UNIVERSITY OF PATRAS
SCHOOL OF HEALTH SCIENCES
DEPARTMENT OF PHARMACY

POSTGRADUATE PROGRAM: **DRUG DESIGN AND DEVELOPMENT**

COURSES DESCRIPTION

PATRAS 2023

INDEX

A. CORE COURSES

B. SPECIALIZATION COURSES

1. Medicinal Chemistry - Natural Products

2. Industrial Pharmacy

3. Molecular Pharmacology and Biotechnology

Γ. DIPLOMA THESIS

UNIVERSITY OF PATRAS
SCHOOL OF HEALTH SCIENCES
DEPARTMENT OF PHARMACY
POSTGRADUATE PROGRAM: DRUG DESIGN AND DEVELOPMENT

COURSE TITLE: DESIGN AND DISCOVERY OF BIOACTIVE COMPOUNDS
CODE: DPHA_1

DESIGN AND DISCOVERY OF BIOACTIVE COMPOUNDS

COURSE OUTLINE

1. GENERAL

SCHOOL	HEALTH SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHARMACY		
PARTICIPATING INSTITUTIONS	-		
TITLE of POSTGRADUATE PROGRAM	DRUG DESIGN AND DEVELOPMENT		
LEVEL	POSTGRADUATE		
COURSE CODE	**DPHA-1**	**SEMESTER**	**A'**
COURSE TITLE	**DESIGN AND DISCOVERY OF BIOACTIVE COMPOUNDS**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Courses	5	8

COURSE TYPE	General Background, Specialised general knowledge (Medicinal Chemistry, Pharmacognosy, Computational Chemistry), Skills Development.
PREREQUISITE COURSES	None
LANGUAGE of INSTRUCTION and EXAMINATIONS	Greek
COURSE OFFERED to ERASMUS STUDENTS	Yes, with guided self-study in English
COUSRSE (URL)	http://www.pharmacy.upatras.gr/images/DS/DPHA_1_EN.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 strategy and logic of relating the activity of a drug to its chemical structure, as well as the role of "molecular targets". 2. have been introduced to the techniques and methodology underlying the discovery of bioactive natural products from natural sources. 3. have understood the basic approaches to the discovery of Lead compounds, as well as the methodologies for designing a specific bioactive compound. 4. have familiarized themselves with the techniques of optimizing physicochemical properties of a molecule with the aim of making it a better "medicine".

5. They will be able to understand the principles of QSAR and modern computational methods and how they can work synergistically and/or independently in the context of new drug design and discovery.

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. Molecular targets in drug discovery.
2. Principles in Structural Bioinformatics, Computational and Structural Biology - Methods & Tools, Database mining, Data analysis and classification.
3. Prediction, experimental study/determination and analysis of 3D structures of pharmaceutical targets and bioactive compounds - Conformational analysis of biomolecular structures.
4. Strategies in the search for new lead compounds (serendipity, analogue design, compound screening, rational drug design).
5. Discovery of bioactive natural products: raw materials and strategies of study and isolation (random control, ethnopharmacological approaches, chemical ecology, bioactivity-driven fractionation, biotechnological approaches).
6. Structure-based and ligand-based design of bioactive molecules.
7. Optimization of drug-target interactions (structural modifications, structure-activity relationships).
8. Optimization of drug access to the target (optimization of hydrophilic/hydrophobic properties, drug metabolism, prodrugs).
9. Enzyme inhibitors in drug discovery:
   a. Enzymes as attractive drug targets
   b. Mechanisms of enzymatic reactions
   c. Reversible inhibitors (Slowly and tightly bound inhibitors)
   d. Irreversible inhibitors
   e. Transition-state analogues as enzyme inhibitors
   f. Kinetics of enzymatic reactions

PUBLIC PRESENTATIONS

Selected case studies in modern drug discovery.

Individual 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 — 65 Presentations of Case Studies — 13 Case Studies' Preparation & non-directed Study — 122 ***Course Total*** **(25 hours of work-load per ECTS credit)** — **200**
STUDENT PERFORMANCE EVALUATION	Language of Evaluation: Greek / English Written exams • Multiple choice questionnaires, Short answer questions, Open ended questions (60% of final grade) Public Presentation • Presentation of a Case study (Greek or English) (40% of final grade)

5. RECOMMENDED BIBLIOGRAPHY

Suggested Bibliography:

1. Graham L. Patrick, "An Introduction to Medicinal Chemistry", 5th Edition, Oxford University Press, 2013.
2. Thomas L. Lemke, David A. Williams, "Foye's Principles of Medicinal Chemistry", 7th Edition, Lippincott Williams and Wilkins, 2012.
3. Richard B. Silverman, "The Organic Chemistry of Drug Design and Drug Action", 3rd Edition Academic Press, 2014.
4. Gareth Thomas, "Medicinal Chemistry: An Introduction", 2nd Edition, Wiley, 2008.

Related Academic Journals:

Journal of Medicinal Chemistry
ACS Medicinal Chemistry Letters
European Journal of Medicinal Chemistry
ChemBioChem, ChemMedChem
Bioorganic and Medicinal Chemistry
Bioorganic and Medicinal Chemistry Letters
Angewandte Chemie International Edition
Medicinal Research Reviews

UNIVERSITY OF PATRAS
SCHOOL OF HEALTH SCIENCES
DEPARTMENT OF PHARMACY
POSTGRADUATE PROGRAM: DRUG DESIGN AND DEVELOPMENT

COURSE TITLE: DESIGN AND DEVELOPMENT OF PHARMACEUTICAL PRODUCTS
CODE: DPHA_2

DESIGN AND DEVELOPMENT OF PHARMACEUTICAL PRODUCTS

COURSE OUTLINE

1. ΓΕΝΙΚΑ

SCHOOL	HEALTH SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHARMACY		
PARTICIPATING INSTITUTIONS	-		
TITLE of POSTGRADUATE PROGRAM	DRUG DESIGN AND DEVELOPMENT		
LEVEL	POSTGRADUATE		
COURSE CODE	**DPHA-2**	**SEMESTER**	**A'**
COURSE TITLE	**DESIGN AND DEVELOPMENT OF PHARMACEUTICAL PRODUCTS**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Courses	5	8

COURSE TYPE	Basic Scientific Field
PREREQUISITE COURSES	None
LANGUAGE of INSTRUCTION and EXAMINATIONS	Greek
COURSE OFFERED to ERASMUS STUDENTS	Yes
COUSRSE (URL)	http://www.pharmacy.upatras.gr/images/DS/DPHA_2_EN.pdf

2. LEARNING OUTCOMES

Learning Outcomes
STUDENTS WILL: HAVE THE THEORITICAL KNOWLEDGE TO DESIGN AND DEVELOP A POTENTIAL SAFE, STABLE AND BIOAVAILABLE DOSAGE FORM FOR a SPECIFIC DRUG (SELECT ROUTE OF ADMINISTRATION, DOSAGE FORM TYPE, EXCIPIENTS, MANUFACTURE METHOD) UNDERSTAND THE IMPORTANCE OF PREFORMULATION STUDIES AND METHODS OF PHARMACEUTICAL PROCESSING, SUCH AS PARTICLE SIZE REDUCTION (SOLIDS), PARTICLE SIZE SEPARATION (SOLIDS), PARTICLE SIZE ANALYSIS, MIXING, DRYING, FILTRATION, STERILIZATION IN PHARMACEUTICAL INDUSTRY

General Competences

- Self-study
- Work in interdisciplinary environment
- Search, analyze and combine data towards making useful conclusions
- Understand basic concepts of formulation development

3. SYLLABUS

LECTURES

1. Pharmaceutical Technology: Basic Considerations and Special topics in the Design and Development of Pharmaceutical Products
2. Industrial Manufacturing - Special Topics
3. Case Study- Instructed Essay

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face-to-Face, Essays, Exercises Self-study
USE of INFORMATION and COMMUNICATIONS TECHNOLOGY	• E-class platform
TEACHING METHODS	***Activity*** — ***Semester Workload*** Lectures — 65 Directed Exercises — 13 Independent Study — 122 ***Course Total*** **(25 hours of work-load per ECTS credit) — 200**
STUDENT PERFORMANCE EVALUATION	Language of Evaluation: Greek Written exams; MCQ; Essays and exercises Final Grade: performance in written exam on the theoretical courses (70%), performance in case study essay: 30%.

5. RECOMMENDED BIBLIOGRAPHY

Suggested Bibliography:

1] Aulton, M. E., (Ed.). Pharmaceutics: The Science of Dosage Form Design. Churchill Livingstone, U.K., 1988.
2] Lachman, L et al., (Eds.). The Theory and Practice of Industrial Pharmacy. Lea and Febiger, Philadelphia, 1986.
3] Remington: The Science and Practice of Pharmacy, 19th edition, 1995, Mack Publishing Company, Easton Pennsylvania.
4] Lembeck, F. Συνταγολογία (μετάφραση Ι. Σ. Παπαδόπουλου και Θ. Λουκά), 5η έκδοση, 1975, Εκδόσεις Παρισιάνος, Αθήνα.

5] Stoklosa, M. J. and Ansel, H. C. Pharmaceutical Calculations, 7th edition, 1980, Lea and Febiger, Philadelphia.
6] Aulton's Pharmaceutics. The Design and Manufacturing of Medicines. Edited by M.E. Aulton, Churchill Livingstone Elsevier, Third Edition, reprinted 2010
7] Biopharmaceutics and Clinical Pharmacokinetics. Fourth Edition. By Milo Gibaldi. Lea and Febiger: Malvem, PA, 1991.

