



HELLENIC REPUBLIC

National and Kapodistrian
University of Athens

EST. 1837

in collaboration with:



"ALEXANDER FLEMING"
Biomedical Sciences Research Center

International MSc Molecular Biomedicine

Mechanisms of Disease, Molecular and Cellular Therapies & Bioinnovation

Curriculum & Syllabus



Message from the Director

Recent international advances in biomedical sciences & emerging technologies are confronting us with the molecular & cellular complexity of disease & pose new challenges as well as opportunities for the identification of new therapeutic targets & the development of new treatments. **Our MSc Program has been designed to provide a vibrant and dynamic international environment where students can engage** in thorough mechanistic understanding of disease pathogenesis, combined with a systemic, integrated view of pathophysiology & tools for the development of novel approaches for disease management. We aim to attract graduate students from different fields of study from all over the world, with demonstrated intellectual and academic excellence for exposure to a cross-cultural way of thinking.

Our goal is to train the next generation of biomedical researchers & innovators in academia, industrial R&D and entrepreneurship, by exposing students to

both high end research and innovation environments. This multidisciplinary training program combines state-of-the-art biomedical technologies, disease modeling, clinical validation, large scale omics analysis, advanced imaging platforms, clinical trial design, as well as complementary training in innovation, entrepreneurship & technology transfer.

Our MSc Program lecturers & research hosts, scientists of international standing, help train and guide students through their education. Invited guest speakers, selected to be among the best, are also participating. Together, we work to make each student's experience a rich and fulfilling one, tailored to their future goals & career perspectives.

The following pages provide more detailed information about the MSc Program's structure. Our team is eager to receive students' applications and would be happy to answer any questions or further discuss students' future goals & interests.

George Kollias, PhD

Postgraduate Program Director

Professor of Physiology – NKUA

Associate Researcher – BSRC “Alexander Fleming”

Member of the Academy of Athens





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Curriculum

MSc PROGRAM DESCRIPTION

Program Duration and Fees

Degree: Master of Science (M.Sc.)

Program duration: 2 years (4 academic semesters) - Full time (100%)

Study location: Athens, Greece

Language: English

Course credits/ECTS: 120 ECTS

Fees: €1,000 per academic semester

Website: www.molecularbiomedicine.gr/

Courses locations

Medical School - National & Kapodistrian University of Athens

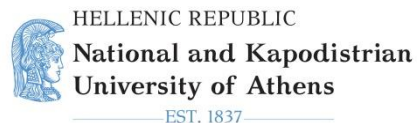
Department of Physiology, Medical School

National & Kapodistrian University of Athens

75 Mikras Asias Street

11527, Athens

Greece



Biomedical Sciences Research Center "Alexander Fleming"

BSRC "Alexander Fleming"

34 Fleming Street

16672, Vari

Greece



Eligibility for Admission

The program is aimed at Greek and non-Greek graduate students from **Universities, Technological Educational Institutes and Polytechnics of the Health Sciences discipline** (e.g. Medicine, Biology, Molecular Biology, Biochemistry, Chemistry, Chemical Engineering, Physics, Pharmacy, Dentistry, Biotechnology, (Bio)informatics, Nursing and other relevant disciplines of Life Sciences).

Candidates wishing to apply coming from a non-Biological graduate program, should have **proven basic Molecular Biology knowledge**, or will be expected to prove it if selected for an interview.

Required level of English: Proficiency in English language (documented by a Diploma from an Educational Body of an English-speaking country, or by a Certificate of Proficiency in English level B2-C2 (Toefl, IELTS, University of Michigan, University of Cambridge, or a National Certificate of Language Proficiency, Learning Resource Network/LRN...etc.). Candidates will be expected to prove their thorough knowledge of the English language if selected for an interview.

For non-Greek graduate students, please visit the [International Student Support Unit page](#) of the National & Kapodistrian University of Athens (in English) before preparing the Application.

Application Materials

Applications must be completed and submitted **ONLINE only through the website of the MSc Program:**

www.molecularbiomedicine.gr/online-application

- **Two Reference Letters** which will be sent directly by the referees to the following email address molecularbiomedicine@med.uoa.gr before the deadline for submission of the applications.

