Program	Bachelor of Pharmacy (BPharm)	**Semester - 1**
Type of Course	-	
Prerequisite		
Course Objective	-	
Effective From A.Y.	2023-24	

Teaching Scheme (Contact Hours)				Examination Scheme				
				Theory Marks		Practical Marks		
Lecture	Tutorial	Lab	Credit	External Marks (T)	Internal Marks (T)	External Marks (P)	Internal Marks (P)	Total Marks
3	1	4	6	75	25	35	15	150

SEE *- Semester End Examination,* ***CIA*** *- Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

Course Content

T - Teaching Hours | **W** - Weightage

Sr.	Topics	T	W
1	**Chapter 1** • **Flow of fluids:** Types of manometers, Reynolds number and its significance, Bernoulli's theorem and its applications, Energy losses, Orifice meter, Venturimeter, Pitot tube and Rotometer. • **Size Reduction:** Objectives, Mechanisms & Laws governing size reduction, factors affecting size reduction, principles, construction, working, uses, merits and demerits of Hammer mill, ball mill, fluid energy mill, Edge runner mill & end runner mill. • **Size Separation:** Objectives, applications & mechanism of size separation, official standards of powders, sieves, size separation Principles, construction, working, uses, merits and demerits of Sieve shaker, cyclone separator, Air separator, Bag filter & elutriation tank	10	22
2	**Chapter 2** • **Heat Transfer:** Objectives, applications & Heat transfer mechanisms. Fourier's law, Heat transfer by conduction, convection & radiation. Heat interchangers & heat exchangers. • **Evaporation:** Objectives, applications and factors influencing evaporation, differences between evaporation and other heat process. principles, construction, working, uses, merits and demerits of Steam jacketed kettle, horizontal tube evaporator, climbing film evaporator, forced circulation evaporator, multiple effect evaporator& Economy of multiple effect evaporator • **Distillation:** Basic Principles and methodology of simple distillation, flash distillation, fractional distillation, distillation under reduced pressure, steam distillation & molecular distillation	10	22
3	**Chapter 3** • **Drying:** Objectives, applications & mechanism of drying process, measurements & applications of Equilibrium Moisture content, rate of drying curve. principles, construction, working, uses, merits and demerits of Tray dryer, drum dryer spray dryer, fluidized bed dryer, vacuum dryer, freeze dryer • **Mixing:** Objectives, applications & factors affecting mixing, Difference between solid and liquid mixing, mechanism of solid mixing, liquids mixing and semisolids mixing. Principles, Construction, Working, uses,vMerits and Demerits of Double cone blender, twin shell blender, ribbon blender, Sigma blade mixer, planetary mixers, Propellers, Turbines, Paddles & Silverson Emulsifier	10	22
4	**Chapter 4** • **Filtration:** Objectives, applications, Theories & Factors influencing filtration, filter aids, filter medias. Principle, Construction, Working, Uses, Merits and demerits of plate & frame filter, filter leaf, rotary drum filter, Meta filter & Cartridge filter, membrane filters and Seidtz filter • **Centrifugation:** Objectives, principle & applications of Centrifugation, principles, construction, working, uses, merits and demerits of Perforated basket centrifuge, Non-perforated basket centrifuge, semi continuous centrifuge & super centrifuge.	8	18
5	**Chapter 5**	7	16

Course Content

T - Teaching Hours | **W** - Weightage

Sr.	Topics	T	W
	Materials of pharmaceutical plant construction, Corrosion and its prevention: Factors affecting during materials selected for Pharmaceutical plant construction, Theories of corrosion, types of corrosion and there prevention. Ferrous and nonferrous metals, inorganic and organic non metals, basic of material handling systems.		
		Total	**45**	**100**

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application	Analyze	Evaluate
Weightage	30	30	30	5	5

NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes

At the end of this course, students will be able to:	
CO1	Knowledge of various unit operations and materials handled in pharmaceutical industries
CO2	Knowledge and ability to perform various processes involved in pharmaceutical manufacturing process.
CO3	Knowledge and ability to perform on various machineries used in pharmaceutical manufacturing process.
CO4	Knowledge of various preventive methods used for corrosion control in pharmaceutical Industries
CO5	Ability to perform various unit operations and their optimization

Reference Books

1.	**Introduction to chemical engineering** By Walter L Badge and Julius Banchero | Latest edition
2.	**Solid phase extraction, Principles, techniques and applications** By Nigel J.K. Simpson | Latest edition
3.	**Unit operation of chemical engineering** By Mcabe Smith | Latest edition
4.	**Pharmaceutical engineering principles and practices** By C.V.S Subrahmanyam et al
5.	**Remington practice of pharmacy (TextBook)** By Martin | LIPPINCOTT WILLIAMS AND WIKINS | 21ST, Pub. Year 2005
6.	**Theory and practice of Industrial Pharmacy** By Lachmann | CBS PUBLISHER AND DISTRIBUTORS | 4TH, Pub. Year 2009
7.	**Physical pharmaceutics (TextBook)** By C.V.S Subrahmanyam et al | Latest edition
8.	**Cooper and Gunn's Tutorial pharmacy** By S.J. Carter | CBS PUBLISHERS AND DISTRIBUTORS | 6TH, Pub. Year 2005

List of Practical

1.	To determine particle size and particle size distribution of given sample of granules by sieving method.
2.	To carry out particle size reduction by using Ball Mill.
3.	To determine average particle size and particle size distribution of given sample by using optical microscope.
4.	To carry out particle size reduction using mortar and pestle.
5.	To study the effect of surface area on the rate of filtration.
6.	To study the effect of thickness of filter media on the rate of filtration.
7.	To find out optimum concentration of filter aid by preparing slurry of calcium carbonate.
8.	To study the effect of surface area on the rate of evaporation.
9.	To study the effect of temperature on the rate of evaporation.
10.	To obtain drying curve for given sample at 70 °C and determine CMC and EMC.
11.	To study the effect of temperature on the rate of drying.
12.	To determine mixing index for blending of given powder by using double cone blender.
13.	To determine mixing index for blending of given powder using mass mixer.
14.	To determine the radiation constant of iron.
15.	To determine the radiation constant of Brass.

List of Tutorial

1.	Tutorial 1
2.	Tutorial 2
3.	Tutorial 3
4.	Tutorial 4
5.	Tutorial 5
6.	Tutorial 6
7.	Tutorial 7
8.	Tutorial 8
9.	Tutorial 9
10.	Tutorial 10
11.	Tutorial 11
12.	Tutorial 12
13.	Tutorial 13
14.	Tutorial 14
15.	Tutorial 15