DEPARTMENT OF CHEMISTRY				*CLASS: I B.Sc. Botany, Zoology, Microbiology & Biotechnology*				
SEM	**Course type**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/week**	**CIA**	**Ext**	**Total**
II	Allied	20U2CAC2	Allied Chemistry – II *(For I Botany& Zoology)*	4	4	25	75	100

Course Objectives: The objectives of this course are to make the student

1. To understand the modern concepts of acids and bases
2. To study the classification and properties of sachharides
3. To recognize about the basic ideas of amino acid and proteins
4. To learn the different types of fertilizers used for plant growth
5. To know about polymers, corrosion and its prevention

UNIT-I: ACIDS AND BASES

Modern concepts of acids and bases – Arrhenius concept, Bronsted-Lowery concept- Lewis concept – relative strength of acids- relative strength bases –concept of pH – common ion effect – applications - buffer solutions – definition - theory of buffer action and applications – Henderson's Equation - strength of solutions – normality- molarity – molality.

UNIT-II: CARBOHYDRATES

Monosaccharides: Definition – classification of carbohydrate – monosaccharides – properties and uses of glucose and fructose – configuration of glucose – mutarotation

Disaccharides: Sucrose – manufacture – properties and uses – distinction between sucrose, glucose and fructose.

Polysaccharides: Starch – Structure, properties and uses.

UNIT-III: AMINO ACIDS AND VITAMINS

Amino acids – Definition, general methods of preparation, properties and uses of Glycine and Alanine.

Proteins – Definition, classification, general properties – colour reactions (Xanthoproteic test, Ninhydrin test and Millon's test) and relationship of aminoacid with proteins.

Vitamins: Definition, classification, sources, function and deficiency of vitamins A, B-complex {(Thiamine (B1), Riboflavin (B2), Niacin (B3)} C, D, E and K (structure and synthesis not expected).

UNIT-IV: FERTILIZERS

Plant Nutrient – Macro and micro nutrients -role of various elements in plant growth-classification – natural fertilizerand chemical fertilizer – nitrogenous, phosphatic and potash fertilizers – functions of the following:

Nitrogenous fertilizers: ammonium sulphate, urea.

Phosphatic fertilizers: super phosphate of lime, triple super phosphate of lime.

Potash fertilizers: potassium sulphate, potassium chloride, potassium nitrate.

UNIT-V: INDUSTRIAL CHEMISTRY

(i) POLYMERS

Introduction: Definition of monomer and polymers – classification of polymers based on micro structures (chemical and geometrical).General methods of preparation, properties and uses of the following polymers: polyethylene, poly vinyl chloride and phenol-formaldehyde resins.

(ii) CORROSION AND PREVENTION

Definition – Types of corrosion – chemical and electrochemical corrosion– factors affecting corrosion process- nature of metal (position in galvanic series, purity of metal, relative area of corrosion, nature of surface film) - nature of environment (temperature, humidity, impurity, pH) – corrosion control - cathodic protection – sacrificial anodic protection - corrosion inhibitors.

Books for Study

1. Puri, B.R., Sharma, L.R. and Pathania, M.S., 2004 (41stEdn.), Principles of Physical Chemistry, S.N. Chand and Co., New Delhi.
2. Bhal, B.S.andArunBahl, 2004, Advanced Organic Chemistry, S. Chand and Co. Ltd., New Delhi.
3. Sathya Prakash, Tuli, Basu& Madan, 1999, Advanced Inorganic Chemistry. Vol. II , 17th Revised Edition, S. Chand and Co. Ltd., Ram Nagar., New Delhi.
4. Puri. B.R., Sharma. L.R., 1989, Principles of Inorganic Chemistry, Shobhan Lal Nagin Chand and Co., Jalandar.

Books for Reference

1. Morrison, R.T., and Boyd, R.N., 1999, Organic Chemistry, Prentice-Hall of India, Pvt. Ltd., New Delhi.
2. Sharma, B.K., 1989, Polymer Chemistry, Goel Publishing House, Meerut.
3. Mukhopathyay. R and Datta. S, Engineering Chemistry, New Age international PVL, Publishers, New Delhi.
4. Sharma, B. K., Industrial chemistry, Goel Publishing House, 1994

Web Resources

1. https://byjus.com/jee/atomic-structure/
2. https://chem.libretexts.org/Bookshelves/Physical_and_Theoretical_Chemistry_Textbook_Maps/Supplemental_Modules_(Physical_and_Theoretical_Chemistry)/Atomic_Theory/Atomic_Structure
3. https://ocw.mit.edu/courses/chemistry/5-12-organic-chemistry-i-spring-2005/syllabus/
4. https://www.khanacademy.org/science/chemistry/chemical-bonds/types-chemical-bonds/v/ionic-bonds-and-coulombs-law?modal=1,
5. https://byjus.com/jee/surface-chemistry/, http://www.ncert.nic.in/ncerts/l/lech105.pdf
6. https://byjus.com/chemistry/catalysis/