- **Detailed Curriculum Vitae** which will include all information about the candidate's education, research of professional activity & interests (in English).
- **Letter of Intent - Personal Statement** (1 page) which will describe the applicant's reasons and motives to apply to the specific Postgraduate Program in relation to his interests (in English).
- **Copy of Degree:** if the Degree is not available during the application period, applications that are accompanied by a *Statement According to Law 1599/86* will be also accepted. Candidates must state in that document that the successful completion of the undergraduate studies is still expected, and must report in detail the pending courses remaining for the examination period of September. In this case, and if the candidate is accepted in the MSc Program, she/he will have to imperatively present the Certified copy of the Diploma & the Certificate of completion of Studies on the registration day (last week of September). Any delay might result in the cancellation of the application.
- **If Foreign Degree: Certified Translation in the Greek language + Certificate of Equivalence & Correspondence of the Academic Degree from NARIC (ΔΟΑΤΑΠ)** (further information at: https://www.doatap.gr/home_english/). If the NARIC Certificate is not available during the application period, applications will still be accepted without it. However, if the candidate is successfully accepted in the MSc Program, she/he will have to present, on the registration's day (last week of September), the *NARIC Certificate itself* or at least a *Statement According to Law 1599/86* that the candidate is aware that, in order to take the oath, her/his degree must be recognized by NARIC-ΔΟΑΤΑΠ.
- **Official/Analytical Transcript:** Detailed record of the grades received during all the undergraduate studies, signed & stamped by the University, stating the date of award.
- **Certificate of Proficiency in English language** documented by a Diploma from an Educational Body of an English-speaking country, or by a Certificate of Proficiency in English level B2-C2 (Toefl, IELTS, University of Michigan,

University of Cambridge, or a National Certificate of Language Proficiency, Learning Resource Network/LRN...etc.). Candidates will be expected to prove their thorough knowledge of the English language if selected for an interview.

- **Short Video (optional):** 1.5 min and less than <200MB, in which the candidate will state the reasons for choosing this specific Postgraduate Program (in English).

All materials must be received by the applicable deadline to be considered. Successful candidates will be required to deposit imperatively on the day of their registration (last week of September), hard copies of all the supporting materials submitted electronically, as well as a copy of their electronic application form. Any delay might result in the cancellation of the application.

Selection Criteria

Applications for the MSc program will be evaluated based on:

- The grades acquired during the undergraduate studies, especially in the subjects related to the MSc courses
- The performance during the undergraduate final year dissertation thesis
- Any recent laboratory or other research related experience
- Background knowledge on basic Molecular & Cellular Biology (proven either through related undergraduate studies, or during the interview)
- The thorough knowledge of the English language
- Other related scientific activities
- Reference letters (can be written in Greek or in English)
- Personal panel interview (in English) during which potential candidates will be invited to deploy their interests and knowledge in the field of Molecular Biomedicine

MSc PROGRAM STRUCTURE

1st SEMESTER (October – January)

The MSc Program 1st semester is composed of **Taught Courses** exclusively. They consist of four main modules which will be attended in parallel during the whole semester, both at the Medical School of the National & Kapodistrian University of Athens and at the BSRC "Alexander Fleming".

The four modules of Taught Courses will cover the following individual fields:

- 1. Mechanisms of Disease (MOD)**
- 2. Molecular and Cellular therapies (MCT)**
- 3. Bio-innovation (BI)**
- 4. Transferable Skills (TRFS)**

An additional module (which will be attended also during the 2nd semester) will introduce students to:

- 5. Journal Clubs (JC1)**

1. Mechanisms of Disease (MOD): The first module MOD focuses on the theoretical training of students in the design and implementation of research studies, the characterization of the molecular and cellular mechanisms underlying human diseases and the in-depth investigation of their etiology.

Detailed MOD Courses:

- MOD-1: Introduction to basic laboratory and clinical research methodology
- MOD-2: Molecular and cellular mechanisms in chronic inflammation and infectious diseases
- MOD-3: Molecular and cellular mechanisms in cancer
- MOD-4: Molecular and cellular mechanisms in neurodegenerative diseases

2. Molecular and Cellular therapies (MCT): The second module focuses on methods for developing targeted and personalized therapies, and will cover the development of small molecules, antibodies, nanoparticles, natural products, biosimilars, etc. for the treatment of human diseases. Particular emphasis will be placed on the use of the most recent technologies (next-generation sequencing, advanced imaging, pharmacogenomics, metagenomics, etc.).

Detailed MCT Courses:

- **MCT-1: Basic principles in bioinformatics, computational biology and biostatistics**
- **MCT-2: Precision medicine: methods, trends and challenges**
- **MCT-3: Biological therapies and drug development process**
- **MCT-4: Cutting-edge technologies in molecular biology and genetics**

3. Bio-innovation (BI): The third module focuses on the translation of research results from the laboratory to the clinic and on the identification of commercially exploitable findings for their further development into innovative products and services. Courses will introduce the innovation process to the students and familiarize them with the basic principles of technology transfer & intellectual property protection, their legal aspects, and commercialization in the industrial sector.

4. Transferable Skills (TRFS): The fourth module focuses on cultivating important scientific/business skills, such as presentations of research results or new business products, writing research proposals or business plans, writing scientific articles or case reports.

5. Journal Clubs (JC1) - Group discussions on pioneering scientific literature: Students will attend and participate in Journal Clubs, a weekly gathering in which they will initially learn how to read & present research articles found in the current scientific literature. They will then initiate group discussions on specific articles presented by their colleagues and discuss it, all together, by asking clarifying questions and critically commenting on the methods, on the approaches and on the article's scientific conclusions & biomedical perspectives. Students are expected through these forums to develop their own personal skills for presenting in public and exchanging scientific thoughts & ideas.

