

Institute/School Name	Chitkara College of Pharmacy		
Department Name	Pharmacy		
Programme Name	B. Pharmacy		
Course Name	Physical Pharmaceutics-I	Session	July-Dec 25
Course Code	BP-302T	Semester/Batch	3 rd /2024
L-T (Per Week)	3-1	Course Credits	4
Pre-requisite	Pharmaceutics basic Knowledge	NHEQF Level	5.5
Course Coordinator	Dr. Mohit Kumar		
SDG	3		

Objectives of the Course: Upon the completion of the course student shall be able to

Understand various physicochemical properties of drug molecules in the designing the dosage forms

Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations

Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

Course Outcomes (COs)

Student should be able to:

	COs	Program Outcomes (PO)	NHEQF Level Descriptor	No. of Lectures
CO01	State the physicochemical properties of drug molecules, pH, and solubility.	PO1	5.5	10
CO02	Describe the concept of state of matter, changes in the state of matter.	PO1	5.5	9
CO03	Understand the physical properties of solutions, buffers, isotonicity.	PO3	5.5	8
CO04	Explain the role of surfactants, interfacial phenomenon.	PO1	5.5	8
CO05	Describe the concept of complexation	PO1	5.5	8
CO06 (Only for lab components)	Describe the concept pH and its determination	PO4	5.5	9
Total Contact Hours				52

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	Type of assessment
CO01	1			2	1							Formative/ Summative
CO02	2			3	1							Formative/ Summative
CO03	2			3	1							Formative/ Summative
CO04	3			1	2							Formative/ Summative
CO05	3			2	1							Formative/ Summative
CO06	2			3	1							Formative/ Summative

3=High, 2=Medium, 1=Low

Recommended Books:

- B01:** Textbook of Physical Pharmaceutics by CVS Subrahmanyam
B02: Biopharmaceutics and Pharmacokinetics A treatise by D.M. Brahmkar
B03: Physical Pharmacy by Alfred Martin, Sixth edition
B04: Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, Marcel Dekkar Inc.
B05: Pharmaceutical Engineering: Principles and Practices by CVS Subramanyam

Other readings and relevant websites:

Serial No	Link of Journals, Magazines, websites and Research Papers
1.	https://drugdiscovery.in/2021/02/pdf-physical-pharmaceutics-books-pdf-download-free/
2.	https://www.carewellpharma.in/B_Pharmacy/Notes/3rd_Sem/Physical_Pharmaceutics/
3.	https://www.slideshare.net/slideshow/surface-tension-235565887/235565887
4.	https://www.slideshare.net/slideshow/raoult-law-physical-analytical-chemistry/75747090
5.	https://www.slideshare.net/slideshow/physicochemical-properties-of-drug-248441303/248441303

Lecture Plan

Lect . No.	Topics	Book No, CH No, Page No	TLM	ALM	Web References	Audi o-Video
1.	Solubility Expressions and Terminology	B03, CH 10, Page no 212-213	Lecture	Group Discussion	https://www.pharmaguide.com/2021/10/solubility-expressions-and-mechanisms-of-solute-solvent-inter.html	NA
2.	Mechanisms of Solute–Solvent Interactions	B03, CH 10, Page no 212-213	Lecture, reviewing	Group Discussion	https://www.pharmaguide.com/2021/10/solubility-expressions-and-mechanisms-of-solute-solvent-inter.html	NA
3.	Ideal Solubility Parameters, Solvation, and Association	B03, CH 10, Page no 218-219	Lecture	Leading question	https://www.slideshare.net/slideshow/ideal-solubility-parameter-solubility-of-drug-part-2/238466901	NA
4.	Quantitative Factors Influencing Drug Solubility	B02, CH 2, Page no. 26-30	Lecture	Just in time teaching	https://www.slideshare.net/slideshow/quantitative-approach-to-the-to-the-factor-influcing-solubility-of-drug-solubility-of-drug-part4s/238466920	NA
5.	Diffusion Principles in Biological Systems	B03, CH 13, Page no 342-344	Lecture, reviewing	Group Discussion	https://www.slideshare.net/MahewashPathan/diffusion-on-principles-in-biological-systems	NA
6.	Solubility of Gases in Liquids	B03, CH 10, Page no 215-217	Lecture	Leading question	https://www.slideshare.net/slideshow/solubility-of-gas-in-liquids/250309740	NA
7.	Solubility of Liquids in Liquids	B03, CH 10, Page no 218-220	Lecture	Just in time teaching	https://www.slideshare.net/slideshow/solubility-of-liquids-in-liquids-in-liquids	NA

