Gyanmanjari Innovative University

Course Syllabus
Gyanmanjari Science College
Semester-1(B.Sc.)

Subject: Basic Chemistry - BSCCM11301

Type of course: Major

Prerequisite: To provide students with the fundamental knowledge of chemistry that is essential for understanding the world around them.

Rationale: By understanding the principle of chemistry, Students can gain a deeper understanding of everything from the food they eat to the air they breathe.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
				SEE		CCE			
CI	T	P	C	Theory	Practical	MSE	LWA/V	ALA	
3	0	2	4	75	25	30	20	50	200

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; SEE - Semester End Evaluation; MSE- Mid Semester Examination; LWA - Lab Work Assessment; V – Viva voce; CCE-Continuous and Comprehensive Evaluation; ALA- Active Learning Activities.

3 Credits * 25 Marks = 75 Marks (each credit carries 25 Marks) Theory
1 Credits * 25 Marks = 25 Marks (each credit carries 25 Marks) Practical
SEE 100 Marks will be converted in to 50 Marks
CCE 100 Marks will be converted in to 50 Marks
It is compulsory to pass in each individual component.

GYANMANJARI INNOVATIVE UNIVERSITY BHAVNAGAR

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	**Presentation** Faculty will assign topics related chemistry and students will prepare presentations (Slideshow/video) and upload to Moodle.	10
2	**Quiz** Faculty will assign 10 MCQs per unit.	10
3	**Scientific Analysis** Faculty will assign scientific pictures and students will analyze and prepare a report in 100 words and upload it to Moodle.	10
4	**Paper Review** Faculty will provide a particular portion of research paper and a group of students will review it and prepare conclusion in 100 words and upload it to Moodle.	10
5	**Attendance**	10
	Total	**50**

Course Content:

Unit No	Course content	Hrs	% Weightage
1	**Chapter-1: Atomic structure** ▪ Electronic configuration - Aufbau principle - Pauli's exclusion principle- Hund's rule. ▪ Bonding Electrovalent, covalent, hydrogen bonds ▪ Orbital overlap - s-s, s-p. **Chapter-2: Molecular Orbital Theory:** ▪ Formation of bonding and anti bonding molecules orbitals, bond order, order of energy for molecular orbitals. ▪ Molecular orbital diagram of homo nuclear diatomic molecules. ▪ Molecular orbital diagram of molecules and ions	15	25%

	such as C2, N 2, O2, F2 and H2, H2+, He2, He2+, LiH, HF, BN, BeO, CO, NO, HCl.		
2	**Chapter-3: Catalysis** ▪ Catalyst, inhibitor, autocatalysis. ▪ Homogeneous and heterogeneous catalysis. ▪ General characteristics of catalytic reactions ▪ Theories of catalysis (chemical theory and adsorption theory), active sites. ▪ Applications of catalysts in industries, role of active sites in catalysis, characterization of catalysts, acid-base catalysis. ▪ Solid acid catalysts, importance of selectivity, catalysis in atmospheric pollution control. ▪ concept of auto , positive and negative catalysis.	10	25%
3	**Chapter-4: Surface chemistry** ▪ Introduction of surface chemistry. ▪ Concept of adsorption, difference between adsorption and absorption. ▪ Physical adsorption and chemical adsorption. ▪ Freundlich's adsorption isotherm and its limitations. ▪ Langmuir's adsorption isotherm. ▪ Applications of adsorption.	10	25%
4	**Chapter-5: Colloids** ▪ Definition and classification of colloids, solids in liquids (sols). ▪ Preparation and purification (lyophobic). ▪ General, optical and electrical properties, stability of colloids. ▪ Liquid in liquid (emulsions), types of emulsions. ▪ Emulsifiers, preparation and uses. ▪ Liquid in solid (gels). ▪ Preparation and uses of colloids.	10	25%

\

Suggested Specification table with Marks (Theory):75

Distribution of Theory Marks **(Revised Bloom's Taxonomy)**						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	25%	40%	35%	-	-	-

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

After learning the course the students should be able to:	
CO1	Learn about electron configuration, the arrangement of electrons in atomic orbitals.
CO2	Understand the various theories of catalyst.
CO3	Learn principle of Surface chemistry
CO4	Apply theoretical concepts in order to describe analyze and assess chemical World.

List of Practical :

Sr. No	Descriptions	Unit No	Hrs
1	**Volumetric analysis (Strong acid –Strong base)** ▪ To determine the Strength of given HCL solution in terms of Normality ,gram/lit and Molarity by using 0.1 N NaOH solution.	1-4	4
2	**Volumetric analysis (week acid –Strong base)** ▪ To determine the Strength in terms of Normality ,gram/lit of NaOH Solution by using 0.1 N H2C2O4 solution.	1-4	4
3	**Double Titration(Strong Acid- Mixture of Base)**		

	▪ To determine the molarity and gm/lit of Na2CO3 and NaHCO3 solution in mixture by using 0.1 M HCl solution. ▪ To determine the molarity and gm/lit of NaOH and Na2CO3 solution in mixture by using 0.05 M H2SO4 solution. ▪ To determine the molarity and gm/lit of NaOH and H2SO4 by using 0.1 M HCl solution.	1-4	8
4	**Redox Titration** ▪ To Preparation of standard solution of Oxalic acid. ▪ To standardized KMnO4 solution by preparing standards Oxalic acid and to estimate ferrous ion . ▪ To determine the molarity and gm/lit of H2C2O4 · 2H2O and NaOH by using 0.02 M KMnO4 solution. ▪ To determine the molarity and gm/lit of each component in a mixture of H2C2O4 · 2H2O and H2SO4 by using 0.02 M KMnO4 and 0.12 M NaOH solution. ▪ To determine the molarity and gm/lit of each component in a mixture of H2C2O4 · 2H2O and K2C2O4 · H2O by using 0.02 M KMnO4 and 0.08 M NaOH solution.	1-4	14
		Total	**30**

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference Books:

[1] Basic Inorganic chemistry,-F.A.Cotton, G.Wilkinson; John Wiley & Sons

[2] Text book of Physical Chemistry ,- Glasstone ; London Macmillan & Company Ltd.

[3] Vogel's Textbook of practical organic chemistry, 5th Edition by B. S. Furniss et. al.

[4] Comprehensive practical organic chemistry, V. K. Ahuwalia