#### RGPV (DIPLOMA WING) BHOPAL

# OBE CURRICULUM FOR THE COURSE

FORMAT - 3

Sheet No.

Branch

CHEMICAL

Semester

6

**Course Code** 

# Course Name CHEMICAL ENGINEERING INSTRUMENTATION

Course	Apply basic principle of measurements in chemical processes	Teach	Marks
Outcome 1		Hrs	
Learning	Identify measurement techniques for various process variables	8	15
Outcome 1			
Contents	Importance of instrumentation & control in processing industries. Measurements and measuring instruments. Methods of measurements. Direct and indirect measurement. Elements of an instruments: primary , secondary, manipulating and functioning elements, Functions of instruments: different functions of an instruments such as Transmitting, Indicating ,recording, registering etc: their meaning and importance. Detector transducer element, classification of transducer, Primary & secondary transducer, mechanical transducer, electrical transducer, transducer description, transducer sensitivity, selection of an instrument transducer, variable resistance transducer, variable inductance transducer, thermo electric transducer, capacitive transducer, piezo electric transducer, photo electric transducer.		
Method of	Theory Exam(external)		
Assessment			
Learning Outcome 2	Classify instruments according to their function in chemical industry	12	15
Contents	Classification of instruments: Absolute and secondary instruments. Power operated and self- operated instruments. Manual & Automatic instruments .Digital & Analog mode. Self-contained & remote indicating, Characteristics of an instrument: Static characteristics: Ra range and span, Accuracy, static error and correction, Calibration and calibration curve, reproducibility and Drift: zero span & point drift Sensitivity & dead zone, hysteresis, linearity, overall system sensitivity Threshold and resolution, Precision, repeatability, and Linearity, Dynamic characteristics: Standard test inputs .Speed of response & measuring lag, Fidelity & dynamic error, overshoot, Dead time and dead zone, Order and response of an instrument.		

Method of	Theory Exam(external)		
Assesment			
Learning	Determine error and necessary correction for an	9	10
Outcome 3	instrument		
Contents	determination of static error and corresponding static		
	correction and to plot calibration curve for different		
	types of instruments		
Method of	Laboratory test by observations(external)		
Assessment			
Course	Use temperature measuring instruments for appropriate		
Outcome 2	industrial application.		
Learning	Use expansion thermometers in appropriate situation .	8	15
Outcome 1			
Contents	Expansion Thermometers: Types of expansion		
	thermometers, Mercury in glass thermometer, other		
	liquids used in thermometer with their ranges, high		
	temperature measurement and over range protection, Dip		
	effect Pressure spring thermometers,		
	Pheumatic pressure thermometers, static error and		
Mathad of	Theory Exem(external)		
Assessment	Theory Exam(external)		
Learning	Use electrical properties of materials to measure temperature	11	20
Outcome 2			
Contents	Thermocouples: Thermoelectricity, Seeback effect, Peltier		
	effect and Thomson effect, .laws of thermoelectric circuits,		
	Working principle and application of industrial thermocouples,		
	Thermocouple lead wires, Thermal well, Thermocouple circuits		
	Mili voltmeter circuit and Null potentiometer circuit		
	Resistance thermometers		
	Working principle, construction and application. resistance		
	heidag circuit		
Method of	Theory Exam(external)		
Assessment			
Learning	Operate pyrometer for given application	07	10
Outcome 3			
Contents	Radiation thermometer, Principle, construction and		
	application of radiation thermometer,		
	Radiation receiving elements,Lens type and mirror type		
	radiation pyrometer		
	Principle and working of optical pyrometer		
	Photoelectric pyrometer		

Method of	Theory Exam(external)		
Assessment			
Learning	Choose the relevant instrument to measure temperature	12	20
Outcome 4	of the given system with justification		
Contents	To determine the temperature using different types of		
	thermometers		
Method of	Laboratory test by observations(external)		
Assessment			
Course	Use relevant instrument for measuring pressure and vacuum in		
Outcome 3	chemical industry		
Learning	Select suitable instrument for measuring differential, gauge	13	20
Outcome 1	pressure and vacuum.		
Contents	Measurement of pressure and vacuum: Manometers:		
	construction , working principle advantages and disadvantages		
	of U tube ,inclined leg ,differential and enlarged leg		
	manometer.		
	Measuring elements for gauge pressure, Differential pressure		
	and vacuum, Bourdon tube Diphragm and bellows, Simple		
	bellow and double bellow working of pressure gauges		
	Measurement of Vacuum: Pirani gauge ,Mcloid gauge and		
	ionization gauge, Indicating elements for measuring gauges		
Method of	Theory Exam(external)		
Assessment			
Learning	Operate appropriate pressure measuring device in the	9	20
Outcome 2	given situation		
Contents	Operation of different types of manometers, pressure		
	gauges and vacuum gauges		
Method of	Laboratory test by observations. (external)		
Assessment			
Course	Apply appropriate method for level, density and composition analysis		
Outcome 4	in process		
Learning	Select suitable method for level measurement in process	6	20
Outcome 1	industry	Ũ	-0
Contents	Instruments for measuring liquid level in open vessel and		
Contents	Closed vessel by direct and indirect method. float and tape.		
	float and shaft method, bubbler system, diaphragm box		
	method, air trap method, Measurement of interface level.		
Method of	Theory Exam (internal)		
Assessment			
Learning	Select suitable method for density measurement in process	4	10
Outcome ?	industry		10
Contents	Density and specific gravity measurement, liquid level method		
	Hydro-meter method. Displacement method		

