Programme: M.Sc. (Biochemistry)

Course Code: BCO 120

Title of the Course: PHARMACEUTICS [T]

Number of Credits: 3

Effective from Academic Year: 2018-19

Prerequisites	The candidates choosing this course are expected to have knowledge of basic microbiology, chemistry and instrumentation. A logical understanding of drug preparation and usage is advantageous.	
Objective:	To introduce the students to pharmacopoeia, drug synthesis, drug formates and GMP practices in a pharmaceutical set-up	
Content:		
1	**Introduction**	**(02)**
	History of Pharmaceutics; Development of pharmaceutical industry in India Origin and development of the pharmacopoeia – IP/BP/USP.	
2	**Unit operations**	**(06)**
	Introduction, classification of unit operations, fundamental principles. Mixing: liquid-liquid mixing, mixing small quantities of solids in liquids, mixing large quantities of solids in liquids Mixers: Impellers and propeller mixers, baffles in tanks, trough mixers, mixers, sigma and ribbon blenders, paddle mixers, double cone blender, cube mixers, planetary mixers. Emulsification and Homogenization: Process and equipment. Filtration and clarification- types of filters, factors influencing rate of filtration, filter aids. Filtration of air – primary filters and HEPA filters, and their evaluation.	
3	**Drugs**	**(03)**
	solvents used in extraction of drugs, processes used for extraction (infusion, decoction, maceration, percolation, hot extraction). Water as universal pharmaceutical vehicle.	
4	**Types of formulations**	**(09)**
	Tablets: advantages of tablets; granulation: methods and equipment, direct compression; excipients in tableting; types: effervescent, lozenges, chewable, buccal and sublingual, dispersible, orodispersible, soluble; problems in tableting. Capsules: Advantages and limitations of hard gelatin and soft gelatin capsules. Sustained release (SR): Delayed absorption and/or a mixture of slow- and fast-release particles to produce rapid and sustained absorption in the same dose.	

	Liquids and Gels: Formulations include solubilizers, stabilizers, buffers, tonicity modifiers, bulking agents, viscosity enhancers/reducers, surfactants, chelating agents and adjuvants. Parenteral: Intravenous, subcutaneous, intramuscular or intra-articular administration, stored in liquid form, or in lyophilized form if unstable. Topical: Cream, ointment, gel, paste, powder.	
5	**General principles of pharmacology**	**(05)**
	Routes of administration with special reference to their advantages and disadvantages. Posology: Determination of doses; dose response relationship, dosage form design, biopharmaceutical consideration, drug antagonism. Compounding and Dispensing: Weight and measures isotonic solutions, hydrophilic-lipophilic balance (HLB) values. Types of dosage forms, formulation, storage, containers and closures for products, labeling of dispensed products.	
6	**Quality assurance/ Quality management**	**(06)**
	Definition; IUPAC nomenclature; GLP, GMP and SOPs Raw material analysis (RMA), Quality control of pharmaceutical excipient. Packaging material testing (PMT): Permeability of plastic; testing of foil, bottles, carrions. Limit tests – chloride, sulphate, arsenic, lead, iron, nitrate, alkali and alkaline earth metals Limits of insoluble matter, soluble matter, nonvolatile matter, volatile matter, residue on ignition and ash value. Product labeling: Drug indication; composition; dosage; storage; instructions; cautions; contraindications; batch number; manufacture date, expiry date.	
7	**Quality control**	**(03)**
	Sources of contamination in pharmaceutical compounds (which are official in pharmacopeias). Physico-chemical and microbiological analyses: Types of errors, selection of sample, precision and accuracy.	
8	**Research and Development**	**(02)**
	Drug design: Drug discovery and development; Clinical trials.	
Pedagogy:	Lectures/ tutorials/ assignments/ students' seminars/ interactive learning/ self-study.	
References/ Readings	Troy, D.B., Remington's-The Science and practice of Pharmacy (Vol.1& 2). Lippincott Williams &Wilkins	
	Carter, S.J., Cooper & Gunn's Dispensing for pharmaceutical students. Cbs Publishers & Distributers	
	Aulton, M.E., Pharmaceutics: The science of dosage form design. Churchill-Livingstone	

	Lachman, L., Herbert A., Lieberman,&Kanig, L., Theory and practice of industrial pharmacy. Lea &Febiger, Philadelphia	
	Sprowls, B.B. Prescription Pharmacy	
	Beckett, A. H. &Stenlake, J. B., Practical pharmaceutical chemistry. Vol. I 4th , The Anthlone Press of University of London	
	Connors, K.A.A., Textbook of Pharmaceutical Analysis, Wiley Interscience, NewYork	
	Howard, A., Introduction of Pharmaceutical Dosage Forms 3rd Lea &Febiger	
	Porter, R.S., The Merck Manual for Diagnosis and Therapy, 19th edition, Wiley	
Learning Outcomes	A basic idea of how drugs are manufactured in a pharmaceutical company. The guidelines and quality checks involved before it reaches to the consumer.	