

INSTITUTE	FACULTY OF SCIENCE
PROGRAM	MASTER OF SCIENCE (CHEMISTRY)
SEMESTER	3
COURSE TITLE	MEDICINAL CHEMISTRY
COURSE CODE	02CY0504
COURSE CREDITS	6

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

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
5	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	Introduction and Important terminology used in Medicinal Chemistry 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
2	Pharmacokinetics ADME, prodrugs and polymorphism. 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.	12

Contents : Unit	Topics	Contact Hours
3	Antibiotics and Anticancer 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	Central Nervous system: 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	Cardiovascular drugs and Genitourinary system drugs Introduction and selected synthesis of Antiarrhythmic agent, antihypertensive, vasodilators (peripheral and coronary), coagulants and anticoagulants, antithrombotic and antiplatelet drugs., Genitourinary system Drugs: Urinary infectives, diuretics and anti-diuretics, analgsics , spermicidal, contraceptives	12
Total Hours		60

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	Experiments Experiment - 1, Experiment - 2, Experiment - 3, Experiment - 4, Experiment - 5, Experiment - 6, Experiment - 7, Experiment - 8, Experiment - 9, Experiment - 10	
Total Hours		

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
- 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
10.00	20.00	25.00	25.00	10.00	10.00

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 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
- 4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.
- 5 Use of hazardous/toxic chemicals should be avoided as far as possible in laboratory.
- 6 All students in the laboratory must wear safety goggles and lab coats during lab session.

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
- 5 <http://ocw.mit.edu/courses/chemistry/>
- 6 https://www.youtube.com/results?search_query=organic+rearrangements