This edition of the Study Guide presents the Organization of the Department of Pharmacy on February 5, 2023 (Version 04)

Any modifications and/or additions to this Study Guide of Studies, which will occur during the academic year 2023-2024, will be incorporated (after the approval of the Department’s Assembly) in the previous one, while the Department’s website will always contain the Official Edition.

Each subsequent edition contains in detail any changes, the pages in which they have been made in relation to the previous one, as well as the number of the latest valid edition (which is also displayed in the footer of the single numbered pages).

The Guide is published only in electronic format [.pdf file - Adobe Acrobat®] and is configured to facilitate reading in electronic media, including hyperlinks to the Internet, to internal pages, etc. (see Symbols).

The Department of Pharmacy and the University of Patras retain all rights for this Issue.

SYMBOLS  [links, bookmarks, files’ downloading]

🌐 Internet Hyperlink
讵 Internal bookmark
📠 Hyperlink to a file download

All html & email references are active!

Edited by George N. Pairas, 2024

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eMail: pharminf@upatras.gr  &  Web: http://www.pharmacy.upatras.gr
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THE UNIVERSITY OF PATRAS

The University of Patras was founded by the L.D. 4425 of November 11th, 1964 and has been in operation since 1966. The establishment of the University contributed vastly to the decentralization of Academic Education in Greece. In June 2013 the University of Western Greece was incorporated in the University of Patras and in 2019 the Technological Educational Institute of Western Greece was incorporated as well.

At present, the University is a six-city campus: Patras, Messolonghi, Agrinio, Aigio, Pyrgos & Amaliada, with the main facilities (University Campus of Patras) located in a single area of 4,500 acres, 12 km S.E. from the city of Patras.

It is the third University of Greece in terms of student, teaching, administrative and other personnel, number of Departments and awarded degrees.

THE DEPARTMENT OF PHARMACY

a. Short Overview

The Department of Pharmacy was originally founded in 1977 by Presidential Act 835/1977 ΦΕΚ Α’ 271. It received its first students in 1978 as a constituent Department of the School of Physical-Mathematical Sciences, whereas since 1983, together with the Department of Medicine, they form the School of Health Sciences (Presidential Act 127/83).

The first officially founded Laboratory of the Department of Pharmacy was that of Pharmaceutical Chemistry (1979), followed by rapid addition of Faculty Members affiliated with the new Laboratories of Pharmaceutical Technology (1981), Instrumental Pharmaceutical Analysis (1987), Pharmacognosy and Chemistry of Natural Products (1988), Molecular Pharmacology (1989), Radiation Therapy (1989), Pharmacokinetics (1989) and Physical Pharmacy (1991). The foundation as well as the internal function of all of the above Laboratories was officially approved by Presidential Act (ΦΕΚ 38/22-02-95 τ(1)). The Laboratory of Molecular Biology and Immunology was founded in 2003, and in 2018 the Laboratory of Pharmacogenomics and Individualized Therapy.

With the aforementioned Laboratories are affiliated 21 Faculty Members, 2 Laboratory Teaching Staff members and 4 Special Technical Laboratory Staff members. The Administration is supported by the Secretary of the Dept. and 3 Administrative Staff members.

According to the current Academic Year data (September 29th, 2023), the Department trains 1090 undergraduate students, 53 in various stages of Ph.D. completion and 210 post-graduates in the framework of the 2 supported Postgraduate Programs:

a. "Drug Design and Discovery" &

b. Cosmetology - Preparation & Evaluation of Cosmetic Products

In addition the Department participates in the Interdepartmental Postgraduate Program: "Informatics for Life Sciences" and in the Inter-institutional "Nanomedicine for Drug Delivery (NANOMED)", supported by 4 European Universities, namely: Paris Descartes University (coordinator, France), Patras University (Greece), Pavia University (Italy) and Angers University (France).
b. Administration

University Administration Bodies
The University Administration bodies are the Council, the Rector, assisted by the Deputy Rectors, and the Senate.

School Administration
The decision making bodies of each School are the Dean, the Deanery and the General Assembly.

Department Administration
At the departmental level the administrative decisions are established by the Chairman and the [General] Assembly.

Chairman: Professor Sotiris S. Nikolopoulos
Deputy Chairman: Professor Fotini Lamari

Members of the General Assembly: Academic Staff (All), One Representative of Laboratory Teaching Staff (elected), one Representative of Special Technical Laboratory Staff (elected), Two Representatives of Post Graduate Students (elected) and Two Representatives of Under Graduate Students (elected)

c. Scientific Sections & Laboratories
PERSONAL PAGES - RESEARCH INTERESTS - RECENT PUBLICATIONS [by Sections]

a. Academic Staff

SECTION OF PHARMACEUTICAL TECHNOLOGY AND ANALYSIS [S1]

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University of Patras – Dept. of Pharmacy – Acad. Year 2023-2024 – Version: 04
Sophia Antimissiaris  
**Professor**

Ph.D.  
Department of Pharmacy  
University of Athens, 1988

**Research Interests**

- Biopharmaceutics and Pharmacokinetics: Improving Drug Biodistribution and Pharmacokinetics through Advances Drug Delivery System Design
- Nanomedicines: Liposomal or Nanoparticulate systems for Controlled Drug (or Vaccine) Delivery and/or Targeting.
- Application of novel lipid vesicles (Arsonoliposomes) in Anticancer / Antiparasitic Therapeutics.
- Novel Controlled-(Release)-Drug-Releasing Stents.
- Delivery of Microbicides for prevention of Sexually transmitted HIV.
- Ocular Drug Delivery (intravitreal injection of novel drug delivery systems).
- Drug Delivery Systems for targeting alveolar macrophages after delivery by nebulization
- Application of Liposomes in Analytical Techniques

**Indicative Publications**

**Constantinos Avgoustakis**

*Professor*

Tel:  +30 2610 96 2317,

Email: avgoust@upatras.gr

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**Research Interests**

- Targeted delivery of anticancer drugs based on i) biodegradable, polymeric, long-circulating ("stealth") nanoparticles and ii) magnetic hybrid organic-inorganic nanoparticles,
- Development of novel prophylactic or therapeutic vaccines based on biodegradable and biocompatible, polymeric nano- and micro-particles,
- Development of formulations for the efficient delivery of drugs with limited aqueous solubility

**Indicative Publications**

Research Interest

✦ Design and synthesis of small heterocyclic molecules as potential protein kinase inhibitors.
✦ Design, synthesis and evaluation of the biological activity of new steroidal alkylating agents.
✦ Design, synthesis and structure-activity relationship studies of novel steroidal derivatives with anticancer activity.