Related specialized journals:

Journal of Pharmaceutical Sciences
International Journal of Pharmaceutics
Pharmaceutical research
European journal of Pharmaceutics and Biopharmaceutics
Journal of Pharmaceutical Sciences

UNIVERSITY OF PATRAS
SCHOOL OF HEALTH SCIENCES
DEPARTMENT OF PHARMACY
POSTGRADUATE PROGRAM: DRUG DESIGN AND DEVELOPMENT

COURSE TITLE: PHARMACEUTICAL ANALYSIS - BIOSPECTROSCOPY
CODE: DPHA_3

PHARMACEUTICAL ANALYSIS - BIOSPECTROSCOPY

COURSE OUTLINE

1. GENERAL

SCHOOL	HEALTH SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHARMACY		
PARTICIPATING INSTITUTIONS	-		
TITLE of POSTGRADUATE PROGRAM	DRUG DESIGN AND DEVELOPMENT		
LEVEL	POSTGRADUATE		
COURSE CODE	**DPHA-3**	**SEMESTER**	**A'**
COURSE TITLE	**PHARMACEUTICAL ANALYSIS - BIOSPECTROSCOPY**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Courses	5	8

COURSE TYPE	Special Background
PREREQUISITE COURSES	None
LANGUAGE of INSTRUCTION and EXAMINATIONS	Greek
COURSE OFFERED to ERASMUS STUDENTS	No
COUSRSE (URL)	http://www.pharmacy.upatras.gr/images/DS/DPHA_3_EN.pdf

2. LEARNING OUTCOMES

Learning Outcomes
The student will be introduced to Spectroscopic and Separation Techniques of Instrumental Analysis with emphasis on the relevant analytical techniques used in Pharmacopoeias for the control of raw drug materials, excipients and finished drug products as well as in the analysis of biological fluids. Specifically, upon successful completion of the course the student is expected to have developed level 7 skills in the following topics: a. Ability to select and use the appropriate analytical spectroscopical technique for the identification and quantification of individual components of liquid or solid samples according to the nature of the analyte. b. Ability to select the select and develop the appropriate separation technique for separation of a mixture of compounds and composition analysis with the purpose of identification and quantification of the individual components of a liquid or solid sample.
General Competences

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Working independently
- Team work
- Decision-making
- Production of new research ideas

3. SYLLABUS

LECTURES

1. Characteristics of analytical methods - Standard solutions - Validation process - Critical regulatory requirements from the Pharmacopoeia
2. Visible-UV spectroscopy: introduction, electromagnetic spectrum, absorption laws and limitations, instrument design and operating principle, chromophore concept, fluorescence.
3. IR, ATR and micro-IR spectroscopy: basics - molecular vibrations, vibrational frequency, factors affecting vibrational frequencies, sampling techniques, instrumentation, spectrum interpretation, FT-IR, theory and applications.
4. Raman and micro-Raman spectroscopy: Fundamentals - sampling techniques, instrumentation, spectrum interpretation, theory and applications.
5. Fluorescence spectroscopy: Fundamentals, instrumentation, spectrum interpretation, theory and applications.
6. Cyclic dichroism: Fundamentals, instrumentation, spectrum interpretation, theory and applications.
7. Mass Spectrometry: Theory, ionization techniques: electron ionization, chemical ionization, field ionization, fast atom bombardment, plasma ejection, fragmentation process:analysis, spectrum interpretation and applications of structure identification and determination.
8. Sample preparation for separation techniques
9. Electrophoresis: Theory, various techniques (e.g. on paper, on gel, capillary electrophoresis, etc.) and experimental setups.
   Applications in drug analysis.
10. Thin layer chromatography: Theory, simple and automated experimental setups and applications.
11. Liquid and gas chromatography (LC and GC): theory, basic instrumentation and different detection techniques and modes with emphasis on mass spectrometry.
    Applications in pharmaceutical analysis.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face to face
USE of INFORMATION and COMMUNICATIONS TECHNOLOGY	Learning process support through the e-class platform
TEACHING METHODS	***Activity*** — ***Semester Workload*** Interactive teaching — 65 Study and Analysis of Bibliography — 70 Project — 65 ***Course Total*** **(25 hours of work-load per ECTS credit)** — **200**
STUDENT PERFORMANCE EVALUATION	Language of Evaluation: Greek 1. Written final examination (80%) including - Short development questions - Questions of a critical nature - Problem solving 2. Assignment - Presentation of an analytical problem from the international literature (20%)

5. RECOMMENDED BIBLIOGRAPHY

Suggested Bibliography:

1. ΕΝΟΡΓΑΝΗ ΑΝΑΛΥΣΗ, ΘΕΜΙΣΤΟΚΛΗΣ Π. ΧΑΤΖΗΪΩΑΝΝΟΥ, ΜΙΧΑΗΛ Α. ΚΟΥΠΠΑΡΗΣ , 2014
2. ΕΝΟΡΓΑΝΗ ΧΗΜΙΚΗ ΑΝΑΛΥΣΗ, Ι. ΠΑΠΑΔΟΓΙΑΝΝΗΣ-Β. ΣΑΜΑΝΙΔΟΥ, 2η Έκδοση, Θεσσαλονίκη, 2011.
3. Φαρμακευτική ανάλυση, D.G. WATSON, , Επιμέλεια Ελληνικής ‘Εκδοσης: Μ. Κουππάρης, Εκδόσεις Παρισιάνου, 2011.
4. ΘΕΜΕΛΙΩΔΕΙΣ ΑΡΧΕΣ ΑΝΑΛΥΤΙΚΗΣ ΧΗΜΕΙΑΣ, SKOOG, D. A. Skoog, D. M. West, F. James Holler, S. R. Crouch, Επιμέλεια Ελληνικής ‘Εκδοσης: Μ. Ι. Καραγιάννης, Κ. Η. Ευσταθίου**,** Εκδόσεις Κωσταράκη, 2016

UNIVERSITY OF PATRAS
SCHOOL OF HEALTH SCIENCES
DEPARTMENT OF PHARMACY
POSTGRADUATE PROGRAM: DRUG DESIGN AND DEVELOPMENT

COURSE TITLE: PRECLINICAL AND CLINICAL DRUG EVALUATION
CODE: DPHA_4

PRECLINICAL AND CLINICAL DRUG EVALUATION

COURSE OUTLINE

1. GENERAL

SCHOOL	HEALTH SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHARMACY		
PARTICIPATING INSTITUTIONS	-		
TITLE of POSTGRADUATE PROGRAM	DRUG DESIGN AND DEVELOPMENT		
LEVEL	POSTGRADUATE		
COURSE CODE	**DPHA-4**	**SEMESTER**	**A'**
COURSE TITLE	**PRECLINICAL AND CLINICAL DRUG EVALUATION**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Courses	5	8

COURSE TYPE	General Knowledge: Revision and analysis of basic concepts, in order to obtain a background "harmonization" of students with varying undergraduate degrees. Scientific field: In-depth understanding of the Approaches and Methods in Preclinical and Clinical Drug Development. Development of Skills in critical evaluation and synthesis of experimental (and other) data.
PREREQUISITE COURSES	Not required. However, the successful enrolment in the course supposes important pre-existing knowledge and background in (among others) Biochemistry, (Patho)Physiology and Cell/Molecular Biology.
LANGUAGE of INSTRUCTION and EXAMINATIONS	Greek. However, a large part of lecture material, scientific articles and final exam questions are in english.
COURSE OFFERED to ERASMUS STUDENTS	Yes
COUSRSE (URL)	http://www.pharmacy.upatras.gr/images/DS/DPHA_4_EN.pdf

2. LEARNING OUTCOMES

Learning Outcomes
Understanding of a variety of basic concepts, methodologies and approaches (and of their combination) used in the Preclinical and Clinical Evaluation of bioactive compounds. Development of ability for Critical Thinking in the evaluation of literature, methodology, approaches, results and conclusions.

Independent analysis and synthesis of experimental and other data (e.g. from publications), enabling the extraction of conclusions.
Development of the skills required for oral and written presentation and argumentation, based on experimental and/or clinical data.
Acquisition of the ability to plan the appropriate experimental methodology and approach in order to evaluate and develop bioactive compounds for the treatment of a specific disease (problem solving).

General Competences

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

3. SYLLABUS

LECTURES
Basic pharmacological and biochemical terms and definitions characterizing compound bioactivity (EC_{50}, IC_{50}, Km, etc).
Biochemical, immunological and immunochemical methods used to evaluate the activity of compounds in vitro.
In vitro cell-based and organoid-based models for the identification and evaluation of bioactive compounds.
Use of organs-on-a-chip in the preclinical evaluation of bioactive compounds.
In vivo experimental models used in the preclinical evaluation of bioactive compounds.
Regulatory framework of preclinical research in animals.
Preclinical data (ADMET) requirements for entering into clinical studies.
Regulatory framework of clinical drug development.
Regulatory processes and mechanisms of drug approval.
Regulatory framework for the approval of drugs with pharmacogenomic biomarker labeling (Companion Diagnostics).
Monitoring of drug safety – Pharmacovigilence.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face to face
USE of INFORMATION and COMMUNICATIONS TECHNOLOGY	Extensive use of E-class to share archives and lectures, to communicate with students and to organize the lecture schedule.
TEACHING METHODS	***Activity*** ***Semester Workload*** Lectures from Faculty and presentations by students based on processing assigned material and on analysis of scientific literature 200 ***Course Total*** **(25 hours of work-load per ECTS credit) 200**
STUDENT PERFORMANCE EVALUATION	Written exam comprising questions requiring short or extensive explanations, multiple questions and problem solving. - The exam and answers are given in greek, but the initial material of the problems may be in English (e.g. data from a scientific publication). - The exam takes place with "open books" ("material"), i.e. all students have access to all the class' scientific content (lectures, articles etc), which they have received or downloaded throughout the semester. - During the exam, the students have no access to the internet.