2nd SEMESTER (February – July)

The MSc Program 2nd semester is composed of **International Seminars**, **Journal Clubs** and **Laboratory Rotations**.

The 2nd semester modules will be the following:

- 1. International Seminars (MCT-5)**
- 2. Journal Clubs (JC2)**
- 3. Lab Rotations (x2)**

1. International Seminars (MCT-5): Systems Biology, Biotechnology and Bioinnovation: These lectures, unlike those of the 1st semester, will take the form of Seminars, which will be given in the fields of System Biology, Biotechnology and Bioinnovation. Seminars will be given by recognized scientists of international standing, of foreign nationality or from Greece who are performing their research abroad.

2. Journal Clubs (JC2) - Group discussions on pioneering scientific literature: Students will attend and participate in a second series of Journal Clubs and group discussions on pioneering scientific literature, which will be organized with a slightly different format compared to those of the 1st semester. These JCs will thus complement and increase the skills that students will have acquired during the 1st semester.

3. Lab Rotations: MSc students will undertake two practical 3-month rotations (short internships), in two different laboratories, under the supervision of our MSc Lecturers & Research Collaborators (in Greece or abroad, between February–April and May–July). Under their Mentors' supervision, students will be introduced to the different laboratory techniques, will be initiated to independent thinking, will learn to critically analyze & evaluate their scientific results, will develop cooperations with other lab members, etc.

3rd and 4th SEMESTERS (October – September)

MSc Dissertation Thesis: During the second year, MSc students will undertake a full 1-year internship in one of our partner laboratories and develop a full Research Project. This project will be supervised by a three-member Examination Committee, which consists of Faculty Members and Research Collaborators of the MSc program (Thesis supervisor, plus 2 other Committee's members) and which will be responsible for monitoring students' progress during their MSc Thesis.

Following completion of the mentored internship at the end of the 4th semester, students are expected to write a Dissertation Thesis and present it along with their research work to the members of the Examination Committee, on the occasion of the Diploma Dissertation Oral Presentation. This MSc Thesis will be defended in public, in an open seminar, before the Committee.

The Dissertation Research is a core component of our MSc program designed to prepare our students for a further advanced degree and/or to pursue successful careers in Science, Industry, Health and Public engagement sectors.

Students' Workshop/Conference: Every academic year, usually at the beginning of the 3rd semester, our 2nd-year MSc students organize their own Workshop (Conference, Webinar...etc.) around a specific scientific theme. These annual workshops are open to the public and gather prominent keynote speakers, invited guest lecturers and students, from all around Greece and abroad. They usually take place in various prestigious venues of Athens (e.g. Athens Medical School, National & Kapodistrian University of Athens historical building, InnovAthens Technopolis, Serafio – City of Athens, etc.) or online (2021 Live Webinar, with nearly 450 registered participants from all around the world).



Organization of the MSc OPEN DAY: Every academic year, our MSc students organize an *online* 'Open Day' Webinar to inform prospective undergrad Students who wish to apply for the coming academic year, about the MSc program and Application's Call.

 (past webinars here: www.molecularbiomedicine.gr/news-events)

Participation in CIVIS Courses: Our students are invited to participate in the large offer of international Blended Intensive Programs (BIPs) & Summer Schools organized by the CIVIS Alliance of European Universities (11 Universities across Europe, including NKUA). Costs for physical mobility abroad are entirely covered by CIVIS/Erasmus+.


Our MSc Program organizes 2 Courses since 2022:

■ ***“CIVIS BIP – Experimental Models in Molecular Biomedicine (EMMB)”*** with the Universidad Autónoma de Madrid, Spain

 <https://civis.eu/en/civis-courses/experimental-models-in-molecular-biomedicine-emmb>

■ ***“CIVIS Summer School – Organoid Models in Immuno-Oncology (ICI-CIVIS)”*** with the Aix-Marseille Université, France

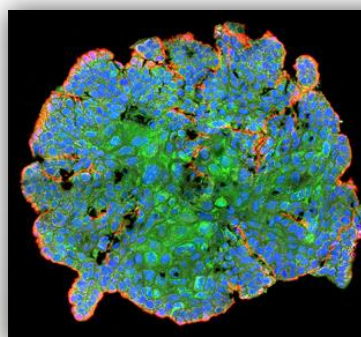
 <https://www.univ-amu.fr/en/public/ecole-dete-organoid-models-immunology-oncology-presentee-par-ici-civis>



Experimental Models in Molecular Biomedicine (EMMB)

30 JANUARY TO 7 JULY 2023
Universidad Autónoma de Madrid, Spain
Blended Intensive Programme

Join real scientists from different CIVIS Universities who will help you to learn how to design experiments to address real research questions by using their favorite experimental model



Organoid Models in Immunology-Oncology (ICI-CIVIS)

3 JULY TO 7 JULY 2023
Aix-Marseille Université, France
Summer School

2nd summer school of the Institute of Cancer & Immunology, a program of excellence led by internationally renowned speakers, practical workshops in the platforms of AMU & time for exchanges



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Syllabus

Overall Learning Outcomes

After completing the MSc program, and based on its expected learning outcomes, the graduates of the International MSc "Molecular Biomedicine":

A) will know in depth the **molecular and cellular mechanisms** that govern a multitude of **human diseases**, such as immune and chronic inflammatory diseases, neoplastic diseases, neurodegenerative diseases, metabolic diseases and others

B) will have acquired knowledge and skills in **cutting-edge technologies and modern research tools of biomedical research**, including innovative next-generation sequencing technologies, proteomics, advanced bioimaging, transgenesis, etc.