Indicative Publications


Research Interests

- Design and study of nanocarriers as transporters of biologically active molecules
- Incorporation of drug molecules in nanosystems (liposomes, nanoemulsions, solid state lipid nanoparticles (SLN), polymeric systems, dendrimers), to improve the pharmacokinetic properties, bioavailability and pharmacological response in target tissues (tumors, lung, skin).
- Formulation of novel carriers of bioactive molecules into final products and study their characteristics (size distribution, zeta-potential, particle surface morphology, content of actives and excipients, active bioavailability, stability).
- Study of the interaction of bioactive molecules with model lipid membranes mainly by Thermal Analysis in order to design new formulations, as well as to predict their interaction with biological membranes.

Indicative Publications

Research Interests

- Characterization of polymorphs in pharmaceutical formulations. Stability studies
- Novel Diagnostic Techniques for Bone Diseases
- Development of non-destructive methodologies using spectroscopic (Raman, IR, XRF) and electrochemical techniques (DPP, Impedance spectroscopy, CV). Application in pharmaceutical formulations, bioceramics, uroliths, bones, release kinetics of active substances from nano-polymeric tubes and liposomal carriers, etc.
- New biomaterials (synthesis, characterization, physicochemical properties)

Indicative Publications


Research Interests

✦ Signal transduction pathways - Innate immunity – Host Defense and Infections
✦ Cloning, expression, and biochemical characterization of protein molecules
✦ Host Pattern Recognition Receptors (PRRs) interactions with pathogens
✦ Study of the gut microbiome in human pathophysiology (immunocompromised patients) and the pharmacologic action of cholesterol-lowering drugs
✦ Oxidative stress - Metabolic diseases - Pleiotropic effects of statins
✦ Study of the pathophysiological mechanisms in autoimmune neuromuscular diseases
✦ Electronic nicotine delivery devices (ENDS) in human health

Indicative Publications

Research Interests

❖ Phytochemical analysis of extracts and essential oils of medicinal and aromatic plants with modern chromatographic techniques
❖ Isolation and structural characterization of natural products: Structure-function studies
❖ Development of analytical methods for quality control of herbal drugs and determination of natural products in biologic samples
❖ Ethnopharmacological studies

Indicative Publications


Research Interests

- Chemistry of amino acids and peptides
- Synthesis in liquid and solid phase analogues of biologically important peptides [Hormones (Substance P, Angiotensin II, Oxytocin, Vasopressin, Luteinizing hormone-releasing hormone, Somatostatin, Neurotensin, Corticotropin-Releasing Factor), Antimicrobial peptides (Chrysophsin), Conopeptides (χ-MrIA)]
- Study of structure-activity relationships of biologically important peptides
- Synthesis and study of Cysteine - Containing Oligopeptides and their Complexes with heavy metals

Indicative Publications


Constantinos Mikelis  
Assoc. Professor  
Ph.D.  
Department of Pharmacy,  
University of Patras, 2009

Tel: +30 2610 96 2362  
Email: kmikelis@upatras.gr

Research Interest

✧ Role of small GTPases on blood and lymphatic vascular physiology
✧ Endothelial cell signaling circuits and their impact on metastatic potential
✧ Tumor-endothelial cell interaction: mechanisms and biological outcome

Indicative Publications


*Co-corresponding author


Back to the Academic Staff List
Research Interest

✦ Design, synthesis and study of biological activity of antineoplastic drugs
✦ Design and synthesis of heterocyclic steroids and analogues of them
✦ QSAR
✦ Drug design

Indicative Publications


Research Interest

✦ Development of non-destructive methodologies for qualitative and quantitative determination of pharmaceutically active substances in solid and liquid formulations.
✦ Characterization of polymorphic phases (generic drugs).
✦ Development of novel methodologies for qualitative and quantitative determination of substances with pharmaceutical activity in biological fluids.
✦ Development of novel methodologies for the study of bone and cartilage diseases (osteoporosis, osteoarthritis).

Indicative Publications

Research Interests

- Natural & Modified Steroids - Design and Synthesis of Ester and Amide derivatives
  - Evaluation of Possible Anti-tumor Activity
- Heterocyclic Compounds - Bioactive Building Blocks in Heterocyclic Synthesis
- Drugs against Infections
- Peptides & Polypeptides - Synthesis - Conformational Studies

Indicative Publications

Research Interests

- Angiogenesis and tumor growth in vivo and in vitro. Pharmacological studies on the mechanisms involved, and evaluation of new compounds or nanoparticles for their anti-angiogenic and anti-tumor activity.
- The biological actions of the heparin-binding growth factor pleiotrophin. Effects on endothelial cell functions, angiogenesis, tumor growth and metastasis, bone cell biology. Signaling and receptors identification. Structure-function studies and development of therapeutic applications.
- The role of receptor RPTPbeta/zeta in the cardiovascular and the skeletal system. Structure-function studies.

Indicative Publications

Research Interests

- Genome discovery in pharmacogenomics
- Clinical implementation of pharmacogenomics
- Genomics of rare diseases and rare drug outcomes
- Human Genome informatics and human genome databases
- Translational tools in pharmacogenomics and personalised medicine
- Public Health Pharmacogenomics
- Economic evaluation in genomic and personalised medicine

Indicative Publications


Konstantinos Poulas
Associate Professor

Tel: + 30 2610 96 2353
Email: kpoulas@upatras.gr

Research Interests
- Biochemistry and Toxicology focusing at Electronic Nicotine Delivery (END) systems and e-liquids
- Recombinant proteins
- Crystallization and crystallography of proteins
- Electroceuticals/Bioelectronic medicine
- Innovative and Functional foods

Indicative Publications
2. El Mubarak M, Danika C, Vlachos N, Farsalinos K, Poulas K, Sivolapenko G. Development and validation of analytical methodology for the quantification of aldehydes in e-cigarette aerosols using UHPLC-UV. 2018 Food and Chemical Toxicology. 116(Pt B):147-151

Back to the Academic Staff List ⇢
Research Interests

- Preclinical and clinical studies of bioavailability and pharmacokinetics of new chemical entities.
- Pharmacokinetic and pharmacodynamics interactions. Toxicokinetics.
- Pharmacokinetic and Pharmacogenomic interactions.
- Drug clinical development, design & conduct of Phase I-IV clinical trials.

