

Course Content
PHAR 522 Pharmaceutics II

I	INTRODUCTION	Multidisciplinary development of a drug candidate
		Routes of drug administration
		The variety of dosage forms
		Therapeutic considerations in dosage form design
		Biopharmaceutic considerations -Bioavailability & bioequivalence
		Patents
II	PREFORMULATION	Timing and goals of preformulation
		Organoleptic properties
		Purity
		Characterization of particle size, shape and surface area
		Solubility, partition coefficient
		Dissolution of drug substance
		Crystallinity, polymorphism
		Stability
		Compatibility tests
III	POWDERS & GRANULES	Advantages and disadvantages
		Particle size reduction
		Comminution, mixing of powders
		Packaging
		Bulk, divided powders
		Official powders and granules
		Effervescent products
IV	CAPSULES	Advantages and disadvantages
		Materials-Gelatin, plasticizers, colorants, preservatives
		Hard gelatin capsules -Sizes and shapes -Sealing and self-locking closures
		Soft gelatin capsules
		Preparation of capsules
		Formulation
		Filling operation
		Solid, semisolid, and liquid formulations
		Special capsules
		Packaging and storage

V	TABLETS	Types and classes of tablets
		Advantages and disadvantages
		Drug release from tablets in gastrointestinal tract
		Properties of good tablets
		Tablet excipients -Fillers, binders, disintegrants, glidants, lubricants, etc.
		Manufacturing procedure
		Evaluation of tablets -Dissolution and disintegration testing -Hardness, friability -Weight and drug content uniformity
		Special tablets -Layered tablets -Buccal and sublingual tablets -Lozenges -Chewable tablets -Effervescent tablets
VI	TOPICAL DOSAGE FORMS	Introduction to skin structure and function
		The skin as a barrier to drug passage
		Ways of enhancing skin penetration by drugs
		The aims of topical therapy
		Percutaneous absorption of drugs
		Classification of topical formulations
		Typical components of topical
		Formulation and manufacture
	Ointments	Classification
		Preparation by fusion and direct incorporation
		Hydrous and anhydrous absorption bases
		Water washable bases
	Creams	Types of creams
		Water washable and vanishing
		Emulsifiers in creams
		Preparation of creams
		Preservatives
	Lotions	Definition
		Types and examples

VII	SURFACE TENSION & SURFACTANTS	Definition of surface and interfacial tension
		Modification of surface tension by surfactants
		Micelle formation
		Volatilization, detergents and emulsification
		Classification of surfactants
		Hydrophilic - Lipophilic Balance (H.L.B.)
		Uses of surfactants
VIII	DISPERSE/POLYPHASIC SYSTEMS	Definitions
		Types of polyphasic systems: colloids, suspensions, emulsions and creams
	Colloids	Distinction between a colloid and a true solution
		Types of colloidal systems
		Lyophilic and lyophobic colloids
		Association colloids
		Preparation of colloids
		Properties of colloids
		The Zeta potential and colloidal stability
		Protective colloids
	Gels	Definitions
		Thixotrophy
		Types of gels -inorganic and organic
	Suspensions	Definition and properties
		The need for suspensions
		Sedimentation - causes and remedies
		Suspending agents
		Methods of stabilizing suspensions
		Colloid theory in relation to suspensions
		Crystal growth and caking
		Examples of suspensions in dosage forms
	Emulsions	Definition
		Internal and external emulsions
		Preparation of emulsions
		Emulsifying agents
		HLB and emulsification
		Preservation of emulsions

IX	SUPPOSITORIES & INSERTS	Description and use
		Types of suppositories
		Advantages and disadvantages
		Local vs. systemic function
		Manufacture
		Ingredients
		Polymorphism of cocoa butter
		Lipoidal bases and water-soluble bases
X	SOLUTION	Definition of a solution, solvent, solute, mole fraction, solubility and dissolution rate
		Dissolution
		Hydrogen bonding and solvation
		Dielectric constant
		Co-solvents
		Factors Influencing Solubility
		Salt forms of drugs and pH
		Intermolecular hydrogen binding
		Crystal lattice energy
		Ionic strength
		Polymorphism
	Pharmaceutical Liquids	Alcohols in water
		Water USP - definition of 5 grades
		Aromatic water
		Syrups, their preparation and use
		Miscellaneous liquid preparations
		Isotonic solutions
		Non-aqueous solutions
		Alcohols and ethers
		Spirits and elixirs
		Tinctures and fluid extracts
XI	PULMONARY & NASAL DDS	Inhalation therapy
		Factors influencing deposition
		Drug targeting
	Meter dose inhaler technology	Definition and Aerosol technology
		Devices
		Principles of aerosol generation

	Dry powder inhaler technology	Definition
		Classification of devices
XII	OPHTHALMIC DDS	Physiology of the eye
		Ophthalmic therapy
		Sterility and preservation of ophthalmics
		Design of ophthalmic agents
		Isotonicity
		Drug absorption across the cornea
		Contact lens products
XIII	MODIFIED-RELEASE DDS	Terminology
		Advantages and disadvantages
		Biological factors
		Physiochemical factors
		Reservoir and matrix systems
		Biodegradable drug delivery systems
		Swelling controlled drug delivery systems
		Osmotically controlled systems -OROS system
		Ion exchange systems
		Bioadhesives drug delivery systems
		Palatal drug delivery systems
XIV	PARENTERALS	Definition of sterility
		Methods of sterilization
		Classification of Parenterals
		USP classifications of injections
		Aseptic technique
		Small and large volume parenteral formulations
		Biologicals
XV	RADIOPHARMACEUTICALS	Definitions
		Physical half-life
		Radioisotopes
		Application
		Diagnostic and therapeutic
		Production using cyclotron and a nuclear reactor
		Corporation, vehicle and misdistribution moiety
		Drug delivery systems, devices & advanced dosage forms examples

XVI	TARGETED DDS	Biophysical aspects
		Passive and active targeting
		Liposomes
		Nanoparticles
		Prodrugs
		Cellular drug carriers
		Storage and sterility
		Toxicity