

KadiSarvaVishwavidhyalaya

M.Sc. Chemistry

Syllabus

(Organic Chemistry)

SemIII and SemIV

w.e.f. June 2013

Semester-III

Paper: Organic chemistry-3 (CH-OC 301)

Credit 04

Rationale of the Paper: To provide the basic and advanced knowledge of very useful concepts of Advanced Medicinal Chemistry. i.e. History of drugs, New invention in Medicinal chemistry and also to provide overview of the applications of these concepts in applied field to the students is also an objective.

Learning Outcome:

- Students can understand the historical and advance concept of medicinal chemistry and it's advantages.
- They can know the impact of advanced medicinal chemistry on the fields of medicine, pharmacy and its impact on the global economy.
- They can understand the fundamental principles of molecular structure and shape as they relate to organic molecules having a medicinal properties and their application to human anatomy.
- They can identify the medicinal properties of different organic molecules by medicinal application in medical science

Course	Subject Title	Credit	Theory (hr/week)	Practical (hr/week)	External marks	Internal marks	Total marks
CH-OC 301	Organic chemistry-3	4	4	-----	70	30	100

Unit	Topics of Paper CH-OC 301	Marks	Teaching Hrs
	Section A		
1	<p>Introduction to Medicinal Chemistry: History of Medicinal Chemistry, Classification of drugs, Important Terminology used in Medicinal Chemistry,</p> <p>Pharmacokinetics: Introduction to drug absorption, disposition, drug metabolism, elimination , important pharmacokinetic parameters in defining drug disposition and in therapeutics, mention of uses of pharmacokinetics in drug development process, concept of pro drug and soft drug.</p>	15	15
2	<p>Pharmacodynamics: Introduction, principles of drug action, mechanisms of drug action, introduction to the concept of receptors and drug receptor interactions, Dose-response relationships, drug potency and efficacy, combined effect of drugs.</p>	15	15
	Section B		
3	<p>Design & Development Drug Design & Development, History and development of SAR and QSAR, Physiochemical parameters, Lipophilicity, electronic parameters, steric parameters, Shelton and surface activity parameters and redox potentials, Free Wilson and Hansch analysis, other statistical methods</p>	15	15
4	<p>1. Antibiotics: Introduction, classification. a) β-lactam antibiotics: penicillin, Classification (early, resistant, broad spectrum, broad spectrum, adverse effects of penicillins. SAR of penicillin, Synthesis: ampicillin, pivampicillins, b) cephalosporins: Classification and SAR Synthesis: cephalexin, 7- amino cephalosporonic acid, c) tetracyclines: introduction and SAR, Synthesis: methacycline, doxycycline</p>	15	15
	Objective questions from all units	10	

Reference books:

1. Medicinal Chemistry, A. Burger Vols. I to V Ed. M. E. Wolff, John Wiley(1994).
2. Goodman & Gilman. Pharmacological Basis of Therapeutics, McGraw-Hill (2005).
3. S. S. Pandeya & J. R. Dimmock. Introduction to Drug Design, New Age International. (2000).
4. D. Lednicher. Strategies for Organic Drug Synthesis and Design, John Wiley (1998).
5. Graham & Patrick. Introduction to Medicinal Chemistry (3rd edn.), OUP (2005).
6. Medicinal Chemistry — A molecular and Biochemical Approach, Thomas Nogrady and Donald F. Weaver
7. Principles of Medicinal Chemistry, W. O. Foye
8. Wilson and Gisvolds Text book of Medicinal Chemistry
9. The Organic Chemistry of the Drug Design and Drug Action, Richard B. Silverman
10. Analogue based Drug Discovery, János Fischer and C. Robin Ganellin
11. Goodman and Gilman's Text book of Pharmacology.
12. Chemoinformatics - Concepts, Methods, and Tools for Drug Discovery, Jürgen Bajorath
13. A Kar, Textbook of Medicinal Chemistry; Asian Age Publication.
14. Sriram D and Yogeshwari P, Medicinal Chemistry; Pearson Education.
15. Ahluwalia V K, Chopra Madhu, Medicinal Chemistry; Ane Books India.

