SARDAR PATEL UNIVERSITY
VALLABH VIDYANAGAR

SYLLABUS EFFECTIVE FROM: 2017-18
Subject: M.Phil (Chemistry)
Semester: I

Paper Code : MS01CCHE21	Total Credit : 02
Title of Paper : Research Methodology-I	

Unit	Description in Detail	Weightage(%)
I	**Unit 1. Fundamental Laboratory Techniques** : Basic principles, Health and safety, working with liquids, Basic laboratory procedures I, Basic laboratory procedures II, Principles of solution chemistry, pH and buffer solutions (Ref. 6. Chapters 1 to 7 : pages 03 to 62)	**25%**
II	**Unit 2. The investigative approach** : Making and recording measurements, SI units and their use, Scientific method and design of experiments, Project work (Ref. 6. Chapters 8 to 11: pages 65 to 83)	**25%**
III	**Unit 3. Analysis and presentation data** : Using graphs, Presenting data in tables, Hints for solving numerical problems, Descriptive statistics, choosing and using statistical tests, drawing chemical structures, chemometrics, computational chemistry (Ref. 6. Chapters 37 to 44 : pages 251 to 295)	**25%**

Reference Books

1. Research Methodology, C.R.Kothari, New Age International Publishers, 2004.
2. Fundamental of Research Methodology and Statistics, Yogesh Kumar Singh, New Age International Publishers, 2006.
3. Thesis and Assignment Writing, J. Anderson, B.H. Dursten and M. Poole, Wiley Eastern**, 1977.**
4. Research Methodology Methods and Techniques, Dr.A.K.Gupta, Vayu Education of India.
5. Research Methodology Text and cases with Spss Applications, Internation Book House Pvt.Ltd.
6. Practical Skills in Chemistry, J. R. Dean, A. M. Jones, D. Holmes, R. Reed, J. Weyers and A Jones, Pearson Education Ltd. [Prentice Hall] (2002)
7. Tests, Measurements and Research Methods in Behavioural Sciences : A. K.Singh.

Paper Code : MS01CCHE22	Total Credit : 03
Title of Paper : Subject specific Advance level (Analytical Methods-I)	

Unit	Description in Detail	Weightage(%)
I	UV-Visible Spectroscopy: Electronic transition-chromophores and auxochromes-factors influencing position and intensity of absorption bands-absorption spectra of dienes, polyene and unsaturated carbonyl compounds-woodward Fieser rules –effect of solvent on spectra. IR Spectroscopy: Vibrational frequencies and factors affecting - identification of functional groups – intra and inter molecular hydrogen bonding –finger print region-far IR region.	**25%**
II	**A.** H_1 NMR Spectroscopy: H_1-NMR –introduction – number of signals- chemical shift – factors affecting chemical shifts –multiplicity of signals- coupling constants germinal and vicinal and long range coupling-factors affecting J value –simplification of complex spectra-introduction to FT NMR-pulse techniques- NOE- effect-chemical exchange -H_1-NMR spectra of some organic and inorganic molecules. C_{13} NMR Spectroscopy: Introduction - decoupled and off resonance C_{13} NMR Spectra-factors affecting C_{13} chemical shifts –empirical calculation of chemical shifts-C_{13} NMR Spectra of some organic molecules. **B.** Introduction to COSY, HSQC, HMBC, NOESY, ROSEY	**25%**
III	EPR Spectroscopy: Factors affecting the magnitudes of g and A tensors in metal species zero field splitting and Kramer's degeneracy-spectra of V(II), Mn(II), Fe(II), Co(II), Ni(II) and Cu(II) complexes-Application of EPR to a few biological molecules containing Cu(II), Fe(II) and Fe(III) ions – densities and McConnel relationship-application of EPR to some simple system such as CH_3, pbenzoquinone and Xe^{2+}.	**25%**
IV	**Unit 4.** Mass Spectroscopy: Principles – Instrumentation – Different ionizing techniques (EI, CI, FD, FAB, MALDI) - Various analysers (Magnetic sector, Quadrupole, Ion trap, ToF) – Analysis of mass spectrum – simple cleavage - β cleavage - allylic cleavage – benzylic cleavage – Factors affecting fragmentation pathways - Mc-Lafferty rearrangement – ortho effect –Fragmentation patterns of common organic compounds.	**25%**

References:

1. Banwell C.N. Introduction to Molecular Spectroscopy.TMH Edition, 1994.
2. Barrow G.M. Introduction to Molecular Spectroscopy. McGraw Hill, 1988.
3. Kemp W. Organic spectroscopy. London: ELBS, 2000.
4. Silverstien R.M., and W.P. Weber. Spectrometric identification of organic compounds. 2005.
5. Pavia D.L., G.M. Lapman and G.S. Kriz. Introduction to spectroscopy, 3rd Ed. Harcourt College Publishers, 2001.
6. Christian G.D. Analytical chemistry. 5th ed, John – Wiley and Sons Inc., 1994.
7. Willard H.H., L.L. Merrit, J.A. Dean and F.A. Set Instrumental methods of analysis. CBS Publishers, 1996.
8. Skoog, West, Holler and Crouch. Fundamentals of analytical chemistry, 8th ed. Thomson Asia Pvt. Ltd, 2004.
9. Ahluwalia V.K and M.Goyal. A text book of organic chemistry. New Delhi: Narosa publishing house, 2000.
10. Ahluwalia V.K. and R. Aggarwal. Organic synthesis: special techniques. New Delhi: Narosa pub. house, 2001.
11. Sanghi R.and M.M.Srivatsava. Green chemistry, environment friendly alternatives, New Delhi: Narosa publishing house, 2003.
12. Ahluwalia V.K. and M.Kidwai, New trends in green chemistry, Netherlands: Kluwer academic publishers, 2004.

Paper Code : MS01CCHE23	Total Credit : 03
Title of Paper : Subject Specific Advance Level (Medicinal Chemistry)	

Unit	Description in Detail	Weightage(%)
I	**A. Introduction** Development of new drugs, procedures followed in drug design, chemical parameters in drug design (biological isosterism), biological properties of simple functional groups. **B. Drug discovery, Design and Development** **a. Finding a lead:** Choosing a disease, choosing a drug target, identifying a bioassay and finding a lead compound. **b. Optimising target interactions:** Structure-activity relationship, identification of a pharmacophore and strategies in drug design. **c. Drug development:** Preclinical and clinical trials, patenting and regulatory affairs, chemical and process development.	25%
II	**Unit 2. Combinatorial synthesis** Solid phase techniques, Methods of parallel synthesis, isolating active component in a mixture: deconvolution, Structural determination, planning and designing a combinatorial synthesis, examples of combinatorial synthesis and its limitations.	25%
III	**Unit 3. Pharmacodynamics and pharmacokinetics** Protein as drug targets: Enzymes- protease, kinase,Protein as drug targets: Receptors- Nuclear receptor, ion channel and GABA receptors Nucleic acids as drug targets	25%
IV	**Unit 4. Various categories of drugs** Antibiotics, Antimalarials, Analgesic & Antipyretics, Anti-inflammatory, Anaesthetics, Tranquilizers, Cardiovascular and Antivirals.	25%

References:

1. Silverman R. B. The Organic Chemistry of Drug design and Drug action, Academic press.
2. Lednicer D. Strategies for Organic Drug synthesis and Design. J. Willey.
3.Wilson, Gisvold AND Dorque: Text book of organic medical and pharmaceutical chemistry
4. Graham L.Patrick An introduction to medicinal chemistry, 3rd ed, Oxford University press, 2005.