

RGPV (Diploma Wing ) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format No. 4
					C	0	2	3	0	1	1	1	
<b>COURSE NAME</b>	APPLIED CHEMISTRY FOR CHEMICAL ENGINEERING.												
<b>CO Description</b>	To recognize single component, bicomponent and multicomponent systems.												
<b>LO Description</b>	To apply phase rule.												
SCHEME OF STUDY													
S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks						
1	Statement of phase rule, concept of phase, component and degree of freedom, application of phase rule to single component Water system and sulfur system, application of phase rule to two component KI-water and silver lead system, calculation of degrees of freedom for simple systems.	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.	5	1	Handouts, chalk board, PPT, text book, lab							
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required			External / Internal						
1	Pen Paper test/Theory Exam	Student will be asked to explain phase rule and its application.	10	(Test paper + Rating scale) and (Question 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	3	0	1	1	2	
<b>COURSE NAME</b>	APPLIED CHEMISTRY FOR CHEMICAL ENGINEERING												
<b>CO Description</b>	To recognize single component, bi component and multi component systems.												
<b>LO Description</b>	To apply the conditions favorable for equilibrium to focus on high yield of products.												
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 chemical equilibrium, physical and chemical equilibrium, laws of mass action, concept of equilibrium constant, dynamic nature of chemical equilibrium, factors affecting equilibrium constant, Le chateliers principle	Interactive classroom teaching, demonstration, quiz, assignments, tutorial. lab demonstration, hands on practice	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge. Teacher will conduct lab assignments to make students practice their knowledge. Teacher will demonstrate the procedure of lab experiments.	5	2	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/Theory Exam	Student will be asked to explain chemical equilibria and related laws.	10	(Test paper + Rating scale) and (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.
				C	0	2	3	0	1	1	3	4
<b>COURSE NAME</b>	APPLIED CHEMISTRY FOR CHEMICAL ENGINEERING											
<b>CO Description</b>	To recognize single component, bi component and multi component systems.											
<b>LO Description</b>	Prepare solutions applying principles of ionic equilibria.											
SCHEME OF STUDY												
S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks					
1	Ionic equilibrium, theory of strong electrolytes, ionization of acid and bases, common ion effect, Debye-Hückel's theory, definition and calculation of PH, Buffer solution, use of indicators, Nernst distribution law : explanation and limitations.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial Lab assignments, presentation, lab demonstration, hands on practice.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge. Teacher will conduct lab assignments to make students practice their knowledge. Teacher will demonstrate the procedure of lab experiments.	03	04	Handouts, chalk board, charts, , lab.						
SCHEME OF ASSESSMENT												
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required			External / Internal					
1	Pen Paper test/Theory Exam/practical Exam	Student will be asked to explain ionic equilibria and perform related experiment	10	(Test paper + Rating scale)/ (Question paper +Rating scale) and rating scale for practicals			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	0	1	2	1	
<b>COURSE NAME</b>	APPLIED CHEMISTRY FOR CHEMICAL ENGINEERING												
<b>CO Description</b>	To interrelate properties and physical behavior of colloids and solutions.												
<b>LO Description</b>	To prepare list of characteristics of colloids that distinguish it from solutions												
SCHEME OF STUDY													
S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks						
1	Colloids, classification, preparation and purification of colloidal solution, properties of colloidal solutions, concept of protective colloids, emulsion and gels, application of colloids	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. Teacher will conduct lab assignments to make students practice their knowledge.	05	03	Handouts, chalk board, PPT, text book, lab							
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required				External / Internal					
1	Pen Paper test/Theory Exam/practical Exam	Student will be asked to describe colloidal solutions and prepare the same.	10	(Test paper + Rating scale)/ (Question paper +Rating scale) and rating scale for practicals				Internal					
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
Nil													