5. RECOMMENDED BIBLIOGRAPHY

Related Academic Journals:

Access / use of scientific journals, preferably wide-circulation ones including (non-exhaustive list):

- Nature and all Nature journals
- Science and all Science journals
- Cell and all Cell journals
- Annual Reviews series
- Journal of Clinical Investigation
- PNAS

UNIVERSITY OF PATRAS
SCHOOL OF HEALTH SCIENCES
DEPARTMENT OF PHARMACY
POSTGRADUATE PROGRAM: **DRUG DESIGN AND DEVELOPMENT**

COURSE TITLE: RESEARCH METHODOLOGY AND ETHICS
CODE: DPHA_5

RESEARCH METHODOLOGY AND ETHICS

COURSE OUTLINE

1. GENERAL

SCHOOL	HEALTH SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHARMACY		
PARTICIPATING INSTITUTIONS	-		
TITLE of POSTGRADUATE PROGRAM	DRUG DESIGN AND DEVELOPMENT		
LEVEL	POSTGRADUATE		
COURSE CODE	**DPHA-5**	**SEMESTER**	**A'**
COURSE TITLE	**RESEARCH METHODOLOGY AND ETHICS**		
INDEPENDENT TEACHING ACTIVITIES		**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures		2	4
COURSE TYPE	General background, Special background (Bioethics), Skills development		
PREREQUISITE COURSES	None		
LANGUAGE of INSTRUCTION and EXAMINATIONS	Greek / English		
COURSE OFFERED to ERASMUS STUDENTS	Yes		
COUSRSE (URL)	http://www.pharmacy.upatras.gr/images/DS/DPHA_5_EN.pdf		

2. LEARNING OUTCOMES

Learning Outcomes
This course aims that students acquire knowledge, skills and competences related to level 7 of the European Qualifications Framework for Lifelong Learning. In particular, the course aims at students' learning and familiarizing with the concepts of Research Methodology (approaches, design, collection, processing, analysis of data), as well as its Ethical aspect, as it should be applied in any research experimental approach to the solution of a scientific problem (good practices, disdain of malpractices, conflict of interest, personal data, etc.). Upon successful completion of the course, students: 1. will have acquired the necessary knowledge to understand the legal, and ethical frame-work governing scientific research. 2. will be able to complete the design of an experimental research project, starting from the literature review, drafting a research protocol, writing the methodology, processing the results, up to evaluating and drawing the final conclusions.

3. will have gained experience in the descriptive indexing of a large amount of information and the "art" of presenting a topic to a specialized and / or non-relevant audience. 4. will have developed the study skills necessary for their further scientific training and professional development.
General Competences
• Search for, analysis and synthesis of data and information, with the use of the necessary technology • Working independently • Team work • Decision-making • Respect for difference and multiculturalism • Showing social, professional and ethical responsibility and sensitivity to gender issues • Working in an international environment • Working in an interdisciplinary environment • Production of free, creative and inductive thinking

3. SYLLABUS

1.	Introduction to Research Methodology
2.	Phases and Steps of Conducting a Study & Selecting or Identifying Research Problems
3.	Literature Review
4.	Quantitative research in Health Sciences
5.	Qualitative research in Health Sciences
6.	Sampling
7.	Data Analysis
8.	Writing a Research Report – Dissertation
9.	Therapeutic and Non-Therapeutic Clinical Research
10.	Topics for Discussion: Orphan Drugs, Placebo, Nocebo, Research in Minorities
11.	Research Practices - Scientific Education
12.	Discrediting Unethical Research Practices - Conflict of Interest
13.	Genethics: Ethics in personalized medicine and therapeutics
14.	Ethics in laboratory animals research

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face to face
USE of INFORMATION and COMMUNICATIONS TECHNOLOGY	Use of ICT in teaching and communication with students (i.e., e-class, emails, PowerPoint presentations)

TEACHING METHODS	***Activity***	***Semester Workload***
	Lectures	13
	Directed Study	35
	non-Directed Study	52
	Course Total **(25 hours of work-load per ECTS credit)**	**100**
STUDENT PERFORMANCE EVALUATION	Language of Evaluation: Greek / English Written exams • Multiple choice questionnaires, Short answer questions, Open ended questions	

5. RECOMMENDED BIBLIOGRAPHY

Suggested Bibliography:

1. Bowling, A., 2014. Research Methods In Health: Investigating Health And Health Services (4th edition). Open University Press. UK.
2. Brink, H., van der Walt, Chr., van Rensburg, G., 2018. Fundamentals of research methodology for health care professionals (4th edition). Juta & Company Ltd. South Africa.
3. Research Ethics for Scientists - A Companion for Students C. Neal Stewart; John Wiley & Sons, Ltd (2011)
4. The Student's Guide to Research Ethics Paul Oliver; Mc Graw Hill, Open University Press (2010)
5. The Ethics of Bioethics - Mapping the Moral Landscape Lisa A. Eckenwiler, Felicia G. Cohn; The Johns Hopkins University Press (2007)

UNIVERSITY OF PATRAS
SCHOOL OF HEALTH SCIENCES
DEPARTMENT OF PHARMACY
POSTGRADUATE PROGRAM: **DRUG DESIGN AND DEVELOPMENT**

COURSE TITLE: BIBLIOGRAPHY
CODE: DPHA_6

BIBLIOGRAPHY

COURSE OUTLINE

1. GENERAL

SCHOOL	HEALTH SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHARMACY		
PARTICIPATING INSTITUTIONS	-		
TITLE of POSTGRADUATE PROGRAM	DRUG DESIGN AND DEVELOPMENT		
LEVEL	POSTGRADUATE		
COURSE CODE	**DPHA-6**	**SEMESTER**	**A'**
COURSE TITLE	**BIBLIOGRAPHY**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
-	-	2

COURSE TYPE	Scientific field: In-depth understanding of the scientific field and of the existing literature related to the subject of the Diploma Thesis. Development of Skills Presentation of the theoretical background of the Thesis research project to an audience composed of all MSc students and Faculty.
PREREQUISITE COURSES	-
LANGUAGE of INSTRUCTION and EXAMINATIONS	All the study material is in english but the presentation taking place at the end of the semester is in greek. Foreign or Erasmus students do the presentation entirely in english.
COURSE OFFERED to ERASMUS STUDENTS	Yes
COUSRSE (URL)	http://www.pharmacy.upatras.gr/images/DS/DPHA_6_EN.pdf

2. LEARNING OUTCOMES

Learning Outcomes
Understanding the concepts and experimental approaches related to the research project they are about to undertake. Development of the skills required for oral and written presentation and argumentation. Acquisition of the ability to plan the appropriate experimental methodology and approach in order to fulfill the assigned Diploma research project (problem solving).
General Competences
• Search for, analysis and synthesis of data and information, with the use of the necessary technology • Adapting to new situations

- Adapting to new situations
- Decision-making
- Elaboration of new research ideas
- Production of free, creative and inductive thinking

3. SYLLABUS

The content of the class is determined by the field of studies related to the Laboratory in which the MSc student will be integrated.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	The training of the students is done by interaction with the Laboratory's research personnel (face-to-face)
USE of INFORMATION and COMMUNICATIONS TECHNOLOGY	Extensive use of multiple biomedical databases. Lectures and presentations are done by access to ICT.
TEACHING METHODS	***Activity*** — ***Semester Workload*** Lectures — 39 Presentations of Case Studies — 10 Case Studies' Preparation & non-directed Study — 1 ***Course Total*** **(25 hours of work-load per ECTS credit)** — **50**
STUDENT PERFORMANCE EVALUATION	Language of Evaluation: Greek / English The evaluation of the student is done during the presentation of the theoretical part and scope of the research project they are planning to execute during the next semesters and the ensuing discussion, by the Supervisor and members of the tripartite examination (evaluation) committee. The presentation and evaluation take place at the end of the semester before an open audience, including the obligatory presence of all the other MSc students.

5. RECOMMENDED BIBLIOGRAPHY

The literature and scientific journals are chosen based on their affinity with the research project that is assigned to the student and described in the presentation.

UNIVERSITY OF PATRAS
SCHOOL OF HEALTH SCIENCES
DEPARTMENT OF PHARMACY
POSTGRADUATE PROGRAM: **DRUG DESIGN AND DEVELOPMENT**

COURSE TITLE: NATURAL PRODUCTS IN DRUG DISCOVERY
CODE: DPHA_A01

NATURAL PRODUCTS IN DRUG DISCOVERY
COURSE OUTLINE

1. GENERAL

SCHOOL	HEALTH SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHARMACY		
PARTICIPATING INSTITUTIONS	-		
TITLE of POSTGRADUATE PROGRAM	DRUG DESIGN AND DEVELOPMENT		
LEVEL	POSTGRADUATE		
COURSE CODE	**DPHA_A01**	**SEMESTER**	**B'**
COURSE TITLE	**NATURAL PRODUCTS IN DRUG DISCOVERY**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Courses	3	5

COURSE TYPE	Specialized Background
PREREQUISITE COURSES	-
LANGUAGE of INSTRUCTION and EXAMINATIONS	Greek
COURSE OFFERED to ERASMUS STUDENTS	Yes, with guided self-study in English
COUSRSE (URL)	http://www.pharmacy.upatras.gr/images/DS/DPHA_A01_EN.pdf

2. LEARNING OUTCOMES

Learning Outcomes
The purpose of this course is to acquaint postgraduate students with state-of-the-art technologies and specialized knowledge regarding the isolation, identification, analysis, preclinical and clinical evaluation of natural products and plant extracts for the purpose of their use in pharmaceutical products as well as with issues of their sustainable production and, finally, regulatory issues, particularly for herbal medicinal products. In summary, students will be aware of cutting-edge issues in the field of Pharmacognosy and, in general, Drug Discovery and Development. Upon successful completion of the course, students will be able: 1. to critically evaluate the scientific achievements of the field 2. to understand how to interact with other scientific fields 3. to propose original research approaches

4. to propose problem-solving strategies in the field of Drug Discovery and Development from natural products
5. to communicate with accuracy and clarity any scientific developments in the field to both specialist and non-specialist audiences.

