ALLIED CHEMISTRY

Course Code	U21PHA33	PHYSICAL SCIENCES	L	T	P	C
SEMESTER -III			5	-	-	4
Learning Objectives		1. To understand the handling of chemicals and errors in chemical analysis 2. To get knowledge in chemical bonding and hybridization 3. To acquire knowledge in volumetric analysis 4. To understand the basic concept of chemistry of Thermodynamics and Kinetics				

Unit-I- Handling of Chemicals and Data Analysis

a) Storage and handling of chemicals: Handling of acids, ethers, toxic chemicals. Antidotes, threshold vapour concentration and first aid procedure.

b) Errors in chemical analysis: Accuracy, precision. Types of error-absolute and relative errors.Methods of eliminating and minimizing errors.

c) Separation techniques–Solvent extraction. Principle of adsorption and partition chromatography, column chromatography, thin layer chromatography (TLC), paper chromatography and their applications.

Unit-II - Chemical Bonding

a) Ionic Bond: Nature of Ionic bond. Structure of NaCl, KCl and CsCl. Factors influencing the formation of ionic bond.

b) Covalent Bond: Nature of covalent bond. Structure of CH_4, NH_3, H_2O based on hybridisation.

c) Coordinate Bond: Nature of coordinate bond. Coordination complexes.Werner's theory.Geometrical and optical isomerism in square planar and octahedral complexes. Mention of structure and functions of chlorophyll and hemoglobin

d) Hydrogen Bond: Theory and importance of hydrogen bonding. Types of hydrogen bonding.Hydrogen bonding in carboxylic acids, alcohol, amides, polyamides, DNA and RNA.

Unit-III - Volumetric Analysis

a) Methods of expressing concentration: normality, molarity, molality, ppm.

b) Primary and secondary standards: preparation of standard solutions

c) Principle of volumetric analysis: end point and equivalence points.

d) Strong and weak acids and bases - Ionic product of water, pH, pKa, pKb. Buffer solutions -pH of buffer solutions. Mention of Henderson equation & its significance.

Unit-IV–Kinetics

a) Chemical Kinetics: Rate, rate law, order and molecularity. Derivation of rate expressions for I and II order reactions.

b) Catalysis-Homogeneous and heterogeneous catalysis. Enzyme catalysis, enzymes in biological system and in industry.

Unit- V –Thermodynamics

a) Introduction: Scope and importance of thermodynamics- system and surrounding-isolated, closed and open systems- state of the system- intensive and extensive variables.Thermodynamic process- reversible and irreversible, isothermal and adiabatic process-

b) First law of thermodynamics- statement- definition of internal energy (E),enthalpy (H), applications of first law of thermodynamics.

The second law of thermodynamics: Limitations of first law and the need for the second law, different ways of stating II law and its significance, Spontaneous or irreversible process.

The concept of entropy – definition and physical significance of entropy.

Text Books:

1. A.Bahl and B.S. Bahl, Advanced Organic Chemistry, I Multicolor Edition, S.Chand& Company, New Delhi,2010.
2. Satya Prakash & R. D. Madan, Advanced Inorganic Chemistry, VolI, 5th Edition, S.Chand and Sons, New Delhi, 2012.

Reference Books:

1. R. Gopalan & S. Sundaram, *Allied Chemistry*, Sultan Chand and Sons Pvt Ltd., 4th Edition, 2006.
2. B.R. Puri, L.R.Sharma&M.S.Pathania, Principles of Physical Chemistry, 46thEdision, Vishal Publishing Company, New Delhi, 2013.

CO	Course outcomes	Remarks
CO1	Students can gain the knowledge on the handling of chemicals and errors in chemical analysis.	K2, K3
CO2	Learn Chemical Bonding and Hybridization	K2
CO3	Learn the calculations of preparing standard solutions	K2, K3
CO4	Understand and appreciate the advanced concepts and rate equations in chemical kinetics.	K2
CO5	Calculate change in thermodynamic properties, equilibrium constants, partial molar quantities, chemical potential	K2

K1- Remember **K2**- Understand **K3**- Apply **K4**- Analyze **K5**-Evaluate

Mapping of Cos with POs &PSOs:

PO/PSO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	M	S	S	S	S
CO2	S	S	S	S	M	M	S	S	S	S
CO3	S	S	S	S	M	M	S	M	S	S
CO4	S	S	S	S	M	M	S	S	S	S
CO5	S	S	S	M	M	M	S	S	S	S

Strongly Correlating(S) - 3 marks Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark No Correlation (N) - 0 mark

Course Code	U21BOA33	LIFE SCIENCES	L	T	P	C
SEMESTER -III			5	-	-	4
Learning Objectives		1. To understand the handling of chemicals and errors in chemical analysis 2. To get knowledge in chemical bonding and hybridization 3. To acquire knowledge in volumetric analysis 4. To understand the basic concept of Biomolecules				

Unit- I - Handling of Chemical and Data Analysis

a) Storage and handling of chemicals: Handling of acids, ethers, toxic chemicals. Antidotes, threshold vapour concentration and first aid procedure.

b) Errors in chemical analysis: Accuracy, precision. Types of error-absolute and relative errors.Methods of eliminating and minimizing errors.

c) Separation techniques–Solvent extraction. Principle of adsorption and partition chromatography, column chromatography, thin layer chromatography (TLC), paper chromatography and their applications.

