

VEER NARMAD SOUTH GUJARAT UNIVERSITY
M.Sc. Semester-III (ORGANIC CHEMISTRY)
SYLLABUS TO BE EFFECTIVE FROM JUNE 2019

PAPER-II (Selected Topics in Organic Chemistry-I)

Max. Marks: 100 (External – 70 + Internal – 30)

Total Periods: 45

UNIT-I NMR SPECTROSCOPY

(12 Periods)

Theory and principles of NMR spectroscopy, Theory of Fourier Transform

(i) ^1H NMR Spectroscopy

Proton resonance condition, Aspects of PMR spectra – number of signals, chemical shift, factors influencing chemical shift, deshielding, chemical shift values and correlation for protons bonded to carbons (aliphatic, olefinic, aldehydic, aromatic) and other nuclei (alcohols, phenols, enols, acids, amides and mercaptans), effect of deuteration, spin-spin coupling, (n+1) rule, factors effecting coupling constant "J"

(ii) ^{13}C NMR spectroscopy

Types of ^{13}C NMR Spectra: proton coupled and decoupled ^{13}C spectra, chemical shift, calculations of chemical shifts of aliphatic, olefinic, alkyne, aromatic, hetero aromatic and carbonyl carbons, factors affecting chemical shifts

(iii) 2D NMR Techniques

Preliminary idea of 2D NMR,

UNIT-II ENVIRONMENTAL CHEMISTRY

(11 Periods)

(i) Water Pollution: Basic Concepts of Eutrophication, Water Quality, Water contaminants, Heavy minerals, Organic contaminants, PCBs and other Halogens materials, PAH, Pesticides, Waterborne Pathogens, Aquatic toxicology, Water Purification Methods, Sewage treatment.

(ii) Air Pollution: Air pollution sources and emissions- Particulates, Aerosols, Photochemical smog, Determination of SO_x , NO_x , CO_x and hydrocarbons, Air pollution control technologies of particulate and gaseous pollutants

(iii) Effluent treatment: Industrial pollution of sugar, distillery, drug, pulp & paper and their analysis. Effluent treatment plants of above industries.

UNIT-III HETEROCYCLIC CHEMISTRY-I**(11 Periods)**

(A) Nomenclature of Heterocycles:

Hantzsch-Widman nomenclature systems for monocyclic and fused heterocycles and bridged heterocycles

(B) Five and six membered heterocycles with two hetero atoms:

Synthesis, reactivity, aromatic character and importance of following heterocyclic rings:

Oxazole, Thiazole, Pyrazole, Imidazole, Pyridazine, Pyrimidine, Pyrazine

(C) Condensed five membered heterocycles:

Synthesis, reactivity, aromatic character and importance of following heterocyclic Rings:

Benzoxazole, Benzthiazole, Benzopyrazole, Benzimidazole.

UNIT-IV REAGENTS FOR ORGANIC SYNTHESIS**(11Periods)**

Introduction, Preparation and Industrial Applications of the following.

(1)N-Bromosuccinimide (NBS)

(2)Grubbs 1st and 2nd generation catalyst

(3)N,N-dicyclohexylcarbodiimide (DCC)

(4)Lead tetra-acetate (LTA)

(5)Baker's yeast

(6)n- butyl lithium

(7)K₃Fe(CN)₆ and DMSO

(8)Grignard Reagent

(9)Diazomethane

(10)Polyphosphoric acid

Reference Books Recommended:

1. R.M. Silverstein and F.X. Webster, Spectroscopic Identification of Organic Compounds, 6th Edition (2003) John Wiley, New York.
2. D.H. Williams and I.F. Fleming, Spectroscopic Methods in Organic Chemistry, 4th Edition(1988), Tata-McGraw Hill, New Delhi.
3. P.Y Bruice, Organic Chemistry, 2nd Edition (1998) Prentice – Hall, New Delhi.
4. Nuclear Magnetic Resonance – Basic Principles- Atta-Ur-Rehman, Springer- Verlag (1986).
5. One and Two dimensional NMR Spectroscopy – Atta-Ur-Rehman, Elsevier (1989).
6. Organic structure Analysis- Phillip Crews, Rodriguez, Jaspars, Oxford University Press (1998).
7. G.W. Vanloon, S.J. Duffer, Environmental Chemistry - A Global Perspective, Oxford University Press (2000).
8. F.W. Fifield and W.P.J. Hairens, Environmental Analytical Chemistry, 2nd Edition (2000), Black Well Science Ltd.
9. Colin Baird, Environmental Chemistry, W.H. Freeman and Company, New York (1995).
10. A.K. De, Environmental Chemistry, 4th Edition (2000), New Age International Private Ltd., New Delhi.
11. Peter O. Warner, Analysis of Air Pollutants, 1st Edition (1996), John Wiley, New York.

12. S.M. Khopkar, Environmental Pollution Analysis, 1st Edition (1993), Wiley Eastern Ltd., New Delhi.
13. S.K. Banerji, Environmental Chemistry, 1st Edition (1993), Prentice-Hall of India, New Delhi.
14. An introduction to the chemistry of heterocyclic compounds-R M Acheso
15. Heterocyclic Chemistry- J A Joule and Smith
16. Heterocyclic Chemistry-II- R R Gupta, M Kumar, V Gupta, Springer (India) pvt
17. Heterocyclic Chemistry, 4th Edition by J. A. Joule & K. Mills, Published by Chapman & Hall (1995)
18. Principles of modern heterocyclic chemistry, Edited by Leo A. Paquette, Published by Pearson Benjamin Cummings (1968)
19. Heterocyclic Chemistry, 3rd Edition by Thomas L. Gilchrist, Published by Prentice Hall (1997)
20. The Structure & Reactions of Heterocyclic Compounds, Edited by Michael Henry Palmer, Published by Edward Arnold (1967)
21. Heterocyclic chemistry by V. K. Ahluwalia, Narosa publishing house.
22. Organic synthesis using transition metals-Roderick Bates (Wiley).
23. Organic chemistry - J. Clayden, N. Greeves, S. Warren and P. Wothers (Oxford Press).
24. Advanced organic chemistry, Part B - F. A Carey and R. J. Sundberg, 5th edition (2007).
25. Guidebook to organic synthesis-R K Meckie, D M Smith and R A Atken.