**NATIONAL TECHNICAL UNIVERSITY OF ATHENS**

**SCHOOL OF ELECTRICAL AND COMPUTER ENGINEERING**

SCHOOL OF MECHANICAL ENGINEERING

INTERDISCIPLINARY POSTGRADUATE PROGRAM

**"TRANSLATIONAL ENGINEERING IN HEALTH AND MEDICINE "**

# Study Guide

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# 1. General Information

The School of Electrical and Computer Engineers and the School of Mechanical Engineers of the National Technical University of Athens (NTUA), in collaboration, have been organizing and operating since the academic year 2022-2023 the Interdisciplinary Postgraduate Program (IPGP) in the scientific field of "Translational Engineering in Health and Medicine" in accordance with the provisions of the founding decision (Government Gazette issue 1338, volume B, March 23, 2022) and the provisions of law 4485/2017 (Government Gazette A' 114) and law 4957/2022 (Government Gazette A' 141). The administrative support for the program is provided by the School of Electrical and Computer Engineers of NTUA.

## 1.1. Subject

In recent years, unprecedented changes have been taking place in the healthcare sector due to the convergence of life sciences with physical sciences and engineering. Rapid advancements in information and knowledge technologies, nanotechnology, and materials science, combined with progress in computational and simulation methods, have transformed biomedical research and clinical practice: many physiological and pathophysiological phenomena can now be quantitatively recorded and evaluated, while new revolutionary therapies have enabled the effective treatment of many diseases. The translation of science into innovative services and provisions has allowed for the quantification and personalization of clinical practice, as well as the empowerment of the patient, who can participate in both the recording of their data and the decision-making regarding their health. Consequently, the rapidly evolving interdisciplinary field of Translational Engineering in Health and Medicine has created a need for scientists with knowledge of Biomedical Science and Engineering, who will be pioneers in converting innovative technologies into commercial provisions and services with significant socio-economic impact in the healthcare sector.

The IPPS "Translational Engineering in Health and Medicine" initially aims to meet the needs for interdisciplinary postgraduate programs. These needs are also expressed by the increased percentage of Greek graduates attending such programs at foreign universities, with obvious economic consequences. The program aims to contribute to reversing this leakage of scientific and research potential abroad. Additionally, this IPPS aims to attract graduates from foreign universities for postgraduate studies at NTUA in the field of Translational Biomedical Engineering and Science.

The subject of the IPPS is to enhance scientific and technological research and generate new interdisciplinary knowledge in the field of Translational Engineering in Health and Medicine.

## 1.2. Goals

The postgraduate studies offered by the program aim to:

a) Deepen the methods and techniques of integrated interdisciplinary approaches, research, and addressing the partial issues of the subject of Translational Engineering in Health and Medicine for engineers, scientists of positive direction, and graduates of health sciences, so that personnel with specialized knowledge in the scientific areas of the programme are formed, capable of adequately addressing the increasing needs of private and public enterprises, organizations, and services of the country or other countries in the multidimensional issues of Translational Engineering in Health and Medicine.

b) Provide in-depth training for engineers, scientists of positive direction, and health scientists, and develop their research skills to enable them to produce new knowledge. A key characteristic of the Program is interdisciplinarity and interculturality in terms of teachers, students, learning subjects, and

problem-solving approaches. During the implementation of the Program, the collaborating Schools cooperate with other academic institutions and industrial partners of recognized standing.

The postgraduate studies in "Translational Engineering in Health and Medicine" aim to create specialized professionals who will be able to:

- Recognize, formulate, and solve complex problems in the healthcare sector by applying knowledge of mathematics, basic sciences, and engineering sciences in a biological or medical context.
- Analyze, design, and develop arrangements, systems, data, products, applications, services, and protocols for better diagnosis, treatment, and rehabilitation of diseases by applying modern tools and techniques.
- Combine knowledge of biomedical sciences and engineering sciences and apply their correct scientific, interpretive, and creative knowledge and skills to design and implement innovative integrated approaches to biomedical issues, taking into account global social, environmental, technological, and economic influencing factors.
- Communicate and effectively present complex interdisciplinary concepts of biomedical engineering and science through written reports and oral presentations to technical/non-technical and medical/non-medical audiences.
- Identify opportunities in the healthcare market for innovative technologies and products.
- Take leadership roles in innovation and entrepreneurship with the aim of possible exploitation of the results of biomedical research to promote health.
- Staff and take leadership roles in various sectors of the healthcare industry with increasing technological requirements.
- Create a collaborative and inclusive work environment by setting and achieving goals through organized task assignment.
- Work effectively as team members in different fields (research, scientific, business, etc.) of the healthcare sector.
- Produce new knowledge as a result of their in-depth training.
- Continue into further research as doctoral candidates with the necessary enhanced knowledge background.