C) will have gained knowledge in **drug development methods and processes**, from their design and discovery to preclinical and their clinical evaluation and ultimately their commercialization

D) will have been exposed to **business activities**, utilization and **protection of research results**

E) they will have developed **transferable skills** that will strengthen their career prospects in academic bodies, research infrastructures, or bodies of private sector

F) during the **laboratory exercises**, but also during the preparation of their **thesis**, the students will become familiar with the experimental process, the design and execution of experimental protocols, the analysis of results and their dissemination through presentations, but also reports/publications.

MOD-1: Introduction to basic laboratory and clinical research methodology

	CREDITS: 2
	COURSE CODE: 042A001
	SEMESTER: First
	HOURS per SEMESTER: 18
	ATTENDANCE: Compulsory

Content

The Courses deal with the Basic Principles of Hygiene and Safety in the Laboratory, the Basic Laboratory Techniques, the Ethics and Welfare of Laboratory Animals, the Basic Concepts of Gene Structure and the Regulation of Gene Expression, and some Basic Biostatistics.

Evaluation

Because of the theoretical nature of the course, students will be examined through Multiple Choice Questions (MCQs). Examination Session: end of the 1st Semester. Credits earned: 2 ECTS.

Objectives

Upon completion of the course, students should be able to apply research standards & risk management principles to anticipate, identify, evaluate and control physical, chemical & biological hazards, and implement the best lab practices. They will be able to fully understand, design and execute basic experimental procedures using common laboratory equipment and laboratory animal models. They will also master the qualitative and quantitative aspects of an experimental design and the interpretation of scientific results.

MOD-2: Molecular and cellular mechanisms in chronic inflammation and infectious diseases



CREDITS: 4



COURSE CODE: 042A002



SEMESTER: First



HOURS per SEMESTER: 78



ATTENDANCE: Compulsory

Content

The Courses introduce the basic principles of Innate and Adaptive Immunity, the molecular mediators & Signaling in Inflammation, the Transcriptional and Epigenetic Regulation of Inflammatory Responses, the Immune Regulation of Metabolism, the Perturbation of the Immune System by Viruses, and the basic Concepts of Autoimmunity presented through a series of Clinical Seminars focusing on some specific autoimmune diseases & syndromes.






Evaluation

Because of the theoretical nature of the course, students will be examined through Multiple Choice Questions (MCQs). Examination Session: end of the 1st Semester. Credits earned: 4 ECTS.

Objectives

On completion of the course, students should be able to fully understand the fundamental concepts of Inflammation, Immunity, Virology and Autoimmunity. They will be able to apprehend the molecular, cellular and regulatory mechanisms of the immune system components that underlie the responses to pathogens & immune system dysregulation, and their clinical implications. Students should also acquire strong knowledge on target & drug discovery and on the most common & the latest immunotherapeutical strategies used in clinical research.

MOD-3: Molecular and cellular mechanisms in cancer

	CREDITS: 2
	COURSE CODE: 042A003
	SEMESTER: First
	HOURS per SEMESTER: 18
	ATTENDANCE: Compulsory

Content

The Courses provide students with basic concepts on Genomic Instability, DNA Damage Response and Cell Cycle, Altered Gene Expression & Epigenetic Regulation, Intracellular Signal Transduction Pathways, Developmental Signaling Pathways in Oncogenesis, Angiogenesis & Metastasis, Tumor Microenvironment, Epithelial-Mesenchymal Transition, Autophagy and Apoptosis.






Evaluation

Because of the theoretical nature of the course, students will be examined through Multiple Choice Questions (MCQs). Examination Session: end of the 1st Semester. Credits earned: 2 ECTS.

Objectives

Upon completion of the course, students will be able to demonstrate their ability in identifying the common genetic, cellular & molecular mechanisms that are dysregulated in cancerous cells, in understanding the oncologic processes that lead to tumor progression and in grasping the biological rationales for traditional and novel cutting-edge targeted therapeutic approaches.

MOD-4: Molecular and cellular mechanisms in neurodegenerative diseases

	CREDITS: 2
	COURSE CODE: 042A004
	SEMESTER: First
	HOURS per SEMESTER: 24
	ATTENDANCE: Compulsory

Content

The Courses deal with Developmental Neuroscience, Neurophysiology, Neuronal Plasticity, Neuroimmunology, Behavioral Neuroscience and the Molecular Basis of Diseases of the Nervous System and Neurodegeneration.

