



SYLLABUS

Course Title	SEPARATION TECHNIQUES	
Course Code	MGC201	
Course Credit	Lecture	: 04
	Practical	: 03
	Tutorial	: 00
	Total	: 07
Detailed Syllabus:		
Sr. No	Name of chapter & Details	Session Allotted
SECTION-I		
1	Introduction: History, Classification, definition of terms, principles, basic theory of chromatographic technique and sample handling. Band broadening and column efficiency: Definition, plate theory and rate theory of chromatographic technique, their limitation and applications.	10
2	TLC AND HPTLC: Introduction, preparation of TLC plate, Basic principles, instrumentation of HPTLC, Application of HPTLC.	10
3	HPLC: Principles of HPLC, instrumentation of HPLC, Types of column, Types of detectors use in HPLC, and difference between HPLC and UPLC, Application of HPLC.	10
SECTION-II		
4	GC: Introduction, Basic principle of GC, difference between GLC and GSC, instrumentation of GC, Types of column, Types of detectors use in GC. Application of GC.	12
5	Ion chromatography: Principle theory , instrumentation and applications	08
6	Hyphenated techniques: Introduction, GC-MS, LC-MS theory working and applications.	10
LIST OF PRACTICALS(3 HOURS/WEEK)		
1. To determine the R_f value of the amino acids present in a given mixture by paper chromatography.		
2. To determine the R_f value of the amino acids present in a given mixture by circular paper		

chromatography.

3. To determine the R_f value of the amino acids present in a given mixture by thin layer chromatography.
4. To determine the R_f value of the components present in a given binary mixture by thin layer chromatography.
5. Separation of different pigments present in spinach leaf by using paper chromatography and calculate their R_f values.
6. Separation of different pigments present in spinach leaf by using thin layer chromatography and calculate their R_f values.
7. Detection of carotene in carrot by using thin layer chromatography and calculation of R_f value.
8. Identification of caffeine present in tea extract by thin layer chromatography.
9. Identification of quinine present in cinchona bark extract by thin layer chromatography.

Instructional Method and Pedagogy:

1. Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
2. Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval.
3. Surprise tests/Quizzes/Tutorials will be conducted.
4. The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
5. Minimum ten experiments shall be there in the laboratory related to course contents.

Students Learning Outcomes:

At the end of the course the students will be able to:

- **Know** various basic fundamental of chromatography and its classification.
- **Know** the utilization of various instrumental techniques for separation and chemical analysis.
Know the various Hyphenated techniques like GCMS, LCMS etc.

Reference Books:

1. Instrumental method of Chemical Analysis by B.K. Sharma. 24th edition, Gohel publishing house Meerut, 2005
2. Vogel Textbook of Quantitative Chemical Analysis, 6th edition.
3. Instrumental method of Chemical Analysis by G. R. Analysis, 5th edition, Himalaya Publishing House, 2012
4. Principles of instrumental analysis by D. A. Skoog, 5th edition, Saunders College Publisher.
5. Analytical chemistry by G. D. Christian. 6th edition. John Wiley & sons, Inc. 2004



SYLLABUS

Course Title		IPR AND RESEARCH METHODOLOGY
Course Code		MGC202
Course Credit	Lecture	: 04
	Tutorial	: 00
	Practical	: 00
	Total	: 04
Detailed Syllabus:		
Sr. No	Name of chapter & Details	Session Allotted
SECTION-I		
1	GMP: introduction, Enforcement (Area covered in GMP) , Schedule-M, cGMP. GLP: Introduction, Principles (OECD). QC: Introduction, Basic requirements of QC area. ICH guideline.	12
2	Patents: Definition, Need for patenting, Types of Patents, Condition to be satisfied by an invention to be patentable, Inventions which are not patentable, Introduction to patent search, The essential elements of patents, Nonobviousness in patents, Process and product protection, Patent of addition. Priority date, Revocation of patent, True inventor, First inventor, Issues to be evaluated before entering into patent license agreements Patent Infringement, Drafting of patent claims patent filling and forms to be submitted along with a patent application. Important patent related websites,	18
SECTION-II		