General Competences

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Working in an international environment
- Respect for the natural environment
- Criticism and self-criticism
- Production of free, creative, and inductive thinking

3.

Learning Outcomes

The purpose of this course is to acquaint postgraduate students with state-of-the-art technologies and specialized knowledge regarding the isolation, identification, analysis, preclinical and clinical evaluation of natural products and plant extracts for the purpose of their use in pharmaceutical products as well as with issues of their sustainable production and, finally, regulatory issues, particularly for herbal medicinal products. In summary, students will be aware of cutting-edge issues in the field of Pharmacognosy and, in general, Drug Discovery and Development.

Upon successful completion of the course, students will be able:
1. to critically evaluate the scientific achievements of the field
2. to understand how to interact with other scientific fields
3. to propose original research approaches

4. to propose problem-solving strategies in the field of Drug Discovery and Development from natural products
5. to communicate with accuracy and clarity any scientific developments in the field to both specialist and non-specialist audiences.

General Competences

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Working in an international environment
- Respect for the natural environment
- Criticism and self-criticism
- Production of free, creative, and inductive thinking

3. SYLLABUS

LECTURES

1. The role of traditional healing systems in drug discovery. Study strategies.
2. Natural products as active ingredients of pharmaceutical products.
3. Natural products from plants.
4. Natural products from microorganisms.
5. Natural products from marine organisms.
6. Natural products from other sources.
7. Techniques of extraction, fractionation, and isolation of natural products. Structural characterization. Techniques to avoid repeating the identification of the same natural products (dereplication).
8. Metabolomic approaches to the study of natural raw materials.
9. Biological evaluation approaches for natural products and special problems. Compounds that non-specifically interfere with the bioactivity assay.
10. Extracts and essential oils as medicinal products. Regulatory requirements, quality control. The issues of synergy and competition.
11. Sustainable production techniques of bioactive natural products.

STUDENT SEMINARS

The students present cases of natural products that were launched as drugs; everything from the discovery to the final approval.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face to face
USE of INFORMATION and COMMUNICATIONS TECHNOLOGY	• Communication with students and learning processes are supported by the Upatras e-class platform. • The teaching process and student self-study are supported by Information and Communication Technologies (ICTs) offered by the Central Library and HEAL-Link .
TEACHING METHODS	***Activity*** — ***Semester Workload*** Lectures — 39 Self-study — 30 Seminar Preparation and Presentation by Students (literature search, preparation and oral presentation) — 56 ***Course Total*** **(25 hours of work-load per ECTS credit) — 125**
STUDENT PERFORMANCE EVALUATION	Language of Evaluation: Greek / English Written exams • Multiple choice questionnaires, Short answer questions, matching questions (20% of final grade) Oral presentation and examination • (80% of final grade)

5. RECOMMENDED BIBLIOGRAPHY

Related Academic Journals:
Planta Medica,
Planta Medica Letters,
Journal of Natural Products,
Journal of Ethnopharmacology
Phytotherapy Research,
Journal of Agricultural and Food Chemistry,
Bioorganic and Medicinal Chemistry,
Medicinal and Aromatic Plants,
Journal of Pharmaceutical and Biomedical analysis,
Journal of Chromatography,
Fitoterapia,
Molecules,
Antioxidants.

UNIVERSITY OF PATRAS
SCHOOL OF HEALTH SCIENCES
DEPARTMENT OF PHARMACY
POSTGRADUATE PROGRAM: **DRUG DESIGN AND DEVELOPMENT**

COURSE TITLE: MODERN METHODS IN DRUG SYNTHESIS
CODE: DPHA_A02

MODERN METHODS IN DRUG SYNTHESIS

COURSE OUTLINE

1. GENERAL

SCHOOL	HEALTH SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHARMACY		
PARTICIPATING INSTITUTIONS	-		
TITLE of POSTGRADUATE PROGRAM	DRUG DESIGN AND DEVELOPMENT		
LEVEL	POSTGRADUATE		
COURSE CODE	**DPHA_A02**	**SEMESTER**	**B'**
COURSE TITLE	**MODERN METHODS IN DRUG SYNTHESIS**		
INDEPENDENT TEACHING ACTIVITIES		**WEEKLY TEACHING HOURS**	**CREDITS**
Courses		3	5
COURSE TYPE	• Background Course • Field of Science Course (Organic Chemistry, Medicinal Chemistry, Chemistry of Natural Products, Pharmacognosy) • Skills Development		
PREREQUISITE COURSES	-		
LANGUAGE of INSTRUCTION and EXAMINATIONS	Greek		
COURSE OFFERED to ERASMUS STUDENTS	Yes		
COUSRSE (URL)	http://www.pharmacy.upatras.gr/images/DS/DPHA_A02_EN.pdf		

2. LEARNING OUTCOMES

Learning Outcomes
This course aims at acquiring knowledge, skills and competences related to Level 7 of the European Qualifications Framework for Lifelong Learning. Upon successful completion of the course: 1. The students will be able to understand and apply modern methodologies for the asymmetric synthesis of new bioactive molecules and drug candidates. 2. They will have comprehended synthetic methods and chemical transformations for common heterocycles which are incorporated in new bioactive molecules and known drugs. 3. They will be familiar with the Pd-catalyzed and multicomponent reactions for the synthesis of new bioactive molecules and known drugs.

4. They will have comprehended basic principles and methodologies of Combinatorial Chemistry and Parallel Synthesis for the design and generation of new bioactive compound libraries.

5. They will have comprehended the principles and methodologies of classical solid-phase peptide synthesis, as well as modern methodologies of microwave-assisted, green (environmentally friendly solvents and reagents) peptide synthesis and enzyme-mediated peptide ligation.

6. They will be able to understand, evaluate and analyze relevant organic synthesis methodologies reporting in the current literature.

7. They will be able to combine and apply the acquired knowledge to solve practical problems of organic synthesis.

General Competences

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Working independently
- Team work
- Working in an international environment
- Working in an interdisciplinary environment
- Production of new research ideas
- Production of free, creative, and inductive thinking

3. SYLLABUS

LECTURES

- Allylic strain $A^{1,2}$ and $A^{1,3}$. Applications of allylic strain as controlling factor in stereoselective synthesis
- Asymmetric synthesis: Methods and applications in drug synthesis
- Asymmetric organocatalytic synthesis of saturated N-heterocyclic rings
- Chemistry of basic heterocycles incorporated in drugs
- Mechanisms of coupling reactions: Buchwald-Hartwig, Hiyama-Denmark, Kumada, Migita-Kosugi-Stille, Negishi, Suzuki-Miyaura, και Sonogashira
- Combinatorial Chemistry and Parallel Synthesis of bioactive compounds (Design and synthesis of compound libraries)
- Synthesis of small bioactive molecules via multicomponent reactions
- Modern solid phase peptide synthesis (linkers, resins and general procedures)
- Microwave-assisted solid-phase peptide synthesis
- Green peptide synthesis
- Enzyme-mediated peptide ligation

STUDENT SEMINARS

Selected case studies in modern drug synthesis

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face to face
USE of INFORMATION and COMMUNICATIONS TECHNOLOGY	• Teaching and learning processes are supported by the Upatras e-class platform. • Teaching process is supported by Information and Communication Technologies (ICTs).
TEACHING METHODS	***Activity*** ***Semester Workload*** Lectures 39 Seminar Presentation 12 Seminar Preparation and unsupervised study 74 ***Course Total*** **(25 hours of work-load per ECTS credit) 125**
STUDENT PERFORMANCE EVALUATION	Language of Evaluation: Greek / English Written exams: • Multiple choice questions, short answer questions, matching questions (40% of the final grade) Seminar Presentation • Evaluation of individual seminar presentation (postgraduate students' and instructors' comments are taken under consideration for the evaluation (60% of the final grade)

5. RECOMMENDED BIBLIOGRAPHY

Suggested Bibliography:

1. K. C. Nicolaou et al., "*Classics in Total Synthesis I-III*".
2. Elias J. Corey, Laszlo Kurti, "*Enantioselective Chemical Synthesis: Methods, Logic, and Practice*" 1st Edition, Direct Book Publishing, 2010.
3. T. Eicher, S.Hauptmann, A. Speicher, "*The Chemistry of Heterocycles*", 3rd Edition, Wiley-VCH, 2012.
4. W. Bannwarth, B. Hinzen (Eds.), "*Combinatorial Chemistry, From Theory to Application*", 2nd Edition, Wiley-VCH, 2006.
5. A. Molnár (Ed.), "*Palladium-Catalyzed Coupling Reactions: Practical Aspects and Future Developments*", Wiley-VCH, 2013.
6. J. Zhu, Q. Wang, M.-X. Wang, "*Multicomponent Reactions in Organic Synthesis*", Wiley-VCH, 2015.

Related Academic Journals:

Angewandte Chemie International Edition, The Journal of Organic Chemistry, Journal of the American Chemical Society, Organic Letters, Chemical Reviews, Journal of Medicinal Chemistry, ACS Medicinal Chemistry Letters, European Journal of Medicinal Chemistry, Bioorganic and Medicinal Chemistry, Bioorganic and Medicinal Chemistry Letters, Tetrahedron, Tetrahedron Letters, European Journal of Organic Chemistry, Asian Journal of Organic Chemistry, Journal, Synthesis, Synlett.