Paper : Organic chemistry-4 (CH-OC 302)

Credit 04

Rationale of the Paper: To provide the basic knowledge of very important concepts of the organic chemistry for the synthesis of new molecule. Also synthesis of different functional group and their properties. To provide overview of the applications of these concepts in applied field to the students is also an objective.

Learning Outcome:

- Students can able to the definition of regioselectivity, alkene synthesis, use of acetylenes and aliphatic Nitro compounds in organic synthesis.
- They can understand about the Micheal addition and Robinson annelation.
- Introduced about the aromatic heterocycles in organic synthesis and ring synthesis, and the pericyclic reaction
- Also Introduced of Synthesis of Some Complex Molecules i.e Camphor, Longifoline, Cortsone, Reserpine, Vitamin D, Juvabione.

Course	Subject Title	Credit	Theory (hr/week)	Practical (hr/week)	External marks	Internal marks	Total marks
CH-OC 302	Organic chemistry-4	4	4	.....	70	30	100

Unit	Topics of Paper CH-OC 302	Marks	Teaching Hrs
	Section A		
1	One Group C-C Disconnections Alcohols and carbonyl compounds, regioselectivity, alkene synthesis, use of acetylenes and aliphatic Nitro compounds in organic synthesis	15	15
2	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. Micheal addition and Robinson annelation.	15	15
	Section B		
3	Pericyclic Reactions Pericyclic reactions, stereochemistry of pericyclic reaction, conservation of molecular orbital symmetry, electrocyclic reactions, cycloaddition, sigmatropic rearrangements, Mobius–Huckel analysis (PMO approach), correlation diagram method.	15	15
4	Synthesis of Some Complex Molecules Application of the above in the synthesis of following compounds: Camphor, Longifoline, Cortisone, Reserpine, Vitamin D, Juvabione, Aphidicolin and Fredericamycin A.	15	15
	Objective questions from all units	10	

References:

1. Designing Organic Synthesis, S. Warren. Wiley.
2. Organic Synthesis-Concept, Methods and Starting Materials, J. Fuhrhop.
3. Some Modern Methods of Organic Synthesis. W. carruthers, Cambridge Univ. Press.
4. Modern Synthetic Reactions H.O. House, W.A Benjamin.
5. Advanced Organic Chemistry : Reactions, Mechanisms and Structure, J. March. Wiley.
6. Principles, of Organic Chemistry Part B. F.a. Carey and R.J. Sundberg, Plenum Press.

Paper : Organic chemistry-5 (CH-OC 303)**Credit 04**

Rationale of the Paper: To provide the basic knowledge of Industries related to Industrial chemistry

Learning Outcome:

- Students can learn the basic Introduction of Application of Industrial Chemistry.
- Able to Know the different method of preparation of Industrial material.

Course	Subject Title	Credit	Theory (hr/week)	Practical (hr/week)	External marks	Internal marks	Total marks
CH-OC 303	Organic chemistry-5	4	4	.....	70	30	100

Unit	Topics of Paper CH-OC 303	Marks	Teaching Hrs
1	Reactions of Alkanes And Cycloalkanes -Petroleum refining reactions. Catalytic alkylation, catalytic isomerisation, Catalytic reforming, catalytic cracking, hydrocracking. -Petrochemical processes Thermal cracking for alkenes, Acetylene processes Catalytic reforming for aromatics, steam reforming.	15	15
2	Unit Processes & Unit Operations -Introduction, Nitration, Halogenation, Amination by reduction sulfonation and sulfation, hydrogenation.	15	15
3	Fermentation Introduction, conditions favorable for fermentation, characteristics of enzymes. Manufacture of beer, Fermentation of Wort, Manufacture of Spirit, manufacture of wine, manufacture of vinegar, manufacture of power alcohol, Ethyl alcohol from molasses.	15	15
4	Synthetic Dyes Introduction, nomenclature Dyeing, Basic operations in dyeing, Due intermediates. Classification of dyes, Acid dyes, Basic dyes, Direct dyes, Mordant dyes, Lakes, Vat dyes, Ingrain dyes, sulphur dyes, pigment dyes, solvent or spirit soluble dyes, food dyes. -Methyl Orange, Diphenyl methane dyes, Mordant, azodyes. Thiazole dyes, Anthraquinone dyes, Indigoids, Xanthene dyes, stilbere dyes. Application Of Dyes.	15	15
	Objective questions from all units	10	