## 1.3. Categories of Applicants

The IPPS admits graduate engineers, graduates of departments of exact sciences or health sciences (e.g., Electrical and Computer Engineers, Mechanical Engineers, Chemical Engineers, Computer Science, Physics, Chemistry, Medicine, Biology, Molecular Biology, Biochemistry, Pharmacy, Dentistry, Biotechnology, Bioinformatics, Nursing, and others), provided they meet all the criteria for successful completion of the courses. The program accepts graduates from domestic universities or recognized equivalent institutions abroad, as defined by the Interdisciplinary Organization for the Recognition of Academic Titles and Information (DOATAP), in accordance with Law 4957/2022.

## 1.4. Required Documents

The necessary documents to be submitted by interested candidates include:

1. Bachelor's and master's degree certificates. Candidates who come from foreign universities submit their bachelor's degree, which is verified according to the criteria of Law 4957/2022 in the National Register of Study Titles of Recognized Institutions - DOATAP (doatap.gr). Candidates who have not graduated at the time of their application must submit a sworn statement of completion

of their studies. The statement must be accompanied by a certificate from the originating school, which will specify the outstanding obligations of the candidates for completing their studies.

2. Copies of detailed course transcripts from undergraduate and graduate studies with degree grades.
3. English language proficiency certificate (at least B2 level), as evidenced by possession of a degree from an English-speaking country or a certificate of proficiency in English (Toefl, IELTS, University of Michigan, University of Cambridge, etc.). Candidates selected for interview are expected to demonstrate good knowledge of the English language.
4. Two recommendation letters. Recommendation letters are submitted electronically through the application platform (as outlined in section 1.6 Application Procedure, following). When submitting the application, candidates are required to provide the details of two individuals from whom they will receive recommendations. For most candidates, recommendations may come from two members of the academic staff of the originating institution who have taught them at the undergraduate level and who, preferably, can comment on subjects or skills relevant to the MSc program. If candidates have been out of tertiary education for more than four years, one recommendation letter may come from their professional field.
5. Full curriculum vitae in English (maximum 2 pages), including information about the candidate's education, as well as their research and professional interests and activities.
6. One-page statement of interest, in English, outlining the candidate's motivations for applying to the MSc program in relation to their interests.
7. Evidence of research experience (if applicable). Candidates may submit copies of publications of works in scientific journals or conferences or/and brief articles resulting from their undergraduate research work, in English.
8. Simple photocopy of the identity card or passport.

## 1.5. Selection Criteria

Applications are evaluated on the basis of each candidate's overall experience, skills, personal qualities, and potential, with the objective of forming a cohort of students with diverse experiences and backgrounds who are able both to benefit from and to contribute to the rigorous interdisciplinary curriculum of the Interdepartmental Master's Programme in Translation. The Selection Committee also takes into consideration the candidates' academic potential, their career objectives—which should align with the aims of the IPPS—as well as their leadership potential.

Specific selection criteria taken into account include:

- The overall grade of the undergraduate degree.
- The ranking of the degree grade in relation to the grades of other graduates in the same School/Department and academic year.
- The grades in undergraduate courses relevant to the MSc program.
- Performance and subject of the thesis, where applicable at undergraduate level.
- Any other relevant postgraduate degrees related to the subject of the MSc program.
- The candidate's research, professional, or technological activity.
- Documentation of sufficient English language proficiency.

- Recommendation letters.
- If the candidate is employed, the needs and prospects of the organization from which they originate.

The program does not discriminate based on race, color, religion, national origin, gender, sexual orientation, age, or disability. The anti-discrimination policy applies to all phases of the candidate selection process as well as to all aspects of the educational process.

## 1.6. Application Procedure

Postgraduate candidates must register as users at gradapply.ece.ntua.gr/register and then submit their application electronically at gradapply.ece.ntua.gr along with the necessary documentation.

All supporting documents must be received by the applicable deadline to be considered. Successful candidates will be asked to submit, on the day of registration, copies of all necessary supporting documents submitted electronically.

If the certificates originate from countries that are parties to the Hague Convention (Apostille Convention), all certificates must bear the Apostille stamp. For countries that are not parties to the Hague Convention, certificates issued abroad must be authenticated by the relevant Consulate (consular legalization).