Indicative Publications


**Research Interests**

- Molecular mechanisms underlying cancer development, invasion/metastasis: tumor suppressors; identification of cancer-associated genes/proteins for the development of targeted pharmaceutical compounds & molecular diagnostics.
- Proteases and protease inhibitors. Kallikrein-related proteases (KLKs).
- Protease inhibitors (proteins/peptides, LMW/synthetic, aptamers)
- Cancer epigenetics: Pharmacological modulation/unmasking of epigenetically silenced tumor suppressors; epigenetic markers.
- Tumor micrometastasis: Minimal residual cancer. Tumor biomarkers.
- Animal models for human diseases.
- Production and engineering of recombinant proteins

**Indicative Publications**


Research Interests

❖ Design/Simulation of bioactive molecules of pharmaceutical interest and Conformational Analysis of biomolecules through Nuclear Magnetic Resonance Spectroscopy (NMR).

❖ Structural Bioinformatics applied in homology modeling of unknown structures of biomolecules, protein-protein/peptide/substrate interaction through molecular dynamics simulation, docking simulation protocols.

❖ In silico design and development of combinatorial libraries of compounds and virtual screening process towards the quest of lead-molecules with biological activity towards protein/enzyme targets, etc.

Indicative Publications


Research Interests

Pharmacology of Vascular, Inflammatory and Fibroproliferative diseases

✦ Past and present investigations address the molecular pathways operating in endothelial and smooth muscle cells and which are amenable to targeting by novel or optimized therapeutics.

✦ These pathways control blood pressure and vascular resistance, inflammatory and thrombotic processes, solid tumor/wound angiogenesis, and are critically involved in the onset and progress of chronic cardiovascular and metabolic diseases (e.g. atherosclerosis, arterial calcification, restenosis).

✦ At the cellular and molecular levels, past research has addressed a) critical aspects of phenotypic determination and functional control of vascular smooth muscle and endothelial cells, triggered by morphogenetic cues (e.g. TGF-β and PDGF) and transcriptional regulators (e.g. SRF, Myocardins, COUP-TF II), and b) modulation of the interaction of the blood vessel wall with circulating cells such as monocytes/macrophages, platelets and T-cells (e.g. IL-22Ra2, TFPI-2, CNP, IL-31).

Indicative Publications


Konstantinos Vasileiou  
Assist. Professor

Tel: +30 2610 962322  
Email: konvasil@upatras.gr

Research Interests
Pharmacology of Vascular, Inflammatory and Fibroproliferative diseases
✦ Pharmaceutical Marketing
✦ Healthcare Marketing
✦ Pharmacoeconomics
✦ Healthcare Economics

Indicative Publications


4. Ntalla A. and Vasileiou K., Pharmacists’ perceptions on the health services provided by the community pharmacies. Proceedings of 3rd International Conference of Development and Economy (ICO.D.ECON.), Kalamata, 03-06 May 2018, pp.112-123.

Research Interests

- Study of novel angiogenic factors and newly designed inhibitors of angiogenic processes
- Mechanisms of angiogenic processes triggered by growth factors
- The angiogenic actions of hydrogen sulfide (H₂S)-underlying molecular mechanisms in the vasculature

Indicative Publications


5. Back to the Laboratory Teaching Staff
Research Interests

- Use of spectroscopic methods for the determination of the structural and dynamic properties of inorganic compounds and pharmaceutical substances.
- Chemistry of rare earth compounds.
- Synthesis and physicochemical investigation of ionic compounds in the solid, liquid and glassy state.

Indicative Publications

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eMail: pharminf@upatras.gr & Web: http://www.pharmacy.upatras.gr
UNDERGRADUATE STUDIES

a. Outline

The education system in Greece is based on semesters. There are two semesters per academic year. The first (Fall) semester begins in October 1st and ends in January 31st. Classes for the second (Spring) semester resume the 16th February and last until 10th of June. Students admitted for undergraduates studies need 10 semesters (5 years) in order to graduate, that is to obtain the diploma of Pharmacy (“Ptychion” in Greek). During each semester a student has to follow ca. 4 to 6 courses with a total of around 24-39 hrs of attendance per week.

A course can consist of Lectures or Lectures and practical work (Laboratory). The courses offered in our Department are grouped in semesters (fall and spring). Lectures can be followed by students at will, whereas attendance of Laboratories is mandatory. In most courses there is not any formal assessment throughout the semester. In rare cases, Lecturers offer partial exams within the semester and the grades obtained at these exams are taken into account in the final mark. However, in the Labs the students are constantly examined usually orally on the theory and practice for each experiment they are to perform before or during their Lab work and finally have to present written account of their results one week after the end of each exercise. All these are taken into account in the final mark together with the results of the final written examination that is associated with each particular Lab. Failure to successfully perform up to 20% of the Laboratory sessions results in the obligation for the student to make up the lost sessions by additional Laboratory work. In cases in which students missed more than 20% of the Laboratory work accompanying a course, they are not allowed to take the final exam of the course. The exam can only be taken after the successful completion of the Laboratory work. The Laboratory work usually includes four to six Laboratory units per semester.

Courses are offered in the Greek language and the faculty members teach the related material based on Greek textbooks. These textbooks usually are either the exact translation of the English counterparts or are based on them. Thus the content and the level of these Greek textbooks are similar to the corresponding english ones. For an ECTS student whose native language is not greek and his/her greek is not good enough to be able to study from a greek textbook there can always be easily found an english textbook with similar content to that his/her fellow greek students use. These textbooks are offered on loan by our university central library.

During their final year and in addition to the courses they follow the students have to carry out a short research project called Diploma Work under the supervision of a member of the academic staff. At the end of this work, students have to provide a written account of their results and often to present them orally. A grade is then assigned to the student by the supervisor involved reflecting the overall performance of the student. This grade should be at least 5 for a successfully completed Diploma Work. A senior year student is also required to make study visits to both Pharmaceutical Industries and Drug Stores.
The duration of the practice period is approximately two semesters. Credit for this activity is given through the courses named Pharmaceutical Practice I & II. The grade assigned for these courses is the average of student performance, student reports and final examination grade.

