

**SARDAR PATEL UNIVERSITY
VALLABH VIDYANAGAR**



SYLLABUS EFFECTIVE FROM: 2017-18

Subject: M.Phil (Chemistry)

Semester: II

Paper Code : MS02CCHE21	Total Credit : 02
Title of Paper : Research Methodology-II	

Unit	Description in Detail	Weightage(%)
I	Survey of literature including patents - chemical nomenclature and literature primary sources - secondary sources including reviews. Treatise and monographs, literature searching, Review of work relevant to the chosen problems. Abstraction of a research paper.	25%
II	Introduction to Internet and its applications – web browsers – World Wide Web – Search Engines – e-journals - literature Survey in Chemistry – Popular journals and websites in Chemistry – Databases in Chemistry - literature searching and collection using e-journals.	25%
III	Writing a thesis or paper - General format - page and chapter formation. The use of quotation - footnotes - tables and figures - referencing - appendixes - revising the paper or thesis – editing and evaluating the final product - proof reading the final typed copy - Publication of Research paper - Presenting in the seminar.	25%
IV	Errors in chemical analysis – classification of errors – determination of accuracy of methods – improving accuracy of analysis – significant figures – mean, standard deviation – comparison of results : “t” test, “f” test and “chi” square test – rejection of results – presentation of data. Sampling – introduction – definitions – theory of sampling – techniques of sampling – statistical criteria of good sampling and required size .	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 : MS02CCHE22	Total Credit : 03
Title of Paper : Subject specific Advance level (Heterocyclic Chemistry)	

Unit	Description in Detail	Weightage(%)
I	A.Introduction Nomenclature, general reactivity patterns of common heterocyclic compounds. B.Small Ring Heterocycles Syntheses of aziranes, oxiranes & thiiranes; Ring openings and heteroatom extrusion; Synthesis & reactions of azetidines, oxetanes & thietanes	25%
II	A. Five membered heterocycles – Furan, Pyrrole and Thiophene Synthesis and reactions B. Six membered heterocycles – Pyridine, Quinoline and Isoquinoline Synthesis and reactions	25%
III	A. Seven-and Large-Membered Heterocycles Synthesis and reactions of azepines, oxepines, thiepinines, diazepines and thiazepines. B. Rings with more than one heteroatom Structural and chemical properties; Synthesis and reactions of 1, 2 –Azoles and 1, 3-Azoles, Synthesis of pyrazole, isothiazole and isooxazole, Synthesis of imidazoles, thiazoles & oxazoles, Synthesis of pyridazines, pyrimidines, pyrazines, Synthesis of triazole and tetrazole.	25%
IV	A. Bicyclic Heterocycles Synthesis and reactions including medicinal applications of benzopyrroles, benzofurans, benzothiophenes, benzimidazoles, benzodiazepines, benzothiazoles, benzoxazoles, quinolines, isoquinolines, benzofused diazines, acridines, phenothiazines, carbazoles and pteridines B.Porphyrins Classification and synthesis of porphin rings; Natural and synthetic metalloporphyrins; importance in biology. C. Biological Heterocycles Chemical and biological properties and total synthesis of thiamine, lysergic acid, reserpine, nicotine, phenanthrene alkaloids, papaverine, nucleic acids bases. Total synthesis of Cephalosporin-C, taxol, Artemisinin, Belladine, Atropine, Heptaphylline, Peepuloidin, Morphine, CaCHEor, Cadinene, Abietic acid, Gibberelic acid, Zinziberine, Squalene, pelargolidin chloride and Hirsutidin chloride, Azadirachtin.	25%

Books Suggested:

1. Bansal K. Raj. Heterocyclic chemistry 3rd ed., New Age International (P) Ltd.,1999.
2. Joule J. A. and K. Mills. Heterocyclic chemistry . 4th ed. Blackwell publishing, 2007
4. Gupta R.R., M. Kumar and V. Gupta. Heterocyclic Chemistry Vol. 1-3, Springer Verlag
5. Gilchrist T.L. Heterocyclic Chemistry. Longman Scietific Techinal.
5. Acheson R.M. An introduction to the Heterocyclic Compounds. John Wiley
6. Katritzky A.R. and C.W. Rees. Comprehensive Heterocyclic Chemistry. eds. Pergamon
7. Mann J., R.S. Davidson, J.B. Hobbs, D.V. Banthrope and J.B. Harborne, Natural Products: 18
Chemistry and Biological Significance, Longman, Essex.
8. Silverman R. B. The Organic Chemistry of Drug design and Drug action, Academic press.
9. Lednicer D. Strategies for Organic Drug synthesis and Design. J. Willey.
10. Wilson, Gisvold AND Dorque: Text book of organic medical and pharmaceutical chemistry
11. Graham L.Patrick An introduction to medicinal chemistry, 3rd ed, Oxford University press, 2005.

Paper Code : MS02CCHE23	Total Credit : 03
Title of Paper : Subject Specific Advance Level (Coordination Chemistry)	

Unit	Description in Detail	Weightage(%)
I	Bonding in Metal Complexes Crystal field theory-splitting of orbitals in octahedral, tetrahedral, square planar, square pyramidal and trigonal bipyramidal fields-Ligand field stabilisation energy-John-Teller effect-Evidence for metal ligand overlap.Molecular orbital theory of transition metal complexes-Molecular orbital energy level diagram for octahedral complexes with and without pi-bonding.	25%
II	Kinetics and Mechanism of metal complex formation Inert and labile complexes-crystal field activation energy-possible mechanisms for ligand replacement reactions Ligand exchange reactions in octahedral complexes of cobalt (III) and Square planar platinum (II), complexes – Trans effect-electron transfer processes. Electron transfer reaction;, outer sphere electron transfer, Marcus equation, inner sphere electron transfer- one and two electron transfer reactions, electron transfer through extended bridges, mixed valence compounds, unstable intermediate oxidation state.	25%
III	Electronic spectra of transition metal complexes Charge transfer transition and d-d transition-selection rules and transition probabilities-effect of spin orbit coupling-Spectrochemical series of ligands-Term states for d ions-ergal diagrams-Tanabe-Sugano diagrams-Calculation of Dq. Values with special reference to nickel complexes-Application of uv and visible spectroscopy in the study of metal complexes of first transition series.	25%
IV	A. Magnetic susceptibilities of transition metal complexes Magnetic susceptibility measurements-Gouy Method-Magnetic moment-Orbital contributions to magnetic moment-spin orbit coupling-Temperature independent paramagnetism Application of magnetic moments to structure elucidation. B. Electron paramagnetic resonance Instrumentation and sampling techniques-presentation of the spectrun-hyperfine splitting – Factors affecting the magnitude of g values-Zerofield spllitting and Kramers dageneracy-Nuclear quadrupole interaction-spin hamiltonian – Line widths in solid state EPR-Applications to metal complexes.	25%

References

1. Huheey J.E. Inorganic Chemistry, Principles of Structure and reactivity; New York: Harper and Row,
2. F.A Cotton. Applications of group theory New York: Wiley, 1971.
3. Cotton F.A. and G.Wilkinson. Advanced Inorganic Chemistry. 4th ed. New York: Wiley Interscience.,
4. Basolo F.and R.G.Pearson. Mechanism of Inorganic reactions. New York: Wiley.
5. Purcele K.F.and J.C.Kotz. Inorganic Chemistry Philadelphia: W.B. Sonders Company,.
6. Drago R.S. Physical Methods in Chemistry. East West Edn.
7. Earnshaw A Introduction to Magentic Chemistry. Academic Press.
8. Azaroff L.V. Introduction to solids, New York. Mc.Graw Hill.
9. Kittel C. Introduction to solid state Physics. New Delhi: Wiley-Eastern.

Paper Code : MS02CCHE24	Total Credit : 08
Title of Paper : Dissertation	

Unit	Description in Detail	Weightage(%)
I	Dissertation	100%