UNIVERSITY OF PATRAS
SCHOOL OF HEALTH SCIENCES
DEPARTMENT OF PHARMACY
POSTGRADUATE PROGRAM: **DRUG DESIGN AND DEVELOPMENT**

COURSE TITLE: BIOMOLECULAR NMR & PROTEIN ARCHITECTURE
CODE: DPHA_A03

BIOMOLECULAR NMR & PROTEIN ARCHITECTURE

COURSE OUTLINE

1. GENERAL

SCHOOL	HEALTH SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHARMACY		
PARTICIPATING INSTITUTIONS	-		
TITLE of POSTGRADUATE PROGRAM	DRUG DESIGN AND DEVELOPMENT		
LEVEL	POSTGRADUATE		
COURSE CODE	**DPHA_A03**	**SEMESTER**	**B'**
COURSE TITLE	**BIOMOLECULAR NMR & PROTEIN ARCHITECTURE**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures and Dry-Lab Exercises	3	5

COURSE TYPE	• Specialized General Knowledge
PREREQUISITE COURSES	Biochemistry
LANGUAGE of INSTRUCTION and EXAMINATIONS	Greek
COURSE OFFERED to ERASMUS STUDENTS	Yes, with guided self-study in English
COUSRSE (URL)	http://www.pharmacy.upatras.gr/images/DS/DPHA_A03_EN.pdf

2. LEARNING OUTCOMES

Learning Outcomes
What it is expected as learning outcomes is that the students will acquire new knowledge about the other than analysis, uses of NMR spectroscopy and on the use and analysis of the appropriate methods in the study of biomolecules according to the Level 7 of the European Qualifications Framework for Lifelong Learning. Thus, at the end of the course the students will acquire knowledge on the use of the: (a) NMR spectroscopy in the study of biomolecules and the strategy for the study of strongly and weakly interaction molecules, thus the basic principles for the NMR-driven in drug design (b) methods and protocols in the preparation of the suitable (in labeled, 15N, 13C and/or 2H forms), protein samples for NMR studies (c) multidimensional homo- or hetero- nuclear NMR experiments analysis (resonance assignment) in the study of the conformational, dynamics and interaction of biomolecules and the way to extract information relative with the structure and the function of these biomolecules
(d) Biomolecular NMR in the discovery and optimization of lead compounds and new applications in structural biology, i.e. in-cell NMR, and (e) NMR as a powerful analysis tool in clinical research and diagnosis

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 new research ideas • Production of free, creative, and inductive thinking

3. SYLLABUS

- Theory and Principles in NMR Spectroscopy – Strategies in 1H 1D resonance assignment – Examples & Practical Exercise.
- Basics of Structural Bioinformatics, Computational & Structural Biology – Methods, Tools, Data bases & Data mining.
- Preparation of biomolecular samples (proteins, RNA, DNA, etc) suitable for NMR studies – Methods in protein/RNA uniform labeling, selective/specific and reverse selective labeling of aminoacids in proteins.
- 2D homo- & hetero- nuclear NMR Spectroscopy – Methodology and Experimental set-up – Applications in peptides/polypeptides.
- 3D homo- hetero- nuclear NMR Spectroscopy – Methodology and Experimental set-up – Applications in proteins.
- Approaches in NMR studies of biomolecules and biomolecular high molecular weight complexes.
- 15N-relaxation measurements, H/D exchange and protein dynamics.
- Determination of 3D structural models using NMR data.
- Study of protein – protein/nucleic acids/RNA/DNA/small molecules interaction through NMR, calculation of Kd, design of bioactive molecules through biomolecular NMR.
- NMR in drug design.
- NMR spectroscopy in lead discovery and optimization process.
- Modern approaches in Structural Biology & Magnetic Resonance Diagnostics -– in cell NMR, NMR-metabolomics, etc.
- NMR in metabolomics and clinical research

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face to face
USE of INFORMATION and COMMUNICATIONS TECHNOLOGY	• Teaching and learning processes are supported by the Upatras e-class platform. • Teaching process is supported by Information and Communication Technologies (ICTs).
TEACHING METHODS	***Activity*** — ***Semester Workload*** Lectures — 39 Unsupervised study — 12 Laboratory practice — 74 ***Course Total*** **(25 hours of work-load per ECTS credit) — 125**
STUDENT PERFORMANCE EVALUATION	Language of Evaluation: Greek / English Written exams: • Multiple choice questions, short answer questions, matching questions, problem solving, writeen work

5. RECOMMENDED BIBLIOGRAPHY

Suggested Bibliography:

- NMR Primer for Life Scientists. Rattle Henry, ISBN 10: 0951643630 ISBN 13: 9780951643631 Publisher: Partnership Press, 1995
- BioNMR in Drug Research, Zerbe, Oliver (Editor), Methods and Principles in Medicinal Chemistry (Series Nr. 16), Edition November 2002, XVIII, 484 Pages, Hardcover, ISBN: 978-3-527-30465-3, Wiley-VCH, Weinheim
- S. Jurt, O. Zerbe "*Applied NMR Spectroscopy for Chemists and Life Scientists*" 1st Edition, Wiley-VCH, Weinheim, 2013.
- L. Garrido, N. Beckmann (Eds), "*New Applications of NMR in Drug Discovery and Development*" (Volume 2), RSC Publishing, 2013.
- E. R. Zartler, M. Shapiro (Eds), "*Fragment-Based Drug Discovery: A Practical Approach",* 1st Edition, Wiley, 2008.

Related Academic Journals:

Primer, Protein NMR spectroscopy,
https://edisciplinas.usp.br/pluginfile.php/5322096/mod_resource/content/0/protein%20NMR%20spectroscopy%20currnt%20biology.pdf

UNIVERSITY OF PATRAS
SCHOOL OF HEALTH SCIENCES
DEPARTMENT OF PHARMACY
POSTGRADUATE PROGRAM: **DRUG DESIGN AND DEVELOPMENT**

COURSE TITLE: NANOMEDICINES AND SPECIAL SYSTEMS FOR ADMINISTRATION AND/OR TARGETING OF DRUGS/IMAGING AGENTS

CODE: DPHA_B01

NATURAL PRODUCTS IN DRUG DISCOVERY

COURSE OUTLINE

1. GENERAL

SCHOOL	HEALTH SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHARMACY		
PARTICIPATING INSTITUTIONS	-		
TITLE of POSTGRADUATE PROGRAM	DRUG DESIGN AND DEVELOPMENT		
LEVEL	POSTGRADUATE		
COURSE CODE	**DPHA_B01**	**SEMESTER**	**B'**
COURSE TITLE	**NANOMEDICINES AND SPECIAL SYSTEMS FOR ADMINISTRATION AND/OR TARGETING OF DRUGS/IMAGING AGENTS**		
INDEPENDENT TEACHING ACTIVITIES		**WEEKLY TEACHING HOURS**	**CREDITS**
Courses		3	5
COURSE TYPE	Scientific Area (Pharmaceutical Technology), Skills Development		
PREREQUISITE COURSES	None		
LANGUAGE of INSTRUCTION and EXAMINATIONS	GREEK or ENGLISH (if required)		
COURSE OFFERED to ERASMUS STUDENTS	YES		
COUSRSE (URL)	http://www.pharmacy.upatras.gr/images/DS/DPHA_B01_EN.pdf		

2. LEARNING OUTCOMES

Learning Outcomes
This course aims to acquire knowledge, skills and competences related to level 7 of the European Qualifications Framework for Lifelong Learning Upon successful completion of the course, students: 1. They will have understood the strategy and rationale of nanotechnology applications in the design and development of advanced drug delivery systems 2. They will have become familiar with the techniques and methodology governing the development of nanomedicines and diagnostics 3. Development of the skills required for oral and written presentation and argumentation, based on experimental data.
General Competences

- Search, analysis and synthesis of data and information, using the necessary technologies
- Self-study
- Team work
- Working in interdisciplinary environment
- Working in the international environment
- Search, analyze and combine data towards making useful conclusions
- Understand basic concepts of formulation development

3. SYLLABUS

LECTURES

- Introduction - Basics.
- Design of Systems for Controlled Drug Delivery - Pharmacokinetic/Pharmacodynamic basis of controlled delivery - Mechanisms of Controlled Release.
- Detection/Targeting Methodologies - Absorption - barrier penetration - Biodegradation - bio-compatibility - hematocompatibility of nanoforms (Limitations and control methods).
- Systems for diagnosis and for simultaneous treatment or monitoring of the therapeutic effect - monitoring - Systems for gene therapy (Structure, Ingredients, Preparation, Characterization, in vitro/in vivo evaluation).
- Other special administration systems: Solid forms for per os administration - Transdermal Administration Systems - Emulsions-microemulsions, gels (in situ formed) - Osmotically regulated systems (Ingredients, Preparation, Characterization, in vitro/in vivo evaluation).
- Liposomes and hybrid liposomes (Ingredients-Structure, Preparation, in vitro/in vivo evaluation - Applications).
- Nanoparticles - Nanocapsules (Ingredients-Structure, Preparation, Physicochemical characterization, Applications).
- The Role of polymers in innovative forms of drug administration.
- Cyclodextrins (Structure, Preparation of complexes, Physicochemical characterization, Applications).
- Lipid Nanocarriers and Nanogels.
- Nano cosmetics.
- Physicochemical Characterization of nanocarriers.
- Methods of studying the interaction of nanocarriers with tissues.

GUIDED WORK

- Analysis and presentation of a relevant scientific paper of recent literature

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face-to-Face, Essays, Exercises Self-study
USE of INFORMATION and COMMUNICATIONS TECHNOLOGY	Use of E-class platform to share archives and lectures, to communicate with students and to organize the lecture schedule.
TEACHING METHODS	***Activity*** — ***Semester Workload*** Lectures — 39 Directed Exercises — 13 Self Study — 73 ***Course Total*** **(25 hours of work-load per ECTS credit)** — **125**

STUDENT PERFORMANCE EVALUATION	Language of Evaluation: Greek / English Written exams; MCQ; Essays and exercises Final Grade: performance in written exam on the theoretical courses (70%), performance in case study essay: 30%.