If deemed appropriate by the selection committee, candidates may be called for an interview.

Candidates are informed electronically about the results of the evaluation of their application.

## 1.7. Number of Admitted Students

The total number of admitted postgraduate students each year in the MSc program "Translational Engineering in Health and Medicine" is set at a maximum of forty (40).

## 1.8. Studies

To obtain the Specialized Postgraduate Diploma (Master's Degree), students must attend and successfully pass courses totaling at least 60 ECTS credits and complete and successfully defend the Master's Thesis, equivalent to an additional 30 ECTS credits. The Study Program is full-time and consists of two semesters of courses and one semester of Master's Thesis work. The minimum duration of studies is 2 academic semesters, and the maximum duration of enrollment is 2 years, including the completion of the Master's Thesis.

## 1.9. Technical Infrastructure

The necessary technical infrastructure (lecture halls, laboratories, libraries, computers) is provided by the collaborating Schools. The Program's Study Committee recommends to the competent bodies of the NTUA the necessary measures to strengthen this infrastructure and to find the necessary resources for acquiring or renewing the program's technical infrastructure.

### 1.10. Participation Cost

Students from non-EU countries are required to pay tuition fees for operational expenses, which are set at €500 per semester. Tuition fees are paid at the beginning of each semester in one installment.

### 1.11. Useful Links

IPPS Website: https://masterteam.ntua.gr/

Regulations of the IPPS: Government Gazette 1183/B'/19.02.2024

Contact - Administrative Services: Information, news, announcements, and forms for the MSc Program are posted on the program's website:: https://masterteam.ntua.gr/news

## 2. Organization and Administration

### 2.1. Organizational Framework

The MSc program "Translational Engineering in Health and Medicine" is organized and implemented in collaboration with the Schools of Electrical and Computer Engineering and Mechanical Engineering of the National Technical University of Athens (NTUA). The School of Electrical and Computer Engineering is the coordinating school.

**National Technical University of Athens (NTUA)**

The National Technical University of Athens (NTUA) was founded in its initial form as the "School of Arts" in 1836, almost simultaneously with the establishment of the modern Greek state. It evolved (1887, 1917) following the standards of the "Continental" European education system for engineers, with a strong theoretical background of studies and a five-year regular duration of attendance. Through the seamless unity of education and research, its primary institutional mission is to provide high-quality higher education and promote science and technology. An NTUA diploma is equivalent to a "Master of Science" (M.Sc.) or "Master of Engineering" (M.Eng.) in the Anglo-Saxon education system.

According to the institution's dominant strategic choice of maintaining and enhancing its position as a distinguished university in the international arena of science and technology, NTUA, with its emblem being Prometheus the Firebearer, considers the human factor as the measure and emphasizes parameters such as quality of life and the protection of democratic rights and achievements. It completes its mission by developing the broader personal and social virtues of both educators-researchers and students. In this context, it cultivates skills for autonomous access to knowledge, synthesis, research, communication, collaboration, and personnel and project management, fostering integrated personalities that not only possess renewable scientific and technological knowledge but also know how to "stand" as scientists and "exist" as conscious-responsible citizens, offering an unreserved and effective contribution to addressing the scientific and technological, social, cultural, and other broader developmental needs of the country as a priority, as well as those of the international community.

**School of Electrical and Computer Engineering**

The School of Electrical and Computer Engineering (SECE) is one of the nine Schools of the NTUA. In 1975, the School of Mechanical and Electrical Engineering of NTUA was divided into the School of Mechanical Engineering and the School of Electrical Engineering. In 1991, the School of Electrical Engineering, which included the rapidly developing areas of Computer Science and Computer Engineering, was renamed to

the Department of Electrical and Computer Engineering, and subsequently, upon a decision by the NTUA Senate, to the School of Electrical and Computer Engineering.

SECE covers the areas of Power Systems, Telecommunication Systems, Electronic Applications, various scientific areas of applications, as well as Computer Science and Computer Engineering. The undergraduate program of SECE is five years long and leads to a Diploma in Electrical and Computer Engineering. Postgraduate studies in SECE lead to a Doctoral Diploma in Electrical and Computer Engineering. SECE has extensive participation in numerous national and European research and development programs.

