RANI CHANNAMMA UNIVERSITY, BELGAVI
SCHOOL OF BASIC SCIENCES : CHEMISTRY

M.Sc. ORGANIC CHEMISTRY
IV SEMESTER

CHORT-4.1 : ORGANIC CHEMISTRY-IVA
Teaching hours per week : 04 Credits : 04
Total hours : 64

UNIT-I **16 hours**

MEDICINAL CHEMISTRY

Introduction, definition of drug, requirements of drugs, chemotherapy, pharmacokinetics, pharmacodynamics, metabolites and anti metabolites, prodrug and soft drugs, agonists and anti-agonists, concept of drug receptor, elementary treatment of drug receptor interactions, theories of drug activity-occupancy theory, rate theory, induced fit theory, classification of drugs.

Sulphonamides: Introduction, classification, synthesis and SAR studies of sulphathiazole, sulphanilamide, sulphadiazine.

Antimalarials: Introduction, classification, synthesis and drug action-Chloraquin and Pamaquin.

Analgesics: Introduction, classification, synthesis and drug action-Paracetamol, Aspirin, Salol, Cinophen, Phenyl butazone, Antipyrine.

Anti-inflammatory: Introduction, classification, synthesis and drug action-Indomethacin and ibuprofen.

UNIT–II **16 hours**

CHEMISTRY OF DYES

Definition, requirements, theory of colour and constitution-chromophore-auxochrome theory, modern theory, classification of dyes-based on methods of dyeing, structure.

Azo dyes: classification, synthesis and applications of acid azo dyes-methyl orange, basic azo dyes-Bismarck brown, direct azo dyes-Congo Red.

Triphenylmethane dyes: synthesis and applications of malachite green, phenolphthalein, crystal violet.

Cyanine dyes: synthesis and applications of quinoline blue, sensitol red.

Fluorescent brightening agents, photographic sensitizers(cyanines), color photography(additive and subtractive process), chemistry of colour developers, instant colour processes.

UNIT–III **16 hours**

GREEN CHEMISTRY

Concept of green chemistry, need for green chemistry, goals, limitations.

Principles – Introduction, twelve principles,

Synthetic methods-Concept of atom economy, concept of selectivity, use of auxillary substances, designing of synthetic methodologies, designing of products, use of green solvents, catalytic reagents, designing of products, analytical methodologies, energy requirements and mode of supply of energy to reactions- use of microwaves, use of sonification with examples

Designing of green synthesis-Choice of starting materials, reagents, catalysts-biocatalysts, polymer supported catalysts, choice of solvents

Green synthesis of adipic acid, catechol, paracetamol, acetaldehyde

UNIT–IV **16 hours**

HETEROCYCLIC CHEMISTRY

Nomenclature-Hantsz-Wiedmann nomenclature of simple and fused systems.

5-Membered heterocyclic compounds with one and two hetero atoms-furan, thiophene, pyrrole, imidazole, oxazoles, thiazoles.

Fused hetereocycles: Synthesis, and chemical reactions of indole, quinoline, benzothiazole, benzimidazole, coumarin, chromones and flavones.

REFERENCE BOOKS:

01. Burger's Medicinal Chemistry and Drug Discovery, Vols. 1-6 Ed. D.J. Abraham, John Wiley, 2003
02. Foye's Principles of Medicinal Chemistry, 6th Edn., T L Lemke and D A Williams Eds., Lippincott, Williams and Wilkins, 2007
03. An Introduction to Medicinal Chemistry, P Graham, III Ed., Oxford, 2006
04. Medicinal Chemistry, N Weaver, Oxford, 2006
05. Goodman and Gilman's Pharmacological Basis of Therapeutics, 11th Edn., Tata McGraw-Hill, 2005.
06. Wilson and Gisvold's Text Book of Organic Medicinal and Pharmaceutical chemistry, J H Block and J M Beale, Jr., Eds., Lippincott, Williams and Wilkins, 2003.
07. Medicinal Chemistry – G R Chatwal, Himalaya, New Delhi, 2002
08. Medicinal Chemistry, A Kar, Wiley, 2000.
09. Green Chemistry, environment friendly alternatives, R. Sanghi and M M Srivastava, Narosa, New Delhi, 2003
10. Green Chemistry-an introduction text, Royal Society of Chemistry, UK, 2002.
11. J. March, Advanced Organic Chemistry, Willey Interscience, 1994.
12. F. A. Carey and Sundberg, Advanced Organic Chemistry – Part A & B, 3rd edition, Plenum Press, New York, 1990.
13. Comprehensive Organic Chemistry, Pergamon Press, New York, Vol 1, 1996,
14. H. Pine, Hendrickson, Cram and Hammond, Organic Chemistry, Mac Grow Hill, NewYork, 1987.
15. I. I. Finar, Organic Chemistry, ELBS Longmann, Vol. I & II, 1984
16. F. A. Carey and Sundberg, Advanced Organic Chemistry – Part A & B, 3rd edition, Plenum Press, New York, 1990
17. Comprehensive Organic Synthesis – B. M. Trost and I. Fleming series, Pergamon Press , New York, 1991.
18. S. K. Ghosh, Advanced General Organic Chemistry, Book and Alleied (P) Ltd, 1998
19. Heterocyclic Chemistry –Joule & Smith
20. Heterocyclic chemistry – Achaeson
21. Basic Principles of heterocyclic chemistry – L. A. Pacquette
22. Comprehensive heterocyclic chemistry –Kartritzky series, Pergamon Press, New York, 1984.
23. Synthetic organic chemistry, Gurdeep Chatwal.

RANI CHANNAMMA UNIVERSITY, BELGAVI
SCHOOL OF BASIC SCIENCES : CHEMISTRY

M.Sc. ORGANIC CHEMISTRY
IV SEMESTER

CHORPr-4.5 : ORGANIC CHEMISTRY-IVA
Teaching hours per week : 04 Credits : 04
Total hours : 64

QUALITATIVE ANALYSIS OF TERNARY MIXTURE USING ETHER

Ternary Mixture Analysis : Qualitative analysis of three **component** mixture using ether containing amino acids, low boiling liquids, nitro phenols etc.

REFERENCE BOOKS:

01. Semi-micro qualitative organic analysis, Cheronis, Entrikin & Hoanett.
02. Preparation of organic intermediates, D. A. Hirley, John Wiley.
03. Text book of practical organic chemistry, A. I. Vogel, Pearson, 5th Edition, Delhi, 2004.
04. Organic experiments, L. F. Fieser, 2nd Edn. D. C. Heath & Co. USA, 1974-2000.
05. Practical organic chemistry F.G. Mann and B. C. Saunders 4th Edn. Longman, 2002.
06. Comprehensive practical organic chemistry : Preparation and quantitative Analysis,
07. V. K. Ahluwalia, R. Aggarwal, Universities Press (India), 2000.
08. Comprehensive practical organic chemistry: Qualitative analysis, V. K. Ahluwalia, S.
09. Dhingra, Universities Press (India), 2000.
10. An advanced course in practical chemistry, A. Ghoshal, B. Mahapatra and A. K. Nad,
11. New central book agency, Calcutta, 2000.
12. Advanced practical organic chemistry, J. Mohan, Vol. I and II, Himalaya Publishing House, 1992.
13. Practical organic chemistry (Quantitative analysis), B. B. Dey, M V Sitaraman and
14. T. R. Govindachari, Allied Publishers, New Delhi, 1992.
15. Laboratory Techniques in Organic Chemistry, V K Ahluwalia, Pooja Bhagat

RANI CHANNAMMA UNIVERSITY, BELGAVI
SCHOOL OF BASIC SCIENCES : CHEMISTRY

M.Sc. ORGANIC CHEMISTRY
IV SEMESTER

CHORT-4.2 : ORGANIC CHEMISTRY-IVB
Teaching hours per week : 04 Credits : 04
Total hours : 64

UNIT-I **16 hours**

ALKALOIDS

Definition, nomenclature and physiological action, occurrence, isolation, general methods of structure elucidation, degradation, classification based on nitrogen heterocyclic ring, role of alkaloids in plants, structure, stereochemistry, structural elucidation and synthesis of the following: ephedrine, (+)-conine, nicotine, atropine, quinine, structure and uses of reserpine and morphine.