Evaluation

For this course specifically, students will be examined through written Essays they will have to produce on two or three different imposed themes in the field of neuroscience. Essays due: by the end of the 1st Semester. Credits earned: 2 ECTS.

Objectives

Upon completion of the course, students should achieve a broad understanding of the structure and functioning of the nervous system, through a solid acquired knowledge on the physiological and pathological mechanisms involved in a range of neurological processes: from their basic genetic, cellular & molecular aspects to their more integrated plastic, behavioral & cognitive perspectives. Students should be also able to grasp the main current therapeutical challenges in the management of neuropsychiatric conditions & neurodegenerative disorders.

MCT-1: Basic principles in bioinformatics, computational biology and biostatistics



CREDITS: 3



COURSE CODE: 042A006



SEMESTER: First



HOURS per SEMESTER: 27



ATTENDANCE: Compulsory

Content

The Courses introduce the Basics of Biostatistics and Bioinformatics (mean, median, standard deviation, significance value/p-value, hypothesis testing/t-test), Computational Approaches to Biological Problems (definitions of distance, variability and correlation), Familiarization with Coding with R (R coding), Performance and Interpretation of Basic Bioinformatics Analyzes.

Evaluation

For this course specifically, students will be examined through a written essay/proposal they will have to prepare and present orally in class.
Examination Session: end of the 1st Semester. Credits earned: 3 ECTS.

Objectives

On completion of the course, students should have acquired a detailed overview of the problems solved by computational and algorithmic approaches in modern biomedical sciences. They will have developed skills in analytical thinking, quantitative approaches and statistical inference, and they will know how to perform, interpret and implement standard bioinformatics analyses on genomic data (Gene Expression, Functional Analysis, Modeling of biological data).

MCT-2: Precision medicine: methods, trends and challenges



CREDITS: 2



COURSE CODE: 042A007



SEMESTER: First



HOURS per SEMESTER: 18



ATTENDANCE: Compulsory

Content

The Courses involve lectures on Immunotherapy, Pharmacogenomics, Screening Programs, In silico drug design, Wearable devices, Microbiota & Nutrition, Induced Pluripotent Stem Cells (iPSCs), and Bioethics considerations in precision medicine.

Evaluation

Because of the theoretical nature of the course, students will be examined through Multiple Choice Questions (MCQs). Examination Session: end of the 1st Semester. Credits earned: 2 ECTS.

Objectives

On completion of the course, students will be able to understand how new approaches & technologies have changed diagnosis, treatment and patient outcomes and to grasp also the ethical issues that population & individuals' screenings are rising. They should be able to apply the principles of precision medicine and to use the newly-developed technological and pharmaceutical tools to propose novel diagnostic and treatment approaches to current and future biomedical needs.

MCT-3: Biological therapies and drug development process



CREDITS: 2



COURSE CODE: 042A008



SEMESTER: First



HOURS per SEMESTER: 18



ATTENDANCE: Compulsory

Content

The Courses deal with the Basic Principles of Design & Development of New Therapies and Drugs, In silico and in vitro Tests – Analyzes, Regulations for the Development of New Medicines, Gene Therapy.






Evaluation

Because of the theoretical nature of the course, students will be examined through Multiple Choice Questions (MCQs). Examination Session: end of the 1st Semester. Credits earned: 2 ECTS.

Objectives

On completion of the course, students should have acquired a comprehensive overview of the drug discovery process, from the bench (bioinformatics and genomics design, high-throughput pharmacological screenings, lead molecule characterization and preclinical evaluation), through the nonclinical development (approval and granting of marketing authorization of a new drug product by various international agencies), to the patient's bed ultimately (drug safety assessment and evaluation in human clinical trials). Students will be able to contribute to the overall development plan of a medical product and grasp the role of intellectual property of regulatory affairs in the whole process.

MCT-4: Cutting-edge technologies in molecular biology and genetics

-  **CREDITS:** 4
-  **COURSE CODE:** 042A005
-  **SEMESTER:** First
-  **HOURS per SEMESTER:** 78
-  **ATTENDANCE:** Compulsory

Content

The Courses will introduce the most recent technological advances in Biology, such as New Next Generation DNA Sequencing (NGS) and Single cell RNA Sequencing Technologies, Transgenic & Gene Targeting, Basic Principles of Flow & Mass Cytometry, Proteomics, Analyses of Biological networks, and advanced Bioimaging Techniques.

Evaluation

Because of the theoretical nature of the course, students will be examined through Multiple Choice Questions (MCQs). Examination Session: end of the 1st Semester. Credits earned: 4 ECTS.

Objectives

Upon completion of the course, students should be able to fully understand and use the most recent & advanced technologies appropriate to the task. They're expected to become proficient in the use of these advanced technologies, which they will encounter during their laboratory internships and future careers. The multidisciplinary aspect of the course will guarantee them a familiarity with a large range of advanced technologies and applications they might use to develop an up-to-date scientific or entrepreneurial innovative project.

