

NORTH MAHARASHTRA UNIVERSITY, JALGAON.

M.Phil Syllabus in Chemistry.

A Condensed course for 1992 Batch.

STRUCTURE :

Course I :- General Chemistry Part A : Research Methodology.
Part B : Applications of Instrumental Techniques.

Course II :- Physical Chemistry.

Course III:- Part A : Inorganic Chemistry.

Part B : Organic Chemistry.

Course IV :- Dissertation.

SYLLABUS

Course I - General Chemistry.

Part A : Research Methodology.

1. Research :- Definition, Characteristics, Objectives, Significance, Characteristics of a good researcher.
Types of research, Research and Scientific methods.

2. Stages in Research Process :-

I) Formulation of a research problem, Criteria for selection of a good topic.

ii) Literature survey, Library and Documentation.

iii) Developing the hypothesis.

iv) Preparing the research design and execution of the project.

v) Determining sample design.

vi) Collecting and organisation of data.

vii) Analysis of the data.

viii) Testing of the hypothesis.

ix) Interpretations and generalisations.

x) Results and formal write of conclusions.

3. Thesis presentation : Dissertation.

Index, Chapters, Titles and subtitles, Tables and Diagrams.

Reference and Bibliography, Synopsis of thesis.

* 4. Publication of a research Paper.

PART B : Applications of Instrumental Techniques.

Principles, Instrumentation and applications of the following techniques in Chemistry.

a) Electronic spectroscopy.

b) Vibrational Spectroscopy.

c) Magnetic Spectroscopy.

Reference Books:-

1. Instrumental Methods of Chemical analysis : Ewing, McGraw Hill

2. Physical Methods in Inorganic Chemistry : R.S.Drago, Reinhold

London.

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- 3) Analytical Applications of NMR, D.E. Leydens and R.H. Cox, John Wiley and sons.
- 4) Ultraviolet and visible spectroscopy : C.N.R., Rao, Butterworth 2nd Edition, 1967.

PHYSICAL CHEMISTRY : COURSE II :

1. Thermodynamics :

Measuring dispersal : The entropy of a system, Entropy change in the universe, Concentrating on the system, Evaluating the entropy and the Gibbs function, Other statements of second law.

Combining the first and second laws, Properties of the Gibbs function, open systems and changes of composition.

Which way is down hill? The response of reactions to the conditions, Applications to selected systems.

The Phase rule, One component systems, Two component systems Three component systems.

2. Applied Radiochemistry :

Radioactive isotopes in studies of the structure of compound and mechanism of chemical reactions : Equivalence of chemical bonds in molecules, Tautomerism, The mechanism of rearrangement and isomerization, Oxidation reduction reactions, catalysis and corrosion (Other details as specified).

Reference Books :

- 1) Physical Chemistry - P.W. Atkins.
- 2) Instrumental methods of Chemical analysis - Ewing.
- 3) Radiochemistry by A.N. Newmeyerov Mir, Publications (1974)

Course III

Part A : Inorganic Chemistry :

1. Thermal Analysis of Inorganic compounds : Principles, instrumentation and methodology of TGA, DTA, and DSC. Thermal analysis of metal complexes.

2. Mossbauer Spectra of Metal complexes :-

The Mossbauer effect, Mossbauer instrumentation, isomer shift quadrupole and magnetic splitting, spectra of iron compounds, back coordination, substituent effect, polynuclear complexes, spinel spectra of tin and gold compounds. (or any other compound.

Reference Books :

1. Coordination Chemistry Experimental Methods, Butterworths, London, 1973, Chapter 4 and 10.
2. Thermochemistry of Metal Complexes : Asherft, Academic Press.
3. Day and Selbin (Mossbauer spectra)
4. Drago. (Physical Methods in Inorganic chemistry)

PART B : Organic Chemistry.

1. Theory technique and applications of C-13 NMR spectroscopy.
2. Examples of structure determination using UV, IR and NMR Spectroscopy.
3. Designing organic synthesis.

Reference Books :

1. Frontier Orbitals and Organic Reaction. Mechanism - Ian Fleming, 1977 (Chapter 2 and 3)
2. Analytical application of NMR
D.E. Leydens and R.H. Cox (John Wiley and Sons) pages 194-255 Topics in C-13 NMR Spectroscopy Vol.2 edited by Gorge C. Levy (John Wiley and Sons).
3. Conformation Analysis-
Elliel, Allinger, Angyal and Morrison
McGraw Hill, 1965 (Pages 200-250)

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