Method of	Theory exam (internal)		
Assessment			
Learning	Select correct method for composition analysis in chemical	8	15
Outcome 3	industries.		
Contents	Composition analysis 1Brief treatment of absorption, Emission and mass, spectroscopy, Beers law, Working principle of gas chromatograph, Thermal conductivity method, Ph meter, Humidity measurement by Hygrometer and Pschychrometer		
Method of	Theory Exam (External)		
Assessment			
Learning	Use appropriate method for level, density and composition analysis	9	20
Outcome 4	in process industry.		
Contents	<b>Extraction:</b> Definition, Difference between leaching & extraction, Comparison with distillation as a separation operation, Fields of application of extraction, Desirable characteristics of solvent for extraction, Selectivity and distribution coefficient with respect to extraction, Representation of ternary system on triangular diagram		
Method of Assessment	Laboratory test by observations (external)		
Course Outcome 5	Evaluate the performance of control system with appropriate controllers and control valves.		
Learning	Explain different elements for open loop and closed loop	11	15
Outcome 1	system	11	10
Contents	ntrol system and elements, Block Diagram, description of block diagram, On off control, feed back and feed forward control Open and Close loop system, servo and regulating problem Proportional, Proportional integral, Proportional derivative and Proportional integral derivative controllers, Reset, rate control and rate control characteristics, Application and concept of automatic control for batch and continuous processes, Elementary idea about pneumatic, electrical and hydraulic controllers		
Method of	Theory Exam (External)		
Assessment			
Learning	use control system in industries.	6	10
Outcome 2			
Contents	Study of level control loop system and temperature control loop system		
Method of Assessment	Laboratory test by observations (external)		

### FORMAT 4 DETAILED COURSE PLAN

RG Dipl a Win Bho	RGPV( Scheme for learning Diplom outcome a Wing& Bhopal		Branch code C 0	Course code	CO	code 1	LO	code 1
Cou	rse name: Che	mical Engineering In	nstrumenta	tion				
CO	description: A	pply basic principle of	f measurem	ents in chemica	l proce	esses.		
LO	description: Iden	ntify measurement tec	hniques for	various proces	s varial	bles.		
	1	Sch	eme of stu	dy	-	1	1	
S.	Learning con	tent	Teachin	Description	Tea	Pract	LRS	Remark
Ν			g	of TL	ch	/Tut	Requir	S
			learning method	process	Hrs.	Hrs	ed	
1.	Importance of	f instrumentation &	Traditio	Faculty will	8	2	Suggest	
	control in proc	cessing industries.	nal	explain			ed	
	Measureme	nts and measuring	Lecture	learning			textboo	
	instruments	. Methods of	Method	content.			k	
	measureme	nts. Direct and		To identify			handout	
	indirect me	asurement. Elements		students			S	
	of an inst	ruments: primary ,		weakness			powerp	
	secondary,	manipulating and		assignment			oint	
	Functions of i	elements, nstruments: different		will be				
	functions of	an instruments such		accordingly				
	as	Transmitting		remedial				
	Indicating .re	cording. registering		and tutorials				
	etc: their mean	ning and importance.		will be				
	Detector tra	ansducer element,		taken.				
	classification	of transducer,						
	Primary & se	condary transducer,						
	mechanical tr	cansducer, electrical						
	transducer, tra	insducer description,						
	transducer ser	sitivity, selection of						
	an instrument	transducer, variable						
	resistance tr	ansducer, variable						
	inductance 1	transducer, thermo						
	electric tran	sducer, capacitive						
	transducer,	piezo electric						
	transducer,	photo electric						
	uansuucei.	<u> </u>	cheme of a	ssessment				
S	Method of	Description of asses	ssment	Maximum	Resou	irces	Exter	nal
No	assessment		,,, <b>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</b>	marks	reani	red	/inter	nal
					requi		, 111001	
	Theory	Theory questions	related to		Quest	ion pape	r	
1	Exam	the learned conten	t will be	15		1 1	Exter	nal
		asked in the	university					
		question paper	-					
		Additional instr	uction for	the HOD/ facu	lty (if	any)		
			Ni	1				