BI: Basic principles of entrepreneurship & innovation / Intellectual property & exploitation of results



CREDITS: 3



COURSE CODE: 042A009



SEMESTER: First



HOURS per SEMESTER: 52



ATTENDANCE: Compulsory

Content

The Courses deal with the Basic Principles of Technology Transfer & IP Protection, their Legal Aspects, and the Commercialization in the Biotechnology Sector. They will also introduce the students to the principles of Innovation and Entrepreneurship, the Innovation Process, the Development of New Products & Services, Business Planning & Business Finance, the Start-ups, the Knowledge-Intensive Enterprises/Spin-offs & Venture Capital and the Innovation & Entrepreneurship in the Global Economy.

Evaluation

The course being both theoretical and practical, students will be examined through Multiple Choice Questions (MCQs) and group presentations of virtual innovative business projects. Examination Session: end of the 1st Semester. Credits earned: 3 ECTS.

Objectives

Upon completion of the course, students should be able to fully understand the basic principles of technology transfer & IP protection and their legal aspects, and become familiar with the world of Innovation and

Entrepreneurship. Through virtual projects they will develop during the courses, they are expected to be fully proficient in the use of the complex tools, mechanisms and strategies for creating and developing scientific or non-scientific ideas into new innovative products & dynamic services that will respond to the current needs of society.

TRSF: Transferable Skills



CREDITS: 4



COURSE CODE: 042B003



SEMESTER: First



HOURS per SEMESTER: 78



ATTENDANCE: Compulsory

Content

The Courses will instruct the students how to search & write Scientific Articles, how to prepare Oral and Poster Communications for Scientific Congresses, how to write a CV/Cover Letter & how to choose a Lab, how to keep a proper Lab Notebook & how manage Time, how to write Grant Proposals for Research Funding, how to plan a Conference, and will intensively train them for Oral Presentations & Thesis Defense.

Evaluation

Because of the non-theoretical nature of the course, students will be examined through oral Presentations & two Grant Proposals. Examination Session: end of the 1st Semester. Credits earned: 4 ECTS.

Objectives

On completion of the course, students should be able to master the scientific “soft-skills” that are too often neglected in traditional scientific training. They are expected to be fully ready and competitive for enrolling into a doctoral project and further and/or joining industry. They will thus confidently communicate their data or projects in front of large audiences, be able to independently organize a Conference, easily manage their career development, effortlessly integrate into new working environments, and expertly attract resources, sponsorships, investments and/or competitive funding.

JC1: Journal Clubs - Group discussions on pioneering scientific literature



CREDITS: 2



COURSE CODE: 042B004



SEMESTER: First



HOURS per SEMESTER: 39



ATTENDANCE: Compulsory

Content

The Courses deal with the Methods of Reading and Presenting Research Articles Found in the Current Scientific Bibliography, Initiating Group Discussions, Asking Clarifying Questions and Critically Commenting on Methods, Approaches and Scientific Conclusions of the Article, Presentation of Biomedical Perspectives.

Evaluation

Students will be examined several times through *detailed* Oral Presentations of Scientific Articles, *which will have been assigned to them*. Examination: during the course of the 1st Semester. Credits earned: 2 ECTS.

Objectives

Upon completion of the course, students should be able to initiate group discussions on specific articles presented by their colleagues and discuss them, all together, by asking clarifying questions and critically commenting on the methods, on the approaches and on the article's scientific conclusions & biomedical perspectives. Students are expected through these forums to develop their own personal skills for presenting in public and exchanging scientific thoughts & ideas.

MCT-5: Systems Biology, Biotechnology and Bioinnovation



CREDITS: 2



COURSE CODE: 042B001



SEMESTER: Second



HOURS per SEMESTER: 39



ATTENDANCE: Compulsory

Content

The Courses will be presented as Seminars given in the fields of System Biology, Biotechnology and Bioinnovation. They will be given by recognized scientists of international standing, of foreign nationality or from Greece who are performing their research abroad.






Evaluation

Students will be examined through written Essays and oral Presentations of a Project they will design on one of the themes presented during the Seminars. Examination: during the course of the 2nd Semester. Credits earned: 2 ECTS.

Objectives

On completion of the course, students should be able to understand and grasp the main basic principles of System Biology, Biotechnology and Bioinnovation. They will also become familiar with the standards of research implemented internationally and be exposed to a cross-cultural way of thinking. They will be fully prepared to the modern challenges of the global world and, more specifically, to pursue successful careers in Greece or abroad in the field of science and innovation.

JC2: Journal Clubs - Group discussions on pioneering scientific literature

	CREDITS: 2
	COURSE CODE: 042B004
	SEMESTER: Second
	HOURS per SEMESTER: 39
	ATTENDANCE: Compulsory

Content

The Courses deal with the Methods of Reading and Presenting Research Articles Found in the Current Scientific Bibliography, Initiating Group Discussions, Asking Clarifying Questions and Critically Commenting on Methods, Approaches and Scientific Conclusions of the Article, Presentation of Biomedical Perspectives.