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					C	0	2	3	0	1	2	2	
<b>COURSE NAME</b>	APPLIED CHEMISTRY FOR CHEMICAL ENGINEERING.												
<b>CO Description</b>	To interrelate properties and physical behavior of colloids and solutions												
<b>LO Description</b>	To prepare standard solutions and explain behavioral changes of solution from pure component.												
SCHEME OF STUDY													
S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks						
1	Types of solutions and expression of concentration, solubility of gases in liquids, colligative properties, Raoult's law and relative lowering of vapor pressure, boiling point elevation and freezing point depression, osmosis and osmotic pressure, application of colligative properties to determine molecular mass.	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. Teacher will conduct lab assignments to make students practice their knowledge	07	05	Handouts, chalk board, PPT, text book, lab.							
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal								
1	Pen Paper test/Theory Exam/practical Exam	Student will be asked to describe different types of solutions and prepare the same.	10	(Test paper + Rating scale)/ (Question paper +Rating scale) and rating scale for practicals	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	0	1	3	1	
<b>COURSE NAME</b>	APPLIED CHEMISTRY FOR CHEMICAL ENGINEERING												
<b>CO Description</b>	To explain adsorption and its effect on physical and chemical changes in solids.												
<b>LO Description</b>	To differentiate physisorption and chemisorption.												
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 adsorption, difference between absorption and adsorption, mechanism of adsorption, types of adsorption, physical and chemical adsorption, factors affecting adsorption of gases on solids.	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. Teacher will conduct lab assignments to make students practice their knowledge	04	02	Handouts, chalk board, charts, , lab.							
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required					External / Internal				
1	Pen Paper test/Theory Exam/practical Exam	. Student will be asked to describe adsorption and apply the same	10	(Test paper + Rating scale)/ (Question paper +Rating scale) and rating scale for practicals					External				
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
Part of External Practical													

<b>RGPV (Diploma Wing ) Bhopal</b>		<b>SCHEME FOR LEARNING OUTCOME</b>			<b>Branch Code</b>			<b>Course Code</b>			<b>CO Code</b>	<b>LO Code</b>	Format No. 4
					C	0	2	3	0	1	3	2	
<b>COURSE NAME</b>	APPLIED CHEMISTRY FOR CHEMICAL ENGINEERING												
<b>CO Description</b>	To explain adsorption and its effect on physical and chemical changes in solids..												
<b>LO Description</b>	To apply principles of adsorption in different conditions.												
<b>SCHEME OF STUDY</b>													
<b>S. No.</b>	<b>Learning Content</b>	<b>Teaching –Learning Method</b>	<b>Description of T-L Process</b>	<b>Teach Hrs.</b>	<b>Pract. /Tut Hrs.</b>	<b>LRs Required</b>			<b>Remarks</b>				
1	Adsorption isotherms, Freundlich and Langmuir isotherms, application of adsorption, ion-exchange adsorption.	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	02	Handouts, chalk board, PPT, text book, charts.							
<b>SCHEME OF ASSESSMENT</b>													
<b>S. No.</b>	<b>Method of Assessment</b>	<b>Description of Assessment</b>	<b>Maximum Marks</b>	<b>Resources Required</b>			<b>External / Internal</b>						
1	Pen Paper test/Theory Exam	Student will be asked to explain adsorption isotherms.	10	(Test paper + Rating scale) and (Question paper +Rating scale)			External						
<b>ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)</b>													
Nil													

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					<i>C</i>	<i>0</i>	<i>2</i>	<i>3</i>	<i>0</i>	<i>1</i>	<i>3</i>	<i>3</i>	
<b>COURSE NAME</b>	APPLIED CHEMISTRY FOR CHEMICAL ENGINEERING.												
<b>CO Description</b>	To explain adsorption and its effect on physical and chemical changes in solids..												
<b>LO Description</b>	Select appropriate catalyst for different conditions.												
<b>SCHEME OF STUDY</b>													
<b>S. No.</b>	<b>Learning Content</b>	<b>Teaching –Learning Method</b>	<b>Description of T-L Process</b>	<b>Teach Hrs.</b>	<b>Pract. /Tut Hrs.</b>	<b>LRs Required</b>			<b>Remarks</b>				
1	Crystal chemistry, crystal geometry, space lattice, lattice sites and coordination number, types of crystal, crystal defects, polymorphism and isomorphism, catalyst activity, selectivity of catalyst, enzyme catalysis	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	02	Handouts, chalk board, PPT, text book, charts.							
<b>SCHEME OF ASSESSMENT</b>													
<b>S. No.</b>	<b>Method of Assessment</b>	<b>Description of Assessment</b>	<b>Maximum Marks</b>	<b>Resources Required</b>			<b>External / Internal</b>						
1	Pen Paper test/Theory Exam	Student will be asked describe crystallography.	10	(Test paper + Rating scale) and (Question paper +Rating scale)			External						
<b>ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)</b>													
Nil													