RC	PV(Scheme	for learning	Branch		Course		aho	IO	code
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Wir	19&			┛└					
Bha	onal								
Cou	rse name: Chem	ical Engineering	y Instrumen	tatio	n				
CO	description: Appl	v basic principle	of measurem	nents	in chemica	al proces	ses.		
LO	description: Class	if v instruments a	ccording to t	their	function in	chemica	l indus	trv.	
10		<u>S</u>	cheme of sti	ndv			ii iiiaas		
S.	Learning conte	ent S	Teaching	Des	cription	Teach	Prac	LRS	Remar
N			learning 0		ч.	Hrs.	t/Tu	Requir	ks
- 1			method	pro	cess		t	ed	
				P-0	••••		Hrs	•••	
1.	Classification of	f instruments:	Tradition	Facu	ulty will	10	2	Suggest	
	Absolute	and secondary	al	expl	lain			ed	
I	instruments	. Power	Lecture	lear	ning			textboo	
	operated ar	nd self-operated	Method	cont	tent.			k	
	instruments	. Manual &		То	identify			handout	
	Automatic	instruments		stud	lents			S	
	.Digital &	Analog mode.		wea	kness			powerp	
	Self-contain	ned & remote		assi	gnment			oint	
	indicating,	Characteristics		will	be given				
	of an ins	trument: Static		and	-				
	characterist	ics:		acco	ordingly				
	range and spa	n, Accuracy,		rem	edial and				
	static error and o	correction,		tuto	rials will				
	Calibration and	calibration		be ta	aken.				
	curve, reproduci	ibility and Drift:							
	zero span & poi	nt drift							
	Sensitivity & de	ad zone,							
	hysteresis, linear	rity, overall							
	system sensitivi	ty Threshold							
	and resolution, I	Precision,							
	repeatability, an	d Linearity,							
	Dynamic charac	teristics:							
	Standard test inp	outs .Speed of							
	response & mea	suring lag,							
	Fidelity & dyna	mic error,							
	overshoot, Dead	time and dead							
	zone, Order and	response of an							
	instrument.		Sahama - f	0.000 - 0	and cred				
C	Mathade	Decemination	Scheme of		sment	<b>D</b>	unco-	<b>T</b> 74	
D. No	wieling of	Description of	o assessmen		wiaximum marka		urces	Ext /int	ernal
INU	Theory Even	Theory avert	iona ralatad		marks	requ	tion nor	/Int	ernal
1	Theory Exam	the learned a	ontent will	be	15	Ques	non par		rnal
1		asked in the university						anal	
		askeu III L	ne universi	пу					
		Additional inc	truction for	tha 1	HOD/ face	ulty (if a	nv)		
		Auditional Ins	NTUCTION 10			uity (II a	цу)		
			IN	11					

RG	PV( Scheme for	r learning	g Branch co	ode	Course	CO	code		LO	code
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8	l l									
Win	ıg&									
Bho	pal									
Cou	rse name: Chemic	al Engin	eering Instrur	nenta	tion					
CO	description: Apply	basic prin	nciple of measu	reme	nts in chemica	al proce	esses.			
LO	lescription: Determ	nine error	and necessary	corre	ction for an ir	Istrume	nt.			
~			Scheme of	f stud	<u>у</u>		_			_
S.	Learning conten	t [1]	Teaching	Desc	ription of	Tea	Prac			Remar
Ν		l	earning	TL I	process	ch	t/Tut	Requ	uire	ks
1	1	r	method	-	1. 11	Hrs.	Hrs	d T		
1.	determination of	static	Lab -	Fac	ulty will		9	Exp	er	
	error and correspondent	onding	demonstrati	exp	lain the			1mer	nt	
	static correction	and to	OII	a conte				Joh	ıp	
	for different tyr			dan	anu			Lau Mor		
	instruments	005 01		how	ionstrate			al	Iu	
	mstruments.			readir				ai		
				Teut	iiiig					
			Sahama	ofoa						
C	Mathadaf	Decerin	Scheme	or as	Sessment	Dec			<b>F4</b>	
D. No	Method of	Descrip	outon of assessi	nent	maximum	i Kes	ources		Exte	ernal
INU	assessment				marks	req	uneu		/1110	rnai
1	Laborate T- (	<b>D</b>								
1.	Laboratory 1est	Exami	ner will ask to	•	10	I	Rating so	cale	F	sternal
	by observation	students	s to take reading	9	10				aomai	
		front of	him and will							
			arrectness of	of International						
		result	sult							
		Addition	al instruction	for th	HOD/ fact	ıltv (if s	anv)			
		- suurnoll	ur mon ucuon	Nil			" <b>""</b> , "			
1				<b>11</b>						

