



KADI SARVA VISHWAVIDYALYA  
M.Sc Organic Chemistry Syllabus

**Kadi Sarva Vishwavidhyalaya**

**M.Sc. Chemistry**

**Syllabus**

**(Organic Chemistry)**

**Sem III and Sem IV**

**w.e.f. June 2018**







# KADI SARVA VISHWAVIDYALYA

## M.Sc Organic Chemistry Syllabus

### KADI SARVA VISHWAVIDYALAYA

#### M.Sc Organic Chemistry Semester 3 & 4 Syllabus Structure (W.E.F. June 2018)

	KADI SARVA VISHWAVIDYALAYA					
	M.SC ORGANIC CHEMISTRY SEMESTER - 3 SCHEME					
	Subject Code	Course	Instructions Hrs / week	Examination		
Internal				University Exam	Total	
CH-OC 301	Organic chemistry 3	4	30	70	100	4
CH-OC 302	Organic chemistry 4	4	30	70	100	4
CH-OC 303	Organic chemistry 5	4	30	70	100	4
CH-OC 304	Organic chemistry 6	4	30	70	100	4
CC-301 A	Research Methodology I	2	15	35	50	2
CH-OC 305	Organic Chemistry Practicals - I	16	0	200	200	8
<b>Total</b>		<b>34</b>	<b>135</b>	<b>515</b>	<b>650</b>	<b>26</b>

	KADI SARVA VISHWAVIDYALAYA					
	M.SC ORGANIC CHEMISTRY SEMESTER - 4 SCHEME					
	Subject Code	Course	Instructions Hrs / week	Examination		
Internal				University Exam	Total	
CH-OC 401	Organic Chemistry 7	4	30	70	100	4
CH-OC 402	Organic Chemistry 8	4	30	70	100	4
CC-401 A	Research Methodology II	2	15	35	50	2
CH-OC 403	Organic Chemistry Practicals - II	8	0	100	100	4
CH-OC 404	Dissertation / Industrial Training	12	50	250	300	12
<b>Total</b>		<b>30</b>	<b>125</b>	<b>525</b>	<b>650</b>	<b>26</b>



# KADI SARVA VISHWAVIDYALYA

## M.Sc Organic Chemistry Syllabus

### Semester-III

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

**Credit 04**

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

**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

Unit	Topics of Paper CH-OC 301	Marks	Teaching Hrs
	Section A		
1	<b>Introduction to Medicinal Chemistry</b> History of Medicinal Chemistry, Important Terminology used in Medicinal Chemistry (Drug, Pharmaceutical chemistry, pharmacy, pharmacognocny, pharmacology, pharmacokinetics, pharmacodynamics, Toxicity, pharmacopeia, antimetabolite, bacteria, virus, fungi, vaccine, therapeutic index), Classification of Drugs (on the basis of Structure & Pharmacological effect), Various routes of Drug Administration, Concept of Pro Drug, Soft Drug and Hard Drug	15	15
2	<b>Drug Design &amp; Development</b> Lead discovery and lead Modification, QSAR, Physicochemical parameters [Lipophilicity (Hansch equation), Electronic parameters (The Hammett equation), Steric parameters (Taft equation)], Bio-isosterism	15	15



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	Section B		
3	<b>Pharmacokinetics:</b> Drug absorption, Drug distribution, drug metabolism, Drug elimination, Important pharmacokinetic parameters in defining drug disposition, Usages of pharmacokinetics in drug development process. <b>Pharmacodynamics:</b> Principles and mechanisms of drug action, Types of receptors and drug receptor interactions, Dose-response relationships( drug potency and efficacy)	15	15
4	<b>Antibiotics:</b> Broad classification of Antibiotics. a) $\beta$ -lactam antibiotics: penicillin, Classification (early, resistant, 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	15	15
	Objective questions from all units	10	

### Reference books:

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



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## M.Sc Organic Chemistry Syllabus

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

**Credit 04**

Course	Subject Title	Credit	Theory (hr/week)	Practical (hr/week)	External marks	Internal marks	Total marks
CH-OC 302	Organic chemistry4	4	4	.....	70	30	100

**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 annulation.
- Introduced about the aromatic heterocycle in organic synthesis and ring synthesis, and the pericyclic reaction
- Also Introduction to good practices and regulatory offers as followed in pharma industry.