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					C	0	2	3	0	1	4	1	
<b>COURSE NAME</b>	APPLIED CHEMISTRY FOR CHEMICAL ENGINEERING												
<b>CO Description</b>	To classify different types of hydrocarbons based on their properties and structure.												
<b>LO Description</b>	To classify organic compounds.												
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 chemistry of hydrocarbons, valency of carbon atoms. Unsaturation in carbon compounds, reason for huge number of organic compounds, empirical, molecular and structural formula, isomerism, chain, functional and position isomerism, classification of organic compounds, homologous series, IUPAC nomenclature of organic compounds	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.	12	04	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	Pen Paper test/Theory Exam	Student will be asked to explain diversity of organic compounds.	10	(Test paper + Rating scale) and (Question paper +Rating scale)			Internal						
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
Nil													

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					C	0	2	3	0	1	4	2	
<b>COURSE NAME</b>	APPLIED CHEMISTRY FOR CHEMICAL ENGINEERING												
<b>CO Description</b>	To classify different types of hydrocarbons based on their properties and structure.												
<b>LO Description</b>	To prepare organic compounds												
SCHEME OF STUDY													
S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teac h Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks						
1	. Lab preparations and uses of Methane, Acetylene, Benzene, Toluene, Diazonium salt and phenol	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. Teacher will conduct lab assignments to make students practice their knowledge	08	06	Handouts, chalk board, PPT, text book, charts, lab.							
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required			External / Internal						
1	Pen Paper test/Theory Exam/practical Exam	Student will be asked to describe preparation methods of organic compounds and prepare them in lab.	10	(Test paper + Rating scale)/ (Question paper +Rating scale) and rating scale for practicals			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	0	1	5	1	
<b>COURSE NAME</b>	APPLIED CHEMISTRY FOR CHEMICAL ENGINEERING											
<b>CO Description</b>	To apply tested organic reactions to prepare new products.											
<b>LO Description</b>	to explain role of organic reactions in synthesis of compounds.											
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 functional groups in organic compounds . importance and general characteristics of functional groups	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. Teacher will conduct lab assignments to make students practice their knowledge	05	02	Handouts, chalk board, PPT, text book, charts, lab.						
SCHEME OF ASSESSMENT												
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal							
1	Pen Paper test/Theory Exam/practical Exam	Student will be asked to explain various functional groups with their practical applications.	10	(Test paper + Rating scale)/ (Question paper +Rating scale) and rating scale for practicals	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	0	1	5	2	
<b>COURSE NAME</b>	APPLIED CHEMISTRY FOR CHEMICAL ENGINEERING												
<b>CO Description</b>	To apply tested organic reactions to prepare new products.												
<b>LO Description</b>	Prepare compounds using famous organic reaction.												
SCHEME OF STUDY													
S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks						
1	Types of organic reactions, Grignard reagents and reactions, Friedalcralts reaction organo metallic compounds, Aldol condonsction, clemensim reduction and wurlz reaction, cannizaro reaction, Tolleris reaction, Hofmann Bromide reaction.	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. Teacher will conduct lab assignments to make students practice their knowledge	08	05	Handouts, chalk board, PPT, text book, charts, lab.							
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal								
1	Pen Paper test/Theory Exam/practical Exam	Student will be asked to describe various organic reactions with practical applications	10	(Test paper + Rating scale)/ (Question paper +Rating scale) and rating scale for practicals	External/Internal								
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
Nil													

### Practical List

S.No.	NAME OF EXPERIMENT	CO	LO
1	Determine equilibrium constant for the reaction $KI + I_2 = KI_3$	1	2
2	Determine pH value of some solutions obtained from fruit juices, solutions using pH paper or universal indicator.	1	3
3	Compare the pH of solutions of strong and weak acid of same concentration	1	3
4	Identify two Anions and Cations in a given sample.	1	3
5	Determine concentration by Conductometric titration.	1	3
6	Determine concentration by Potentiometric Titration.	1	3
7	Determine cell potential in $Zn/Zn^{2+}/Cu^{2+}/Cu$ with change in concentration of electrolytes ( $CuSO_4$ or $ZnSO_4$ ) at room temperature.	1	3
8	Determine conductance of strong and weak electrolytes	1	3
9	Determine concentration of given solutions	2	2
10	Prepare standard solution of oxalic acid and determine strength of a given solution of sodium hydroxide by titrating it against standard solution of oxalic acid.	2	2
11	Determine the concentration of $KMnO_4$ solution using standard solution of Mohr's salt.	2	2
12	Prepare one lyophilic and one lyophobic sol.	2	2
13	Determination of adsorption isotherm of acetic acid on activated charcoal	3	2
14	Test for the detection of halogens, nitrogen and sulphur in an organic compound.	5	1

15	Test for the functional group present in organic compounds.(Nitro, Alcoholic, Ketonic,Carboxyl,Amino,Aldehydic	5	1