3	<p>Research: Meaning, purpose, Types, (industrial, Clinical, Experimental, historical, descriptive, Basic and applied Research) and objectives of Research, phases of research.</p> <p>Research Design: Review of Research Literature: Purpose and use of literature review, locating relevant information, use of library & electronic databases, preparation & presentation of literature review, research article reviews,</p>	10
4	<p>Documentation: Techniques of documentation. Importance of documentation. Use of computer packages in documentation.</p> <p>Research Publication: Thesis, Research paper, Review Article & Technical Reports: Organization of thesis and reports, formatting issues, citation methods, Bibliography, effective oral presentation of research. Quality indices of research publication: impact factor, H- index and other citation indices.</p>	10
5	<p>Cost analysis of the project: Cost incurred on raw materials, Procedure, instrumentations and clinical trials.</p> <p>Sources for procurement of research grants: Major and minor projects. International agencies, government and private bodies.</p> <p>Research Ethics and Morals: Ethics, research and professional ethics. Standards of Ethical conduct in Science, Moral Theory, Moral Choices. Issues related to plagiarism, collaborative models and ethics, Acknowledgements.</p>	10
Instructional Method and Pedagogy:		
<ol style="list-style-type: none"> 1. Lectures will be conducted with the aid of multi-media projector, black board, OHP etc. 2. Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval. 3. Surprise tests/Quizzes/Tutorials will be conducted. Lectures will be conducted with the aid of multi-media projector, black board, OHP etc. 		
Students Learning Outcomes:		
<p>After Successful completion of the above course, students will be able to:</p> <p>Understand the importance of patents and IPR in Chemical industries.</p> <p>Appreciate the component of Scholarly writing and evaluate its quality.</p> <p>Able to write proper research proposal, report and Thesis.</p> <p>To take suitable decision between moral and ethics.</p>		
Reference Books:		
<ol style="list-style-type: none"> 1. Introduction to Instrumental Analysis, by Robert D. Braun, Pharme Med Press Hyderabad-India. 2. Instrumental Method of Analysis, Willard, Merritt, Jr., Dean and Settle Jr., CBS Publishers and distributors, New Delhi, India 		



SYLLABUS

Course Title	ORGANIC CHEMISTRY - II	
Course Code	MOC201	
Course Credit	Lecture	: 04
	Practical	: 03
	Tutorial	: 00
	Total	: 07
Detailed Syllabus:		
Sr. No	Name of chapter & Details	Session Allotted
SECTION-I		
1	Reaction Mechanism Macmurry olefination reaction Oppenauer reaction Passerini reaction Perkin reaction Reformatsky reaction Robinson annulation reaction Shapiro reaction Sharpless asymmetric epoxidation Stobbe reaction Storke enamine reaction Suzuki coupling reaction Ugi reaction Vilsmeier-hack reaction Wolff kishner reaction	12
2	Photochemical reaction: Interaction of electromagnetic radiation with matter, types of excitations, fate of excited molecule, quantum yield, transfer of excitation energy.	08
3	Photochemistry of aromatic compound: Isomerizations, Addition and substitution reactions.	10
SECTION-II		
4	Pericyclic reaction: Molecular orbital symmetry, Frontier orbital's of ethylene, 1,3-butadiene, 1,3,5-hexatriene and allyl system.	15

	Classification of pericyclic reaction: Woodward-Hoffmann correlation diagram. FMO and PPMO approach. Electrocyclic reaction-conrotatory and disrotatory motion, $4n$ and $4n+2$ and allyl systems. $2+2$ cycloadditions-antarafacial and suprafacial additions	
5	Aromaticity: Nonbenzene aromatic compounds, azulenes, Tropolene ($4n+2$), Huckel's rules and its applications.	15
LIST OF PRACTICALS(3 HOURS/WEEK)		
<ol style="list-style-type: none"> 1. Organic Spotting and its derivatives and crystallization 2. Preparation of various active drugs and measures progress of reactions. 		
Instructional Method and Pedagogy:		
<ol style="list-style-type: none"> 1. Lectures will be conducted with the aid of multi-media projector, black board, OHP etc. 2. Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval. 3. Surprise tests/Quizzes/Tutorials will be conducted. 4. The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures. 5. Minimum ten experiments shall be there in the laboratory related to course contents. 		
Students Learning Outcomes:		
After Successful completion of the above course, students will be able to:		
<p>Know various basic fundamental organic reactions and their utilization in synthesis of new organic compound.</p> <p>Know the utilization of various reagents for synthesis reaction.</p>		
Reference Books:		
<ol style="list-style-type: none"> 1. Principles of Organic Synthesis: R.O.C Norman & J.M. Coxon (ELBS). 2. Mechanism in Organic Chemistry: Peter Sykes (Orient Longman). 3. Modern Methods of Organic Synthesis: W. Carruthers (Cambridge). 4. Organic Reaction Mechanism: V.K.Ahluwalia and R.K.Parashar (Narosa). 5. Organic Chemistry by Morrison Robert Thornton. 6. Advanced Organic Chemistry: Reactions, Mechanisms, and Structure by March Jerry. 7. Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry by Block Johan H., Editor; Wilson and Gisvold 		