5. RECOMMENDED BIBLIOGRAPHY

Related Academic Journals:

Pharmaceutical Manufacturing Handbook : Production and Processes Shayne Cox Gad

Methods in Molecular Biology: Liposomes

Related Scientific Journals

- Nano Letters
- ACS Nano
- Nature Nanotechnology
- Nanomedicine
- Biomaterials
- Journal of Pharmaceutical Sciences
- International Journal of Pharmaceutics
- Pharmaceutical Research
- Small
- European journal of Pharmaceutics and Biopharmaceutics
- Journal of Pharmaceutical Sciences
- J. Contr. Release
- Pharmaceutics

UNIVERSITY OF PATRAS
SCHOOL OF HEALTH SCIENCES
DEPARTMENT OF PHARMACY
POSTGRADUATE PROGRAM: **DRUG DESIGN AND DEVELOPMENT**

COURSE TITLE: STATISTICS AND QUALITY MANAGEMENT IN PHARMACY
CODE: DPHA_B02

STATISTICS AND QUALITY MANAGEMENT IN PHARMACY

COURSE OUTLINE

1. GENERAL

SCHOOL	HEALTH SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHARMACY		
PARTICIPATING INSTITUTIONS	-		
TITLE of POSTGRADUATE PROGRAM	DRUG DESIGN AND DEVELOPMENT		
LEVEL	POSTGRADUATE		
COURSE CODE	**DPHA_B02**	**SEMESTER**	**B'**
COURSE TITLE	**STATISTICS AND QUALITY MANAGEMENT IN PHARMACY**		
INDEPENDENT TEACHING ACTIVITIES		**WEEKLY TEACHING HOURS**	**CREDITS**
Courses		3	5
COURSE TYPE	General Background		
PREREQUISITE COURSES	-		
LANGUAGE of INSTRUCTION and EXAMINATIONS	Greek		
COURSE OFFERED to ERASMUS STUDENTS	No		
COUSRSE (URL)	http://www.pharmacy.upatras.gr/images/DS/DPHA_B02_EN.pdf		

2. LEARNING OUTCOMES

Learning Outcomes
This course aims to acquire knowledge, skills and abilities related to level 7 of the European Qualifications Framework for Lifelong Learning. Upon successful completion of the course, the students: • will have the ability to design experiments and perform statistical analysis of data and experimental results • will have the necessary knowledge about quality management and quality assurance in pharmaceutical industry
General Competences
• Working independently • Team work • Working in an interdisciplinary environment • Adapting to new situations • Project planning and management

3. SYLLABUS

LECTURES

1. Definitions and introductory concepts
2. Probability, Probability Distributions
3. Statistical Estimation, Hypothesis Testing
4. Sample selection, Sample size, Power of test
5. Linear regression and correlation
6. Analysis of variance I
7. Analysis of variance II
8. Factorial designs
9. Experimental design in clinical trials
10. Non-parametric statistical methods
11. Process validation
12. Quality assurance
13. Total quality management

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Physical presence of students/teachers in a lecture hall (face-to-face)
USE of INFORMATION and COMMUNICATIONS TECHNOLOGY	Use of E-class to share archives and exercises Use of E-class for general communication with students.
TEACHING METHODS	***Activity*** — ***Semester Workload*** Lectures from Faculty — 39 Self-study — 86 ***Course Total*** **(25 hours of work-load per ECTS credit)** — **125**
STUDENT PERFORMANCE EVALUATION	Language of Evaluation: Greek Written exam. During the exam the students have free access to all teaching material of the course.

5. RECOMMENDED BIBLIOGRAPHY

Related Bibliography

- Sanford Bolton, Charles Bon, Pharmaceutical Statistics: Practical and Clinical Applications, 5th Edition, 2009, CRC Press.
- R. Dan Reid, Nada R. Sanders, Operations Management: An Integrated Approach, 7th Edition, 2019, Wiley , Chapter 5 - Total Quality Management.

Related Academic Journals:

Pharmaceutical Statistics
Journal of Pharmaceutical Sciences
International Journal of Pharmaceutics
European journal of Pharmaceutics and Biopharmaceutics

UNIVERSITY OF PATRAS
SCHOOL OF HEALTH SCIENCES
DEPARTMENT OF PHARMACY
POSTGRADUATE PROGRAM: **DRUG DESIGN AND DEVELOPMENT**

COURSE TITLE: APPLIED PHARMACEUTICAL ANALYSIS AND CHARACTERISATION TECHNIQUES OF FINAL PRODUCTS

CODE: DPHA_B03

STATISTICS AND QUALITY MANAGEMENT IN PHARMACY

COURSE OUTLINE

1. GENERAL

SCHOOL	HEALTH SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHARMACY		
PARTICIPATING INSTITUTIONS	-		
TITLE of POSTGRADUATE PROGRAM	DRUG DESIGN AND DEVELOPMENT		
LEVEL	POSTGRADUATE		
COURSE CODE	**DPHA_B03**	**SEMESTER**	**B'**
COURSE TITLE	**APPLIED PHARMACEUTICAL ANALYSIS AND CHARACTERISATION TECHNIQUES OF FINAL PRODUCTS**		
INDEPENDENT TEACHING ACTIVITIES		**WEEKLY TEACHING HOURS**	**CREDITS**
Courses		3	5
COURSE TYPE	Skills Development		
PREREQUISITE COURSES	-		
LANGUAGE of INSTRUCTION and EXAMINATIONS	Greek		
COURSE OFFERED to ERASMUS STUDENTS	No		
COUSRSE (URL)	http://www.pharmacy.upatras.gr/images/DS/DPHA_B03_EN.pdf		

2. LEARNING OUTCOMES

Learning Outcomes
The student is introduced to the Spectroscopic techniques for characterization of pharmaceutical formulation: (NIR, IR-ATR, Raman, X-ray diffraction, microscopy (optical and scanning electron), Elemental Analysis Techniques (XRF, AAS, AES, ICP-MS, ICP-OES), Diffraction, Polarimetry, Particle Size Characterization Techniques, Thermal Analysis Techniques (TGA, DTA, DSC). Porosity measurement (BET). Specifically, upon successful completion of the course, the graduate student is expected to have developed level 7 skills in the following topics: Ability to select and use the Spectroscopic technique for the identification and quantification of the individual components of a liquid or solid sample of a pharmaceutical formulation.
General Competences
• Working independently • Team work • Search for, analysis and synthesis of data and information, with the use of the necessary technology

3. SYLLABUS

1. Validation of analytical methods. The concept of traceability. Good practice rules (GLP, GMP) and quality procedures in the pharmaceutical industry. Stability control of active substances and excipients.
2. Techniques for the determination of physical characteristics of substances:
3. Diffractometry- Principles, instrumentation, applications in Pharmaceutical Analysis,
4. Polarimetry- Principles, instrumentation, applications in Pharmaceutical Analysis,
5. Particle size characterization Principles, instrumentation, applications in Pharmaceutical Analysis.
6. Methods of thermal analysis (TGA, DTA, DSC).
7. Measurement of porosity (BET).
8. Microscopy (Optical and scanning electron).
9. Polymorphism of active substances in formulations: NIR, IR-ATR, Raman, X-ray diffraction, Microscopy (optical and electron). Examples.
10. Elemental analysis (XRF, AAS, AES, ICP-MS, ICP-OES)

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Physical presence of students/teachers in a lecture hall (face-to-face)
USE of INFORMATION and COMMUNICATIONS TECHNOLOGY	Learning process support through the e-class platform
TEACHING METHODS	***Activity*** — ***Semester Workload*** Interactive teaching — 39 Study and analysis of bibliography — 47 Project — 39 ***Course Total*** **(25 hours of work-load per ECTS credit)** — **125**
STUDENT PERFORMANCE EVALUATION	1. Written final examination (80%) including - Short development questions - Questions of a critical nature - Problem solving 2. Assignment - Presentation of an analytical problem from the international literature (20%)

5. RECOMMENDED BIBLIOGRAPHY

Related Bibliography

1. ΕΝΟΡΓΑΝΗ ΑΝΑΛΥΣΗ, ΘΕΜΙΣΤΟΚΛΗΣ Π. ΧΑΤΖΗΪΩΑΝΝΟΥ, ΜΙΧΑΗΛ Α. ΚΟΥΠΠΑΡΗΣ , 2014
2. ΕΝΟΡΓΑΝΗ ΧΗΜΙΚΗ ΑΝΑΛΥΣΗ, Ι. ΠΑΠΑΔΟΓΙΑΝΝΗΣ-Β. ΣΑΜΑΝΙΔΟΥ, 2η Έκδοση, Θεσσαλονίκη, 2011.
3. Φαρμακευτική ανάλυση, D.G. WATSON, , Επιμέλεια Ελληνικής ‘Εκδοσης: Μ. Κουππάρης, Εκδόσεις Παρισιάνου, 2011.
4. ΘΕΜΕΛΙΩΔΕΙΣ ΑΡΧΕΣ ΑΝΑΛΥΤΙΚΗΣ ΧΗΜΕΙΑΣ, SKOOG, D. A. Skoog, D. M. West, F. James Holler, S. R. Crouch, Επιμέλεια Ελληνικής ‘Εκδοσης: Μ. Ι. Καραγιάννης, Κ. Η. Ευσταθίου**,** Εκδόσεις Κωσταράκη, 2016

UNIVERSITY OF PATRAS
SCHOOL OF HEALTH SCIENCES
DEPARTMENT OF PHARMACY
POSTGRADUATE PROGRAM: **DRUG DESIGN AND DEVELOPMENT**

COURSE TITLE: MOLECULAR TARGETS OF DRUG ACTION
CODE: DPHA_C01

MOLECULAR TARGETS OF DRUG ACTION

COURSE OUTLINE

1. GENERAL

SCHOOL	HEALTH SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHARMACY		
PARTICIPATING INSTITUTIONS	-		
TITLE of POSTGRADUATE PROGRAM	DRUG DESIGN AND DEVELOPMENT		
LEVEL	POSTGRADUATE		
COURSE CODE	**DPHA_C01**	**SEMESTER**	**B'**
COURSE TITLE	**MOLECULAR TARGETS OF DRUG ACTION**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Courses	3	5

COURSE TYPE	*Scientific field*: In-depth understanding of the theoretical and experimental approaches and methods in Molecular Pharmacology. *Development of skills* in critical evaluation of experimental approaches and design of experiments to study molecular targets of drug action.
PREREQUISITE COURSES	Not required but recommended to have ATTENDED PRECLINICAL AND CLINICAL DRUG EVALUATION in the 1st semester.
LANGUAGE of INSTRUCTION and EXAMINATIONS	Greek. However, a large part of lecture material, scientific articles and final exam questions is in English. If there are Erasmus or other students that are no fluent in Greek, the course is totally in English.
COURSE OFFERED to ERASMUS STUDENTS	Yes
COUSRSE (URL)	http://www.pharmacy.upatras.gr/images/DS/DPHA_A01_EN.pdf

2. LEARNING OUTCOMES

Learning Outcomes
Understanding of concepts and experimental approaches related to the identification and study of molecular targets of drug action. Develop critical thinking skills to evaluate literature, methodologies, approaches, results, and conclusions. Independent analysis and synthesis of experimental and other data (e.g., from research/scientific publications) to draw conclusions.