References:

1. An introduction to industrial organic chemistry by peter wiseman.
2. Unit processes in organic synthesis by P.H.Groggins.
3. Industrial chemistry by B.K.Sharma.

Paper : Organic chemistry-6 (CH-OC 304)**Credit 04**

Rationale of the Paper: To provide the basic knowledge of very important concepts of the analytical chemistry (Sampling and Calibration Methods, Volumetric Method of Analysis, Gravimetric Analysis). To provide overview of the applications of these concepts in applied field to the students is also an objective.

Learning Outcome:

- Students can learn the basic concepts of Chemistry of Natural Products
- Able to synthesize know about the Structure determination, stereochemistry, biosynthesis and synthesis of the following representative molecules :Citral, Gerniol, α -Terpeneol, Menthol, Farnesol, Zingiberence, Santonin, Phytol, Abietic acid and β -Carotene.
- To know and understand Steroids &Porphyrins::Occurrence, nomenclature, basic skeleton, Diel's hydrocarbon and stereochemistry, Isolatin, Structure determination and synthesis of Cholesterol, Bile acids, Androsterone, Testosterone, Estrone, Progestrone, Aldosterone, Biosynthesis of Steroids.Structure and synthesis of Haemoglobin and Chlorophyll.

Course	Subject Title	Credit	Theory (hr/week)	Practical (hr/week)	External marks	Internal marks	Total
CH-OC 304	Organic chemistry-6	4	4	.....	70	30	100

Unit	Topics of Paper CHE-OC 304	Marks	Teaching Hrs
	Section A		
1	Terpenoids and Carotenoids Classification, nomenclature, occurrence, isolation, general methods of structure determination, isoprene rule. Structure determination, stereochemistry, biosynthesis and synthesis of the following representative molecules :Cadinene, Gerniol, α -Terpeneol, Farnesol, Phytol and β -Carotene.	15	15
2	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, synthesis and biosynthesis of the following : (+)- Coniine, Nicotine, Atropine, Quinine and Morphine	15	15
	Section B		
3	Steroids: Occurrence, nomenclature, basic skeleton, Diel's hydrocarbon and stereochemistry, Isolatin, Structure determination and synthesis of Cholesterol, Bile acids, Androsterone, Testosterone, Estrone, Progesterone, Aldosterone, Biosynthesis of Steroids.	15	15
4	Porphyryns: Structure and synthesis of Haemoglobin and Chlorophyll.	15	15
	Objective questions from all units	10	

References :

1. Natural Products : Chemistry and Biological Significance, J. Mann, R.S. Davidson, J.B. Hobbs, D.V. Banthropeadn J.B. Harbome, Longman, Esses.
2. Organic Chemistry: Vol. 2 1L. Finar, ELBS
3. StereoselectiveSynthesis : A Practical Approach, M. Norgradi, VCH.
4. Rodd's Chemistry of Carbon Compounds, Ed. S. Coffey, Elsevier.
5. Chemistry, Biological and Pharmacological Properties of Medicinal Plants from the Americas, Ed. Kurt Hostettmann, M.P. Gupta and A. Marston. harwood Academic Publishers.
6. Introduction to Flavonoids, B.A. Bohm. Harwood Academic Publishers.

Laboratory Course

Sem-III

Organic Chemistry

Course	Subject Title	Credit	Theory (hr/week)	Practical (hr/week)	External marks	Internal marks	Total
CH-OC 305	Organic chemistry Practicals	8	--	16	200	-----	200

(1) Organic Separation:

Credit 08

Separation, Purification and identification of three compounds (Ternary mixture) from 8 grams organic mixture by semimicro Method- Preparation of Derivative.