Evaluation

Students will be examined several times through *brief* Oral Presentations of Scientific Articles, *which will have been chosen by themselves*. Examination: during the course of the 2nd Semester. Credits earned: 2 ECTS.

Objectives

Upon completion of the course, students should be able to initiate group discussions on specific articles presented by their colleagues and discuss it, all together, by asking clarifying questions and critically commenting on the methods, on the approaches and on the article's scientific conclusions & biomedical perspectives. Students are expected through these forums to develop their own personal skills for presenting in public and exchanging scientific thoughts & ideas.

1st 3-month advanced laboratory training (Rotation#1)

-  **CREDITS:** 13
-  **COURSE CODE:** 042B005
-  **SEMESTER:** **Second**
-  **HOURS per SEMESTER:** 416
-  **ATTENDANCE:** Compulsory

Content

Students will Learn *in-situ* Laboratory work, be Introduced to the various Laboratory Techniques, be Initiated to Independent Thinking, will Learn to Critically Analyze and Evaluate Scientific Results and Develop Collaborations with other laboratory members.

Evaluation

Students will be examined during the overall course of their internship by their own lab supervisor. They will also write & submit an overall Rotation Report, in English, which will cover the aim, methodology, results, conclusions of each research programs. The Report and students' overall performance during the internship will be evaluated. Report due: after the completion of the 1st Rotation. Credits earned: 13 ECTS.

Objectives

On completion of the Rotation#1, students should have acquired a basic knowledge on the scientific method and experimental design. They will know how to critically analyze and evaluate scientific results. They will be able to synthesize and implement all theoretical knowledge acquired previously during their BSc studies and the MSc 1st Semester.

2nd 3-month advanced laboratory training (Rotation#2)



CREDITS: 13



COURSE CODE: 042B006



SEMESTER: **Second**



HOURS per SEMESTER: 416



ATTENDANCE: Compulsory

Content

Students will Learn *in-situ* Laboratory work, be Introduced to the various Laboratory Techniques, be Initiated to Independent Thinking, will Learn to Critically Analyze and Evaluate Scientific Results and Develop Collaborations with other laboratory members.

Evaluation

Students will be examined during the overall course of their internship by their own lab supervisor. They will also write & submit an overall Rotation Report, in English, which will cover the aim, methodology, results, conclusions of each research programs. The Report and students' overall performance during the internship will be evaluated. Report due: after the completion of the 2nd Rotation. Credits earned: 13 ECTS.

Objectives

On completion of the Rotation#2, students will have reinforced their basic knowledge on the scientific method and experimental design. The successful fulfillment of these objectives will allow them to readily embark for their 1-year MSc Dissertation Thesis.

MSc Dissertation Thesis



CREDITS: 50



COURSE CODE: 042E001



SEMESTER: Third & Fourth



HOURS per SEMESTER: -



ATTENDANCE: Compulsory

Content

Students will Learn *in-situ* Laboratory work for a full year, be Introduced to the various Laboratory Techniques, be Initiated to Independent Thinking, will Learn to Critically Analyze and Evaluate Scientific Results and Develop Collaborations with other laboratory members. During this long-term experience, they will also learn how to Manage their own Research Project and Communicate it to both specialized and larger audiences.






Evaluation

Students will write & orally present (MSc thesis defense) in English an overall MSc Dissertation Thesis, which will be evaluated by a dedicated 3-member Evaluation Committee composed of Professors and Researchers. Thesis due: at the completion of the 2-semester (12 months) MSc Dissertation Thesis. Credits earned: 50 ECTS.

Objectives

On completion of the MSc Dissertation Thesis, students will have developed strong research and analytical skills based on their research findings. They will be able to manage a project by setting realistic timelines, prioritizing tasks, meeting deadlines, and collaborate efficiently with their colleagues. They will have improved their written and oral presentation skills, and will be able to successfully communicate their research. The successful fulfillment of these objectives will allow students to readily embark for a doctoral program (PhD) or enter the job market and industry by increasing their employability.

Research Proposal

-  **CREDITS:** 10
-  **COURSE CODE:** 042Δ001
-  **SEMESTER:** Fourth
-  **HOURS per SEMESTER:** -
-  **ATTENDANCE:** Compulsory

Content

The Courses will instruct the students how to Develop a good/novel idea, Address a significant problem, Search for possible sources of funding, Analyze & Synthesize the current knowledge in the field & the credentials resources of participants/organizations and Describe clearly the research activities and implementation plan, with estimated budget, expected results, deliverables and impact. Students will learn to Manage a Project by Setting realistic timelines, Prioritizing tasks, Meeting deadlines, and Collaborate efficiently with their colleagues.

Evaluation

Students will be examined when completing their MSc Dissertation Thesis. The written Research proposal, written in English, will be evaluated by a dedicated 3-member Evaluation Committee composed of Professors and Researchers. Research Proposal due: at the completion of the 2-semester (12 months) MSc Dissertation Thesis. Credits earned: 10 ECTS.