	(Binary and Ideal Solutions)				liquids/238482463	
8.	Raoult's Law and Real Solutions	B03, CH 10, Page no 220	Lecture	Group Discussion	https://www.slideshare.net/slideshow/liquidliquid-solution-systems/111545042	NA
9.	Real Solutions	B03, CH 10, Page no 220	Lecture	Group Discussion	https://www.slideshare.net/slideshow/liquidliquid-solution-systems/111545042	NA
10.	Partially Miscible Liquids and Critical Solution Temperature	B03, CH 10, Page no 218-219	Lecture, reviewing	Leading question	https://www.slideshare.net/slideshow/critical-solution-temperature-of-phenolwater-system/53654506	NA
11.	Distribution Law – Concepts, Limitations, and Applications	B03, CH 10, Page no 237	Lecture	Just in time teaching	https://www.slideshare.net/slideshow/distribution-law/161037451	NA
12.	States of Matter and Phase Changes	B03, CH 2, Page no 24-26	Lecture	Group Discussion	https://www.slideshare.net/slideshow/change-of-states-of-matterpptx/252343775	NA
13.	Latent Heat, Vapour Pressure,	B03, CH 2, Page no. 30-31, 24	Lecture	Leading question	https://www.slideshare.net/DRxPoojaBhandare/state-of-matter-and-properties-of-matter-part2-latent-heat-vapour-pressure-and-sublimation	NA
14.	Sublimation, Critical Point	B03, CH 2, Page no. 30-31, 24	Lecture	Leading question	https://www.slideshare.net/DRxPoojaBhandare/state-of-matter-and-properties-of-matter-part2-latent-heat-vapour-pressure-and-sublimation	NA
15.	Eutectic Mixtures and Applications	B03, CH 2, Page no. 30-42-43	Lecture	Just in time teaching	https://www.slideshare.net/slideshow/state-of-matter-and-properties-of-matter-part3-eutectic-mixture/238673498	NA
16.	Gases,	B03, CH 2, Page no. 28	Lecture, reviewing	Group Discussion	https://www.slideshare.net/slideshow/aerosol-inhalerspptx/252801036	NA
17.	Aerosols, and Inhalers	B03, CH 2, Page no. 28	Lecture	Group Discussion	https://www.slideshare.net/slideshow/aerosol-inhalerspptx/252801036	NA
18.	Relative Humidity and Liquid Complexes,	B05, CH 15, Page no. 102	Lecture	Leading question	https://www.slideshare.net/slideshow/state-of-matter-and-properties-of-matter-part6relative-humidity-liquid-complex-liquid-crystals-glassy-state/238828927	NA

19.	Liquid Crystals, and Glassy States	B03, CH 2, Page no. 36-37	Lecture	Just in time teaching	https://www.slideshare.net/slideshow/state-of-matter-and-properties-of-matter-part6relative-humidity-liquid-complex-liquid-crystals-glassy-state/238828927	NA
20.	Solid States – Crystalline, Amorphous, Polymorphism	B03, CH 2, Page no. 30-30-33	Lecture	Group Discussion	https://www.slideshare.net/slideshow/solidcrystalline-amorphous-polymorphism/231232115	NA
21.	Determination and Applications of Refractive Index and Optical Rotation	B03, CH 4, Page no. 95-97	Lecture	Leading question	https://www.slideshare.net/DRxPoojaBhandare/state-of-matter-and-properties-of-matter-part8physicochemical-properties-of-drug-molecule-determination-and-application-1-refractive-index-2-optical-rotation	NA
22.	Determination and Applications of Dielectric Constant and Dipole Moment	B03, CH 4, Page no. 86-87	Lecture	Just in time teaching	https://www.slideshare.net/slideshow/state-of-matter-and-properties-of-matter-part9physicochemical-properties-of-drug-molecule-determination-and-application-3-dielectric-constant-4-dipole-moment/238967097	NA
23.	Determination and Applications of Dissociation Constant	B03, CH 7, Page no. 144-146	Lecture	Group Discussion	https://www.slideshare.net/slideshow/state-of-matter-and-properties-of-matter-part10physicochemical-properties-of-drug-molecule-determination-and-application-5-dissociation-constant/238967121	NA
24.	Introduction to Interfaces and Liquid Interfaces	B03, CH 14, Page no. 363-364	Lecture	Leading question	https://www.slideshare.net/slideshow/surface-and-interfacial-phenomenon/211258360	NA
25.	Introduction to Surface and Interfacial Tensions	B03, CH 14, Page no. 364	Lecture	Just in time teaching	https://www.slideshare.net/slideshow/surface-and-interfacial-tension-240884031/240884031	NA
26.	Measurement of Surface and Interfacial Tensions	B03, CH 14, Page no. 365-367	Lecture, reviewing	Group Discussion	https://www.slideshare.net/slideshow/surface-and-interfacial-tension-and-its-measurement/76241770	NA
27.	Surface Free Energy	B03, CH 14, Page no. 364	Lecture	Leading question	https://www.slideshare.net/slideshow/surface-energypptx/253649897	NA