Unit	Topics of Paper CH-OC 302	Marks	Teaching Hrs
	Section A		
1	<b>One Group C-C Disconnections</b> Alcohols and carbonyl compounds, regioselectivity, alkene synthesis, use of acetylenes and aliphatic Nitro compounds in organic synthesis	15	15
2	<b>Two Group C-C Disconnections</b> Diels-Alder Reaction, 1,3-difunctionalised compounds, $\alpha,\beta$ -unsaturated carbonyl compounds, control in carbonyl condensations, 1,5-difunctionalised compounds. Micheal addition and Robinson annulation.	15	15
	Section B		
3	<b>Pericyclic Reactions</b> 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	<b>Reaction, mechanism and applications of Following Rearrangements.</b> Beckmann Rearrangement, Benzilic Acid Rearrangement, Claisen Rearrangement, Fries Rearrangement, Dienone-phenol Rearrangement, Wagner Meerwin Rearrangement.	15	15



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	Objective questions from all units	10	
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### 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.



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## M.Sc Organic Chemistry Syllabus

Paper : Organic chemistry-5 (CH-OC 303)

Credit 04

Course	Subject Title	Credit	Theory (hr/week)	Practical (hr/week)	External marks	Internal marks	Total marks
CH-OC 303	Organic chemistry5	4	4	.....	70	30	100

**Rationale of the Paper:** To provide the basic knowledge of stereochemistry. Also to impart knowledge of different name reactions, oxidising and reducing agents used in industry

**Learning Outcome:**

- Students can learn the basics of stereochemistry
- Able to Know the mode of action of various oxidising and reducing agent.
- They can understand the application of name reactions in the synthesis of drugs

Unit	Topics of Paper CH-OC 303	Marks	Teaching Hrs
1	<b>Fundamental of Stereochemistry</b> Important terminology of stereochemistry and nomenclature. Chiral properties of Organic compounds: ORD, CD and rules for optical properties. <b>Conformational Analysis</b> Acyclic, cyclic, fused and bridged cyclic ring system. Dynamic stereochemistry, conformation and reactivity, Helicity, methods of separation of enantiomers.	15	15
2	<b>Diastereoselectivity</b> Stereospecific and stereo selective reactions, prochirality, Cram's rule, Newman projection and Felkin-Ahn model. Stereo selective and stereo regulator polymerization. Stereo chemistry of fused ring and bridge ring and spirans	15	15
3	<b>Name reaction, mechanism and application of:</b> Vilsmeier-Haack reaction, Mitsunobu reaction, Suzuki reaction, Buchwald-Hartwig reaction, Sonogashira coupling, Stobbe condensation, Dieckmann condensation, Michael condensation, Knoevenagel reaction	15	15
4	<b>OXIDISING AND REDUCING AGENTS</b> Oxidising agents: $\text{CrO}_3$ , $\text{MnO}_2$ , $\text{KMnO}_4$ , $\text{SeO}_2$ , $\text{OsO}_4$ , DMSO, DDQ, $\text{K}_3[\text{Fe}(\text{CN})_6]$ , Dess-Martin oxidation. Swern oxidation. Reducing Agents: $\text{NaBH}_4$ , $\text{LiAlH}_4$ , $\text{Na}/\text{NH}_3$ , PTC, DCC, Baker's Yeast. $\text{Pd}/\text{C}$ , $\text{H}_2$ , $\text{Pd}(\text{OH})_2$ .	15	15
	Objective questions from all units	10	



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### References:

1. Stereochemistry: Conformation and Mechanism by P.L. kalsi, New age Publications
2. Stereochemistry of Organic Compounds: Principles and Applications by D. Nasipuri, New Age International Publishers.
3. Principles of organic synthesis; P.O.C. Norman and J.M. COXON
4. Organic reaction Mechanism: Clayden and Warren
5. Modern method of organic synthesis: W. carruthers.
6. Organic Reaction Mechanism :V. K Ahluwalia, R. K. Parashar





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## M.Sc Organic Chemistry Syllabus

Paper : Organic chemistry-6 (CH-OC 304)

Credit 04

Course	Subject Title	Credit	Theory (hr/week)	Practical (hr/week)	External marks	Internal marks	Total
CH-OC 304	Organic chemistry6	4	4	.....	70	30	100

**Rationale of the Paper:** To provide the basic knowledge of natural products, their extraction, constitution and application.

### 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, Geraniol,  $\alpha$ -Terpeneol, Farnesol, Zingiberene, Phytol, Abietic acid and  $\beta$ -Carotene.
- To know and understand Steroids & Porphyrins: Occurrence, nomenclature, basic skeleton, Diel's hydrocarbon and stereochemistry, Isolation, Structure determination and synthesis of Cholesterol, Bile acids, Androsterone, Testosterone, Oestrone, Progesterone, Aldosterone, Biosynthesis of Steroids. Structure of phthalocyanins, Haemoglobin and Chlorophyll.

Unit	Topics of Paper CH-OC 304	Marks	Teaching Hrs
	Section A		
1	<b>Terpenoids and Carotenoids</b> Classification, nomenclature, occurrence, isolation, general methods of structure determination, isoprene rule. Structure determination, stereochemistry, biosynthesis and synthesis of the following representative molecules: Geraniol, Farnesol, Phytol, zingiberene, abietic acid and $\beta$ -Carotene.	15	15
2	<b>Alkaloids</b> 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		



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3	<b>Steroids:</b> Occurrence, nomenclature, basic skeleton, Diel's hydrocarbon and stereochemistry, Isolation, Structure determination and synthesis of Cholesterol, Bile acids, Androsterone, Testosterone, Oestrone, Progesterone, ergosterol, Biosynthesis of Steroids.	15	15
4	Constitution of Haemoglobin, Chlorophyll and phthalocyanins. (no synthesis)	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. Stereoselective Synthesis: 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.



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## M.Sc Organic Chemistry Syllabus

**Paper: Research Methodology-I(CC-301A)**

Credit 02

Course	Subject Title	Credit	Theory (hr/week)	Practical (hr/week)	External marks	Internal marks	Total Marks
CC-301A	Research Methodology-I	2	2	.....	50	-----	50

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

**Learning Outcome:**

- Students can learn the basic Introduction of Objective of research.
- Student will learn to define a research problem.

Unit	Topics of Paper CC-301A	Marks	Teaching Hrs
1	<b>Research Methodology:</b> An Introduction Meaning of research, Objectives of research, motivation in research, Types of research, Research Approaches, significance of research, research method vs methodology, research and scientific method, importance of knowing how research is done, research process, criteria of good research, problems encounter by researchers in india.	25	15
2	<b>Defining Research Problem:</b> what is research problem?, selecting the problem, necessity of defining the problem, Technique involved in defining a problem, an illustration, conclusion <b>Research Design:</b> Meaning of research design, need for research design, features of good design, important concepts relating to research design, different research designs, basic principles of experimental design	25	15

**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, VistaarPublication, New Delhi, 2006
5. The Research Student's Guide to Success by Pat Cryer, Viva Books Pvt Ltd., New Delhi



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### 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 I	8	--	16	200	-----	200