The School is organized into seven sectors: the Sector of Electromagnetic Applications, Optics and Electronic Materials, the Sector of Information Transmission Systems and Materials Technology, the Sector of Signals, Control, and Robotics, the Sector of Computer Technology and Computer Science, the Sector of Communications, Electronics, and Information Systems, the Sector of Power Systems, and the Sector of Industrial Electrical Installations and Decision Systems.

The Sector of Electromagnetic Applications, Optics, and Electronic Materials coordinates the cognitive subjects: theory and applications of electromagnetic fields, wave propagation in wireless communication systems, plasma and electron beams, structure, properties, and applications of electronic and optoelectronic materials, electromagnetic propagation in nonlinear media, nonlinear optics, biomedical optics, and applied biophysics.

The Sector of Information Transmission Systems and Materials Technology coordinates the cognitive subjects: wireless communication systems and information transmission, radar, radiometry, and telematics, microwave and optical communications, mobile radio communications, material technology, and biomedical technology.

The Sector of Signals, Control, and Robotics coordinates the cognitive subjects: signal processing, system analysis and design, control systems, robotics, automation, machine learning, computer vision, and speech technology.

The Sector of Computer Technology and Computer Science coordinates the cognitive subjects: computation theory, hardware, software, computer systems, information systems, human-computer interaction systems.

The Sector of Communications, Electronics, and Information Systems coordinates the cognitive subjects: communication systems and services, information theory, communication and computer networks, electronics, microsystems, distributed information systems, mobile and personal communications, multimedia tools and content.

The Sector of Power Systems coordinates the cognitive subjects: electric machines, power systems, high voltages, power electronics, photovoltaics, industrial electronics, analysis/management of industrial electrical networks, economic analysis of energy and environmental systems.

The Sector of Industrial Electrical Installations and Decision Systems coordinates the cognitive subjects: electrical measurement systems, industrial and building electrical installations, control of electrical machines and propulsion systems, management and decision systems, support systems for energy and environmental policy.

**School of Mechanical Engineering**

Following the establishment of the National Technical University of Athens (1836), during the period 1844-1862, an additional Higher School was created, more technical courses were introduced, and the Mechanical Workshop was established, known as the "Ironworking Factory". In 1887, 3 four-year Schools were founded: Civil Engineers, Mechanical Engineers, and Surveyors-Site Engineers. In 1914, the

Institution included the School of "Engineers and Mechanical Engineers," as the School of Mechanical Engineers was renamed, along with 3 more Schools. In 1917, the Higher School of Mechanical Engineers was transformed into the Higher School of Mechanical and Electrical Engineers, and 2 more Schools were established. In 1963, the Department of Production Engineering was established in the School of Mechanical Engineers, and in 1968 the Department of Naval Engineers was founded. In 1975, the School of Mechanical and Electrical Engineers was divided into two independent Schools. With the implementation of the Framework Law for Universities, in 1982, the Department of Naval Engineers was separated from the School of Mechanical Engineers. Additionally, in 1983, with the implementation of the Framework Law for Universities, the six Departments of the School were established, which exist to this day, and in 1988 the scientific subjects of the Departments were determined, which have remained unchanged since then. In 1990, the 14 Laboratories and Workshops of the School, which existed at that time, were distributed among the Departments. In 1986, the study programs "Energy" and "Construction Engineer" were created in the School, in addition to the existing program "Production Mechanical Engineer". In 1990, the program "Aeronautical Mechanical Engineer" was added to these, which in 2000 was expanded and renamed to "Mechanical Engineer of Aerial and Ground Transport Means". Today, the above 4 study programs still exist and give students the opportunity to partly determine the focus of their five-year studies. Additionally, since 1999, the School participates in 14 Interdepartmental Postgraduate Programs, in two of which as a leading institution. The School of Mechanical Engineers is organized in the following six departments: Department of Industrial Management & Business Research, Department of Thermodynamics, Department of Mechanical Constructions & Automatic Control, Department of Nuclear Technology, Department of Fluids, and Department of Processing Technology.

## 2.2. Administration

**Leading School**
The leading School of the Interdepartmental Postgraduate Program "Translational Biomedical Engineering and Science" is the School of Electrical and Computer Engineering of NTUA, which collaborates with the School of Mechanical Engineering of NTUA. The administrative support for the program is provided by the School of Electrical and Computer Engineering of NTUA.