28.	Spreading Coefficient	B03, CH 14, Page no. 364	Lecture	Just in time teaching	https://www.slideshare.net/venkideshvenks/spreadin-g-coefficient	NA
29.	Adsorption at Liquid Interfaces	B03, CH 14, Page no. 370-371	Lecture	Group Discussion	https://www.slideshare.net/slideshow/surfactants-adsorption-at-liquid-surfaceinterface/78725225	NA
30.	Surface Active Agents	B03, CH 14, Page no. 370-371	Lecture	Leading question	https://www.slideshare.net/slideshow/surface-active-agents/7699374	NA
31.	HLB Scale	B03, CH 14, Page no. 371-372	Lecture	Just in time teaching	https://www.slideshare.net/slideshow/hydrophiliclipophilicbalancepdf/252991880	NA
32.	Solubilization	B03, CH 15, Page no. 410-411	Lecture	Group Discussion	https://www.slideshare.net/slideshow/solubilization-physical-pharmacy/96225092	NA
33.	Detergency	B03, CH 14, Page no. 386	Lecture	Leading question	https://www.slideshare.net/slideshow/detergency/122520038	NA
34.	Adsorption at Solid Interfaces	B03, CH 14, Page no. 379-380	Lecture	Just in time teaching	https://www.slideshare.net/SnehaPandey624445/adsorptionatsolidinterfacepptx	NA
35.	Introduction to Complexes	B03, CH 11, Page no. 251	Lecture	Group Discussion	https://www.slideshare.net/slideshow/complex-128471530/128471530#8	NA
36.	Classification of Complexation	B03, CH 11, Page no. 251	Lecture	Leading question	https://www.slideshare.net/slideshow/complexation-110223092/110223092	NA
37.	Applications of Complexation	B03, CH 11, Page no. 260	Lecture	Just in time teaching	https://www.slideshare.net/slideshow/complex-128471530/128471530	NA
38.	Methods of Analysis of Complexes	B03, CH 11, Page no. 260-262	Lecture	Group Discussion	https://www.slideshare.net/slideshow/analytical-methods-by-mrbhavesh-amrute/242345736	NA
39.	Protein Binding	B03, CH 11, Page no. 268-269	Lecture, reviewing	Leading question	https://www.slideshare.net/slideshow/protein-binding-of-drugppt/44770608	NA
40.	Complexation and Drug Action	B03, CH 11, Page no. 256	Lecture	Just-in-time teaching	https://www.slideshare.net/slideshow/complexation-and-protein-binding-254189554/254189554	NA
41.	Crystalline Structures of Complexes	B05, CH 15, Page no. 410	Lecture	Group Discussion	https://www.slideshare.net/slideshow/crystalline-structure-l/130910445	NA
42.	Thermodynamic Treatment of Stability Constants	B03, CH 11, Page no. 274-275	Lecture	Leading question	https://www.slideshare.net/slideshow/thermodynamic-and-kinetic-stability-of-metal-complexes-part-1pptx/257531667	NA
43.	Sorensen's pH Scale	B03, CH 7, Page no. 149-150	Lecture	Just in time teaching	https://www.slideshare.net/slideshow/sorensens-ph-scale-sb/239119054	NA

44.	pH Determination (Electrometric and Calorimetric Methods)	B03, CH 9, Page no. 199-200, 203	Lecture	Group Discussion	https://www.slideshare.net/slideshow/ph-determination-electrometric-method-236810974/236810974	NA
45.	pH Determination (Electrometric and Calorimetric Methods)	B03, CH 9, Page no. 199-200, 203	Lecture	Group Discussion	https://www.slideshare.net/slideshow/ph-determination-electrometric-method-236810974/236810974	NA
46.	Buffer Equation	B03, CH 8, Page no. 177-179	Lecture	Leading question	https://www.slideshare.net/slideshow/buffer-applications-and-capacity-sb/239119434	NA
47.	Buffers Applications	B03, CH 8, Page no. 177-179	Lecture	Leading question	https://www.slideshare.net/slideshow/buffer-applications-and-capacity-sb/239119434	NA
48.	Buffer Capacity	B03, CH 8, Page no. 173	Lecture	Group Discussion	https://www.slideshare.net/slideshow/buffer-capacity/241913671	NA
49.	Buffers in pharmaceutical and biological systems	B03, CH 8, Page no. 177-179	Lecture	Leading question	https://www.slideshare.net/Basit13/buffers-in-pharmaceutical-and-biological-system	NA
50.	Buffers in pharmaceutical and biological systems	B03, CH 8, Page no. 177-179	Lecture	Leading question	https://www.slideshare.net/Basit13/buffers-in-pharmaceutical-and-biological-system	NA
51.	Isotonic Solutions	B03, CH 8, Page no. 180	Lecture	Just in time teaching	https://www.slideshare.net/slideshow/buffered-isotonic-solutions-248909070/248909070	NA
52.	Methods of Adjusting isotonicity	B03, CH 8, Page no. 180	Lecture	Just in time teaching	https://www.slideshare.net/slideshow/buffered-isotonic-solutions-248909070/248909070	NA

Teacher in-charge

Assistant Dean

Dean