Course Specifications

General Information

Course name	Industrial Pharmacy 1
Course number	PHTC4215
Faculty	
Department	
Course type	Major Needs
Course level	4
Credit hours (theoretical)	2
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

1 - Outline the design and mechanism of action of the instruments included in the unit operation in pharmaceutical practice .

2 - Point out the principles of each unit operation in pharmaceutical processes.

3 - Support the equipment used for each unit operation in relation to its advantages, disadvantages and mechanism of action.

4 - Difine the physical principle of each unit operation in industrial pharmacy.

5 - Rationalize the use of the equipment for a specific application in pharmaceutical industry.

6 - Diagrammatcally design the studied equipments for each operation.

Intended Learning Outcomes

Knowledge and Understanding	* At the end of the course the students will able: * To suggest or choose the suitable equipment for carrying out any industrial process
Intellectual Skills	* The problems arising during the manufacturing processes could be avoided
Professional Skills	* Optimization of the industrial conditions is given special consideration

Course Contents

1 - Industrial pharmacy is a very important course for fourth year pharmacy students because they will then almost come out to the labor market that includes working at factories :

2 - Introduction of industrial pharmacy: Difintion, general layout and plant desiesigning of the pharmaceurtical industry , pharmaceutical plant construction, nature and propertes of important materials emplooyed in construction and erection of plant, convenience and storage of raw materials.

3 - Heat transfer : 1- Clssification of heat flow process.2- Overall coefficient of heat transfer. 3- Mechanisms of heat transfer

4 - Flow of heat:1-Design of heating equipment. 2- Steam as a heating medim. 3- Tubular heater 4- Heat exchangers .

5 - Evaporation : 1- General principles of evaporation. 2- Types of evaporators. 3- Evaporation under reduced pressure. 4- Multiple effect evaporation.

6 - Drying: 1- Classification of dryers. 2- Dryers for dilute solutions and suspensions. 3- Dryers for solid materials. 4- Theory of drying loss on drying and moisture content, Equilibrium moisture content. 5- Principles of freeze drying. 6- Freeze - dryers (Lyophilizatio(.

7 - Mixing, Emulsificaion and Homogenization: 1- Fundamentals and mechanisms. 2- Mixing equipments used in liquid - liquid, liquid - solid, and solid - solid mixing.

8 - Crystallization: 1- Classification, batch crystallizers, simple vacuum crystallizers. 2- Nucleation and crystal growth.. 3- Critical humidity prevention of caking.

Teaching and Learning Methods

1 - Lectures using overhead projector, LCD and data show students are encouring to assume some problems in the industrial and try to solve them.

Students Assessment

Assessment Method	TIME	MARKS
First Exam	60 min.	30%
Home work (drawing of operation equipments	-	10%
Final Written Exam	120 min.	60%

Books and References

Essential books	1-Theory and Practice of Industrial Pharmacy- Lachman, Lieberman and Kanig
Recommended books	2-Tutorial Pharmacy- Cooper and Gunn
	3-Bentleys TextBook of Pharmaceutics-Rowlin