Development of oral and written presentation of experimental data and argumentation, based on experimental and/or clinical data.

Acquiring the ability to design an appropriate experimental methodology and approach to evaluate drug action through a specific molecular target (problem solving).

General Competences

- Search, analysis and synthesis of data and information, using the necessary technologies
- Adaptation to new situations
- Decision making
- Autonomous work
- Teamwork
- Work in an international environment
- Work in an interdisciplinary environment
- Generating new research ideas
- Respect for diversity and multiculturalism
- Respect for the natural environment
- Demonstrating social, professional, and ethical responsibility and sensitivity to gender issues
- Exercise criticism and self-criticism
- Promotion of free, creative, and inductive thinking

3. SYLLABUS

Lectures and presentations on the following:

- Cellular, biochemical, and molecular pharmacology.
- Drugs that act on receptors. Molecular structure of drug receptors.
- Pharmacological targeting of ion channels.
- Pharmacological targeting of G-protein coupled receptors.
- Pharmacological targeting of receptors with endogenous catalytic actions (tyrosine and serine/threonine kinase, phosphatase, guanylate cyclase).
- Pharmacological targeting of transcription factors.
- Enzymes as drug targets.
- Pharmacological targeting of secreted proteins (growth factors, cytokines).
- Antisense oligonucleotides, siRNAs, aptamers, and microRNAs as drugs.
- Pharmacological targeting of signaling molecules.
- Methods of identifying new drug targets.
- Cell and gene therapies.
- Optimization of production, stability, and activity of protein drugs through biotechnological methods.
- Development of experimental disease models with biotechnological / genetic methods in experimental animals.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Extensive use of e-class to share archives and lectures, to communicate with students and to organize the lecture schedule. Lectures and presentations are all done using information and communications technologies *(*ICT) and information retrieval is done through biomedical databases.
USE of INFORMATION and COMMUNICATIONS TECHNOLOGY	Extensive use of e-class to share archives and lectures, to communicate with students and to organize the lecture schedule. Lectures and presentations are all done using information and communications technologies *(*ICT) and information retrieval is done through biomedical databases.
TEACHING METHODS	***Activity*** ***Semester Workload*** Lectures 39 Literature study and analysis 39 Elaboration of a study 34 Writing assignment / assignments 56 ***Course Total*** **(25 hours of work-load per ECTS credit) 125**
STUDENT PERFORMANCE EVALUATION	*Oral presentation* of a research paper related to the course. The understanding of the problem and the scientific approach to solving it, is discussed with all students in the class through questions and discussion. The *written examination* is based on questions on understanding research problems and analysis of research results. The exam and answers are given in Greek or English, and the source material of the problems is in English (data from research publications). During the exam, students have access to all the scientific material (lectures, publications/articles, assignments) that they have used throughout the semester. During the exam, students may have access to the internet. The grade is derived from both oral presentation and written examination at a rate of 50% from each. The method of evaluating the graduate students in the course is described in eclass (https://eclass.upatras.gr/courses/PHA1813/) and is visible to all students who register for the course.

5. RECOMMENDED BIBLIOGRAPHY

Access / use of scientific journals, preferably wide-circulation ones including (non-exhaustive list):

- Nature and all Nature journals
- Science and all Science journals
- Cell and all Cell journals
- Annual Reviews series
- Journal of Clinical Investigation
- PNAS
- Molecular Pharmacology

UNIVERSITY OF PATRAS
SCHOOL OF HEALTH SCIENCES
DEPARTMENT OF PHARMACY
POSTGRADUATE PROGRAM: **DRUG DESIGN AND DEVELOPMENT**

COURSE TITLE: APPLIED BIOTECHNOLOGY AND BIOINFORMATICS
CODE: DPHA_C02

APPLIED BIOTECHNOLOGY AND BIOINFORMATICS

COURSE OUTLINE

1. GENERAL

SCHOOL	HEALTH SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHARMACY		
PARTICIPATING INSTITUTIONS	-		
TITLE of POSTGRADUATE PROGRAM	DRUG DESIGN AND DEVELOPMENT		
LEVEL	POSTGRADUATE		
COURSE CODE	**DPHA_C02**	**SEMESTER**	**B'**
COURSE TITLE	**APPLIED BIOTECHNOLOGY AND BIOINFORMATICS**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Courses	3	5

COURSE TYPE	Specialized Background, Επιστημονικών Περιοχών (Chemistry, Biochemistry, Cellular Biology, Molecular Biology, Bioinformatics), Skills Development
PREREQUISITE COURSES	None
LANGUAGE of INSTRUCTION and EXAMINATIONS	Greek
COURSE OFFERED to ERASMUS STUDENTS	Yes
COUSRSE (URL)	http://www.pharmacy.upatras.gr/images/DS/DPHA_C02_EN.pdf

2. LEARNING OUTCOMES

Learning Outcomes
This course aims to acquire knowledge, skills and abilities related to level 7 of the European Qualifications Framework for Lifelong Learning. Upon successful completion of the course, students: 1. will be able to understand and apply modern biotechnological methods for the study of pharmaceutical molecules and biomolecules 2. will be able to understand and apply modern bioinformatics methods to study the sequence, structure and function of biomolecules 3. They will have familiarized themselves with the basic concepts of modern biotechnology and bioinformatics, through the study of publications and modern literature
General Competences

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

3. SYLLABUS

LECTURES
- Transgenic Technology.
- Genetic targeting.
- Genetic databases.
- Big data analysis.
- Protein structure analysis and prediction.
- Analysis of nucleotide and amino acid sequences.
- Sequencing.
- Access and extracting information from databases.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face to face
USE of INFORMATION and COMMUNICATIONS TECHNOLOGY	Extensive use of E-class to share archives and lectures, to communicate with students and to organize the lecture schedule.
TEACHING METHODS	***Activity*** — ***Semester Workload*** Lectures — 39 Analysis of scientific literature — 39 Study assignement — 34 Writing assignment / assignments — 13 ***Course Total*** **(25 hours of work-load per ECTS credit) — 125**
STUDENT PERFORMANCE EVALUATION	Language of Evaluation: Greek / English Written exams • Multiple choice questionnaires, Short answer questions, Open ended questions (40% of final grade) Public Presentation • Evaluation of individual presentations (taking into account the individual observations of the group of postgraduate students and teachers (60% of final grade)

5. RECOMMENDED BIBLIOGRAPHY

Suggested Bibliography:

- Recombinant DNA, James D. Watson, Jan A. Witkowski, Richard M. Myers, Amy A. Caudy
- Βιοχημεία, Stryer
- Βιοπληροφορική, Μπάγκος Παντελεήμων, ΚΑΛΛΙΠΟΣ

Related Academic Journals:

Cell, Nature, Nature Biotechnology, Bioinformatics, Journal of Molecular Biology, PLoS One, PloS One Biotechnology,

UNIVERSITY OF PATRAS
SCHOOL OF HEALTH SCIENCES
DEPARTMENT OF PHARMACY
POSTGRADUATE PROGRAM: **DRUG DESIGN AND DEVELOPMENT**

COURSE TITLE: PRECISION THERAPEUTICS
CODE: DPHA_C03

PRECISION THERAPEUTICS

COURSE OUTLINE

1. GENERAL

SCHOOL	HEALTH SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHARMACY		
PARTICIPATING INSTITUTIONS	-		
TITLE of POSTGRADUATE PROGRAM	DRUG DESIGN AND DEVELOPMENT		
LEVEL	POSTGRADUATE		
COURSE CODE	**DPHA_C03**	**SEMESTER**	**B'**
COURSE TITLE	**PRECISION THERAPEUTICS**		
INDEPENDENT TEACHING ACTIVITIES		**WEEKLY TEACHING HOURS**	**CREDITS**
Courses		3	5
COURSE TYPE	General Knowledge and Scientific field: Genetics, Genomics, Pharmacogenomics, Personalized Therapy. Development of Skills in critical evaluation and synthesis of experimental (and other) data.		
PREREQUISITE COURSES	-		
LANGUAGE of INSTRUCTION and EXAMINATIONS	Greek. However, a large part of lecture material, scientific articles and final exam questions is in english.		
COURSE OFFERED to ERASMUS STUDENTS	Yes		
COUSRSE (URL)	http://www.pharmacy.upatras.gr/images/DS/DPHA_C03_EN.pdf		

2. LEARNING OUTCOMES

Learning Outcomes
This course aims to acquire knowledge, skills and abilities related to level 7 of the European Qualifications Framework for Lifelong Learning. Upon successful completion of the course, students: 1. will be able to understand concepts such as pharmacogenomics and personalized therapy. 2. will know those therapeutic interventions which can be the object of individualization in all related medical specialties 3. have a global view of therapeutic interventions that are approved by regulatory agencies such as the FDA and the European Medicines Agency

