

Course Unit	New Therapeutic Systems		Field of study	Biotechnology	
Master in	Applied Health Sciences - Biotechnology		School	School of Health	
Academic Year	2022/2023	Year of study	1	Level	2-1
Type	Semestral	Semester	2	ECTS credits	4.5
Code	5055-669-1205-00-22				
Workload (hours)	121,5	Contact hours	T -	TP -	PL -
			TC -	S -	E -
			OT -	O	54

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) Josiana Adelaide Vaz

Learning outcomes and competences

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

1. Identify the differences between conventional drug delivery systems and the new therapeutic systems.
2. Acquire a global knowledge about the different classes of biomaterials used in therapeutic systems.
3. Understand the relevance of the properties of biomaterials in their applications in therapeutic systems.
4. Understand the importance of nanotechnology in the production of new therapeutic systems.
5. Identify and understand the use of new nanosystems.
6. To understand the importance of the incorporation and release of therapeutic agents in Tissue Engineering.
7. To apply the knowledge from different areas in a creative and integrated way in the development of new therapeutic solutions.
8. To develop the ability to analyze scientific texts and explain the theoretical foundations of practical problems.

Prerequisites

Not applicable

Course contents

Conventional systems: advantages and limitations. New therapeutic systems: advantages and limitations. Biomaterials: the importance of biomaterials in therapeutic systems. Nanotechnology applied to therapeutic systems: general concepts. Tissue engineering and its applications in the delivery of therapeutic agents

Course contents (extended version)

1. Conventional systems: advantages and limitations.
2. New therapeutic systems: advantages and limitations.
3. Biomaterials: the importance of biomaterials in therapeutic systems.
 - Physical and chemical properties.
 - Classes of materials.
 - Biocompatibility and Biodegradability.
4. Nanotechnology applied to therapeutic systems: general concepts.
 - Liposomes and Micelles;
 - Dendrimers;
 - Fullerenes;
 - Nanoparticles: polymeric, lipid and metallic.
5. Tissue engineering and its applications in the delivery of therapeutic agents
6. In the laboratory component:
 - Preparation, evaluation of the encapsulation efficacy of therapeutic agents in alginate
 - Preparation and evaluation of the release efficacy of therapeutic agents in chitosan hydrogels

Recommended reading

1. Ranade, V. V. , & Cannon, J. B. (2011). Drug delivery systems: CRC press.
2. Rossi, F. , Perale, G. , & Masi, M. (2016). Controlled drug delivery systems: towards new frontiers in patient care: Springer.
3. Ratner, B. D. , Hoffman, A. S. , Schoen, F. J. , & Lemons, J. E. Third Edition (2013). Biomaterials science: an introduction to materials in medicine: Academic press.
4. Reisner, David E. (2011). Bionanotechnology: Global Prospects. Vol. 2, CRC Press.
5. Fisher, J. P. , Mikos, A. G. , Bronzino, J. D. , Peterson, D. R. (2013) Tissue engineering : principles and practices: CRC Press

Teaching and learning methods

The lectures are taught using videoconferencing technology by Maximiano Ribeiro e Paula Coutinho Borges from IPG. The lecture, tutorial, demonstrative, active, problem solving and simulation methods are integrated in the different types of teaching learning: theoretical-practical (TP), practical and laboratory (PL), and tutorial orientation.

Assessment methods

- Unique Alternative - (Regular, Student Worker) (Final, Supplementary, Special)
- Final Written Exam - 60% (written test, of the theoretical component.)
- Practical Work - 40% (Group work component)

Language of instruction

Portuguese, with additional English support for foreign students.

Electronic validation

Josiana Adelaide Vaz	Ana Maria Gerales Rodrigues Pereira	Juliana Almeida de Souza	Adília Maria Pires da Silva Fernandes
28-08-2023	30-08-2023	30-08-2023	30-08-2023