UNIT-II **16 hours**

TERPENOIDS

Classification, nomenclature, occurrence, isolation, general methods of structure determination, isoprene rule, structure determination, structural elucidation and synthesis of the following representative molecules: citral, geraniol, α-terpeneol, menthol, zingiberene, structure and uses of farnesol, phytol, abietic acid.

UNIT–III **16 hours**

STEROIDS AND PROSTAGLANDINS

Steroids: Introduction, classification and nomenclature, Diels hydrocarbon- its importance and synthesis, stereochemistry of cholesterol.

Structural elucidation of cholesterol-Blanc's rule, location of double bond, hydroxy group, angular methyl groups and side chain in cholesterol, total synthesis.

Prostaglandins: Introduction, classification and biological importance, structural elucidation of PGE_1, synthesis of PGE_1 by Corey's and Upjohn's approach.

UNIT-IV **16 hours**

ANTIBIOTICS, VITAMINS AND HORMONES

Antibiotics: Introduction, classification, penicillins, chloramphenicol, streptomycin, chloromycitin and tetracyclins–structure and their importance, synthesis of cephalosporin-C, structural elucidation of Pencillin-G.

Vitamins: Definition, Classification and biological importance, synthesis of vitamin C from D(+)-Glucose, synthesis of vitamin A.

Hormones: Definition, Classification, Biological importance of hormones, synthesis of adrenaline and thyroxin.

REFERENCE BOOKS:

01. Natural products: Their chemistry and biological significance-J. Mann,
02. R. S. Davidson, J. B. Hobbs, D. V. Banthorpe & J. B. Harborne, Longman, UK, 1994.
03. Terpenes, J. Verghese, Tata McGraw-Hill, New Delhi, 1982.
04. Chemistry of terpenes and terpenoids, A. Newman, Academic Press, London, 1975.
05. Handbook of naturally occurring compounds Vol. II: Terpenes, T. K. Davon, I. Scott, Academic Press, NY, 1972.
06. Natural products chemistry Vol. I & II, K. Nakanishi, T. Goso, S. Ito, S. Natori & S. Nozoe, Academic Press, NY, 1974.
07. Total synthesis of natural products Vol. I & VI, Apsimon, John Wiley, NY, 1973-1981.
08. Organic chemistry Vol.II, I. L. Finar, 6th Edn. Longman,1992.
09. Chemistry of natural products Vol. I & II, O. P. Aggarwal, Goel Publishing House, 6th Edn. 1982.
10. Total synthesis of natural products: The chiral approach Vol.III, S. Hanessian Pergamon Press, 1983.
11. Total synthesis of steroids, Akhaun & Titov, Jerusalem, 1969.
12. Medicinal natural products: A biosynthetic approach, P. M. Dewick. John Wiley, Chichester, 1997.
13. The colours of life: An introduction to the chemistry of porphyrins and related compounds, L. R. Milgrom, Wiley Chichester, 1995.
14. Spectral data of natural products Vol. I- K.Yamaguchi, Elsevier Publishing Co, London,1970.
15. Chemistry of natural products: A unified approach, N. R. Krishnaswamy, University Press, India, 1999.

RANI CHANNAMMA UNIVERSITY, BELGAVI
SCHOOL OF BASIC SCIENCES : CHEMISTRY

M.Sc. ORGANIC CHEMISTRY
IV SEMESTER

CHORPr-4.6 : ORGANIC CHEMISTRY-IVB
Teaching hours per week : 04 Credits : 04
Total hours : 64

PART-A : ISOLATIONS

01. Isolation of cysteine from human hair
02. Isolation of hesperidine from orange peel
03. Isolation of myristine from nutmug
04. Isolation of lycopene from tomato
05. Isolation of piperine from pepper
06. Isolation of caffeine from tea
07. Isolation of casein from milk
08. Isolation of nicotine from tobacco

PART-B : INSTRUMENTAL METHODS IN ORGANIC ANALYSIS

01. Recording/predicting/downloading from web sites the UV, IR, NMR and GC-MS/mass spectra of the compounds prepared in C-105/205/305 (Organic Practical – I), C-106/206/306 (Organic Practical – II), C-405 (Organic Practical – III) and C- 406 (Organic Practical – IV).
02. Structural elucidation of organic compounds with the help of spectra provided by the instructors/examiners.