**Director:**
Konstantina Nikita, Professor, School of Electrical and Computer Engineering, NTUA

**Program of Studies Committee (PSC):**
Marios Anagnostakis, Professor, School of Mechanical Engineering, NTUA

Christos Manopoulos, Associate Professor, School of Mechanical Engineering, NTUA

Georgios Matsopoulos, Professor, School of Electrical and Computer Engineering, NTUA

Konstantina Nikita, Professor, School of Electrical and Computer Engineering, NTUA

Athanasios Voulodimos, Assistant Professor, School of Electrical and Computer Engineering, NTUA

**Coordinating Committee (CC):**
Marios Anagnostakis, Professor, School of Mechanical Engineering, NTUA

Christos Manopoulos, Associate Professor, School of Mechanical Engineering, NTUA

Georgios Matsopoulos, Professor, School of Electrical and Computer Engineering, NTUA

Konstantina Nikita, Professor, School of Electrical and Computer Engineering, NTUA

Athanasios Voulodimos, Assistant Professor, School of Electrical and Computer Engineering, NTUA

**Chair of the Programme Studies Committee:**
Konstantina Nikita, Professor, School of Electrical and Computer Engineering, NTUA

**Registrar of the School of Electrical and Computer Engineering:**
Panagiotis Tsanakas, Professor, School of Electrical and Computer Engineering, NTUA

**Secretariat of the School of Electrical and Computer Engineering:**
Effrosyni Kanta, Administrative Staff
**Secretariat of the IPPS:**

Emilia Kougkoulou, Administrative Staff

Office Γ.2.3, 2nd Floor, New Electrical Engineering Building, NTUA

Contact Number: (+30) 210 772-3859

Email: masterteam-info@ece.ntua.gr

## 2.3. Instructors

The teaching duties of the Postgraduate Programs (PGPs) are assigned, upon decision of the Curriculum Committee (CC) of the PGP, to members of the Teaching and Research Staff (TRS), members of the Special Teaching Staff (STS), Laboratory Teaching Staff (LTS), and Special Technical Laboratory Staff (STLS) of the participating and other Schools of NTUA or other Higher Education Institutions (HEIs), honorary Professors or retired members of TRS of the participating Schools or other Schools of the same or other HEIs, collaborating professors, appointed instructors, visiting professors or visiting researchers, researchers and specialized operational scientists of research and technological organizations or other research centers and institutes in Greece or abroad, as well as scientists of recognized stature, who possess specialized knowledge and relevant experience in the subject matter of the PGP. The selected instructors are renowned scientists and have extensive experience in the treatment of the respective subjects, with extensive provision of relevant teaching work, supervision of relevant diploma theses and doctoral dissertations, production of relevant publications in international journals and conferences, and participation in relevant research projects (funded and non-funded).

**Table 1.** Teaching Staff of IPPS

| NAME | INSTITUTION |
|---|---|
| Georgios Alexandridis | Assistant Professor, School of Physical Sciences, National and Kapodistrian University of Athens (NKUA) |
| Marios Anagnostakis | Professor, School of Mechanical Engineering, National Technical University of Athens (NTUA) |
| Hypatia Anagnostopoulou | Associate Professor, School of Medicine, National and Kapodistrian University of Athens (NKUA) |
| Panagiotis Vartholomaios | Assistant Professor, School of Electrical and Computer Engineering, National Technical University of Athens (NTUA) |
| Athanasios Voulodimos | Assistant Professor, School of Electrical and Computer Engineering, National Technical University of Athens (NTUA) |
| Spyretta Golemati | Associate Professor, School of Medicine, National and Kapodistrian University of Athens (NKUA) |