(Minimum Five mixtures should be done)

(2) Organic Estimation (Semimicro methods)

(a) Estimation of Enol group.

(b) Estimation of Oils and Fats:

Saponification and ester value of the given Oil or fat samples, Iodine value and acid value of given oil or fat samples. Other estimation techniques of Oils and fats.

(3). Preparation of dyes:

Preparation of Azo dyes, dyes obtained by other methods- Fluorescein, Eosin, Malachite green, Crystal violet etc and their TLC and MP.

(4) Organic Preparation :

Two & Three stage preparations from 4 to 5 grams starting material by semimicro method (Minimum five should be done) including name reactions. M.Sc. Organic Chemistry Semester III

M.Sc. Organic Chemistry Semester IV

Paper – Organic chemistry-7 (CH-OC 401)

Credit 04

Rationale of the Paper: To provide the basic and advanced knowledge of very useful concepts of Advanced Medicinal Chemistry. i.e. History of drugs, New invention in Medicinal chemistry and also to provide overview of the applications of these concepts in applied field to the students is also an objective.

Learning Outcome: Learning Outcome:

- Students can understand the historical and advance concept of medicinal chemistry and it's advantages.
- They can know the impact of advanced medicinal chemistry on the fields of medicine, pharmacy and its impact on the global economy.
- They can understand the fundamental principles of molecular structure and shape as they relate to organic molecules having a medicinal properties and their application to human anatomy.
- They can identify the medicinal properties of different organic molecules by medicinal application in medical science

Course	Subject Title	Credit	Theory (hr/week)	Practical (hr/week)	External marks	Internal marks	Total
CH – OC 401	Organic chemistry-7	4	4		70	30	100

Unit	Topics of Paper CH –OC 401	Marks	Teaching Hrs
	Section A		
1	Introduction, classification, synthesis and SAR of old and new drugs: Antihistamines and antiulcer drugs: Diphenhydramine, carbinoxamine, doxylamine, pheniramine, Diuretics: Acetazolamide, methazolamide. Antihypertensive: methyldopa, propranolol	15	15
2	Antihyperlipidemics: Fluvastatine, bezafibrate, fenofibrate. Adrenergics: Adrenaline, salbutamol, Cholinergic drugs: Pilocarpine, isofluorophate. Narcotic Analgesics: Levallorphan, mepiridine (pethidine), pentazocine.	15	15
	Section B		
3	Sedatives, Hypnotics and Anxiolytics: Phenobarbital, diazepam, bromazepam, . Anticonvulsants: Hydantoins, vigabatrin, progabide, sodium valproate, denzimol, zonisamide. Antipsychotic: thiothixene, haloperidol, pimozide, chlozapine, ziprasidone, seretindole.	15	15
4	Antipyretics and NSAIDS: Aspirin, salsalate, diflunisil, paracetamol, phenylbutazone, oxephenbutazone, flufenamic, indomethacin, sulindac, tolmetin, ibuprofen, diclofenac, naproxen, ketoprofen, tenoxicam, nambutone, nimesulide, anlagin, selecoxib, etodolac. Miscellaneous CNS drugs: Levodopa, carbidopa, mefanicin, baclofen, milameline, besiperdine, phenserine, ecopizil. Antiarrhythmic drugs: Procanamide, mexiletine, encainide, flecainide, amiodarone.	15	15
	Objective questions from all units	10	

Reference books:

