BSC502					Liquid State and Ionic Equilibrium					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
4	0	0	0	4	25	50	25	--	--	100

COURSE OBJECTIVES

- To develop the fundamental understanding on properties of liquid
- To provide the knowledge about reaction equilibrium
- To develop the knowledge on ionisation of electrolytes in solution
- To provide the knowledge about salt hydrolysis

UNIT 1 LIQUID STATE **14 Hrs.**

Physical properties of liquid; structure of the liquid state; vapour pressure, surface tension and coefficient of viscosity, and their determination. Effect of addition of various solutes and temperature on surface tension and viscosity. Structure of water.

UNIT 2 EQUILIBRIUM **14 Hrs.**

Reactions at equilibrium, significance of equilibrium constant and the composition at equilibrium. Response of equilibria to the conditions: catalyst, temperature and pressure. Reaction equilibrium in electrolyte and nonelectrolyte solutions. Standard States and Gibbs energy change for a reaction.

UNIT 3 IONIZATION **14 Hrs.**

Ionization and degree of ionization. Ionization constant and ionic product. Strong, moderate and weak electrolytes.Ionization of weak acids and bases. pH of weak acids and bases.Dissociation constants of mono-, di- and triprotic acids (exact treatment).

UNIT 4 HYDROLYSIS OF SALTS **14 Hrs.**

Salt hydrolysis-calculation of hydrolysis constant, degree of hydrolysis and pH for different salts. Buffer solutions; derivation of Henderson equation and its applications; buffer capacity, buffer range, buffer action and applications of buffers in analytical chemistry and biochemical processes in the human body. Solubility and solubility product of sparingly soluble salts – applications of solubility product principle. Common ion effect.Multistage equilibria in polyelectrolyte systems; hydrolysis and hydrolysis constants.

56 Hrs.

COURSE COUCOMES

On completion of the course, student will be able to

CO1– Understand the liquid state and it's importance in solution chemistry
CO2– Understand the solution equilibrium and its dependence on different thermodynamic parameters
CO3– Understand and learn the significance of ionisation of electrolytes and extraction of pH
CO4– Explain the process of salt hydrolysis and its application
CO5– Acquire the knowledge about buffer and its application on analytical chemistry
CO6– Develop the knowledge on the use of buffer in biological processe

TEXT/REFERENCE BOOKS

1. A Text Book of Physical Chemistry, Vol I, States of Matter and Ions in Solution, 5e, K. L. Kapoor, McGraw Hill
2. Physical Chemistry (6thEdn), (SIE), Ira N. Levine,Tata McGraw-Hill Education Pvt. Ltd., 2013; ISBN 10: 0071321217 / ISBN 13: 9780071321211
3. Physical Chemistry for the Life Sciences (2nd Edn.), Peter Atkins & Julio de Paula, Oxford University Press, 2011; ISBN 978-0-19-956428-6

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks: 100. **Exam Duration: 3 Hrs**

Part A/Question: 5Questions from each unit, each carrying 1 mark. 20 Marks
Part B/Question: 2 Questions from each unit, each carrying 10 marks 80 Marks