REFERENCE BOOKS:

01. Modern experimental Organic Chemistry — John H. Miller and E. F. Neugil
02. An introduction to practical Organic Chemistry — Robert, Wingrove etc.
03. A Text book of practical Organic Chemistry — A I. Vogel Vol.III
04. Practical Organic Chemistry — Mann & Saunders
05. Semimicro qualitative Organic Analysis — Cheronis, Entrikin and Hodnet
06. Laboratory Manual of Organic Chemistry — R. K. Bansal New AGE International (P) Ltd. London, 3rd edition, 1996.
07. Practical Organic Chemistry — N. K. Visno, New AGE International(P) Ltd. London, 3rd edition, 1996.

RANI CHANNAMMA UNIVERSITY, BELGAVI
SCHOOL OF BASIC SCIENCES : CHEMISTRY

M.Sc. ORGANIC CHEMISTRY
IV SEMESTER

CHORT-4.3 : ORGANIC CHEMISTRY-IVC
Teaching hours per week : 04 Credits : 04
Total hours : 64

UNIT–I **16 hours**

PESTICIDES AND INSECTICIDES

Introduction, classification, naturally occurring insecticides - rotanones, pyrethrins. synthetic insecticides: synthesis and properties of DDT, BHC, chlordane, aldrine, malathion.

Introduction to the use of following in the control of pests and insects - fumigants, nematicides, acaricides, juvenile hormones, insect repellents, molluscicides, rodenticides.

Insect pheromones: Introduction, classification, pheromones in pest control, syntheses of grandisol (component of boll weevil pheromone) and farenal (trail pheromone of pharaoh's ants).

UNIT–II **16 hours**

ORGANIC SYNTHESIS

Disconnection Approach: An introduction to synthons and synthetic equivalents, disconnection approach, functional group inter-conversions, the importance of the order of events in organic synthesis, one group C-X and two group C-X disconnections, chemoselectivity, reversal of polarity, cyclization reactions, amine synthesis.

One Group C-C Disconnections: Alcohols and carbonyl compounds, regioselectivity, alkene synthesis, use of acetylenes in organic synthesis.

Two Group C-C Disconnections: Diels-Alder reaction, 1,3-difunctionalised compounds, α,β-unsaturated carbonyl compounds, control in carbonyl condensations, 1,5-difunctionalised compounds, Michael addition and Robinson annulations.

Retrosynthesis: Retrosynthesis of benzocaine, 4-methoxy acetophenone, saccharin, bisavalone, cubane, estrone, cantharidin and lycorane.

UNIT–III **16 hours**

PHASE TRANSFER CATALYSTS, CROWN ETHERS AND PROTECTING GROUPS

Phase transfer catalysis: Introduction, definition, mechanism of phase transfer catalysis. Types of phase transfer catalysts and reactions and their advantages, application in substitution, elimination, addition and alkylation reactions.

Crown ethers: Introduction, nomenclature, features, nature of donor site, general synthesis of crown ethers.

Protecting Groups: Illustration of protection and deprotection in organic synthesis, Protection of hydroxyl, carboxyl, carbonyl, thiol and amino groups. Functional Group Interconversions(FGI).