Unit-II- Chemical Bonding

a) Ionic Bond: Nature of Ionic bond. Structure of NaCl, KCl and CsCl. Factors influencing theformation of ionic bond.

b) Covalent Bond: Nature of covalent bond. Structure of CH_4, NH_3, H_2O based onhybridization.

c) Coordinate Bond: Nature of coordinate bond. Coordination complexes.Werner's theory.Geometrical and optical isomerism in square planar and octahedral complexes. Mention of structure and functions of chlorophyll and hemoglobin

d) Hydrogen Bond: Theory and importance of hydrogen bonding. Types of hydrogen bonding.Hydrogen bonding in carboxylic acids, alcohol, amides, polyamides, DNA and RNA.

Unit-III - Volumetric Analysis

a) Methods of expressing concentration: normality, molarity, molality, ppm.

b) Primary and secondary standards: preparation of standard solutions

c) Principle of volumetric analysis: end point and equivalence points.

d) Strong and weak acids and bases - Ionic product of water, pH, pKa, pKb. Buffer solutions -pH of buffer solutions. Mention of Henderson equation & its significance.

Unit-IV–Kinetics

a) Chemical Kinetics: Rate, rate law, order and molecularity. Derivation of rate expressions for I and II order reactions.

b) Catalysis-Homogeneous and heterogeneous catalysis. Enzyme catalysis, enzymes in biological system and in industry.

Unit-V - Chemistry of Biomolecules

a) Fats – Occurrence and composition. Hydrolysis of fats.

b) Vitamins – Source, provitamin, properties and classification. Structure and functionof vitamin A, C, D, K and E

c) Hormones– Thyroxin, adrenaline and sex hormones (structure and functions only)

Text Books:

1. A.Bahl and B.S. Bahl, Advanced Organic Chemistry, I Multicolor Edition, S.Chand& Company, New Delhi,2010.
2. Satya Prakash & R. D. Madan, Advanced Inorganic Chemistry, Vol.I, 5th Edition, S.Chand and Sons, New Delhi, 2012.

Reference Books:

1. R. Gopalan & S. Sundaram, Allied Chemistry, Sultan Chand and SonsPvt Ltd., 4th Edition, 2006.
2. B.R. Puri, L.R. Sharma &M.S.Pathania, Principles of Physical Chemistry, 46thEdision, Vishal Publishing Company, New Delhi, 2013.
3. J. M. Berg, J. L. Tymoczko. and L. Stryer, L. Biochemistry, 6th Edition, 2007.

CO	Learning outcome	Remarks
CO1	Students can gain the knowledge on the handling of chemicals and errors in chemical analysis	K2, K3
CO2	Learn Chemical Bonding and analyze the Hybridization	K2,K4
CO3	Learn the calculations of preparing standard solutions	K2
CO4	Understand and appreciate the advanced concepts and rate equations in chemical kinetics.	K2
CO5	Learn the importance of Biomolecules in chemistry	K2

K1- Remember **K2**- Understand **K3**- Apply **K4**- Analyze **K5**-Evaluate

Mapping of Cos with POs &PSOs:

PO/PSO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	M	S	S	S	S
CO2	S	S	S	S	M	M	S	S	S	S
CO3	S	S	S	S	M	M	S	M	S	S
CO4	S	S	S	S	M	M	S	S	S	S
CO5	S	S	S	M	M	M	S	S	S	S

Strongly Correlating(S) - 3 marks Moderately Correlating (M) - 2 marks

Weakly Correlating (W) - 1 mark No Correlation (N) - 0 mark

ALLIED PRACTICAL

Course Code	U21PHA44	PHYSICAL SCIENCES	L	T	P	C
SEMESTER -IV			-	-	4	4
Learning Objectives		1. To enable the students to acquire knowledge in Organic Estimation 2. To understand basics and gain knowledge in organic analysis 3. At the end of the course, the students should be able to plan experimental projects and execute them.				

Acidimetry and alkalimetry: Titration acids used: hydrochloric acid, sulphuric Standard solutions prepared: sodium carbonate, sodium bicarbonate, oxalic acid.