A course is considered as being successfully passed only when the student has acquired at least the grade 5 out of 10 in the associated exams. The grading scheme, based on a 0 to 10 scale is as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXCELLENT</td>
<td>8.5 to 10</td>
</tr>
<tr>
<td>GOOD</td>
<td>5.0 to 6.5</td>
</tr>
<tr>
<td>VERY GOOD</td>
<td>6.5 to 8.5 (not included)</td>
</tr>
<tr>
<td>UNSATISFACTORY</td>
<td>0 to 5.0 (not included)</td>
</tr>
</tbody>
</table>

The minimum passing grade is 5.0 and all the grades are expressed as integers. However a course associated with Lab work requires in addition also successful completion of the Lab work and for the final mark both the grade in the exam and the Lab performance are considered with factors which vary from Lab to Lab. Exams are offered to the students after the end of each semester and repeat exams in September. However students who have failed in these exams or not participated at all can sit for these exams as many times as they wish in the following exams periods. A student is considered as having completed his/her studies in our Department only when he/she has passed all the exams associated with all courses consisting our curriculum.

Taking into account the Greek higher education system the basic requirements of the ECTS system for 30 credits for each semester was met in the Department by initially assigning for each 1 hr per week per semester of Lecture and Lab work 1 ECTS credit. Additional ECTS credits were then added to those of the course that are considered as the most hard for the students to be passed that is those requiring higher student workload.

ECTS students who have studied for at least a year in our institution can be considered as candidates to obtain the Diploma (Ptychion) in Pharmacy offered by the Department for undergraduate studies. The ECTS Committee of our Department dealing with the recognition of studies carried out abroad will consider students transcripts of records and their performance at our Department. Courses successfully completed abroad will then correlated to those in Patras. If there is no need for additional courses to be taken by the student in Patras in order to fulfil the requirements imposed by our curriculum this committee will propose the General Assembly of the Department to offer our Diploma (Ptychion) to that particular student. Otherwise, the student will have to attend and successfully pass all those courses that are needed to complete our curriculum.

b. Academic Calendar

<table>
<thead>
<tr>
<th>Academic Calendar 2023-2024</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Semester Courses</td>
<td>02.10.2023</td>
<td>12.01.2024</td>
</tr>
<tr>
<td>Fall Semester Exams</td>
<td>22.01.2024</td>
<td>09.02.2024</td>
</tr>
<tr>
<td>Spring Semester Courses</td>
<td>19.02.2024</td>
<td>31.05.2024</td>
</tr>
<tr>
<td>Spring Semester Exams</td>
<td>10.06.2024</td>
<td>28.06.2024</td>
</tr>
<tr>
<td>September Exams (Prev. Academic Year)</td>
<td>28.08.2023</td>
<td>23.09.2023</td>
</tr>
</tbody>
</table>
c. University Holidays & Days-off

The University academic year runs from September to June.

- 28 October: The Ochi Day [National Celebration]
- 17 November: Polytechneio Day [Anniversary of the 1973 Students’ uprising in the National Technical University of Athens against the junta]
- 30 November: St. Andrew Day [Patron Saint of the city of Patras]
- 24 December - 6 January: Christmas Holidays
- January 30: The Three Holy Hierarchs [Celebration of the Education Day]
- Clean Monday [Orthodox Shrove Monday, Movable]
- 25 March, Dual holiday: 1. Anniversary of the declaration of the start of Greek War of Independence from the Ottoman Empire, in 1821. 2. Celebration of the Annunciation of the Lord.
- Orthodox Easter Holidays [Movable]
- 1 May: Labor Day
- 24 June: Holy Spirit Monday
- Students’ Elections Day [Spring, Movable]

d. Curriculum & Courses for 2023-2024

Starting from the Academic Year 2016-2017, the Department’s Assembly redesigned and reshaped the Curriculum of the Department of Pharmacy in order to cover modern scientific fields, as well as to comply with the corresponding European Union standards.

The New Curriculum of the Department of Pharmacy is being implemented gradually and annually from 2016-2017 with its first graduates completing the E Year in the Academic Year 2020-2021 (completion of the 10th semester of studies in June 2021).

The Old Curriculum is inactive - completed at the Academic Year 2019-2020.

**The Curriculum applies:**

to students enrolled in the 1st semester of the academic year 2016-2017 and thereafter, who follow -and will be examined in- the courses coded as "PHA-XYF-NEW" [New Curriculum of the Department of Pharmacy].
# DEPARTMENT OF PHARMACY - COURSES - ACADEMIC YEAR: 2023-2024

## NEW CURRICULUM

### 1’ YEAR STUDENTS FROM 2016 – 2017 & LATER

### YEAR 1’ - 1st SEMESTER

*(Fall, Running from 2016-2017)*

<table>
<thead>
<tr>
<th>Course Code</th>
<th>EN</th>
<th>TITLE</th>
<th>TEACHING ASSIGNMENT</th>
<th>L</th>
<th>T</th>
<th>Lb</th>
<th>ECTS</th>
<th>Course Outline</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHA-A11-NEW</td>
<td></td>
<td>General and Inorganic Chemistry</td>
<td>V. Magafa, G. Zissi</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>PHA-A12-NEW</td>
<td></td>
<td>Introduction to Pharmaceutical Sciences</td>
<td>S. Hatziantoniou, G. Pairas, E. Papadimitriou, A. Pyrioxou</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>PHA-A13-NEW</td>
<td></td>
<td>Applied Mathematics</td>
<td>Pending</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>PHA-A14-NEW</td>
<td></td>
<td>Cell Biology</td>
<td>G. Patrinos, G. Sotiropoulou, A. Pyrioxou</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>PHA-A15-NEW</td>
<td></td>
<td>Informatics</td>
<td>G. Spyroulias</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>PHA-A16-NEW</td>
<td></td>
<td>English Language &amp; Terminology I</td>
<td>Chr. Papagianni</td>
<td>3</td>
<td>0</td>
<td>0</td>
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**TOTAL** 18 4 8 30

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* EN: Instructed/Guided self study in english for Erasmus Students.

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### Student Labs [SL] No: ➍ & ➐ - GO TO Building Plan Overview

- Course Communication Officer
- Faculty Member
- Laboratory Teaching Staff Member
- Appointed Teaching Staff
- Academic Scholar
- Invited Speaker
- Lectures - Tutorial Classes
- Laboratories

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*EN: Instructed/Guided self study in english for Erasmus Students.