Pedagogy

1. Chalk-Talk class room activities
2. Group Discussion
3. Seminar
4. Quiz through ICT- Model

Lesson plan

Unit	Descriptions	Staff Name	Hours	Lecture Mode
I	**ACIDS AND BASES**			
	Modern concepts of acids and bases – Arrhenius concept, Bronsted-Lowery concept-	-	2	BB
	Lewis concept – Relative strength of acids- Relative strength bases-	-	3	BB/PPT
	Concept of pH – common ion effect – applications -	-	2	BB/PPT
	Buffer solutions – definition - theory of buffer action and applications – Henderson's Equation	-	3	BB/PPT
	Strength of solutions – normality- molarity – molality		2	BB/PPT
II	**CARBOHYDRATES**			
	Monosaccharides : Definition – classification of carbohydrate –	-	2	BB/PPT
	Monosaccharides – properties and uses of glucose and fructose – configuration of glucose – Mutarotation	-	3	BB/PPT
	Disaccharides: Sucrose – manufacture – properties and uses – distinction between sucrose, glucose and fructose	-	3	BB/PPT
	Polysaccharides: Starch: Structure, properties and uses	-	4	BB/PPT
III	**AMINO ACIDS AND VITAMINS**			
	Amino acids – Definition, general methods of preparation, properties and uses – Glycine and Alanine.	-	2	BB/PPT
	Proteins – Definition, Classification, general properties – colour reactions (Xanthoproteic test, Ninhydrin test and Millons test) and relationship of aminoacid with proteins.	-	3	BB/PPT
	Vitamins: Definition, classification, sources, function and deficiency of vitamins A, B-complex (Thiamine (B1),	-	3	BB/PPT
	Riboflavin (B2)Niacin (B3))	-	1	BB/PPT
	C, D, E and K (structure and synthesis not expected).		3	BB/PPT
IV	**FERTILIZERS**			
	Plant Nutrient – Macro and micro nutrients -role of various elements in plant growth	-	3	BB/PPT
	Classification: natural fertilizer and chemical fertilizer – Nitrogenous, Phosphatic and Potash fertilizers -	-	2	BB/PPT
	Functions of the following: Nitrogenous fertilizers: ammonium Sulphate, urea.	-	2	BB/PPT
	Phosphatic fertilizers: super phosphate of lime, triple super phosphate of lime.	-	2	BB/PPT
	Potashfertilizers: potassium Sulphate, potassium chloride, potassium nitrate..		3	BB/PPT
V	**INDUSTRIAL CHEMISTRY**			
	Introduction: Definition of monomer and polymers - classification of polymers based on micro structures (Chemical and Geometrical).		2	BB/PPT
	General methods of preparation, properties and uses of the following polymers: polyethylene, poly vinyl chloride and phenol-formaldehyde resins.		3	BB/PPT
	Definition – Types of corrosion – chemical and electrochemical corrosion		2	BB/PPT
	Factors affecting corrosion process- nature of metal (position in galvanic series, purity of metal, relative area of corrosion, nature of surface film) - nature of environment (temperature, humidity, impurity, pH)		3	BB/PPT
	Corrosion control - cathodic protection – sacrificial anodic protection - Corrosion inhibitors		2	BB/PPT
Total Hours			60	

*BB-Black board/Chalk and Talk

PPT-Power point presentation

Course Learning Outcomes: After successful completion of this course, the student will be able

CLOs	CLO Statement	Knowledge level
CLO1	To explain the applications of common ion effect and buffer action	K2
CLO2	To indicate structure of carbohydrates and figure out the configuration of glucose	K3
CLO3	To describe the preparation, properties and uses of glycine and alanine	K3
CLO4	To classify proteins, vitamins and to explain the sources, functions and deficiency of vitamins A, B, C, D, E & K and to identify the role of various elements in plant growth	K3
CLO5	To explain the types of polymers, corrosion and its control	K4

PO and CO Mapping:

	PO 1	PO 2	PO 3	PO 4	PO 5
CLO1	3	2			
CLO2	3	2			
CLO3	3	2			
CLO4	3	2			
CLO5	3	2			

PSO and CO Mapping:

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9
CLO1	1						3		
CLO2	1						2		3
CLO3	1						2		3
CLO4	1								3
CLO5	1						3		2

3-Advance application; 2-Intermediate level;1-Basic level

Blue Print

Mapping with Course Learning Outcomes(CLOs)

Units	CLOs	K- Level	Section A		Section B		Section C (Either/or Choice)	Section D (Open Choice)
			MCQs		Short Answers			
			No. of Questions	K- Level	No. of Questions	K- Level		
1	CLO 1	Up to K 2	2	K1& K2	1	K1	2 (K1&K1)	1(K2)
2	CLO 2	Up to K 3	2	K1& K2	1	K1	2 (K2&K2)	1(K3)
3	CLO 3	Up to K 3	2	K1& K2	1	K2	2 (K3&K3)	1(K3)
4	CLO 4	Up to K3	2	K1& K2	1	K2	2 (K3&K3)	1(K3)
5	CLO 5	Up to K 4	2	K1& K2	1	K2	2 (K3&K3)	1(K4)
No. of Questions to be asked			10		5		10	5
No. of Questions to be answered			10		5		5	3
Marks for each question			1		2		5	10
Total Marks for each section			10		10		25	30

Distribution of Section-wise Marks with K Levels

K Levels	Section A & B (No Choice)	Section C (Either / or)	Section D (Open Choice)	Total Marks	% of Marks without choice	Consolidated
K1	9	10	--	19	15.83	42%
K2	11	10	10	31	25.83	
K3	-	20	30	50	41.67	42%
K4	-	10	10	20	16.67	16%
Total marks	20	50	50	120	100.00	100%

Name of the Course Designer:

1.Dr. M. Boominathan