Dipl a Win Bho Cou CO o LO o	RGPV(   Scheme for learning outcome   Branch code C   Course code   CO code 2   LO code     a   Image: Course code   Image: Code										
	<b>T</b> • • • •	r	Scheme o	i study			D	TDC	<b>D</b>		
S. N	Learning content	1	l'eaching earning nethod	Descr TL pr	ocess	Teach Hrs.	Prac t/Tu t Hrs	LRS Requir ed	Remar ks		
1.	Expansion Thermo Types of expansion rmometers, Mercury in glass thermometer, other liquids used in thermometer with ranges, high temp measurement and range protection, I effect Pressure spr thermometers, Pneumatic pressure thermometers, stat and compensation, Bimetallic thermom	meters: n I r their erature over Dip ing e ic error meters	Traditional Lecture Method	Teach explain conter provid hando studen Teach condu assign /quiz/ make practic knowl	er will n the tts and e uts to tts. er will ct ments tutorial to students e their edge.	06	02	Handou ts Chalk board, PPT text board.			
		<b>D</b>	Scheme	e of asse	essment	D					
5. N 0.	Method of assessment	Descriptio	on of assessi	nent	Maximum marks	requi	urces ired	Ext /int	ernal ernal		
1.	Theory Exam	Theory que the learne asked in question p	estions rela d content w the univ aper	ted to vill be versity	15	Quest	tion Par	per Ext	ernal		
		Additional	instruction	for the Nil	e HOD/ facu	ulty (if a	ny)				

RG	PV(	Scheme fo	or learning	Branch c	ode	Course	CO	ode	LC	) code
Dip a Wir Bho	lom a ng& opal	outo	come	<u>C</u> 0	2	code	2	2		2
Cou	rse na	me: Chem	ical Engine	ering Instru	mentati	ion				
CO	descr	i <b>ption:</b> . Use	temperatur	e measuring	instrum	ents for appr	opriate i	ndustria	al applica	tion
01	descri	ption: Use	electrical pr	operties of m	aterials	to measure	temperat	ure		
				Scheme of	of study			1	1	
5. N	Lear	ming conte	nt	Teaching learning method	Descr TL pr	iption of ocess	Teach Hrs.	Prac t/Tu t Hrs	LRS Requir ed	Remain ks
Ι.	Thern effec Thom therr Work appli therr Thern Thern Mill v Null p <b>Resis</b> Worl const appli therr When Calle circul	mocouples: moelectricity t,Peltier effe- nson effect, .l noelectric cir cing principle cation of inde nocouples, mocouple lea mal well, mocouple cir voltmeter circ otentiometer tance therm king principle cruction and cation. resist nometer circ atstone bridg ndar Griffiths t,	, Seeback ct and aws of cuits, and ustrial d wires, cuits cuits cuit and er circuit <b>ometers</b> cuits:- ce, bridge	Traditional Lecture Method	Facult explai conter To studer weakn assign be g accord remed tutoria taken.	y will n learning nt. identify tts ness ment will iven and lingly ial and ils will be	8	3	Sugges ed textboo k handou s powerp oint	t
0	Mad	and of	Degement	Scheme Scheme		Marimum	Daga		E-	4
s. No	asses	ssment	Descript	IOII OI ASSESS	ment	marks	requi	ired	/in	ternal
l	Theo	ory Exam	Theory c the learn asked i question	uestions rela ed content v n the uni paper	ated to will be versity	20	Ques	tion Paj	per Ex	ternal
			Additiona	al instruction	n for the	e HOD/ facu	ılty (if a	ny)		