Table of Contents ⇩ Phones & eMails ⇩ eMail: pharminf@upatras.gr & Web: http://www.pharmacy.upatras.gr
# DEPARTMENT OF PHARMACY - COURSES - ACADEMIC YEAR: 2023-2024

**NEW CURRICULUM**

1’ YEAR STUDENTS FROM 2016 – 2017 & LATER

## YEAR 2’ - 3rd SEMESTER

*(Fall, Running from 2017-2018)*

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* Student Labs [SL] No: ②, ③ & ④ - GO TO Building Plan Overview

- ✪ Course Communication Officer
- ○ Faculty Member
- ■ Laboratory Teaching Staff Member
- ♦ Appointed Teaching Staff
- ○ Academic Scholar
- ☐ Invited Speaker
- ☀ Lectures - Tutorial Classes, ☀ Laboratories

Affiliation - Department of: Pharmacy: ①, Medicine: ②, Foreign Language Teaching Unit: ⑤.

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## DEPARTMENT OF PHARMACY - COURSES - ACADEMIC YEAR: 2023-2024
### NEW CURRICULUM
### 1’ YEAR STUDENTS FROM 2016 – 2017 & LATER
### YEAR 2’ - 4th SEMESTER
(Spring, Running from 2017-2018)

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### Table of Contents
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**eMail**: pharminf@upatras.gr & Web: [http://www.pharmacy.upatras.gr](http://www.pharmacy.upatras.gr)
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*(Fall, Running from 2018-2019)*

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* Student Labs [SL] No: ➌, ➍ & ➎ - GO TO Building Plan Overview ☞

- ✔ Course Communication Officer
- ☑ Faculty Member
- ■ Laboratory Teaching Staff Member  ● Appointed Teaching Staff
- ○ Academic Scholar  □ Invited Speaker
- ◆ Lectures - Tutorial Classes,  ◇ Laboratories
- ▲ Affiliation - Department of: Pharmacy: 1

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**DEPARTMENT OF PHARMACY - COURSES - ACADEMIC YEAR: 2023-2024**

**NEW CURRICULUM**

*1’ YEAR STUDENTS FROM 2016 – 2017 & LATER*

**YEAR 3’ - 6th SEMESTER**

*(Spring, Running from 2018-2019)*

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*EN: Instructed/Guided self study in english for Erasmus Students.*

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**Student Labs [SL] No: ❼, ❼, ❼, ❼ - GO TO Building Plan Overview**

- ♦ Course Communication Officer
- ● Faculty Member
- ■ Laboratory Teaching Staff Member ♦ Appointed Teaching Staff
- ○ Academic Scholar □ Invited Speaker
- ◆ Lectures - Tutorial Classes, ◇ Laboratories
- Affiliation - Department of: Pharmacy: 1

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- **Phones & eMails**
- **eMail:** pharminf@upatras.gr & **Web:** [http://www.pharmacy.upatras.gr](http://www.pharmacy.upatras.gr)
## DEPARTMENT OF PHARMACY - COURSES - ACADEMIC YEAR: 2023-2024

### NEW CURRICULUM

1’ YEAR STUDENTS FROM 2016 – 2017 & LATER

### YEAR 4’ - 7th SEMESTER

*(Fall, Running from 2019-2020)*

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**TOTAL** 17 3 8 30

[Student Labs [SL] No: ➊ & ➋ - GO TO Building Plan Overview ⇪]

- ‡ Course Communication Officer
- ● Faculty Member
- ■ Laboratory Teaching Staff Member
- ◆ Appointed Teaching Staff
- ○ Academic Scholar
- □ Invited Speaker
- ◆ Lectures - Tutorial Classes
- ▼ Laboratories

Affiliation - Department of: Pharmacy

* EN: Instructed/Guided self study in english for Erasmus Students.*

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University of Patras – Dept. of Pharmacy – Acad. Year 2023-2024 – Version: 04
# DEPARTMENT OF PHARMACY - COURSES - ACADEMIC YEAR: 2023-2024

**NEW CURRICULUM**

**1’ YEAR STUDENTS FROM 2016 – 2017 & LATER**

## YEAR 4’ - 8th SEMESTER

*(Spring, Running from 2019-2020)*

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<th>Course Code</th>
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* Student Labs [SL] No: 2, 7 & 3 - GO TO Building Plan Overview

**Course Communication Officer**

- Faculty Member
- Laboratory Teaching Staff Member
- Appointed Teaching Staff
- Academic Scholar
- Invited Speaker
- Lectures - Tutorial Classes
- Laboratories

**Affiliation - Department of:** Pharmacy: 1, Medicine: 2

*EN: Instructed/Guided self study in English for Erasmus Students.*

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* Course Communication Officer
** Faculty Member
[ ] Laboratory Teaching Staff Member • Appointed Teaching Staff
[ ] Academic Scholar [ ] Invited Speaker
◆ Lectures - Tutorial Classes, ◇ Laboratories
Affiliation - Department of: Pharmacy: 1

* EN: Instructed/Guided self study in english for Erasmus Students.
** Only after individual agreement with a Faculty Member
**NEW CURRICULUM**
1’ YEAR STUDENTS FROM 2016 – 2017 & LATER

YEAR 5’ - 10th SEMESTER
(Spring, Running from 2020-2021)

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**TOTAL** 3 0 33 30

Course Communication Officer
Faculty Member
Laboratory Teaching Staff Member
Appointed Teaching Staff
Academic Scholar
Invited Speaker
Lectures - Tutorial Classes, Laboratories
Affiliation - Department of: Pharmacy

EN: Instructed/Guided self study in english for Erasmus Students.

** Only after individual agreement with a Faculty Member.
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  - Outline .................................................................................................. 51
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INTER-DEPARTMENTAL

● “Informatics for Life Sciences”
  - Outline .................................................................................................. 53
  - Awarded Title ......................................................................................... 53
  - Curriculum [Courses Outlines & Teaching Assignments in Web Links] ... 54

INTER-INSTITUTIONAL

● “Nanomedicines for Drug Delivery (NANOMED)”
  - Outline .................................................................................................. 55
  - Links to Curriculum & to the Coordinating University ....................... 55
a. Outline
The Drug Discovery and Development (DDD) Master of Science (MSc) degree is an 18-months curriculum offering a high quality and multidisciplinary training in modern fields of Pharmaceutical Sciences, including all stages required from the discovery of a new bioactive compound until its release as a drug, as well as the strategies followed for the discovery of bioactive compounds. The program aims at:

- Training young scientists in modern fields of Pharmaceutical Sciences to create appropriate human resources that will support the country's participation in international scientific developments and contribute to the assimilation of the introduced technology and its penetration into new disciplines of Science.
- Linking the research effort to business development, enhancing technology transfer mechanisms to Greek pharmaceutical companies' production units and meeting specific professional needs related to the business design, development and distribution of pharmaceutical products.
- The production of scientists capable of pursuing doctoral studies in related scientific fields.
- Providing theoretical and practical knowledge to postgraduate students in order to successfully meet the requirements of positions of responsibility in the pharmaceutical and related industries, Regulatory Organizations, as well as diagnostic and research laboratories, in Greece and internationally.

