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

COURSE TITLE: INNOVATIONS IN PHARMACEUTICAL TECHNOLOGY

CODE:HG4_NM5

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_NM5**	**SEMESTER**	**B'**
COURSE TITLE	**INNOVATIONS IN PHARMACEUTICAL TECHNOLOGY**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Courses and Seminars	2	3

COURSE TYPE	Specialised knowledge on Pharmaceutical Technology and Industrial Pharmacy (Pharmaceutical Technology, Industrial Pharmacy,), 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_NM05.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 advanced and novel methods applied in current days for formulation design 2. understand advanced and novel methods applied in current days for formulation design 3. have been introduced to innovative techniques and methodologies applied for development of Pharmaceutical products

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

Special topics in Pharmaceutical Technology:

1. Introduction of "Advanced Pharmaceutical technology"
2. Experiment planning by Design of Experiments
3. Conference on 3D printing
4. 3D printing technologies for individualized drug therapy
5. Quality guidelines- Quality by Design
6. Innovations in Design and Production of transdermal delivery Devices/Patches
7. Industrial production of Injectable
8. microfluidic mixing for scaled up production of nanomedicines. Types of platforms, chips and Examples. Scaling up
9. Preparation of nanoparticles by microfluidics
10. Production of nanoparticles by supercritical fluids
11. Challenges to produce LNP vaccines
12. Stability of Formulations and Novel Methodologies for Assesment
13. Novel approaches for Lipid based formulations for oral delivery
14. Nanocrystals: Development and manufacturing
15. green synthesis for APIs and Ingredients and NPs
16. continuous manufacturing approaches
17. "green" analysis with less organic solvent
18. Advanced Characterization methods for Pharmaceuticals (Raman, micro-CT etc
19. Innovative devices for Pulmonary delivery
20. Other specialized topics by experts from Industry

An essay on topics of innovative methods to produce specific formulation types will be given to students.

PUBLIC PRESENTATIONS

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 — 30 Preparation / Presentations of Essay — 15 non-directed Study — 30 ***Course Total*** **(25 hours of work-load per ECTS credit) — 75**
STUDENT PERFORMANCE EVALUATION	Language of Evaluation: English Written exams • Multiple choice questionnaires, Short answer questions, Open ended questions (80% of final grade) Public Presentation • Presentation of a Essay (20% of final grade)

5. RECOMMENDED BIBLIOGRAPHY

Suggested Bibliography:

1. Innovation and Marketing in the Pharmaceutical Industry: Emerging Practices, Research, and Policies. (2013). Netherlands: Springer New York.
2. Gassmann, O., Reepmeyer, G., von Zedtwitz, M. (2013). Leading Pharmaceutical Innovation: Trends and Drivers for Growth in the Pharmaceutical Industry. Germany: Springer Berlin Heidelberg.
3. Value Creation in the Pharmaceutical Industry: The Critical Path to Innovation. (2016). Germany: Wiley.
4. Atun, R. A., Sheridan, D. J. (2007). Innovation In The Biopharmaceutical Industry. Singapore: World Scientific Publishing Company.
5. Continuous Manufacturing of Pharmaceuticals. (2017). Germany: Wiley.
6. Engelhardt, H. T. (2014). Innovation and the Pharmaceutical Industry: Critical Reflections on the Virtues of Profit. United States: Ebsco Publishing.
7. National Academies of Sciences, Engineering, and Medicine; Division on Earth and Life Studies; Board on Chemical Sciences and Technology; Committee to Identify Innovative Technologies to Advance Pharmaceutical Manufacturing. Innovations in Pharmaceutical Manufacturing on the Horizon: Technical Challenges, Regulatory Issues, and Recommendations. Washington (DC): National Academies Press (US); 2021 Feb 24. 3, Innovations in Manufacturing Drug Products. Available from: https://www.ncbi.nlm.nih.gov/books/NBK570316/

Related Academic Journals:

Journal of Intelligent Manufacturing
Journal of Pharmaceutical Manufacturing