UNIT –IV **16 hours**

REAGENTS IN ORGANIC SYNTHESIS

Use of the following reagents in organic synthesis and functional group transformation:

01. Gilmann reagent	02. Lithium diisopropyl amide (LDA)
03. Dicyclohexyl carbodimide (DCC)	04. 1,3-Dithiane (reactivity umpolung)
05. Trimethylsilyl iodide	06. Tri-n-butyl tin hydride (TNBH)
07. DDQ	08. Woodward-Prevost hydroxylation
09. Osmium tetroxide	10. Peterson synthesis

REFERENCE BOOKS:

01. F. A. Carey and Sundberg, Advanced Organic Chemistry – Part A & B, 3rd edition, Plenum Press, New York, 1990.
02. F. A. Carey and Sundberg, Advanced Organic Chemistry – Part A & B, 3rd edition, Plenum Press, New York, 1990.
03. Comprehensive Organic Synthesis – B. M. Trost and I. Fleming series, Pergamon Press, New York, 1991.
04. S. K. Ghosh, Advanced General Organic Chemistry, Book and Alleied (P) Ltd, 1998
05. Principles of organic synthesis, Richard Norman and J. M. Coxon
06. Disconnection approach, by Steurt Warren.
07. Organic Synthesis-Special Techniques, V.K.Ahluwalia and R. Aggarwal, Narosa, New Delhi, 2001
08. Organic Synthesis, R.E.Ireland, Prentice Hall India, 1969.
09. Advanced Organic Chemistry, IV Ed., Part A &B, F.J.Carrey & R.J.Sundberg, Kluwer, 2001.
10. Organic Synthesis- A Disconnection Approach, Stuart
11. Art in Organic Synthesis, Anand, Bindra & Ranganath, Wiley, New Delhi, 1970.
12. Modern Methods of Organic Synthesis, N. Carruthers, Cambridge University, 1996.
13. Organic Reaction Mechanisms, V.K.Ahluwalia & R.K.Parashar, Narosa, 2006
14. Synthesis and Chemistry of Agrochemicals, Vol I & II, ACS, Wahington.
15. Chemistry of Pesticides, K H Buchel.
16. Advances in Pesticide Formulation Technology, ACS.
17. Chemicals for Crop Protection and Pest Managements, M B Green, G.S. Hartley West, Pergamon.
18. Chemistry of Insecticides and Fungicides, Sree Ramulu, Oxford & IBH, 1985.

RANI CHANNAMMA UNIVERSITY, BELGAVI

DEPARTMENT OF POST-GRADUATE STUDIES IN CHEMISTRY
(I TO II SEMESTERS)
SCHOOL OF BASIC SCIENCES

UNDER
CHOICE BASED CREDIT SYSTEM(CBCS)

WITH EFFECT FROM
ACADEMIC YEAR 2014-15 AND ONWARDS

QUESTION PAPER PATTERN

HARD CORE CHEMISTRY
(Regular AND Repeater)

Duration: 03 Hours **Maximum Marks: 80**

Instructions:
01) Answer all questions.
02) Figures to the right indicate marks.

01. Answer any EIGHT of the following questions. (08x02=16)
a.
b.
c.
d.
e.
f.
g.
h.
i.
j.

02. a) **05 Marks**
b) **05 Marks**
c) **06 Marks**
OR
d) **06 Marks**

03. a) **05 Marks**
b) **05 Marks**

c) **06 Marks**

OR

d) **06 Marks**

04. a) **05 Marks**

b) **05 Marks**

c) **06 Marks**

OR

d) **06 Marks**

05. a) **05 Marks**

b) **05 Marks**

c) **06 Marks**

OR

d) **06 Marks**

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DEPARTMENT OF POST-GRADUATE STUDIES IN CHEMISTRY
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CHOICE BASED CREDIT SYSTEM(CBCS)

WITH EFFECT FROM
ACADEMIC YEAR 2014-15 AND ONWARDS

QUESTION PAPER PATTERN

SOFT CORE CHEMISTRY:Spectroscopy
(Regular AND Repeater)

Duration: 02 Hours **Maximum Marks: 40**

Instructions:
01) Answer all questions.
02) Figures to the right indicate marks.

01. Answer any FOUR of the following questions. (04x02=08)
a.
b.
c.
d.
e.
f.

02. a) **05 Marks**
b) **05 Marks**
c) **06 Marks**
OR
d) **06 Marks**

03. a) **05 Marks**
b) **05 Marks**
c) **06 Marks**
OR
d) **06 Marks**