Graduates from Health Sciences and other related subject areas are admitted. The maximum number of enrolled students shall be no more than forty (40). English language proficiency is a main requirement. Total ECTS credits required for obtaining the degree amounts to 90, distributed in three (3) semesters (30 ECTS per semester). MSc students are required to successfully attend and complete all courses, compulsory or elective, of the specialization in which they have enrolled, to participate as tutors in laboratory courses and tutorials, to attend seminars and study courses and draw their MSc thesis in subject related to the specialization they study. Lessons and writing the thesis will be in Greek and in specific cases in English.

b. Awarded Title - Specializations
The Postgraduate Studies Program "Drug Discovery and Development" leads to the award of a Master of Science (MSc) Degree in "Drug Discovery and Development" on the following Specializations:

1. Medicinal Chemistry – Natural Products
2. Industrial Pharmaceutics
3. Molecular Pharmacology and Biotechnology
c. Curriculum: Courses Outlines & Teaching Assignments in web links
[x]: ECTS

The courses are semestral, divided into fall and spring semesters. Total credit points (ECTS) required for obtaining the MSc amount to 90 ECTS, distributed in three semesters (30 ECTS per semester). Courses' attendance is mandatory.

A. Core Courses (1st semester)
Graduate students must choose three (3) out of four (4) courses among DPHA_1, DPHA_2, DPHA_3 & DPHA_4. Courses DPHA_5 και DPHA_6 are mandatory for all.

- DPHA_1 Design and Discovery of Bioactive Compounds [8]
- DPHA_2 Design and Development of Pharmaceutical Products [8]
- DPHA_3 Pharmaceutical Analysis-Biospectroscopy [8]
- DPHA_4 Preclinical and Clinical Drug Evaluation [8]
- DPHA_5 Research Methodology and Ethics [4]
- DPHA_6 Literature-based seminar [8]

B. Specialization Courses (2nd semester)
Students should choose two (2) courses from the specialization they have enrolled in and one (1) from any specialization. ECTS credits for all specialization courses are 5.

1. Medicinal Chemistry - Natural Products
   - DPHA_A01 Natural Products in Drug Discovery [5]
   - DPHA_A02 Modern methods in drug synthesis [5]
   - DPHA_A03 Biomolecular NMR and protein architecture [5]

2. Industrial Pharmacy
   - DPHA_B01 Nanomedicines and special systems for administration and/or targeting of drugs/imaging agents [5]
   - DPHA_B02 Statistics and quality management in Pharmacy [5]
   - DPHA_B03 Applied pharmaceutical analysis and characterization of pharmaceutical formulations [5]

3. Molecular Pharmacology and Biotechnology
   - DPHA_C01 Molecular Targets of Drug Action [5]
   - DPHA_C02 Applied Biotechnology & Bioinformatics [5]
   - DPHA_C03 Precision Therapeutics [5]

C. Diploma Thesis (2nd & 3rd semesters)
   - DPHA_DIP1 Diploma Thesis (2nd semester) [15]
   - DPHA_DIP2 Diploma Thesis (3rd semester) [15]
Departmental Postgraduate Program

“Cosmetology - Preparation and Evaluation of Cosmetic Products”

a. Outline
The subject of this Postgraduate Program is the theoretical and practical education and training of young scientists in the design, production (in small and industrial scale) and evaluation (quality control, efficiency and safety) of cosmetic products, both theoretically and practically.

The aim of the program is:
- to cover research and training needs in the field of cosmetic products
- to develop research in this field and thereby promote new knowledge.

Graduates of the course will have the cognitive background to work inter alia at the cosmetics industry and at National and International regulatory bodies.

In addition, it is expected that the research link with the Greek production units will be strengthened, through the creation of well-qualified and specialized human resources and the transfer of know-how that will contribute to the promotion of the country’s development needs.

The duration of the curriculum is 18 months divided in three (3) semesters (90 ECTS) and includes specialization courses and a thesis.

Graduates from Health Sciences and other related subject areas are admitted.

The number of admissions to the program per year is up to ten (10).

The tuition fee of the program is 1,800€ (600€ per semester).

b. Awarded Title
The Postgraduate Studies Program “Cosmetology - Preparation and Evaluation of Cosmetic Products” leads to the award of a Master of Science (MSc) Degree in "Cosmetology - Preparation and Evaluation of Cosmetic Products".

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eMail: pharmini@upatras.gr & Web: http://www.pharmacy.upatras.gr
c. Curriculum: Courses Outlines & Teaching Assignments in web links

[No] = ECTS

Semester A
- PHA-COS-11 Physiology of Human Skin-Dermatology [6]
- PHA-COS-14 Microbiology [6]

Semester B
- PHA-COS-23 Methods of Instrumental Analysis for Cosmetic Products [6]
- PHA-COS-24 Industrial Production of Cosmetic Products [6]
- PHA-COS-25 Practical Course on Preparation of Cosmetic Products [6]

Semester C
Inter-Departmental Postgraduate Program

"Life Sciences Informatics"

a. Outline
The Postgraduate Program Life Sciences Informatics (LSI) was founded in 2003. It is currently co-organized by the Departments of Medicine, Computer Engineering and Informatics, Biology and Pharmacy, of the University of Patras.

We aim to provide high quality education in Life Sciences Informatics with prospects both in academia and in the field of applications. The graduates will be able to perform independent academic research in the field of Life Sciences Informatics and solve life sciences problems by developing novel informatics tools (databases, models, acquisition, data analysis and visualization software etc.). The program aims to meet the educational, research, health, technological and social needs and contribute to the development of this new hybrid scientific field.