1. Medicinal Chemistry, A. Burger Vols. I to V Ed. M. E. Wolff, John Wiley(1994).
2. Goodman & Gilman. Pharmacological Basis of Therapeutics, McGraw-Hill (2005).
3. S. S. Pandeya & J. R. Dimmock. Introduction to Drug Design, New Age International. (2000).
4. D. Lednicer. Strategies for Organic Drug Synthesis and Design, John Wiley (1998).
5. Graham & Patrick. Introduction to Medicinal Chemistry (3rd edn.), OUP (2005).
6. Medicinal Chemistry — A molecular and Biochemical Approach, Thomas Nogrady and Donald F. Weaver
7. Principles of Medicinal Chemistry, W. O. Foye
8. Wilson and Gisvolds Text book of Medicinal Chemistry
9. The Organic Chemistry of the Drug Design and Drug Action, Richard B. Silverman S
10. Analogue based Drug Discovery, János Fischer and C. Robin Ganellin
11. Goodman and Gilman's Text book of Pharmacology.
12. Chemoinformatics - Concepts, Methods, and Tools for Drug Discovery, Jürgen Bajorath
13. A Kar, Textbook of Medicinal Chemistry; Asian Age Publication.
14. Sriram D and Yogeshwari P, Medicinal Chemistry; Pearson Education.
15. Ahluwalia V K, Chopra Madhu, Medicinal Chemistry; Ane Books India.

Paper – Organic chemistry-8 (CH-OC 402)

Credit 04

Rationale of the Paper: To provide the basic knowledge of very important concepts of the bio-organic chemistry and also introduced the concepts of clinical trials, contract research organizations and different phases of clinical trials and how the bio organic chemistry work to parallel of clinical trials and CRO Industries.

Learning Outcome: Learning Outcome:

- Students can learn the basic of bio organic chemistry and technical skills to work effectively in the various fields of chemistry.
- To know and understand the structure of DNA & briefly know about the process of protein synthesis as organic synthesis point of view
- To know and understand the Clinical Trials :Phase 0, Phase I, Phase II, Phase III, Phase IV study, Contract Research organization (CRO), BA/BE studies

Course	Subject Title	Credit	Theory (hr/week)	Practical (hr/week)	External marks	Internal marks	Total Marks
CH – OC 402	Organic chemistry-8	4	4	0	70	30	100

Unit	Topics of Paper CH –OC 402	Marks	Teaching Hrs
	Section A		
1	Fundamentals of Biochemistry: Introduction of Biochemistry, Amino acids: peptides, primary, secondary, tertiary, and quaternary structure of proteins. Nucleic acids: Base pairing, double helices, DNA replication, transcription and translation, Enzymatic hydrolysis of proteins to peptides; Amino acid sequencing; amino acid metabolism (biosynthesis and degradation).	15	15
2	Metabolism and Metabolic Reactions: Overview and important relationships between-glycolysis, Bioenergetics And bioenergetic principles, oxidative phosphorylation process, ATP synthetase, photophosphorylation.Fatty acid metabolism: Biological importance of fatty acids and lipids, even chain and odd chain fatty acids, saturated and unsaturated fats, ketone bodies, fatty acid metabolism, calorific value of foods, biological membranes, properties and function of lipid bilayers and liposomes.Protein-related transformations: urea cycle, uric acid and ammonia formation	15	15
	Section B		
3	Nucleic Acids: Chemical and enzymatic hydrolysis of nucleic acids; Structure and function of mRNA, tRNA, rRNA; Polymorphic nature of DNA, B- and Z-DNA, multi- stranded DNA; DNA sequence determination by chemical and enzymatic methods, Genetic code – origin, salient features, Gene expression transcription and translation; Gene mutation and carcinogenesis	15	15
4	Clinical Trials : Phase 0,PhaseII,PhaseIII,PhaseIVstudy,Contract Research organization(CRO),BA/BE studies	15	15
	Objectives from all units	10	

References:

1. Albert L. Lehninger, David L. Nelson, Michael M. Cox., Principles of Biochemistry, CBS Publishers and Distributors, 1993.
2. Lubert Stryer, Biochemistry, W. H. Freeman and Company, 4th edition, 1995.
3. Christopher K. Mathews and K. E. Von Holder, Biochemistry, Benjamin/Cummings, 1990.
4. Eric E. Conn, Paul K. Stumpf, George Breening and Roy H. Doi, Outlines of Biochemistry, 5th edition, John Wiley and Sons, 1987.
5. F. A. Carey and R. J. Sundberg, (Eds) 3rd Edition, Part B. Plenum/Rosetta, 1990.
6. I. Fleming, Selected Organic Synthesis, John Wiley and sons, 1982.
7. Atta-ur-Rehman, Studies in Natural Products Chemistry, Vol.1 and 2, Elsevier, 1988.
8. T. Lindberg, Strategies and Tactics in Organic Synthesis, Academic Press, 1984.
9. H. Pape and J. H. Rehm, (eds): Biotechnology, A Comprehensive Treatise, Vol. 1-8, VCH, 198

