UNIVERSITY OF PATRAS
SCHOOL OF HEALTH SCIENCES
DEPARTMENT OF PHARMACY
POSTGRADUATE PROGRAM: NANOMEDICINES FOR DRUG DELIVERY- NANOMED (EMJMD)

COURSE TITLE: CLASSICAL AND CONTROLLED RELEASE DOSAGE FORMS

CODE:HG4_NM2

NANOMEDICINES FOR DRUG DELIVERY- NANOMED (EMJMD)

COURSE OUTLINE

1. GENERAL

SCHOOL	HEALTH SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHARMACY		
PARTICIPATING INSTITUTIONS	-		
TITLE of POSTGRADUATE PROGRAM	NANOMEDICINES FOR DRUG DELIVERY- NANOMED (EMJMD)		
LEVEL	POSTGRADUATE		
COURSE CODE	**HG4_NM2**	**SEMESTER**	**A'**
COURSE TITLE	**CLASSICAL AND CONTROLLED RELEASE DOSAGE FORMS**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Courses	7	9

COURSE TYPE	Specialised knowledge (Pharmaceutical Technology, Pharmaceutics, Biopharmaceutics, Industrial Pharmacy, Pharmacokinetics), Skills Development.
PREREQUISITE COURSES	None
LANGUAGE of INSTRUCTION and EXAMINATIONS	ENGLISH
COURSE OFFERED to ERASMUS STUDENTS	THIS IS ALREADY AN EMJMD PROGRAM COURSE
COUSRSE (URL)	https://www.pharmacy.upatras.gr/images/DS/NanoMed/HG4_NM02.pdf

2. LEARNING OUTCOMES

Learning Outcomes
Upon successful course completion, students will acquire knowledge, skills and abilities related to level 7 of the European Qualifications Framework for Lifelong Learning. In particular, students will: 1. understand the differences of drug formulation types according to physical state and administration route 2. understand the requirement for quality control of dosage forms 3. have been introduced to the techniques and methodologies for manufacturing of different types of Pharmaceutical Dosage forms 4. have understood the basic requirements for ingredients and industrial settings for production of different types of dosage forms according to route of administration 5. have familiarized themselves with the concepts of acute releasing and prolonged/sustained release

dosage forms
6. have understood the kinetics regulating the design of controlled release dosage forms
7. have understood the basic requirements for formation of controlled release dosage forms and the methods to design and formulate such dosage forms
8. They will be able to design and propose preparation methods for classical and controlled release formulations

General Competences

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Working independently
- Team Work
- Decision-making
- Working in an international environment
- Working in an interdisciplinary environment
- Production of free, creative and inductive thinking
- Adapting to new situations

3. SYLLABUS

LECTURES

1. Introduction of "Formulation of classical forms" Dosage forms and oral route/Immediate and modified release definitions
2. Introduction to Case Study Essay
3. Oral liquid forms
4. Solutions, Emulsions, Suspensions
5. Injectable forms and sterilisation
6. Capsules (Types, Ingredients, Preparation/ uses)
7. Spoilage and preservatives of medicines, product stability
8. Powder properties
9. Granulation
10. Tableting
11. Rectal forms,
12. Vaginal Forms
13. Ocular drug delivery
14. Coating/Controls/Packaging of oral solid forms
15. French language courses
16. Personal work on case study
17. Tutorial 1 of case study
18. Personal work on case study
19. Bases of skin biology for active cosmetic and skin delivery of drug
20. Overview of objectivation methods for raw materials and finished cosmetic products. Notions of cosmetic regulation
21. Nasal drug delivery,
22. Tutorial 2 of case study
23. Pulmonary drug delivery
24. Controlled release forms :Introduction, Fast release /Delayed release oral dosage forms
25. Personal work
26. Diffusion test (skin formulations): Franz cell
27. Modified release dosage forms : Extended release dosage forms by other routes

28. Strategic plan of formulation for oral route
29. Tutorial 3 of case study

30. Revisiting biopolymer-based micro- and nanoencapsulation: an analysis of their potential in oral delivery of insulin
31. Dermal and transdermal delivery
32. Biorelevant in vitro performance testing of oraly administered dosage forms
33. Presentation of Case study essays

Case Study Project, is carried out by teams of students that are asked to design and produce a new formulation for a drug to treat a specific disease and/or patient group (paediatric, geriatric etc). Students should document the selection of the route of administration and appropriate dosage form, select the ingredients and provide a detailed formula and method of manufacturing together with required assays for quality control, and also select appropriate packaging and if required applicators for proper drug dosing. Finally, the drug information sheet that will be placed in the packaging should also be prepared.
Tutorials to guide students are carried out.

PUBLIC PRESENTATIONS
Case Study Essay

Assignment & Presentation

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face to face
USE of INFORMATION and COMMUNICATIONS TECHNOLOGY	• Use of ICT - e-class platform • Communication with students
TEACHING METHODS	***Activity*** — ***Semester Workload*** Lectures — 130 Preparation/Presentations of Case Studies — 50 non-directed Study — 45 ***Course Total*** **(25 hours of work-load per ECTS credit) — 225**
STUDENT PERFORMANCE EVALUATION	Language of Evaluation: English Written exams • Multiple choice questionnaires, Short answer questions, Open ended questions (60% of final grade) Public Presentation • Presentation of a Case study (English) (40% of final grade)

5. RECOMMENDED BIBLIOGRAPHY

Suggested Bibliography:

1. Sinko, P. J. (2023). Martin's Physical Pharmacy and Pharmaceutical Sciences. United States: Wolters Kluwer Health.
2. Attwood, D., Florence, A. T. (2012). Physical Pharmacy. Germany: Pharmaceutical Press.
3. Jain, G., Krishen Khar, R., Ahmad, F. J. (2011). Theory and Practice of Physical Pharmacy - E-Book. India: Elsevier Health Sciences.
4. Aulton's Pharmaceutics: The Design and Manufacture of Medicines. (2013). United Kingdom: Churchill Livingstone/Elsevier.
5. Perrie, Y., Rades, T. (2012). Pharmaceutics: Drug Delivery and Targeting. United Kingdom: Pharmaceutical Press.
6. Jones, D. S. (2016). Pharmaceutics: Dosage Form and Design. United Kingdom: Pharmaceutical Press.
7. Agarwal, G. (2018). Pharmaceutics-L: Theory and Practical. India: CBS Publishers & Distributors.
8. Siegel, R. A., Rathbone, M. J. (2011). Fundamentals and Applications of Controlled Release Drug Delivery. Germany: Springer US.
9. Oral Controlled Release Formulation Design and Drug Delivery: Theory to Practice. (2011). Germany: Wiley.

Related Academic Journals:

- Journal of Controlled Release
- J. Colloid and Interphase Sciences
- Colloids and Surfaces A and B
- International J. Pharmaceutics
- Journal of Pharmaceutical Sciences
- European Journal of Pharmaceutical Sciences
- Eur. J. Pharmaceutics and Biopharmaceutics
- Pharmaceutics
- Pharmaceuticals