RG	PV( Scheme for	· learning	g Branch co	ode	Course	COo	ode		LO	code
Dip	lom outco	ome	C 0	C 0 2		2		3		3
8	1									
Win	ng&									
)Bhc	pal									
Cou	rse name: Chemic	al Engin	eering Instrur	nentati	ion	<u> </u>				
CO	description: Use to	emperatur	e measuring in	istrume	nts for appro	opriate ir	Idustria	l appl	icatio	on.
LO	description: Opera	ate pyrome	eter for given a	applicat	.1011.					[
G	T	4	Scheme o	f study	•		D	IDO	3	D
D.	Learning content	[ ] J	l eaching	Descr	iption of	I each	Prac		<b>)</b>	Remar
IN			earning	IL pi	ocess	пrs.	t/1u	Req	lau	KS
		1	method				t Hrs	cu		
1	Padiation thormom	otor 1	raditional Faculty will			5	2	Sug	gest	
		ion I	Lecture	explai	n learning	5	-	ed	5000	
	and application	of N	Method conter		nt.			text	boo	
	radiation	01		To ide	entify			k		
	thermometer.			studer	nts			hand	dout	
	Radiation receiving			weakr	ness			S		
	elements.Lens t	vpe		assign	ment will			pow	verp	
	and mirror type	//		be giv	en and			oint		
	radiation pyrom	eter		accore	lingly					
	Principle and worki	ng of		remed	al and					
	optical pyrometer			tutoria	us will be					
	Photoelectric pyro	meter		taken.						
G			Scheme	e of ass	essment	P			<b>F</b> (	
S.	Method of	Descrip	tion of assessr	nent	Maximum	Reso	urces		Exte	ernal
INO	assessment				marks	requi	rea		/inte	ernai
•	Theory Exam	Theory	questions rela	ted to		Oues	tion nar	her		
1		the lear	ned content w	vill be	10	Zues	non pu		Exte	rnal
_		asked	in the univ	ersity						
		question	paper	5						
		Addition	al instruction	for the	e HOD/ facu	ulty <u>(if</u> a	ny)			
				Nil						

<b>RGPV</b> (Diplom Scheme for			Branch code	Course	C	O code	LO	code
	a a	learning	$\begin{array}{ c c } \hline C & 0 & 2 \\ \hline \end{array}$	code		2	4	
Wing&	)Bhopal	outcome						
_	_							
Course	name: Ch	emical Engine	ering instrume	ntation				
CO dese	cription:	Use temperatur	e measuring ins	truments for ap	propriat	e industrial a	pplication.	
LO deso	ription:	Choose the relev	vant instrument to	o measure temp	erature d	of the given sy	stem with just	tification
	-		Sch	eme of study				
S.No.	Learnin	g content	Teaching	Descriptio	Teac	Pract/Tut	LRS	Remark
			learning	n of TL	h	Hrs	Required	S
			method	process	Hrs.			
1.	To deter	mine the	Lab –	Faculty		12	Experi	
	temperat	ure using	demonstrati	will			ment	
	different	types of	on	explain			Setup	
	thermom	eters.		the			Lab	
				content			Manual	
				in lab				
				and				
				demonst				
				rate				
				how to				
				take				
				reading				
			Schem	e of assessme	nt			
S.No.		Method of as	sessment	Description	of	Maximu	Resource	External
				assessment		m marks	S	/internal
							required	
1.		Laboratory T	est by	Examiner w	ill		Rating	
		observation		ask to student	ts	20	scale	External
				to take readin	ıg	20	scale	
				and then				
				calculate in				
				front of him a	and			
				will asses	_			
				correctness of	f			
				result				
		Addit	ional instructio	n for the HOL	D/ facult	y (if any)		
				Nil				

RGP	RGPV(DiplomaWing&)B Schem   hopal e for   learnin g   outcom e		Branch code C 0	Course code	C	O code 3	LO	code l
Cours	e name: Chemical Engi	ineering Iı	L nstrumentat	ion				
CO de	scription: Use relevant ir	nstrument f	for measuring	g pressure and	vacuun	n in chemi	cal industry.	
LO de	scription: Select suitabl	e instrume	ent for measu	ring differenti	al. gaug	e pressure	and vacuum	
	<u> </u>		Scheme	of study	, 88	<u>, F</u>		-
S.No	Learning content		Teaching	Descriptio	Teac	Pract/T	LRS	Remar
•			learning	n of TL	h	ut Hrs	Require	ks
			method	process	Hrs.		d	
1.	Measurement of pressure and vacuum: Manometers: construction , working principle advantages and disadvantages of U tube ,inclined leg ,differential and enlarged leg manometer. Measuring elements for gauge pressure, Differential pressure and vacuum, Bourdon tube Diphragm and bellows, Simple bellow and double bellow working of pressure gauges Measurement of Vacuum: Pirani gauge ,Mcloid gauge and ionization gauge, Indicating elements for measuring gauges.		Traditiona l Lecture Method	Faculty will explain learning content. To identify students weakness assignment will be given and accordingl y remedial and tutorials will be taken.	10	3	Suggeste d textbook handouts powerpoi nt	
			Scheme of	assessment				
S.No ·	Method of assessment		Description assessment	ı of	Maxin marks	num s	Resource s required	External /internal
1.	Theory Exam		Theory que to the lear will be as university paper		20	Question paper	External	
	Add	litional in	struction for	r the HOD/ fa	culty (i	f any)		
			N	lil				

