DEPARTMENT OF PHARMACY
M.I.T., MUZAFFARPUR

AFFILIATED TO
ARYABHATTA KNOWLEDGE UNIVERSITY, MITHAPUR, PATNA

PHARMACEUTICS III
DEPARTMENT OF PHARMACY
NAME OF FACULTY: ABHILASHA
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NAME OF COURSE: PHARMACEUTICS III

COURSE CODE (T): 1301

COURSE CODE (P): 1301P

SEMESTER:IIIRD

ACADEMIC: 2018-2019

COURSE DESCRIPTIONS: PHARMACEUTICS -III

B. PHARM – THIRD SEMESTER

1. Course Syllabus

Module-1

Stoichiometry: Unit processes material and energy balances, molecular units, mole fraction, tie substance, gas laws, mole volume, primary and secondary quantities, equilibrium state, rate process, steady and unsteady states, dimensionless equations, dimensionless formulae, dimensionless groups, differenttypes of graphic representation, mathematical problems.

Module-2

Heat Transfer: Source ofheat, heat transfer, steam andelectricity as heating media, determination ofrequirement of amount of steam/electrical energy, steam pressure, Boiler capacity, Mathematical problemson heat transfer.

Evaporation: Basic concept of phase equilibria, factor affecting evaporation, evaporators, film evaporators, single effect and multiple effect evaporators, Mathematical problems on evaporation
.
.**Distillation:** Rault's law, phase diagrams, volatility; simple steam and flash distillations, principles of rectification, Mc. Cabe Thiele method for calculations of number of theoretical plates, Azeotropic and   extractive distillation. Mathematical problems on distillation.

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Drying: Moisture content and mechanism of drying, rate of drying and time of drying calculations; classification and types of dryers, dryers used in pharmaceutical industries and special drying methods. Mathematical

Module-3.

Size Reduction and Size Separation: Definition, objectives of size reduction, factors affecting size reduction, laws governing energy and power requirements of a mills including ball mill, hammer mill, fluid energy milletc

Mixing: Theory ofmixing, solid-solid, solid-liquid and liquid-liquid mixing equipments

Module-4.

Automated Process Control Systems: Process variables, temperature, pressure, flow, level and vacuum and their measurements.Elements of automatic process control and introduction to automatic process control systems. Elements of computer aided manufacturing (CAM).

Reactors and fundamentals of reactors design for chemical reactions.

Recommended Books:

1. Cooper and Gunn's Tutorial Pharmacy Edited by S.J.Carter (CBS Publishers, Delhi)

2. Pharmaceutical Engineering by K.Sanbamurty (New Age International, New Delhi)

3. Chamical Engineering by Badger and Banchero (Mc Graw Hill, New Delhi)

4. Pharmaceutical Dosage forms by Aulton.(Churchill Livingstone, Edinburg)

5. Gennaro, "Remington's The Science & Practice of Pharmacy" (Lippincott William and Wilkins).

2. Program Objectives (POs)

The graduates of the programme will possess:

1. The knowledge of core concepts of stoichiometry

2. The knowledge of heat transfer, evaporation, distillation and drying

3. Brief knowledge about size reduction and size separation and mixing.

4. Brief knowledge about automated process control systems

5. The knowledge of reactors and fundamental of reactors.

3.Course Outcomes (COs)

1. Recall The knowledge of heat transfer, evaporation and distillation.
2. Gain The knowledge of drying, mixing and size reduction.
3. Gain brief knowledge about automated process control systems

4. Mapping of COs with Pos

PO	CO1	CO2	CO3	CO4
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				

12				

5. Assessment Methods for Cos

5.1. Theory

S. No	Assessment Tools	Marks	Outcomes
1	Sessional Examination	20	CO1 CO2 CO3 CO4
2	Assignment	02	CO1 CO2 CO3 CO4
3	Presentation	02	CO1 CO2 CO3 CO4
4	Quizzes	01	CO1 CO2 CO3 CO4
5	Attendance	05	NA
6	University Examination	70	NA

5.2. Practical

S. No	Assessment Tools	Marks	Outcomes
1	Attendance	05	CO1 CO2 CO3 CO4
2	Experiment valuation	10	CO1 CO2 CO3 CO4
3	Internal Viva- voce	05	CO1 CO2 CO3

			CO4
4	University Practical Exam	30	CO1 CO2 CO3 CO4

6. Delivery Methodology

Outcomes	Methods	Supporting Tools
CO 1	Chalk-Talk, Interactive classroom, ICT usage, Case study discussion about diseases, Group discussions, Web based learning	Board, Laptop, Projector, You Tube, WhatsApp, Google,
CO2	Chalk-Talk, Interactive classroom, ICT usage, Case study discussion about diseases, Group discussions, Web based learning	Board, Laptop, Projector, You Tube, WhatsApp, Google,
CO3	Chalk-Talk, Interactive classroom, ICT usage, Case study discussion about diseases, Group discussions, Web based learning	Board, Laptop, Projector, You Tube, WhatsApp Google,
CO4	Chalk-Talk, Interactive classroom, ICT usage, Case study discussion about diseases, Group discussions, Web based learning	Board, Laptop, Projector, You Tube, WhatsApp, Google,

7. Teaching plan

7.1. Theory

Lecture No.	Date of Delivery	Contents
1		Unit process and energy balance
2		Molecular units, mole fraction, mole volume
3		Primary and secondary quantities
4		Steady and unsteady states
5		Graphic representation
6		Mathematical problems of stoichiometry
7		Heat transfer and source of heat
8		Heating media
9		Determination of heating amount
10		Mathematical problems of heat transfer
11		Evaporation introduction and Phase equilibria concept
12		Factors affecting evaporation
13		Classification of evaporators and Film evaporators
14		Single effect and multiple effect evaporator
15		Application of evaporation and mathematical problem
16		Rault's law, phase diagram
17		Volatility
18		Simple, steam and flash distillation
19		Principles of rectification
20		Theoretical plate calculation
21		Azeotropic and extractive distillation
22		Mathematical problems of distillation
23		Moisture content and mechanism of drying
24		Rate and time of drying calculation
25		Classification and types of dryers.

26		Special drying method and mathematical problems
27		Size reduction and separation objective and definition
28		Factors affecting size reduction and laws governing
29		Ball mill and hammer mill
30		Fluid energy mill
31		Theory of mixing and solid –solid mixing equipments
32		Solid –liquid and liquid – liquid mixing equipments
33		Automated process control system- process variables, temperature, pressure,flow
34		Level and vaccum and their measurement
35		Elements of automatic process control systems.
36		Elements of computer aided manufacturing (CAM)
37		Reactors design for chemical reactions
38		Fundamentals of reactors design for chemical reactions
39		
40		
41		
42		

7.2. Practical

Exp. No	Experiment
1	To determine overall heat transfer coefficient.
2	Determination of rate of evaporation.
3	Experiments based on steam, extractive and azeotropic distillations.
4	Determination of rare of drying, free moisture content and bound

	moisture content.
5	To study the influence of various parameters on the rate of drying
6	Experiments to illustrate principles of size reduction
7	Experiments to illustrate Laws governing energy and power requirements of size Reduction.
8	Experiments to illustrate solid-solid mixing
9	To determine mixing efficiency using different types of mixers
10	
11	
12	