Paper: Organic-chemistry-9(CH-OC-403)

Credit 02

Rationale of the Paper: To provide the basic knowledge of Industries related to Industrial chemistry**Learning Outcome:**

- Students can learn the basic Introduction of Application of Industrial Chemistry.
- Able to Know the different method of preparation of Industrial material.

Course	Subject Title	Credit	Theory (hr/week)	Practical (hr/week)	External marks	Internal marks	Total Marks
CH-OC 403	Organic chemistry-9	4	4	0	70	30	100

Unit	Topics of Paper CH-OC 403	Marks	Teaching Hrs
Section A			
1	<p>Petrochemicals -Coal, Petroleum nature gas organic chemicals coal distillation refining of crude oil for industrial fuels C₁,C₂,C₃,C₄ and aromatic chemicals. -Introduction, classification of fuels, Formation of coal, Properties of coal, classification of coal, Analysis of coal, Manufacture of coal gas. -Artificial gaseous fuels, water gas, Producer gas, semi water gas, Oil gas, Liquid Petroleum gas, Bio gas or gobar gas, coal gas.</p>	15	15
2	<p>Explosives and Toxic Chemical Weapons -Introduction, classification, characteristics of explosive. Nitrocellulose, PETN, DNB, EDNA, HMX, Tetryl, Pentryl, Hexyl, Dinol. -Toxic chemical weapons, Introduction, Toxic chemicals, screening smokes, Incendiaries, Pyrotechnics.</p>	15	15
Section B			
3	<p>Oils, Fats, Waxes and Soaps -Introduction, Classification, Vegetable Oils, Manufacture Of Cotton Seed Oil, Soybeen Oil, Refining of crude vegetable oils. Animals Oils, Animals Fat and oils, mineral essential oils. -Waxes, Classification of waxes, solubility of waxes, seponification of value, Ester Value, Acid Value, Iodine value, wijs method, Reichert Messi value, Henher value, Elaiden test. -Soap and its manufacture, Manufacture of soap, Oil to be used for soaps, other soaps.</p>	15	15
4	<p>Polymer Chemistry -Synthetic fibres : -Introduction, Difference between natural fibres and artificial or synthetic fibres. Methods of spinnings, Application of synthetic fibres. Acetate rayon, Viscose rayon, Nylon-66, Kapron, Terylene, orlon, saran. -Plastics: -Introduction, Classification, Moulding of Plastics, phenol-formaldelyde resins-Bakelite, preparation of resol, polyester resins. Polyethylene, Polypropylene, polystyrene, cellulose acetate, cellulose nitrate. Urea formal dehyde resins, Vinyl resins, PVC, PVA, Eproxy resins.</p>	15	15
	Objectives from all units	10	

References:

1. An introduction to industrial organic chemistry by peter wiseman.
2. Unit processes in organic synthesis by P.H.Groggins.
3. Industrial chemistry by B.K.Sharma.

Paper:Organic-chemistry-10(CH-OC-404)

Credit 04

Rationale of the Paper: To provide the basic knowledge of Research & Methodology**Learning Outcome:**

- Students can learn the basic Introduction of Objective of research.
- Able to Art of literature review, user of ICT in effective literature review, formulation of problem, formulation of hypothesis, developing research plan, meaning of research design, types of research design, basic principles of experimental design, selection of relevant variables, validity of experiments.