The program enrolls up to 30 graduate students per year, with a first degree in Life Sciences (Biology, Medicine, Pharmacy, Biotechnology, Chemistry etc) or Informatics and related fields (Physics, Mathematics, Engineering etc).

The studying period for the Master Program is 1.5 years (3 semesters, 90 ECTS) and includes specialization courses and a thesis. Teaching will be in Greek and English.

b. Awarded Title
The Interdepartmental Postgraduate Programme "Life Sciences Informatics" (LSI) leads to the award of a Master's Degree (MSc) in "Informatics for Life Sciences" and in the following Specializations:

1. Bioinformatics
2. Medical Informatics
c. Curriculum

1st semester
- LSI-102 Principles of Pathophysiology and Therapeutics [5] ⇩
- LSI-103 Introduction to Programming [6] ⇩
- LSI-106 Seminar Series I [2] ⇩

2nd Semester
- LSI-201 Artificial Intelligence, Machine Learning and applications [5] ⇩
- LSI-203 Introduction to Biomedical Database design, implementation and information retrieval [5] ⇩
- LSI-204 Seminar Series II [2] ⇩

Specialization [Elective Stream]
Bioinformatics
- LSI-205 Bioinformatics I [8] ⇩
- LSI-206 Genes and Genomes [5] ⇩

Medical Informatics
- LSI-207 Medical Informatics I [8] ⇩
- LSI-208 Health systems management and principles of medical practice [5] ⇩

3rd Semester
- LSI-301 Diploma Research [20] ⇩
- LSI-302 Big Data Retrieval and processing [4] ⇩
- LSI-303 Transferable Skills [2] ⇩

Specialization [Elective Stream]
Bioinformatics
- LSI-304 Bioinformatics II [4] ⇩

Medical Informatics
- LSI-305 Medical Informatics II [4] ⇩
Inter-Institutional Postgraduate Program

Erasmus Mundus Joint Master Degree: “Nanomedicines for Drug Delivery”
Acronym: NANOEMD

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"NANOMED"

a. Outline

The subject of this Postgraduate Program is the theoretical and practical education and training of young scientists in the design, production (in small and industrial scale) and evaluation (quality control, efficiency, and safety) of Nanomedicines for Drug Delivery and other related applications, both theoretically and practically.

The aim of the program is:

- to cover research and training needs in the field of Nanomedicinal Drug products
- to develop research in this field and thereby promote new knowledge.

Graduates of the course will have the cognitive background to work inter alia at the related Pharmaceutical/biotech industry and at National and International regulatory bodies.

In addition, it is expected that the research link with the Academic and Industrial Partner Network of the NANOMED consortium will help to create and strengthen well-qualified and specialized human resources and additionally augment the transfer of know-how that will contribute to the promotion of the country's and Europe's development needs, in the area of Nanomedicines.

b. Awarded Title

NANOMED EMJMD students receive titles from all four participating Universities, together with a Document signed by all four Academic Coordinators. The possibility for a joint-Diploma is under consideration.

In University of Patras, the Postgraduate Studies Program “Nanomedicines for Drug Delivery” leads to the award of a Master of Science (MSc) Degree in "Nanomedicines for Drug Delivery".

c. Learning Outcomes

Upon successful completion of the program, graduates will be able to know and master the following:

- the techniques and methodology for identifying and determining/calculating the required (for formulation) physicochemical properties of a drug, underlying the decision about the selection of the optimal type of formulation and optimal route of administration for a specific drug product
- the differences of drug formulation types according to physical state and administration route and the requirements for quality control of dosage forms; the techniques and methodologies for manufacturing of different types of Pharmaceutical Dosage forms and the basic requirements for ingredients and industrial settings for production of different types of dosage forms according to route of administration
the concepts of acute releasing and prolonged/sustained release dosage forms and the kinetics regulating the design of controlled release dosage forms; methods to design and formulate such dosage forms
approaches to evaluate the quality of dosage forms, according to regulatory rules
advanced and novel methods applied in current days for formulation design and innovative techniques and methodologies applied for development of Pharmaceutical products; the strategy for experiment design and Quality by design
the strategy and logic of applying Nanotechnology for formation of Nanoparticulate drug delivery systems/carriers, the specific requirements in terms of biocompatibility of Nanomedicines; the techniques and methodology for manufacturing of different types of Nanomedicines
the differences between nanomedicine types and the requirements depending on the specific therapeutic or theragnostic or diagnostic application as well as the concept and strategies of drug Targeting (passive/active) by using nanomedicines
methods to prepare nanomedicines, characterize them and evaluate their performance by in vitro methods
The structure and properties of biological and biotech drugs (peptides, proteins, nucleic acids); structure and properties of antibodies, their production methods and how they are used in Pharmaceutics; basic concepts of immunology and vaccines; basic approaches to consider for preparation of a vaccine and for formulation of biological drugs
to systematically review the scientific literature for a specific scientific question; critically assess publications
the techniques of optimizing nanomedicines depending on therapeutic or diagnostic requirements, route of administration etc.; how a nanomedicine can go from the lab to the clinic and finally to the market, what to consider and how to organize each step
Finally, they will be able to know the methods of industrial production of pharmaceutical/nanomedicine products and the Good Manufacturing Practice Practices, GMP), as described in the related European Harmonized Standard ISO’s, and EMA/FDA guidelines.
d. Quality Assurance and Evaluation Process

The quality assurance of the NANOMED joint Master Degree is based on both internal and external evaluations. According to the special Cooperation Agreement of the consortium (Consortium Agreement), the establishment of an Executive Committee (Executive Committee) and a Strategic Board (Strategic Board), as well as their specific responsibilities are detailed below.

External evaluation/quality assurance is ensured by the organization of periodic overall evaluations, under the responsibility of the Strategic Boards. This evaluation takes place at the end of each NANOMED EMJMD intake (i.e. when the students of each student intake graduate). The Strategic Council also includes the participation of external members who do not belong to the Executive Committee, such as current or future Affiliated Partners. In addition, the program is periodically evaluated by the competent committee of ECAEA (European Education and Culture Executive Agency), which is responsible for Erasmus Mundus programs, both for quality assurance and for the management of funding.

Internal Quality Assurance procedures:
Each individual course is evaluated after the exam in the form of questionnaires to be completed. A common evaluation form has been developed for the courses of NANOMED EMJMD, per semester and/or place of teaching of the courses. There are five forms in total. The results of the internal evaluation (evaluation forms) are analyzed at the end of each semester.
The Strategic Council then discusses the results of these different assessments and makes recommendations to improve the curriculum that it submits to the Executive Committee.

