

<b>INSTITUTE</b>	<b>FACULTY OF SCIENCE</b>
<b>PROGRAM</b>	<b>MASTER OF SCIENCE (CHEMISTRY)</b>
<b>SEMESTER</b>	<b>3</b>
<b>COURSE TITLE</b>	<b>MEDICINAL CHEMISTRY</b>
<b>COURSE CODE</b>	<b>02CY1503</b>
<b>COURSE CREDITS</b>	<b>4</b>

**Objective:**

- 1 To understand drug metabolism and its action in human body.
- 2 To learn theories and principles related to medicinal chemistry.
- 3 To learn various nucleophilic, substitution and electrophilic reactions in organic chemistry.
- 4 To create an interest of students to learn medicinal chemistry.

**Course Outcomes:** After completion of this course, student will be able to:

- 1 Understand Drug metabolism and mechanism pathways.
- 2 Student will analyze and identify types of drugs in the market.
- 3 Recognise and comment on different synthetic strategies and methods for stereo control when faced with a synthetic scheme.
- 4 Able to draw mechanisms for reactions involving heterocycles as starting materials, intermediates and products, and to propose syntheses of heterocycles from the major classes.

**Pre-requisite of course:** Students have knowledge about pharmaceutical chemistry

**Teaching and Examination Scheme**

<b>Theory Hours</b>	<b>Tutorial Hours</b>	<b>Practical Hours</b>	<b>ESE</b>	<b>IA</b>	<b>CSE</b>	<b>Viva</b>	<b>Term Work</b>
4	0	0	50	30	20	0	0

<b>Contents : Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
1	<b>Introduction and Important Terminology Used in Medicinal Chemistry</b> Drug design: i) Development of new drugs, procedures followed in drug design, concepts of lead identification and lead modification, structure-activity relationship (SAR), and bio-isosterism., ii) History and development of QSAR. Physicochemical parameters: Lipophilicity, electronic parameters, steric parameters, Free Wilson analysis, Hansch analysis, Relationship between Free-Wilson and Hansch analysis.	12

<b>Contents : Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
2	<b>Pharmacokinetics</b> ADME, prodrugs and polymorphism. Pharmaco dynamics: 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.	12
3	<b>Antibiotics and Anticancer</b> i) Antibiotics Introduction, Classification, Selected Synthesis, properties and uses of following antibiotics drugs: Oxacillin, Cloxacillin, Floxacillin, Ampicillin, Cephalexin, Cefadroxil, cephalosporin., ii) Anticancer Introduction to chemotherapeutic agents, Antimalarials, antiprotozoals, ntileprosy, antitubercular, antifungal, antianaerobics anthelmintics and antiinfestive drugs and antiviral.	12
4	<b>Central Nervous System</b> Introduction and selected synthesis of Anaesthetic (local & general), analgesics, antipyretics, (steroidal and nonsteroidal anti-inflammatory drugs), old concepts of sedative and hypnotic tranquilizers (major and minor),, antiepileptics, anticonvulsants, antidepressants and antimaniacs. Drugs used in movement disorder, antiemetics ,CNS stimulants and activators.	12
5	<b>Cardiovascular Drugs and Genitourinary System Drugs</b> Introduction and selected synthesis of Antiarrhythmic agent, antihypertensive, vasodilators (peripheral and coronary), coagulants and anticoagulants, antithrombotic and antiplatelet drugs., Genito urinary system Drugs: Urinary infectives, diuretics and anti-diuretics, analgsics , spermicidal, contraceptives	12
<b>Total Hours</b>		<b>60</b>

#### **Textbook :**

- 1 Textbook of medicinal chemistry, Alagarsamy V, CBS Publishers & Distributors Pvt. Ltd, 2022
- 2 Chemistry of Antibiotics and Related Drugs, Mrinal K. Bhattacharjee, Springer Cham, 2022
- 3 Modern CNS Drug Discovery, Rudy Schreiber, Springer Cham, 2021

#### **References:**

- 1 Wilson and Gisvold's Textbook of organic medicinal and pharmaceutical chemistry, Wilson and Gisvold's Textbook of organic medicinal and pharmaceutical chemistry, Charles Owens Wilson, Ole Gisvold, Robert F. Doerge, Lippincott, Philadelphia, 2011
- 2 The Organic Chemistry of Drug Design and Drug Action, The Organic Chemistry of Drug Design and Drug Action, Richard Silverman, Academic Press, 2014
- 3 Medicinal Chemistry, Medicinal Chemistry, Ashutosh Kar, New Age International (P) Limited, 2006

### References:

- 4 Medicinal Chemistry, Medicinal Chemistry, Ahluwalia, V K & Madhu Chopra, Ane Books, , 2012
- 5 The Organic Chemistry of Drug Synthesis, The Organic Chemistry of Drug Synthesis, Daniel Lednicer, John Wiley & Sons, Inc, 2007

### Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
10.00	20.00	30.00	30.00	10.00	0.00

### Instructional Method:

- 1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
- 2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
- 3 Students will use supplementary resources such as online videos, NPTEL videos, ecourses, Virtual Laboratory.

### Supplementary Resources:

- 1 <http://www.organic-chemistry.org/reactions.htm>
- 2 <http://www.organic-chemistry.org/books/>
- 3 <http://vlab.amrita.edu/index.php?sub=2>
- 4 [http://www.vlab.co.in/ba\\_labs\\_all.php?id=9](http://www.vlab.co.in/ba_labs_all.php?id=9)
- 5 <http://ocw.mit.edu/courses/chemistry/>
- 6 [https://www.youtube.com/results?search\\_query=organic+rearrangements](https://www.youtube.com/results?search_query=organic+rearrangements)