	nr Presentation		at will be asked to	Explain and	10	Board or PPT Presentation				Internal				
			ADDIT	IONAL INSTRU	CTIONS FOR	R THE HC	D/ I	FACU	JLTY	(IF A	NY))			
					Nil										

RGPV (Diploma Wing) Bhop		1	SCHEME FOR LEARNING OUTCOME		Bran	Branch Code		Course Code		ode CO Code	LO Code	Format No. 4		
	` •	37		OUICC	DNIE	R	0	1	4	0	4	5	2	
COURSE NAME Basics of Heat T			ransfer				·				·			
CO5 Description Analyze Heat Exchangers														
LO2 De	scription	Derive Equation	and Ca	lculate L.M.T.D.										
				,	SCHEME O	F STUDY								
S. No.	Lear	ning Content	Tea	nching –Learning Method	_	tion of T-L ocess	Tea Hr		Prac /Tut H			LRs Req	uired	Remarks
1	L.M.T.D. derivation of equation Overall heat transfer co-efficient of heat exchangers and heat exchanger area		teachin quiz, a		contents and handouts to Teacher will assignment to make stutheir know.	o students. Il conduct s/ quiz/tutorial idents practice ledge.			04		Handouts, chalk board, charts, video film, virtual lab.			
	I			SCE	IEME OF A	SSESSMENT								
S. No.	Metho	d of Assessment		Description of Asses	sment	Maximum Marks			Reso	urce	es Re	quired		External / Internal
1	Lab	oratory work		ent will be asked tion and Calculate L.N		10			Γest Pa	per ·	+ Rat	ing Scale		Internal
			ADD	ITIONAL INSTRUC	CTIONS FOR	R THE HOD/	 FACI	JLTY	/ (IF A	NY)			

RGPV (Diploma Wing) Bhopal		al	SCHEME FOR LEARNING		Bran	ich Co	de Coi	urse C	ode	CO Code	LO Code	Format No. 4	
	- · (F			OU	ГСОМЕ	R	0	1 4					
COURSE NAME Basics of Heat Tra		ransfer					1					1	
CO5 De	escription	Analyze Heat E	Exchanger	S									
LO3 De	escription	Solve Simple Nu	merical Pr	oblems on Heat	Exchangers								
					SCHEME OF STU	DY							
S. No.	Lear	ning Content		ng –Learning Method	Description of T-I Process		each frs.	Pract. /Tut Hrs.		LRs Requir		ed	Remarks
1	Counter flow heat exchangers, Overall heat			e classroom demonstration, gnments,	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge		07		cha		s, chalk b deo film, b.	· ·	

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 Solve simple numerical problems based on LMTD and Overall Heat transfer Coefficient and NTU	10	Question paper + Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)