**(1) Drug Synthesis: WITH CHARACTERIZATION UV & IR OF ANY ONE**

Phenacetin, Benzyl Benzoate, Dichloramine-T, Pechman Condensation (7-Hydroxy-4-methyl coumarin, Resacetophenone) Hoesch Reaction (or Houben-Hoesch Reaction), Acetaminophen, Isoniazid, Methyldopa, Acetylcysteine, Acetylacetone, Paracetamol, Benzoyl Glycineminimum five should be done). or any kind of medicinal drug we can synthesized in the lab (be done). **Theoretical Characterization for all.**

**(2) Preparation of dyes: WITH CHARACTERIZATION UV & IR OF ANY ONE**

Preparation of Azo dyes, dyes obtained by other methods- Fluorescein, Eosin, Malachite green, Crystal violet, Dimethyl-p-phenylenediamine etc and their TLC and MP. **(minimum 5 should be done) Theoretical Characterization for all.**

**(3) Organic Preparation : WITH CHARACTERIZATION UV & IR OF ANY ONE**

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



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## M.Sc Organic Chemistry Syllabus

### M.Sc. Organic Chemistry Semester IV

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

Credit 04

Course	Subject Title	Credit	Theory (hr/week)	Practical (hr/week)	External marks	Internal marks	Total
CH – OC 401	Organic chemistry7	4	4		70	30	100

**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

Unit	Topics of Paper CH –OC 401	Marks	Teaching Hrs
	Section A		
1	<b>Introduction, classification, synthesis and SAR of old and new drugs:</b> <b>Sedatives, Hypnotics and Anxiolytics:</b> Phenobarbital, diazepam, bromazepam, <b>Anticonvulsants:</b> Hydantoins, vigabatrin, progabide, sodium valproate, denzimol, zonisamide. <b>Antipsychotic:</b> thiothixene, haloperidol, pimozide, chlozapine, ziprasidone, seretindole.	15	15
2	<b>Miscellaneous CNS drugs:</b> Levodopa, carbidopa, mefanicin, baclofen, milameline, ecopizil. <b>Adrenergics:</b> Adrenaline, salbutamol, <b>Cholinergic drugs:</b> Pilocarpine, isofluorophate. <b>Diuretics:</b> Acetazolamide, methazolamide.	15	15



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Section B			
3	<b>Antihyperlipidemics:</b> Fluvastatine, benzafibrate, fenofibrate. <b>Antiarrhythmic drugs:</b> Procanamide, mexiletine, encainide, flecainide, amiodarone. <b>Antihypertensive:</b> methyldopa, propranolol <b>Antihistamines and antiulcer drugs:</b> Diphenhydramine, carbinoxamine, doxylamine, pheniramine	15	15
4	<b>Antipyretics and NSAIDS:</b> Aspirin, salsalate, diflunisil, paracetamol, phenylbutazone, oxephenbutazone, flufenamic, indomethacin, sulindac, tolmetin, ibuprofen, diclofenac, naproxen, ketoprofen, tenoxicam, nambutone, nimesulide, anlagin, selecoxib, etodolac. <b>Narcotic Analgesics:</b> Levallorphan, mepiridine (pethidine), pentazocine.	15	15
<b>Objective questions from all units</b>		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.



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## M.Sc Organic Chemistry Syllabus

**Paper :Organic chemistry-8 (CH-OC 402)**

**Credit 04**

Course	Subject Title	Credit	Theory (hr/week)	Practical (hr/week)	External marks	Internal marks	Total Marks
CH – OC 402	Organic chemistry8	4	4	0	70	30	100

**Rationale of the Paper:** To provide the basic knowledge of very important concepts of the bio-organic chemistry ,lipids,nucleic acids, proteins, enzymes and different metabolic process.

