

Course Unit	Pharmaceutical Biotechnology and New Therapeutic Systems		Field of study	Pharmacy	
Bachelor in	Pharmacy		School	School of Health	
Academic Year	2021/2022	Year of study	3	Level	1-3
Type	Semestral	Semester	1	ECTS credits	5.0
Code	9549-644-3102-00-21				
Workload (hours)	135	Contact hours	T	-	TP
			45	PL	-
			TC	-	S
			E	-	OT
			7,5	O	-

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Luis Migue Fernandes Nascimento

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. Mastering the basics of biotechnology and its interest in production Drug;
2. Understand the techniques and methods used in pharmaceutical production by biotechnology;
3. Understand the benefits that may or may not arise from the use of drugs obtained through biotechnology;
4. Identify the drugs that are currently obtained by the industry biotechnology;
5. Lead students to reflect on the prospects, challenges and future biotechnology applications in health care.

Prerequisites

Before the course unit the learner is expected to be able to:
Not applicable.

Course contents

Concept and Biotechnology application, biocatalysts, microbial biotechnology, industrial processes related to the area, sterilization. The biotechnology and health and biopharmaceuticals.

Course contents (extended version)

1. INTRODUCTION
 - Definitions, concepts and objectives
 - Historical development of biotechnology
 - Interconnection of Biotechnology with various disciplines
 - Areas of Application of Biotechnology
2. BIOCATALYSTS
 - Types of biocatalysts
 - Immobilized biocatalysts / free
 - Preparation of Biocatalysts
 - Criteria for Selection of biocatalysts
 - Advantages of Biocatalysts for Chemical Catalysts
 - Biocatalysts of biological importance and its applications
3. MICROBIAL BIOTECHNOLOGY
 - Microbial Diversity and systematic
 - Isolation of Micro organisms
 - Composition of the microbial cells
 - Culture media
 - Development of inoculums
 - Types of Cultures
 - Phases of Growth
 - Kinetics of Microbial Growth - General
 - Kinetics of Microbial Growth in Discontinuous ("Batch")
 - Kinetics of Microbial Growth in Continuous
4. INDUSTRIAL PROCESSES IN BIOTECHNOLOGY
 - Bioreactors
 - Fermentation
 - Use of isolated enzymes as biocatalysts
 - Biotransformation
5. STERILIZATION
 - Death kinetics of vegetative cells
 - Death kinetics of spores
 - Decimal reduction time
 - Sterilization versus degradation of nutrients
 - Relative resistance to moist heat
 - Choose the time / temperature sterilization
 - Factor or Del Naba
 - Stages and processes of sterilization of fermented
6. RECOVERY AND PURIFICATION OF PRODUCTS
 - Operations used
 - Factors that influence the choice of process
 - Income
7. BIOTECHNOLOGY AND HEALTH NEW THERAPEUTIC SYSTEMS
 - Gene therapy and new vaccines
 - Systems for controlled release of drugs
 - Biomaterials
 - Pharmaceutical Administration
 - Delivery of biopharmaceutical products. New drug delivery technologies.
8. BIOPHARMACEUTICALS
 - Genetic engineering
 - Recombinant DNA Technology
 - Alternatives to recombinant DNA technology
 - Advantages of biopharmaceuticals
 - Handling and storage of biopharmaceuticals
 - Regulation of biopharmaceuticals
 - Examples of biopharmaceuticals
 - Biosimilar pharmaceuticals
9. SAFETY AND REGULATION IN BIOTECHNOLOGY
10. ETHICS IN BIOTECHNOLOGY

Recommended reading

1. Becker, J. M. , Caldwell, G. A. , & Zachgo, E. A. (Eds.). (1996). Biotechnology: a laboratory course. San Diego, Academic press.
2. Walsh, G. (2003). Biopharmaceuticals: biochemistry and biotechnology. Chichester, Wiley.
3. Lima N. (2006). Biotecnologia, Fundamentos e Aplicações. Lisboa, LIDEL.
4. Ahuja, S. (1992). Chromatography of Pharmaceuticals: Natural, Synthetic, and Recombinant Products. Washington, American Chemical Society.
5. Oréfice, R. L. , de Magalhães Pereira, M. , & Mansur, H. S. (2006). Biomateriais: fundamentos e aplicações. Rio de Janeiro, Cultura Médica.

Teaching and learning methods

Theoretical-Practical Learning: Expositive method

Assessment methods

1. Alternative 1 - (Regular, Student Worker) (Final)
 - Final Written Exam - 80% (Minimum grade of 8. 5 values as Pedagogical Regulation of ESSa)
 - Development Topics - 20% (Minimum grade of 8. 5 values as Pedagogical Regulation of ESSa)
2. Alternative 2 - (Regular, Student Worker) (Supplementary, Special)
 - Final Written Exam - 80% (Minimum grade of 8. 5 values as Pedagogical Regulation of ESSa)
 - Development Topics - 20% (Minimum grade of 8. 5 values as Pedagogical Regulation of ESSa)
3. Alternative 3 - (Student Worker) (Final, Supplementary, Special)
 - Final Written Exam - 100%

Language of instruction

1. Portuguese
2. Portuguese, with additional English support for foreign students.

Electronic validation

Luis Migue Fernandes Nascimento	Isabel Cristina Jornalo Freire Pinto	Juliana Almeida de Souza	Adília Maria Pires da Silva Fernandes
02-03-2022	03-03-2022	05-04-2022	06-04-2022