Oxidation and reduction titration: Oxidising agents: Potassium permanganate (permanganimetry) Reducing agents: Ferrous sulphate, ferrous ammonium Sulphate, oxalic acid

Standard solutions prepared: Ferrous Sulphate, ferrous ammonium Sulphate and oxalic acid.

Iodometry titrations: titrations of liberated iodine against sodium thiosulphate using acidified potassium permanganate, potassium dichromate and copper Sulphate solutions.
Standard solutions: potassium dichromate, copper sulphate.

Text Books

1. Sundaram, Krishnan, Raghavan, Practical Chemistry (Part II), S. Viswanathan Co. Pvt., 2009.
2. B.S. Furniss, A.J. Hannaford, P.W. G. Smith, A.R. Tatchell, Vogel's Text Book of Practical Organic Chemistry. 5th Edn., Pearson Education, 2005.

Reference Books

1. Mann & Saunders, Practical Organic Chemistry, 4th Edition, 2009.
2. V. Venkateswaran, R. Veeraswamy, A. R. Kulandaivelu, Basic Principles of Practical Chemistry, Sultan Chand & Sons, New Delhi, 2nd Edn., 2004.

CO	Course outcomes	Remarks
CO1	Learn the concept of Titration methods and various Titrations	K2
CO2	Understand the Acidimetry and alkalimetry titrations	K2
CO3	The preparation of standard solutions and methods of analyze the various salts	K2, K4
CO4	Understand the calculations of molarity, molality and Normality of the solutions	K2
CO5	Understand the concept of Iodometry titrations	K2

K1- Remember **K2**- Understand **K3**- Apply **K4**- Analyze **K5**-Evaluate

Mapping of Cos with POs &PSOs:

PO/PSO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	M	M	M	S	S	S	M
CO2	S	M	S	S	M	M	S	S	S	M
CO3	S	S	M	S	M	M	S	M	S	M
CO4	S	S	M	S	M	M	S	S	S	M
CO5	S	S	M	M	M	M	S	S	S	M

Strongly Correlating(S) - 3 marks Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark No Correlation (N) - 0 mark

Course Code	U21BOA44	LIFE SCIENCES	L	T	P	C
SEMESTER -IV			-	-	4	4
Learning Objectives		1. To understand basics and gain knowledge on laboratory reagents and their uses in volumetric analysis. 2. At the end of the course, the students should be able to plan experimental projects and execute them.				

Acidimetry and alkalimetry: Titration acids used: hydrochloric acid, sulphuric Standard solutions prepared: sodium carbonate, sodium bicarbonate, oxalic acid.

Oxidation and reduction titration: Oxidizing agents: Potassium permanganate (permanganimetry) Reducing agents: Ferrous sulphate, ferrous ammonium Sulphate, oxalic acid

Standard solutions prepared: Ferrous Sulphate, ferrous ammonium Sulphate and oxalic acid.

Iodometry titrations: titrations of liberated iodine against sodium thiosulphate using acidified potassium permanganate, potassium dichromate and copper Sulphate solutions.

Standard solutions: potassium dichromate, copper sulphate.

Text Books

1. Sundaram, Krishnan, Raghavan, Practical Chemistry (Part II), S. Viswanathan Co. Pvt., 2009.
2. B.S. Furniss, A.J. Hannaford, P.W. G. Smith, A.R. Tatchell, Vogel's Text Book of Practical Organic Chemistry. 5th Edn., Pearson Education, 2005.

Reference Books

1. Mann & Saunders, Practical Organic Chemistry, 4th Edition, 2009.
2. V. Venkateswaran, R. Veeraswamy, A. R. Kulandaivelu, Basic Principles of Practical Chemistry, Sultan Chand & Sons, New Delhi, 2nd Edn., 2004.

CO	Course outcomes	Remarks
CO1	Learn the concept of Titration methods and various Titrations	K2
CO2	Understand the Acidimetry and alkalimetry titrations	K2
CO3	The preparation of standard solutions and methods of analyze the various salts	K2, K4
CO4	Understand the calculations of molarity, molality and Normality of the solutions	K2
CO5	Understand the concept of Iodometry titrations	K2

K1- Remember **K2**- Understand **K3**- Apply **K4**- Analyze **K5**-Evaluate

Mapping of Cos with POs &PSOs:

PO/PSO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	M	M	M	S	S	S	M
CO2	S	M	S	S	M	M	S	S	S	M
CO3	S	S	M	S	M	M	S	M	S	M
CO4	S	S	M	S	M	M	S	S	S	M
CO5	S	S	M	M	M	M	S	S	S	M

Strongly Correlating(S) - 3 marks Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark No Correlation (N) - 0 mark

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