DC			•				<u> </u>		1	TO	
RG	PV(	Scheme for lea	rning	Branch c	ode	Course		code		LO	code
Dip	lom	outcome		C 0	2	code	3				2
é	a										
Wiı	ıg&										
)Bho	opal										
Cou	rse n	ame: Chemical <b>H</b>	Enginee	ring Instru	ment	ation					
СО	descr	iption: Use relev	ant instr	ument for n	neasu	ring pressure a	and vacua	um in cl	hemic	cal ind	dustry.
LO	descr	iption: Operate a	opropria	te pressure n	neasu	ring device in th	ne given s	ituation			
		· · ·	• •	Scheme o	f stu	dv					
S.	Lea	rning content		Teachin	Des	crintion of	Teach	Prac	LR	S	Remar
N	N			σ	TL	nrocess	Hrs.	t/Tu	Requir		ks
11				8 learning		Process		t t	ed		
				method				t Hrs	cu		
1	One	ration of diffe	ront	Lab	Fa	oulty will		0	Ev	no	
1.	types of manometers,		demons		culty will				pc m		
			and	tration	ex	plain the			nt	le	
	pres	sure gauges	tration								
	vact	ium gauges			and			Sel	up		
					monstrate			La	D		
					ho	w to take			Man		
					rea	ading			ual		
			1	Scheme	e of a	ssessment					
S.N	0.	Method of	Descri	ption of		Maximum	Reso	urces		Exte	ernal
		assessment	assess	ment		marks	requi	ired		/inte	ernal
1.		Laboratory	Exan	niner will							
		Test by	ask to	students to		20	Ra	ating sc	ale	E	xternal
		observation	take re	ading and							
			then ca	alculate in							
			front o	f him and							
			will as	ses							
			correct	tness of							
			result								
		A .J.	ditional	instruction	for	the HOD/fee	ulty (if a	nv)			
		Au	linonal	mstruction	101°		uny (11 a	пу)			
					- INI	1					

RGP	Scheme for lea	rning	Branch coo	le	Course	CO	code		LO	code
V(Di	outcome		C 0 2		code	4	4		1	l
plom										
a										
Wing										
&)Bh										
opal		<b>F</b> •	• • •							
Course	name: Chemical	Engin	eering Instrum	nentati	0 <b>n</b>			1	•	
CO des	cription: Apply a	ppropri	ate method for	level, c	iensity and	composi	tion ana	uysis	in pro	ocess
Industry	/. arintion: Salaat a	uitabla	mathed for law	al man	uromont in	process	industr	.7		
LU des	cription. Select s	unable		f study	surement m	process	mausu	у.		
S.N	Learning conte	nt	Teaching	Descr	intion of	Teach	Prac	LR	S	Remar
5.14	Learning conter	10	learning	TL nr	ncess	Hrs.	t/Tu	Rec	mir	ks
			method	12 pi	000055	1115	t	ed	lan	
							Hrs	•••		
1.	Level Measureme	nt :	Traditional	Facult	y will	5	1	Sug	gest	
	Instruments for		Lecture	explai	n learning			ed	-	
	measuring liquid	level	Method	conter	nt.			text	boo	
	in open vessel and	d		To ide	ntify			k		
	Closed vessel by d	irect		studen	its			han	dout	
	and indirect meth	od.		weakn	ess			s po	ower	
	float and tape, flo	at and		assign	ment will			poir	nt	
	shaft method, but	bler		be giv	en and					
	method air tran	II DOX		accore	lingly					
	method Measure	ment		remed	al and					
	of interface level.	mente		tutoria	lis will be					
				taken.						
	·		Scheme	of asse	ssment	·	<u> </u>	·		
S.No.	Method of	Descr	iption of		Maximun	n Re	esource	s	Exte	ernal
	assessment	assess	ment		marks	re	quired		/inte	rnal
	Pen paper test.	Theor	y question rela	ited to	20	Te	est pape	er +	Inter	mal
1		the lea	arned content v	will be		Ra	ating Sca	ale		
		asked	in the test pape	er						
	Α	ddition	al instruction	tor the	HOD/ fac	ulty (if a	ny)			
				NI						