**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 metabolism and metabolic reactions.

Unit	Topics of Paper CH –OC 402	Marks	Teaching Hrs
	Section A		
1	<b>Proteins and Nucleic acids</b> Amino acids, structure, peptide bond, chemical bonds in protein structure, protein configuration (primary, secondary, tertiary and quaternary structure of protein) Nucleic acid: types, sugar, bases and phosphates in DNA & RNA, DNA: internucleotide linkages, double helicle structure, types of DNA RNA: types of RNA (m RNA, t RNA, r RNA), difference between DNA & RNA	15	15
2	<b>Lipids</b> Definition, Fatty acids and its nomenclature, Saturated and unsaturated fatty acids, hydroxy fatty acids, cyclic fatty acids, biological role of lipids. Simple lipids: Fats, oils & waxes Compound lipids: Phospholipids, Glycolipids.	15	15



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<b>Section B</b>			
3	<b>Enzymes</b> Definition, nomenclature and classification, Isoenzymes, Biological role of enzymes, Chemical nature and characteristics of enzymes, Colloidal Nature, Catalytic nature, Specificity of enzyme action, Thermolability, Reversibility of reaction, pH sensitivity, MichaelisMenten equation, Fischers lock & key model, Koshlands Induced fit model.	15	15
4	<b>Metabolism and Metabolic Reaction</b> Catabolism, Anabolism, Metabolism of Carbohydrates (Glycolysis, Kerbs Cycle, oxidative phosphorylation, oxidative photophosphorylation) Metabolism of proteins(Urea cycle)	15	15
<b>Objectives from all units</b>		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 Brening 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. 18, VCH, 198





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## M.Sc Organic Chemistry Syllabus

**Paper: Research Methodology-II(CC-401A)**

Credit 02

Course	Subject Title	Credit	Theory (hr/week)	Practical (hr/week)	External marks	Internal marks	Total Marks
CC-401A	Research Methodology-II	2	2	.....	50	-----	50

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

**Learning Outcome:**

- Students can learn the methods to collect research data through different methods. Also understand role of computer in research
- Student will gain the knowledge of processing data and understand the guidelines of thesis writing.

Unit	Topics of Paper CC-401A	Marks	Teaching Hrs
1	<b>Methods of Data Collection:</b> collection of primary data, observation method, Interview method, collection of data through questionnaires, collection of data through schedules, difference between questionnaires and schedules, some other method of data collection, collection of secondary data, selection of appropriate method for data collection, role of computer in research.	25	15
2	<b>Processing And analysing data:</b> Processing operations, solving problems in processing, types of analysis, statistics in research, measures of central tendency, measures of dispersion, measures of asymmetry, measures of relationship, simple regression analysis, multiple correlation and regression, partial correlation, association in case of attributes, significance of writing thesis, different types of research writing, guidelines of writing good thesis.	25	15

**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, VistaarPublication, New Delhi, 2006
5. The Research Student's Guide to Success by Pat Cryer, Viva Books Pvt Ltd., New Delhi

**Organic Chemistry Practicals (CH-OC 403)**

Credit: 04



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Course	Subject Title	Credit	Theory (hr/week)	Practical (hr/week)	External marks	Internal marks	Total Marks
CH-OC 403	Organic Chemistry Practicals II	04	----	08	100	--	100

### Laboratory Course Organic Chemistry (minimum 6)

#### (1) Organic Estimation (semi micro method) (Any Two)

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

#### (2) Organic Preparation : (Any three)

Three stage preparations from 4 to 5 grams starting material by semimicro method including name reactions along with the characterization

#### (3) Spectroscopic Problems: (atleast two)

Identification of Organic Problems by either spectral data or actual spectra (Combined UV-Visible, HNMR, <sup>13</sup>C 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, Edward Arnold.
5. Handbook of Organic Analysis – Qualitative and Quantitative, H. Clark, Edward Arnold.
6. Vogel's Textbook of Practical Organic Chemistry, A. R. Tatchell, John Wiley.

### Organic Chemistry- Dissertation / industrial training (CH-OC 404) Credit 12

Course	Subject Title	Credit	Theory (hr/week)	Practical (hr/week)	External marks	Internal marks	Total Marks
CH-OC 404	Dissertation / industrial training	12		-----	250	50	300