Course	Subject Title	Credit	Theory (hr/week)	Practical (hr/week)	External marks	Internal marks	Total Marks
CH-OC 404	Organic chemistry-10	4	4	.....	70	30	100

Unit	Topics of Paper CH-OC- 404	Marks	Teaching Hrs
	Section A		
1	Introduction: Objective of research, motivation in research, types of research, interdisciplinary research, scientific methods of research, criteria of good research, and characteristics of a good researcher.	15	15
2	Defining Research Problem: Art of literature review, user of ICT in effective literature review, formulation of problem, formulation of hypothesis, developing research plan, meaning of research design, types of research design, basic principles of experimental design, selection of relevant variables, validity of experiments.	15	15
	Section B		
3	Computer Application: Role of computer in research, data organization, software selection and its applications, solving problems by using scientific software & tools, sample programmes for analysis of data.	15	15
4	Thesis Writing and Presentation: Significance of writing thesis, different types of research writing; conference paper, journal paper, patents, thesis etc., different steps in writing thesis, layout of thesis, guidelines for writing good thesis, precautions in writing thesis, presentations skills, defending the thesis.	15	15
	Objectives from all units	10	

Reference Books:

1. Research Methodology: Methods & Techniques by C R Kothari, 2e, Wishwa Publication, New Delhi
2. Research Methodology by D K Bhattacharyya, 1 e, Excel Books, New Delhi, 2003
3. How to Research by Loraine Blaxter, Christina Hughes and Molcolm Tight, Viva Books Pvt.Ltd., New Delhi
4. Writing Your Thesis by Paul Oliver, VistaarPulication, New Delhi, 2006
5. The Research Student's Guide to Success by Pat Cryer, Viva Books Pvt Ltd., New Delhi

M.Sc. Semester IV

CH-OC 405 A. Practicals Credit: 08

Rationale of the Paper: To enhance practical skills of the students in organic qualitative analysis, quantitative analysis and instrumental methods of analysis. To provide overview of the applications of these experiments in applied field to the students is also an objective.

Teaching and Evaluation Scheme:

Each practical's listed in the syllabus will be explained and demonstrated in the laboratory. Students are evaluated based on the marks obtained in writing part as well as performance in the laboratory. Viva voce will be conducted based on practical performed by the students during the examinations.

CH-OC:405 Practicals:

Credit: 08

Course	Subject Title	Credit	Theory (hr/week)	Practical (hr/week)	External marks	Internal marks	Total Marks
CH-OC 405	Organic Practicals	08			200		200

Laboratory Course

Sem-IV

Organic Chemistry

(1) Organic Separation :

Separation, Purification and identification of three compounds (Ternary mixture) from 8 grams organics mixture by semimicro Method- Preparation of Derivative.

(Minimum Five mixtures should be done)

(2) Organic Estimation (Semi micro methods)

Estimation of Isniazide, Estimation of Ibuprofen, T.L.C. of Drugs ,T.L.C. of Dyes

(3) Organic Preparation :

Two & Three stage preparations from 4 to 5 grams starting material by semimicro method (Minimum five should be done) including name reactions.

(4) Spectroscopic problems: Identification of Organic compound by either spectral data or actual spectra (Combined UV-visible, HNMR, ¹³C NMR, Mass, IR).

Book Suggested:

1. Vogel's Textbook of Quantitative Analysis, revised, J. Bassett, R.C.Denney, G.H. Jeffery and J. Mendham, ELBS
2. Experiments and TEchniques in Organic Chemistry, D.Pasto, C. Johnson and M. Miller, Prentice Hall
3. Macroscale and Microscale Organic Experiments, K. K. Williamson, D. C. Heath.
4. Systematic Qualitative Organic Analysis, H. Middleton, Adward Arnold.
5. Handbook of Organic Analysis – Qualitative and Quantitative, H. Clark, Adward Arnold.
6. Vogel's Textbook of Practical Organic Chemistry, A. R. Tatchell, John Wiley.

Organic Chemistry- Project Work /industrial training (CH-OC 405 B)**Credit 08**

Course	Subject Title	Credit	Theory (hr/week)	Practical (hr/week)	External marks	Internal marks	Total Marks
CH-OC 405	Project Work/industrial training	08		-----	200		200