Programme: M. Sc. (Chemistry, Part-II)
Course Code: OCO-503
Title of the Course: Introduction to Medicinal Chemistry
Number of Credits: 3 **Effective from AY**: 2019-20

Prerequisites for the course:	Should have studied the topics on Reaction Mechanisms, stereochemistry and spectroscopy at M. Sc. part-I (Chemistry) levels.	
Course Objective:	4. Study of drugs and drug development. 5. Introduction to the concepts and processes of drug discovery, delivery, absorption and metabolism. 6. It also provides brief introduction to pharmacology, pharmacokinetics and pharmacodynamics.	
Course Outcome	1. Understand the historical and advanced concepts of medicinal chemistry and its advantages 2. Identify the medicinal properties of different organic molecules.	
Content:	**1. Introduction to Drugs** 1.1. Requirement of an ideal drug 1.2. Sources of drugs 1.3. Important terms used in chemistry of drugs 1.4. Classification and nomenclature of drugs **2. Drug Design** 2.1. Analogues and pro-drugs 2.2. Concept of lead compounds 2.3. Features governing drug design – The method of variation, drug design through disjunction, conjunction, tailoring of drugs 2.4. Cimetidine – a rational approach to drug design. **3. Drug Development and drug action** 3.1. Screening of natural products, isolation and purification, structure determination 3.2. Structure-activity relationship, QSAR, Synthetic analogues 3.3. Natural Products as leads for new pharmaceuticals 3.4. Receptor theories 3.5. Oxaminiquine – a case study. 3.6 Mechanism of drug action. 3.6. Introduction 3.7. Enzyme stimulation 3.8. Enzyme inhibition 3.9. Sulfonamides **4. Study of the following class of major drugs:** **4.1. Pharmacodynamic Agents.** a) Local anaesthetics b) Analgesics: Narcotic and non-steroidal anti-inflammatory,	5 hours 5 hours 8 hours 8 hours

	narcotic antagonists (Mechan ism of Action and Synthesis of Ibuprofen) c) Antiepileptic drugs d) Antiparkinsonism drugs e) Antihistaminics (SAR and synthesis of chlorpheniramine) f) Sedatives and hypnotics (Mechanism of Action of and synthesis of Phenobarbital) g) Antipsychotics h) Cardiovascular agents: Cardiovascular diseases, Antianginal agents and vasodilators, Antihypertensive agents, Antiarrhythmic drugs, Adrenergic blocking agents (Mechanism of Action of Methyl Dopa and synthesis of Propranolol) i) Antihyperlipidemic and antiatherosclerotic agents j) Anticoagulants, blood coagulation and anticoagulant mechanism k) Diuretics l) Drugs and diabetes: Synthetic hypoglycemic agents. **5.1 Chemotherapeutic Agents.** a) Sulfonamides (Mechanism of Action of sulphonamides) b) Antitubercular and Antilepral agents (Mechanism of Action of p-Aminosalicylic acid and Dapsone) SAR of Dapsone c) Antiamoebics (Mechanism of Action of Metronidazole) d) Anthelmintics e) Antimalarials f) Antiviral agents g) Antineoplastic Agents Synthesis of Dapsone sulphacetamide Isoniazid Metronidazole **5.2. Antibiotics : General information, mode of action and application of:** a) β-Lactam antibiotics: Penicillins and Cephalosporins b) Aminoglycocides: Streptomycin, Neomycin c) Tetracyclines d) Macrolides: Erythromycin, Rifamycin e) Lincomycin f) Polypeptides: Bacitracin g) Unclassified antibiotic: Chloramphenicol (SAR and Synthesis)	4 hours 6 hours
Pedagogy:	Lectures/ tutorials/ seminars/ term papers/assignments/ presentations/ self-study/ Case Studies etc. or a combination of some of these. Sessions shall be interactive in nature to enable peer group learning.	
References/Readings	1. R. F. Doerge, *Wilson and Gisvold's Text book of Organic Medicinal and Pharmaceutical Chemistry*, Edited by, J. B.	

	Lippincott Company, Philadelphia, USA, 8th Ed. 2. M. E. Wolff, *Burger's Medicinal Chemistry, Part I and II*, John Wiley, 4th Ed. 3. W. O. Foye, *Principles of Medicinal Chemistry,* K. M. Varghese and Co., Bombay, 3rd Ed. 4. Lednicer & Mitscher, *Organic Chemistry of Drug Synthesis Vols I and II*, John Wiley. 5. Graham Patrick, *An Introduction to Medicinal Chemistry*, Oxford University Press, Oxford, 1998. 6. D. J. Abraham, *Burgers Medicinal Chemistry and Drug Discovery, Vol. I*, John Wiley and Sons, New Jersey, 2003, 6th Ed.	