RGP V(Di plom a Wing	Scheme for lea outcome	rning	Branch coo C 0 2	de ]	Course code	CO code 4		code ]		code 2
&)Bh										
Course	name: Chemical	Engin	eering Instrur	nentati	on					
CO des industry	scription: Apply a y.	ppropri	ate method for	level, c	lensity and	compo	osition a	nalysis	s in pr	ocess
LO des	cription: Select s	uitable	method for der	nsity m	easurement	in pro	cess ind	ustry.		1
C N	<b>T</b> • (		Scheme of	f study	•	T				D
S.N	Learning conte	nt	learning	Descr.	iption of	Teac	h Pra	C   LK	(S auir	Kemar ks
			method	112 pi	00055	1115.	t Hrs	ed	quii	K5
1.	Density and speci gravity measurem liquid level metho Hydro-meter met Displacement met	fic ient id, ihod thod	Traditional Lecture Method	Facult explai conter To ide studen weakn assign be giv accord remed tutoria taken.	y will n learning at. entify its eess ment will en and lingly ial and .ls will be	3	1	Sug ed tex k har s pov oin	ggest tboo ndout werp t	
C NL	NT. (L. L.C	D	Scheme	e of asse	ssment		D		E 4	1
3.INO.	Method OI assessment	Descr	iption OI ment		wiaximun marks	<b>1</b> .	Kesour( require	es 1	LXte /inte	ernal
1	Pen paper test.	Theor the lea asked	y question relation r	ated to will be er	10		Test pa Rating S	per + cale	Inte	rnal
	А	dditior	al instruction	for the	HOD/ fac	ulty (i	f any)			
				Nil						

RGPV (Diplo ma Wing &)Bho	Scheme for learning outcome	Bran C	nch code 0 2		Course code		CO coo 4	le		) code 3
pal Course	name: Chemical Er	ngine	ering Inst	rum	entation					
CO des industry	<b>scription:</b> Apply app	propri	ate method	l for	level, density a	and o	compositi	on ar	nalysis in <sub>l</sub>	process
LO des	cription: Select cor	rect	method for	r cor	nposition analy	vsis i	n chemic	al inc	lustries.	
			Sc	chem	e of study		1	1		
S.No.	Learning content		Teaching learning method	5	Description of TL process	of	Teach Hrs.	Pra ct/ Tut Hrs	LRS Requir ed	Rema rks
1.	Composition analysis 1Brief treatment of absorption, Emissic and mass, spectroscopy, Beers law, Working princi of gas chromatogra Thermal conductivity method, Ph meter, Humidity measureme by Hygrometer and Pschychrometer	on 5 ple ph, ty ent	Tradition Lecture Method	al	Faculty will explain learni content. To identify students weakness assignment w be given and accordingly remedial and tutorials will taken.	ng 'ill be	6	2	Sugges ted textbook handou ts power point	
			Sche	me o	of assessment			I		
S.No.	Method of assessment	D	escription	of a	nssessment	Ma ma	aximum arks	H e r	Resourc s equired	Externa l /interna l
1.	Theory Exam	T th as qu	heory que le learned sked in lestion par	estion cor the per	ns related to ntent will be university		15	C F	Question paper	External
	Addi	tiona	l instructi	on f	or the HOD/ f	acul	ty (if any	/)		
					Nil					

RGPV (Diplo ma Wing &)Bho	Scheme for B learning outcome	ranch codeC02	Course code		CO coo 4	le	LO	code 4
Course CO desc industry.	name: Chemical Eng ription: Apply appro	ineering Instru- priate method iate method for	umentation for level, density and c level, density and	and cor	compositi nposition	on and analy	alysis in pro	process
C No	Looming context	Sch	neme of study	гт	Tecch	D	IDC	Domo
<b>5.</b> 1 <b>0</b> .	Learning content	learning method	process	IL.	Teach Hrs.	Pra ct/ Tut Hrs	LKS Requir ed	rks
1.	Measure level by Float type Level Meter and air purge method Measure density by Density Bottle and hydrometer method. Use of Spectrophotometer hygrometer and psychrometer	Lab - demonstra tion	Faculty will explain the content in lab and demonstrate how to take reading			9	Expe rime nt Setu p Lab Man ual	
		Schen	ne of assessment					
S.No.	Method of assessment	Description	of assessment	Ma ma	ıximum ırks	R es re	esourc equired	Externa l /interna l
1	Laboratory Test by observation	Examiner w students to ta and then calc of him and w correctness o	ill ask to ke reading ulate in front ill asses f result	2	0	R sc	ating ale	internal
	Additi	onal instructio	n for the HOD/ f	facul	ty (if any	7)		