4. understand concepts such as population pharmacogenomics, companion diagnostics and the role of pharmacogenomics in drug development and the pharmaceutical industry 5. will gain a better understanding of those interventions at a social, ethical and legal as well as economic level, which are required to be carried out in order to integrate personalized treatment into clinical practice.
General Competences
• Search for, analysis and synthesis of data and information, with the use of the necessary technologies • Adapting to new situations • Decision-making • Working independently • Team work • Working in an international environment • Working in an interdisciplinary environment • Criticism and self-criticism • Production of free, creative and inductive thinking

3. SYLLABUS

LECTURES

1. Basic principles of targeted therapy/diagnosis
2. Pharmacokinetic and pharmacodynamic drug interactions. Modification of medication based on accompanying diseases and conditions, gender, age
3. Liquid Biopsy in Clinical Practice. Analytical platforms and liquid biopsy. Circulating cancer cells, miRNAs and lncRNAs, exosomes
4. Biomarkers in precision medicine. Drugs specifically administered based on genetic analysis/ evaluation of the molecular target
5. Application of Pharmacogenomics in clinical practice
6. Precision approaches with novel nano-systems for targeted drug delivery/targeting
7. Economic, social and ethical dimensions of precision medicine approaches
8. Toxicogenomics

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face to facePhysical presence of students/teachers in a lecture hall (face-to-face)
USE of INFORMATION and COMMUNICATIONS TECHNOLOGY	Extensive use of E-class to share archives and lectures, to communicate with students and to organize the lecture schedule.

TEACHING METHODS	***Activity***	***Semester Workload***
	Lectures	39
	Presentations based on processing assigned material	30
	Analysis of scientific literature	56
	Course Total **(25 hours of work-load per ECTS credit)**	**125**
STUDENT PERFORMANCE EVALUATION	Language of Evaluation: Greek / English Written exam comprising questions requiring short or extensive explanations, multiple questions and problem solving. • The exam and answers are given in Greek, but the initial material of the problems may be in English (50% of the total grade) • Evaluation of individual presentations (50% of the total grade)	

5. RECOMMENDED BIBLIOGRAPHY

Books

1. Pharmacogenomics and Proteomics (Greke edition, Parisianou Publications)
2. Molecular Diagnostics (Greek edition, Parisianou Publications)

Related Academic Journals:

Clinical Pharmacology and Therapeutics (Wiley)
The Pharmacogenomics Journal (Springer-Nature)
Pharmacogenomics (Future Medicine)

UNIVERSITY OF PATRAS
SCHOOL OF HEALTH SCIENCES
DEPARTMENT OF PHARMACY
POSTGRADUATE PROGRAM: **DRUG DESIGN AND DEVELOPMENT**

COURSE TITLE: DIPLOMA THESIS 01
CODE: DPHA_DIP1

DIPLOMA THESIS 01

COURSE OUTLINE

1. GENERAL

SCHOOL	HEALTH SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHARMACY		
PARTICIPATING INSTITUTIONS	-		
TITLE of POSTGRADUATE PROGRAM	DRUG DESIGN AND DEVELOPMENT		
LEVEL	POSTGRADUATE		
COURSE CODE	**DPHA_DIP1**	**SEMESTER**	**B'**
COURSE TITLE	**DIPLOMA THESIS 01**		
INDEPENDENT TEACHING ACTIVITIES		**WEEKLY TEACHING HOURS**	**CREDITS**
Work on MSc Thesis		-	15
COURSE TYPE	Scientific field Development of Skills		
PREREQUISITE COURSES	-		
LANGUAGE of INSTRUCTION and EXAMINATIONS	Greek. (English for foreign students or Erasmus students)		
COURSE OFFERED to ERASMUS STUDENTS	YES		
COUSRSE (URL)	http://www.pharmacy.upatras.gr/images/DS/DPHA_DIP1_EN.pdf		

2. LEARNING OUTCOMES

Learning Outcomes
Through their Thesis work, graduate students will choose the appropriate methodological approaches to solve research problems, taking advantage of the possibilities and infrastructure provided by the Laboratories of the Department, working both independently as well as part of the research team of the Laboratory which will integrate them. In parallel, they will be trained in the hands-on experimental application of techniques (chemical, biochemical / biological, analytical, technological, etc), with which they were familiarized during the previous semester of their MSc studies. The class Aims to train the students to understand and familiarize with the process of choosing and applying the appropriate technique and approach, as well as to train them in the global analysis of their
General Competences
• Search for, analysis and synthesis of data and information, with the use of the necessary technologies • Adapting to new situations

- Decision-making
- Working independently
- Team work
- Working in an international environment
- Working in an interdisciplinary environment
- Criticism and self-criticism
- Production of free, creative and inductive thinking
- Elaboration of new research ideas
- Project planning and management
- Respect for difference and multiculturalism

3. SYLLABUS

The content of each students Diploma Thesis I is determined by the nature and field of study associated with the Departmental Laboratory in which the student will be integrated.

The MSc student will use the Laboratory's and the Department's research infrastructure, as well as "central" facilities of the University of Patras, including the U Library, in combination with tools of bioinformatics and communication necessary to the accomplishment of the Thesis.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Physical presence of students in the Laboratory (including Lab meetings etc)
USE of INFORMATION and COMMUNICATIONS TECHNOLOGY	Obligatory / necessary access in order to forward / exchange results, reports and scientific literature, as well as for the writing and checking of the Thesis text (e.g. to determine possible plagiarism via Turnitin, etc)
TEACHING METHODS	***Activity*** — ***Semester Workload*** Work on Thesis — 365 Attendance of seminars and lectures — 10 ***Course Total*** **(25 hours of work-load per ECTS credit)** — **375**
STUDENT PERFORMANCE EVALUATION	The evaluation of the students during the elaboration of their Thesis is done by the monitoring and examination of their performance throughout their Thesis work. The criteria are strictly determined at the beginning (i.e. by the Supervisor and implicit agreement of the student). Since all the research work is done by physical presence in the lab, the student's activity is constantly monitored at every stage.

5. RECOMMENDED BIBLIOGRAPHY

The Bibliography and Scientific Journals differ on a case-by-case basis and are selected according to relevance to the project to be carried out by the postgraduate student.

UNIVERSITY OF PATRAS
SCHOOL OF HEALTH SCIENCES
DEPARTMENT OF PHARMACY
POSTGRADUATE PROGRAM: **DRUG DESIGN AND DEVELOPMENT**

COURSE TITLE: DIPLOMA THESIS 02
CODE: DPHA_DIP2

DIPLOMA THESIS 02

COURSE OUTLINE

1. GENERAL

SCHOOL	HEALTH SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHARMACY		
PARTICIPATING INSTITUTIONS	-		
TITLE of POSTGRADUATE PROGRAM	DRUG DESIGN AND DEVELOPMENT		
LEVEL	POSTGRADUATE		
COURSE CODE	**DPHA_DIP2**	**SEMESTER**	**C'**
COURSE TITLE	**DIPLOMA THESIS 02**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Work on MSc Thesis	-	30

COURSE TYPE	Scientific field Development of Skills
PREREQUISITE COURSES	-
LANGUAGE of INSTRUCTION and EXAMINATIONS	Greek. (English for foreign students or Erasmus students)
COURSE OFFERED to ERASMUS STUDENTS	YES
COUSRSE (URL)	http://www.pharmacy.upatras.gr/images/DS/DPHA_DIP2_EN.pdf

2. LEARNING OUTCOMES

Learning Outcomes
Through their Thesis work, graduate students will choose the appropriate methodological approaches to solve research problems, taking advantage of the possibilities and infrastructure provided by the Laboratories of the Department, working both independently as well as part of the research team of the Laboratory which will integrate them. In parallel, they will be trained in the hands-on experimental application of techniques (chemical, biochemical / biological, analytical, technological, etc), with which they were familiarized during the previous semester of their MSc studies. The class Aims to train the students to understand and familiarize with the process of choosing and applying the appropriate technique and approach, as well as to train them in the global analysis of their
General Competences
• Search for, analysis and synthesis of data and information, with the use of the necessary technologies • Adapting to new situations

- Decision-making
- Working independently
- Team work
- Working in an international environment
- Working in an interdisciplinary environment
- Criticism and self-criticism
- Production of free, creative and inductive thinking
- Elaboration of new research ideas
- Project planning and management
- Respect for difference and multiculturalism

3. SYLLABUS

The content of each students Diploma Thesis I is determined by the nature and field of study associated with the Departmental Laboratory in which the student will be integrated.

The MSc student will use the Laboratory's and the Department's research infrastructure, as well as "central" facilities of the University of Patras, including the U Library, in combination with tools of bioinformatics and communication necessary to the accomplishment of the Thesis.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Physical presence of students in the Laboratory (including Lab meetings etc)
USE of INFORMATION and COMMUNICATIONS TECHNOLOGY	Obligatory / necessary access in order to forward / exchange results, reports and scientific literature, as well as for the writing and checking of the Thesis text (e.g. to determine possible plagiarism via Turnitin, etc)
TEACHING METHODS	***Activity*** — ***Semester Workload*** Work on Thesis — 500 Attendance of seminars and lectures — 14 Writing up (composition) of Thesis text — 235 Oral Presentation of Thesis — 1 ***Course Total*** **(25 hours of work-load per ECTS credit)** — **750**
STUDENT PERFORMANCE EVALUATION	The evaluation of the students during the elaboration of their Thesis is done by the monitoring and examination of their performance throughout their Thesis work. The criteria are strictly determined at the beginning (i.e. by the Supervisor and implicit agreement of the student). Since all the research work is done by physical presence in the lab, the student's activity is constantly monitored at every stage.

5. RECOMMENDED BIBLIOGRAPHY

The Bibliography and Scientific Journals differ on a case-by-case basis and are selected according to relevance to the project to be carried out by the postgraduate student.