From 2017 and on, changes have been made to the courses materials based on student recommendations regarding material overlaps and other issues (e.g. topics have been added to some course material to make it easier for students from other backgrounds), while we have also made any changes possible regarding the organization of mobility and the assistance provided to students in relation to matters concerning the granting of visas and residence permits, the opening of a bank accounts in European Union, and others.

Regarding the constitution and Responsibilities of the Committees:

• The Executive Committee consists of at least one representative from each member of the Consortium and is responsible for all decisions regarding the organization of NANOMED EMJMD (curriculum, assessments, student progress, quality assurance) and ensures that the program of courses within the Consortium is consistent with the curriculum objectives.

The activities of the Executive Committee are included in the following annual program:

II. March – May: Selection of students (scholarships and self-financed). Scholarship holders will be selected before April 15th. Self-funded students will be selected before May 31
III. Sept. – Oct.: subjects and destinations of the 3-month laboratory work and Diploma.
IV. July: final validation to agree which of the students passed the NANOMED EMJMD in terms of their scores and results.
The Executive Committee conducts these activities through physical meetings or teleconferences. Whenever possible, the Executive Committee tries to reach a consensus. If this is not possible, the decision is taken by the majority vote of each member of the Consortium.

The Strategic Board consists of: The members of the Executive Committee, four elected students from the same intake (each student has a different mobility path), and at least one member of Affiliated Partners (as provided by the Agreement).

I. The goal of the Strategic Board is to make recommendations for adaptation and improvement in pedagogical and organizational aspects of NANOMED EMJMD. These recommendations are advisory only. The executive committee is responsible for approving or rejecting the recommendations.

II. The Strategic Board meets once a year in July, after the annual Summer school and Workshop for students.
e. Program & Courses Description

Upon successful completion of the program, graduates will be able to know and master the following:

This 2-year, 120 ECTS Master's Course in English offers a high quality and multidisciplinary education in the emerging field of Nanomedicine. The consortium is composed of four Universities: Paris (Fr, coordinator), Patras (Gr), Pavia (It) and Angers (Fr). Nanomedicine is a revolutionary interdisciplinary science, combining knowledge from Physics, Biology, Chemistry and Medicine to treat diseases of the human body. The NANOMED consortium has brought together the expertise of four Universities in their respective domains of Nanomedicine. Renowned experts in the field from academia and industry are involved in the pedagogical staff. The final goal is to achieve the qualification of young scientists with appropriate credentials to lead the related field, either in Industry or in Academia.

Upon graduation, each student will receive four Master's degree diplomas corresponding to the National diplomas of the founding Universities.

Regarding the course content, the first semester (S1) taking place in Paris or Patras is dedicated to the "Introduction to pharmaceutical formulation" (Biopharmacy, formulation, production, controls). This first level provides the essential knowledge necessary to work in Pharmaceutical domains and to introduce innovative drug delivery system. Specific courses on chemistry or biology will be proposed to students with a scientific background who are non-pharmacist. At the end of S1, all students will follow practical courses in Paris.

The second semester will be dedicated to "Basic Nanomedicine and Biomolecules". A 3-months traineeship carried out in selected laboratories will conclude S2.

The Advanced Nanomedicine part of the curriculum (S3) corresponds to the specialization of students by choosing a training option according to their professional project. In Pavia, S3 will be dedicated to the "Production and Specific Applications of Nanoparticles" providing students with in-depth knowledge on different applications of nanoparticles and production, regulations and quality by design. In Angers, "Strategy of Pharmaceutical Development and Non-Clinical Development of Nanomedicines" is training professionals to manage innovative research projects with skills in Nanomedicine transfer from research to pre-clinical applications. During the final traineeship period (S4, 6 months), students apply this new knowledge to the successful achievement of research and development projects on Nanomedicine carried out in academic or industrial laboratories. The curriculum will also allow NANOMED participants to attend one summer school and two workshops organized by the consortium. Application requirements will include the completion of a Bachelor's degree in Pharmacy, or (under special provisions) in Chemistry, Biology, Biochemistry, Material Sciences or other adequate discipline. English language proficiency is also required.
Application requirements will include the completion of a Bachelor's degree in Pharmacy, or (under special provisions) in Medicine, Chemistry, Biology, Biotechnology, Chemical Engineering, Biochemistry, Material Sciences or other adequate discipline.

English language Proficiency is a main requirement.

The number of admissions to the program per year is up to twenty (20).

The tuition fee of the program is 4,500€ (1,125€ per semester).
f. Curriculum Courses Outlines in web links (No) = ECTS

S1 Université Paris Cité (FR)
- HG4_NM0 Introduction in Pharmaceutical Sciences (3) ⇔
- HG4_NM1 Preformulation and formulation strategy (3) ⇔
- HG4_NM2 Classical and Controlled Release dosage forms (9) ⇔
- HG4_NM3 Practical Applications of Formulations (9) ⇔
- HG4_NM4 Innovative Dosage forms (6) ⇔

S2 University of Patras (GR) and 3-month internship in Consortium University
- HG4_NM5 Innovations in Pharmaceutical Technology (3) ⇔
- HG4_NM6 Basic Nanomedicines (6) ⇔
- HG4_NM7 Biomolecules (6) ⇔
- HG4_NM8 3-month Internship (12) ⇔
- HG4_NM9 Summer School and Workshop (3) ⇔

S3 Cycle of Specialized knowledge courses for Specialization semester
   Selection 1.
   Université d'Angers (FR)
   - HG4_NM10 ⇔
     - CMC Regulatory and QbD Approach (5)
     - Innovation and Application (5)
     - Drug Product Design (5)
     - Characterization strategy (5)
     - Non Clinical Strategy (5)
     - Innovation Project (5)

   Selection 2.
   Università degli studi di Pavia (IT)
   - HG4_NM11 ⇔
     - Nanotechnology and biologic/biotech. Drugs (5)
     - Regulatory and analytical aspects (7)
     - Industrialization (4)
     - Drug targeting and vaccination (7)
     - Specific applications of Nanomedicines (5)
     - Personal Development Seminars (2)

S4 (in any of the 4 Partner Universities or Participating Institutions)
- HG4_NM12 ⇔ 6-Month Diploma Thesis Project (30)
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