MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF CHEMISTRY
Course Structure – Semester wise CBCS (w.e.f.2017-2018)

Class	**: B.Sc (Physics)**	**Part III**	**: Allied**
Semester	**: V**	**Hours**	**: 04**
Subject Code	**: 15UCHA51**	**Credits**	**: 04**

ALLIED CHEMISTRY – III ORGANIC, INORGANIC AND PHYSICAL CHEMISTRY-II

Unit-I

Adsorption**:** Definition – differences between adsorption and absorption – adsorbate, adsorbent – physical absorption – chemical absorption – differences between these two types – factors influencing adsorption – adsorption isotherm – Langmuir isotherm (no derivation statement only) – adsorption of gases on solid surface. (6 hrs.)

Chromatographic techniques: Principle and application-partition and adsorption chromatography - Thin layer chromatography - Column chromatography - Paper chromatography- Gas - solid and gas-liquid chromatography.(6 hrs)

Unit - II

Catalysis**:** Definition – different types of catalysis – acid – base catalysis – surface catalysed reactions – definition and examples – auto catalyst – catalytic poisoning - promoters – enzyme catalysis – characteristics.(6 hrs)

Polymers**:** Definition – Classification of polymers – properties of polymers – addition and condensation polymerization reactions with examples – natural rubber – isoprene unit – vulcanization of rubber – preparation and applications of polystyrene, urea – formaldehyde resin, Teflon and buna – S - rubber.(6 hrs)

Unit -III

Photochemistry**:** comparison of thermal and photochemical reactions – definition of photochemical reactions – laws of photochemistry – Grotthus – Draper law – quantum

efficiency – reasons for low and high quantum yields with examples – consequences of light absorption by atoms and molecules- Jablonski diagram – fluorescence – phosphorescence – photosensitization- chemiluminescene–bioluminescence – applications of photochemistry. (12 hrs)

Unit -IV

Coordination Compounds: Definition – nomenclature-definition of various terms involved in coordination chemistry – Werner's theory – EAN rule – VB theory (outline only) – Nickel carbonyl – chelates.(6 hrs)

Nitrogen compounds: Manufacture of ammonia – nitric acid – ammonium nitrate – ammonium sulphate - physico – chemical principles involved in the manufacture of ammonia. (6 hrs)

Unit - V

Heterocyclic compounds containing two heteroatoms: preparation, properties and structure of oxazole, pyrazole and imidazole (structural elucidation not required) (3 hrs)

Terpeniods: Introduction – classification – occurrence – isolation – general properties – Isoprenerule – Structures of citral geraniol, terpeniol, menthol and dipentene. (Structural elucidation not required) (4 hrs)

Hormones: – Structure, source and importance of testosterone, progesterone and thyroxin – (3 hrs.)
Chemotherapy: Antimalarials- Chloroquine and plasmoquine – preparation and its use.
Arsenical drugs: Salvarasan – 606 – Neosalvarasan - preparation and its use.(2hrs)

Text books:

Book No : 1

K.Rathinamuthu(*), R.Victoria(**), **Ancillary Chemistry**, (*) Head of the Department of Chemistry, Vivekanadha College, Thiruvedakam,(**) Head of the Department of Chemistry, Lady Doak College, Madurai, 2012.

Unit No.I : Page No.1 to 25
Unit No.II : Page No.26 to 43
Unit No.III : Page No.44 to 60
Unit No.IV : Page No.61to 87

Book No : 2

K.Rathinamuthu(*), R.Victoria(**), **Ancillary Chemistry**, (*) Head of the Department of Chemistry, Vivekanadha College, Thiruvedakam,(**) Head of the Department of Chemistry, Lady Doak College, Madurai, 1999.

Unit No.V : Page No.27 to 35, 42, 46, 47, 49 & 50

Reference Books :

1. S.Lakshmi, **Pharmaceutical Chemistry**, Sultan Chand and Sons, New Delhi, 2004.
2. Jeyashree Ghosh , **Fundamental concepts of Applied Chemistry**, S. Chand and Co Ltd, New Delhi, 2008.
3. B.R. Puri and L.R. Sharma, **Principles of Inorganic Chemistry**, Shobanlal Nagin Chand and Co Ltd, New Delhi,2000.
4. B.K. Sharma**, Industrial Chemistry**, Goel Publishing House, XIV Revised Enlarged Education, New Delhi,2004.
5. B.R. Puri , L.R. Sharma, S. Pathania, **Principles of Physical Chemistry** , Vishal Publishing Co, New Delhi, 43rd Edition , 2008.
6. P.L. Soni, HM Chawla, **Organic Chemistry**, 29th Edition, Sultan Chand and Sons, New Delhi, 2007.