Objectives

On completion of the Research Proposal, students will be able to develop any good/novel idea and efficiently manage its implementation. The successful fulfillment of these objectives will facilitate students to apply to doctoral programs (by funding their own research project) and enable them to fund any other project, thus increasing employability.

List & Contact of faculty members

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Students' Welfare and Services

The MSc program in Molecular Biomedicine provides students with several services offered at a larger level by the National & Kapodistrian University of Athens and the BSRC "Alexander Fleming":

- **Healthcare**

According to paragraph 3 of article 31 of Law 4452/15-2-2017 (A' 17) "undergraduate and postgraduate students and doctoral candidates who do not have other medical and hospital care, are entitled to full medical and hospital care in the National Health System (E.S.Y.) with coverage of the relevant expenses by the National Organization for the Provision of Health Services (E.O.P.Y.Y.) in accordance with article 33 of Law 4368/2016 (A' 83), only by using their Social Security Number". The Health Service operates the following clinics: A) Internal Medicine Clinics B) Ophthalmology Clinic C) Dental Clinic D) Psychosocial Intervention Unit E) Dermatological examination. NKUA students have the opportunity to be examined at the "Andreas Syngros" Hospital after consultation with the Secretariat of the Health Service of the University Club. The health service is housed in University Club, Ippokratous 15, on the 1st floor.

- **European Health Insurance Card (E.K.A.A.)**

When students are going to a European Union country, they can obtain the relevant card in order to have the possibility of medical care in the respective health systems of European countries. The E.K.A.A. card is issued by the Department of Computerization of the National and Kapodistrian University of Athens only to students (undergraduate/postgraduate/doctoral candidates) who do not have insurance capacity (i.e. are not insured with another insurance institution) and are going to a European Union country, Norway, Liechtenstein, Iceland and Switzerland. Students submit an application to the Secretariat of the Postgraduate Program, which is forwarded to the Secretariat of the Department. The card is collected from the Directorate of Computerization (Mathematics building, tel. 210 7276450) upon presentation of the student ID. Students who have chosen another insurance provider can obtain this card from their insurance providers.

- **Academic identity (ID)**

Students receive their academic identity upon electronic application in a specially designed for this purpose information system

<http://academicid.minedu.gov.gr>. It is valid for the entire academic year and for as many years as the studies last. The academic card with the right to a reduced ticket is valid for full-time students of the first cycle of studies who do not already hold a university degree and for as many years as are required to obtain a degree, increased by two years. The ID card provides a 50% discount on urban transport in Athens and intercity transport to and from Athens, and 25% on urban transport in the rest of the country.

- **Accessibility for students with disabilities**

The courses of the MSc take place in the amphitheatres of the Department of Physiology and of the BSRC “Alexander Fleming”. Due to the nature of both institutions, full accessibility is offered to students with different abilities and requirements through adaptations to the environment and access services. The Medical School of Athens has a special Accessibility Unit for Students with Disabilities of the University of Athens. In order to better serve the students with disabilities, a consultant Professor of Physical Education has been appointed at the Medical School of the University of Athens, as well as a special employee at the Secretariat of the Medical School, to which the Postgraduate Program belongs.

More information: 210-725130, 210-7275687, email: access@uoa.gr, Website: <https://access.uoa.gr/en/>

- **Electronic services of the MSc**

The MSc has an independent website at <https://www.molecularbiomedicine.gr/>. The MSc website provides information about the Program of Studies, the Teaching Staff as well as the Directorate of the Postgraduate Program. Regular news and special announcements are provided through the New & Events tab of the website, while topographic information about the headquarters of the Postgraduate Program and instructions for contacting the Secretariat of the Postgraduate Program are provided.

As the MSc is part of the Postgraduate Program of the Medical School of the National and Kapodistrian University of Athens, it uses the electronic system of studies of the National and Kapodistrian University of Athens. With the new computerization system of the Secretariat of the Medical School, students are given the opportunity to monitor their student status online and make course registrations electronically. Also, through the university email given when registering in mystudies, they can receive updates and announcements from the general announcements folder (Announcement) and the central folder of the school (Med). In addition, the system enables faculty members to register directly, through a network, the grades of their students.

- **Students' Electronic address (Email)**

MSc e-mail: molecularbiomedicine@fleming.gr

The Electronic Mail Service provides students with an e-mail address in the form of username@med.uoa.gr. It also provides the infrastructure for sending messages to other internet users, storing messages on the University's server via IMAP protocol, accessing mail via Webmail (<https://webmail.noc.uoa.gr/>) and combating spam.



HELLENIC REPUBLIC

**National and Kapodistrian
University of Athens**

EST. 1837

in collaboration with:



"ALEXANDER FLEMING"
Biomedical Sciences Research Center

International MSc Molecular Biomedicine

Mechanisms of Disease, Molecular & Cellular therapies & Bioinnovation

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