Chitkara College of Pharmacy
Chitkara University, Rajpura, Punjab
Chandigarh–Patiala National Highway, Punjab – 140 401, India

Institute/School Name	Chitkara College of Pharmacy		
Department Name	Chitkara College of Pharmacy		
Programme Name	B. Pharmacy		
Course Name	Pharmaceutical Engineering	**Session**	July-Dec, 25
Course Code	BP 304T	**Semester/Batch**	III/2024
L-T (Per Week)	3-1	**Course Credits**	4
Pre-requisite	Develop the analytical and technical skills required to succeed in advanced pharmaceutical engineering topics such as drug development, manufacturing, process optimization, and regulatory compliance.	**NHEQF Level**	5.5
Course Coordinator	Dr. Manju Rani		
SDG	SDG-9		

Objectives of the Course:
Upon completion of the course student shall be able to know various unit operations used in Pharmaceutical industries; understand the material handling techniques; perform various processes involved in pharmaceutical manufacturing process; carry out various test to prevent environmental pollution; appreciate and comprehend significance of plant lay out design for optimum use of resources; appreciate the various preventive methods used for corrosion control in Pharmaceutical industries.

Course Outcomes (COs)

Students should be able to:

	COs	**Program Outcomes (PO)**	**NHEQF Level Descriptor**	**No. of Lectures**
CO01	After completion of the course students will be able to define and explain the basic concepts and principles of pharmaceutical engineering, including unit operations and fluid mechanics	PO1, PO10	Q1	**17**
CO02	After completion of the course Students will be able to apply engineering principles in the design and operation of pharmaceutical processes, such as drying, filtration, centrifugation, crystallization, and mixing.	PO3, PO1, PO10	Q1, Q2	**17**
CO03	After completion of the course, Students will be able to analyze and interpret process parameters and data related to pharmaceutical manufacturing, such as flow rates, pressure, temperature, and mass transfer rates, to optimize process efficiency.	PO4, PO3, PO1	Q1	**17**

CO04	After completion of the course, Students will be able to evaluate the performance and efficiency of pharmaceutical equipment and processes, identifying potential issues and proposing improvements to enhance product quality and process safety.	PO1, PO3, PO4	Q1, Q3	**05**
CO05	After completion of the course, Students will be able to design and develop pharmaceutical processes and equipment layouts, incorporating principles of scale-up, automation, and process control to meet industrial and regulatory standards.	PO3, PO1, PO4, PO10	Q1	**05**
Total Contact Hours				**61**

CO-PO Mapping

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

3=High, 2=Medium, 1=Low

Recommended Books:

B01: Theory and practice of industrial pharmacy by Lachmann., Latest edition
B02: Pharmaceutical engineering principles and practices – C.V.S Subrahmanyam et al., Latest edition.
B03: Cooper and Gunn's Tutorial pharmacy, S.J. Carter, Latest edition.
B04: Unit operation of chemical engineering – Mcabe Smith, Latest edition.
B05 Remington practice of pharmacy- Martin, Latest edition.

Other readings and relevant websites:

Serial No	Link of Journals, Magazines, websites and Research Papers
1.	https://www.journals.elsevier.com/international-journal-of-pharmaceutics
2.	https://www.springer.com/journal/11095
3.	https://www.journals.elsevier.com/journal-of-pharmaceutical-sciences
4.	https://www.pharmtech.com/

Lecture Plan

Lec no.	Topic	Book no, Ch no, page no.	TLM	ALM	Web References	Audio- video
1-5	Size Reduction	B02, CH-3,65-103	Lecture, Questioning, Diagram Practice	Instrument working Video, ppt, class discussions	ACE Impex	https://youtube.com/shorts/NIRqjLC1_1k?feature=shared

6-10	Size Separation	B02,CH-4,104-138	Lecture, discussion, Diagram Practice	Quiz, leading questions	Pharmaceutical Technology	MOOC Course : Separation Processes - Coursera
11-15	Filtration	B02,CH-10,382-424	Lecture, Questioning, Diagram Practice	Instrument working Videos, discussions	ScienceDirect	https://youtu.be/EfTcfQY4kEY?feature=shared
16-20	Drying	B02,CH-8, 271-315	Lecture, Questioning, Diagram Practice	Instrument working Video, discussions	Pharma Approach	Drying Techniques in Pharmaceutical Industry - edX
21-26	Evaporation	B02, CH-6, 195-223	Lecture, discussion, Diagram Practice	Leading Question	Research Gate	https://youtube.com/shorts/ljbKoqeNZVQ?feature=shared
31-35	Flow of Fluids	B02,CH-2,26-64	Lecture, Questioning, Diagram Practice	Class discussions	Pharma Manufacturing Engineering Toolbox	https://youtu.be/_bfcdRhY7Rw?feature=shared
36-40	Heat Transfer	B02,CH-5,139-194	Discussion, Diagram Practice	Brain Storming Sessions	Pumps & Systems Pharma Focus Asia	MOOC Course : Introduction to Heat Transfer - MIT OCW
41-45	Distillation	B02,CH-7,224-270	Lecture Questioning	Class discussions	PharmaGuideline	https://youtu.be/RMiGiSzAqKs?feature=shared
46-49	Mixing	B02,CH-9, 316-381	Lecture, discussion Questioning	Focused Listening	ScienceDirect	https://youtube.com/shorts/IrtqjmSRrtg?feature=shared
50-56	Centrifugation	B02,CH-11,427-447	Lecture, Questioning	Brain Storming Sessions	Pharma Manufacturing	https://youtube.com/shorts/lqBXi01Qe7A?feature=shared
57-61	Plant construction and Corrosion	B02, CH-12,448-470	Lecture, Discussion	Focused Listening	ScienceDirect	https://youtube.com/shorts/5PhUck3L-W0?feature=shared

Teacher in-charge Assistant Dean Dean