SYLLABUS

Course Title	ADVANCED MEDICINAL CHEMISTRY	
Course Code	MOC202	
Course Credit	Lecture	: 04
	Practical	: 03
	Tutorial	: 00
	Total	: 07
Detailed Syllabus:		
Sr. No	Name of chapter & Details	Session Allotted
SECTION-I		
1	Introduction to medicinal chemistry: Drug Design: Development of new drugs, procedures followed in drug design, concepts of lead identification and lead modification, structure-activity relationship, factor affecting bioactivity, resonance, inductive effect, isosterism, bio-isosterism and	10
2	History and development of QSAR: Lipophilicity, electronic parameters, steric parameters, Shelton and surface activity parameters, redox potentials, free Wilson analysis, hansch analysis, relationship between them, other statical methods.	12
3	Pharmacokinetics: Introduction to drug absorption, Distribution, metabolism, elimination,. Important pharmacokinetic parameters in defining drug desorption and in therapeutics. Mention of uses of pharmacokinetics in drug development process. Concept of prodrug and soft drugs.	08
SECTION-II		
4	Pharmacodynamics: Introduction to drug receptors interactions, theory of drug activity relationship, treatment of diseases by enzyme stimulation and enzyme inhibition, LD ₅₀ , ED ₅₀ , MIC and MEC etc. Membrane active drugs, xenobiotics, significance of drug metabolism in medicinal chemistry.	12
5	Combinatorial Chemistry: Automation, solid supported and solution phase of synthesis and related other methodologies, preparation study of targeted or focused libraries.	10

6	Recent update in drug discovery:	08
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LIST OF PRACTICALS(3 HOURS/WEEK)

Determination of Drugs amount

- To Determine the amount of Aspirin in given sample of medicine.
- To Determine the amount of Cefalexin in given sample of medicine.
- To Determine the amount of Ascorbic acid in given sample of medicine.
- To Determine the amount of glucose in given sample of medicine.
- To Determine the amount of anta acid in given sample of medicine.
- To Determine the amount of isoniazide in given sample of medicine.
- To Determine the amount of salicylic acid in given sample of medicine.
- To Determine the amount of calcium gluconate in given sample of medicine.

Instructional Method and Pedagogy:

1. Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
2. Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval.
3. Surprise tests/Quizzes/Tutorials will be conducted.

Students Learning Outcomes:

After Successful completion of the above course, students will be able to:

- Learn** elucidation of structures by SAR.
- Learn** methodology of any recent advanced drug discovery.

Reference Books:

1. Introduction to Medicinal Chemistry, A Gringuage, Wiley-VCH.
2. Burger's Medicinal Chemistry and Drug Discovery, Sixth Edition, Ed.M.E.vWolff, John Wiley.
3. Goodman and Gilman's Pharmacological Basis of Therapeutics, McGraw-Hill.
4. The Organic Chemistry of Drug Design and Drug Action, R.B. Silverman, Academic Press.
5. Strategies for Organic Drug Synthesis and Design, D. Lednicer, John Wiley.
6. Pharmaceutical Substances., Kleemann, Vol-I & II., Fourth edition., Thieme.
7. Principles of Medicinal Chemistry., William Foye, Fourth Edition., Lippincott, William and Wilkins.
8. Analytical Profile of Drug Substances (Series)., Florey.