R	GPV	Scheme for	Br	anch code	Course code		CO coo	de	LC	code
(D	iplo na	learning	C	0 2			5			1
W	ing	outcome								
<b>&amp;</b> )	Bho									
I	bal									
	urse I	name: Chemical E	ngir	neering Instru	imentation		· · · · · ·			
	) aeso atrol v	eription: Evaluate i values	ne p	performance of	f control system v	vith	appropria	ate co	ntrollers a	ind
LC	) desc	<b>ription:</b> Explain di	iffer	ent elements	for open loop and	clos	ed loop s	vsten	1.	
		<b>I I I I I</b>	-	Sch	eme of study		F	J		
S	S Learning content			Teaching		Teach	Pra	LRS	Rema	
•			learning	TL process		Hrs.	ct/	Requir	rks	
N				method				Tut	ed	
U								1115		
1	contr	ol system and elemer	nts	Traditional	Faculty will		8	3	Sugges	
•	Block Diagram, description of			Lecture	explain learning	g			ted	
	loo	ck diagram		Method	content.				textboo	
	On of	ft control, feed back a forward control	and		To identify				k	
	Open	and Close loop syster	n.		assignment will be				nandou ts	
	se	rvo and regulating	,		given and				powerr	,
	pr	oblem			accordingly				oint	
	Propo	rtional, Proportional			remedial and					
	ini de	rivative and			tutorials will be					
	Pr	oportional integral			taken.					
	de	rivative controllers								
	Reset	, rate control and rat	е							
	CO A malia	ntrol characteristics	·							
	аррію	tomatic control for								
	ba	tch and continuous								
	pr	ocesses								
	Eleme	entary idea about	لم							
	pn by	eumatic, electrical ar draulic controllers	10							
				Schen	ne of assessment		•	•		
S.N	No.	Method of	Τ	Description of	of assessment	Ma	aximum	F	Resourc	Externa
		assessment				ma	rks	e	s · ·	1
								r	equired	/interna
		Theory Exam	+	Theory ques	tions related to				Question	-
1				the learned	content will be		15	p	aper	External
				asked in	the university					
		:E. E. A	<b>it</b> a-	question pape	r n for the UOD/f		4., (:f ~			
		Add	11101	iai mstructio	<u>n for the HOD/ I</u> Nil	acul	iy (ii any	<b>)</b>		
					114					

RGPV (Diplo ma Wing &)Bho pal	Scheme for learning outcome		canch code202	Course code		CO code 5		L	0 0	code
Course	name: Chemical E	ngi	neering Inst	rumentation	-					
CO desc	ription: Evaluate	the	performance	of control system v	with a	approprie	ite co	ontrollers	an	d
Control v	rintion: use contro	l sv	stem in indus	tries						
LO dese	ription: use control	/1 S y	<u>Sceni in indus</u>	heme of study						
S.No.	Learning content	Te lea me	aching rning ethod	Description of T process	ΓL	Teach Hrs.	Pra ct/ Tu Hr	a LRS Requ t ed s	ir	Rema rks
1.	Study of level control loop system and temperature control loop system	La de	b - monstration	Faculty will explain the conte in lab and demonstrate how take reading.	ent v to		6	Exper ment Setup Lab Manu	'i al	
			Sche	me of assessment	r					
S.No.	Method of assessment		Description	Ma ma	ximum rks	1	Resourc es required		Externa interna	
	Laboratory Test observation	by	Examiner will ask to students to take reading and then calculatein front of him and will asses correctness of regult			10	Rating Scale	]	External	
		• • •	nalinaturati	on for the UOD/ f	'aeult	tv (if any	<i>n</i> )			
	Add	11110	nai instructi		<u>acun</u>	<u>iy (ii any</u>	)			
	Add	11110		Nil	acui	ty (II ally	)			

## TENTATIVE LIST OF PRACTICALS

1. Calibration of Mercury in glass thermometer.

2 Calibration of Thermocouple thermometer.

- 3 Calibration of Thermocouple thermometer.
- 4. Study of different types of thermocouple and temperature measurement with them.
- 5. Temperature measurement with pressure spring thermometer.
- 6. Study of different types of pyrometer and temperature measurement with them.
- 7. Study of Mcloid gauge and vacuum measurement with it.
- 8. Study of Pirani gauge and vacuum measurement with it.
- 9. Study of Ionization gauge and vacuum measurement with them.
- 10.Level measurement by float and tap method.
- 11. Level measurement by float and shaft method.
- 12. Level measurement by air purge method.
- 13. Density measurement by hydrometer method.

14. Density measurement by density bottle method.

15.Determination of properties of air by psychrometer method.

16. Determination of properties of air by hygrometer method.

- 17. Determination of properties of air by psychrometer method.
- 18 Study of spectrophotometer with its application.
- 19.Study of temperature control loop.
- 20. Study of pressure control loop.
- 21. Study of level control loop.