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Semester	**: VI**	**Hours**	**: 04**
Subject Code	**: 15UCHA61**	**Credits**	**: 03**

ORGANIC AND PHYSICAL CHEMISTRY-II

Unit- I

1.Heterocyclic compounds: Preparation and reactions of furan, pyrrole, pyridine, quinoline, isoquinoline, preparation of uracil, thymine, adenine and guanine. (6 hrs)

2.Alkaloids: Pharmacological properties and importance of the following alkaloids nicotine, quinine, piperine and cocaine (Structural elucidation not necessary) (4 hrs)

3.Vitamins: Classification and biological functions of vitamins A, B_6, B_{12}, C, D, E and K (Structural elucidation not required) (2 hrs)

Unit -II

Thermodynamics: Importance of thermodynamics – terms used in thermodynamics – open and closed systems, state functions and path functions, extensive and intensive properties, reversible and irreversible processes, statement and mathematical form of first law of thermodynamics – heat capacity at constant volume and pressure, relation between C_p and C_v - statement of second law of thermodynamics – entropy - entropy as a thermodynamic function – dependence of entropy on variables of the system – physical significance of entropy – Gibb's free energy and its significance. (12 hrs)

Unit -III

Chemical Kinetics: Reaction rate –order and molecularity of a reaction – zero order – first order. First order rate equation and half life period – derivation. Examples of first order

reactions – second order reactions – Carbon dating – enzyme catalysis Michaelis and Menton mechanism – Line weaver-Burk plot – Significance of k_m (12 hrs)

Unit- IV

Electrochemistry: Arrhenius theory of electrolytes – strong electrolytes – weak electrolytes – Ostwald's dilution law and its applications – ionic product of water and its application – solubility product. pH – definition – simple calculation of pH from molarity of acids and bases – buffer solution – definition – theory of buffer action- application.

Acid –base indicators – working range of indicators – choice of indicators – commercial cells – primary and secondary cells – Weston cadmium cell – Lead storage cell – Electroplating - application. (12hrs)

Unit -V

Spectroscopy: Basic principles of UV and IR spectroscopy – identification of simple organic molecules (ethanol and dimethyl ether, acetaldehyde and acetone, ethylene and acetylene, cis-2-butene and trans-2-butene, methylamine, dimethylamine and trimethylamine) – Proton nmr spectroscopy – Principle – Instrumentation – Chemical shift – Spectrum of ethanol. (12 hrs)

Text books :

Book No :1

1.K.Rathinamuthu(*), R.Victoria(**), **Ancillary Chemistry**, (*) Head of the Department of Chemistry, Vivekanadha College, Thiruvedakam,(**) Head of the Department of Chemistry, Lady Doak College, Madurai, 2012.

Unit.I : Page No.1 to 29

Unit.II : Page No.33 to 51

Unit.III : Page No.52 to 71
Unit.V : Page No.98 to 117

Book No :2

2. K.Rathinamuthu(*), R.Victoria(**), **Ancillary Chemistry**, (*) Head of the Department of Chemistry, Vivekanadha College, Thiruvedakam,(**) Head of the Department of Chemistry, Lady Doak College, Madurai, 1999.

Unit.IV : Page No.93 to 105, 110 to 125

Reference Books :

1. B.R. Puri, L.R. Sharma, S. Pathania, **Principles of Physical Chemistry**, 43rd Edition, Vishal Publishing Co, New Delhi, 2008 .

2. P.L.Soni H.M. Chawla, **Organic Chemistry**, 29th Edition, Sultan Chand and Sons, New Delhi, 2007.

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DEPARTMENT OF CHEMISTRY
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Class	**: B.Sc (Physics)**	**Part III**	**: Allied**
Semester	**: V&VI**	**Hours**	**: 02**
Subject Code	**: 15UCHAP2**	**Credits**	**: 01**

ALLIED CHEMISTRY PRACTICAL-II
ORGANIC ANALYSIS

A study of reaction of the following organic compounds:

1. Carbohydrate
2. Amide
3. Aldehyde .
4. Ketone
5. Monocarboxylic acid
6. Dicarboxylic acid
7. Amine
8. Phenol
9. Ester
10. Nitro compound

The students may be trained to perform the specific reaction like test for element (nitrogen only), Aliphatic or aromatic, saturated or unsaturated, color reaction, functional group present and record their observation.