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| Ioannis Delis | Assistant Professor, School of Electrical and Computer Engineering, National Technical University of Athens (NTUA) |
| Dimitrios Koulocheris | Professor, School of Mechanical Engineering, National Technical University of Athens (NTUA) |
| Christos Manopoulos | Associate Professor, School of Mechanical Engineering, National Technical University of Athens (NTUA) |
| Petros Maragos | Professor, School of Electrical and Computer Engineering, National Technical University of Athens (NTUA) |
| Angelos Markopoulos | Associate Professor, School of Mechanical Engineering, National Technical University of Athens (NTUA) |
| Georgios Matsopoulos | Professor, School of Electrical and Computer Engineering, National Technical University of Athens (NTUA) |
| Effie Bastounis | Researcher, Head of “Infection Biomechanics“ group, Interfaculty Institute of Microbiology & Infection Medicine (IMIT), University of Tübingen, Germany |
| Konstantina Nikita | Professor, School of Electrical and Computer Engineering, National Technical University of Athens (NTUA) |
| Vasilis Papakonstantinou | Vice Chairman, MIT Enterprise forum Greece |
| Ourania Petropoulou | Member of Teaching and Research Staff (EDIP), School of Electrical and Computer Engineering, National Technical University of Athens (NTUA) |
| Ioannis Poulakakis | Associate Professor, School of Mechanical Engineering, National Technical University of Athens (NTUA) |
| Nikolaos Protonotarios | Research Scientist, Mathematics Research Center (MaRC) of the Academy of Athens |
| Anastasios Raptis | Laboratory Teaching Staff, School of Mechanical Engineering, National Technical University of Athens |
| Vasileios Spitas | Professor, School of Mechanical Engineering, National Technical University of Athens (NTUA) |
| Georgios Stamatakos | Researcher Grade A', Institute of Communication and Computer Systems, National Technical University of Athens (NTUA) |
| Georgios Stamou | Professor, School of Electrical and Computer Engineering, National Technical University of Athens (NTUA) |
| Konstantinos Tzafestas | Professor, School of Electrical and Computer Engineering, National Technical University of Athens (NTUA) |
| Evgenia Giannini | Assistant Professor, School of Applied Mathematical and Physical Sciences. NTUA |
| Goni Toyia | Dr., Foreign Languages Center, NTUA |

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|---|---|
| Nikolaos Chronis | Professor, School of Chemical Engineering, National Technical University of Athens (NTUA) |

As part of the "Life Sciences for Engineering" course for the winter semester of 2025–2026, a series of lectures has been scheduled and is being held in collaboration with the following faculty members and researchers from the School of Medicine of the National and Kapodistrian University of Athens:

Dr. Nefeli Lagopati, Assistant Professor, Department of Biology-Nanomedicine, Medical School, NKUA

Dr. Angelos Papaspyropoulos, Assistant Professor, Laboratory of Histology and Embryology, Medical School, NKUA

Dr. Effie Bastounis, Group Leader, Interfaculty Institute for Microbiology and Infection Medicine, Eberhard Karls University &. University Hospital Tübingen

Dr. Dimosthenis Chrysikos, Assistant Professor, Department of Anatomy, Medical School, NKUA

Dr. Athanasios Kotsinas, Associate Professor, Laboratory of Histology and Embryology, Medical School, NKUA

Dr. Sofia Havaki, Associate Professor, Laboratory of Histology and Embryology, Medical School, NKUA

Dr. Clio Mavragani, Professor of Physiology/Clinical Physiology, Head of Department of Physiology, Medical School, NKUA

Dr. Nikolaos Pappas, MSc, Department of Anatomy, Medical School, NKUA

Dr. Dimitrios Toumpanakis, MD PhD, Assistant Professor of Critical Care and Pulmonary Medicine, Medical School, NKUA

Dr. P. Vassiliou, PostDoc Researcher, Laboratory of Histology and Embryology, NKUA

Dr. C. Davos, Associate Professor Cardiovascular Diseases, Biomedical Research Foundation Academy of Athens (BRFAA)

Dr. S. Spyrakos, Pediatric Surgeon, Laboratory of Histology and Embryology, Medical School, NKUA

Dr. Georgios Tsakotos, Assistant Professor, Department of Anatomy, Medical School, NKUA

Dr. Mara Simopoulou, Professor of Physiology-Clinical Embryology, Department of Physiology, Medical School, NKUA

Dr. Konstantinos Palikaras, Assistant Professor, Department of Physiology, Medical School, NKUA

Dr. Anastassios Philippou, Professor, Department of Physiology, Medical School, NKUA

# 3. Regulation of Studies

## 3.1. Program of Studies

- The MSc program awards a Master's Degree in Translational Engineering in Health and Medicine upon successful completion of the relevant course of study.
- The Program consists of two (2) semesters of courses and one (1) semester of completion of the master's thesis. To obtain the MSc degree, students are required to attend and pass examinations in 12 courses (7 compulsory core courses and 5 elective courses) totaling 60 European Credit Transfer and Accumulation System (ECTS) credits. Additionally, the completion and successful defense of the master's thesis equate to 30 ECTS credits. The redistribution of courses in the MSc program may be made by decisions of the competent bodies.
- The courses (compulsory and elective) taught each academic year are determined by decisions of the competent bodies and are listed in the Study Guide and in the "Courses" section of the program's website (https://masterteam.ntua.gr).
- The language of instruction for the courses is English.
- The language of writing for the Master's Thesis is English.

## 3.2. Course attendance and student assessment

- Attendance in classes and participation in related educational activities and assignments are mandatory. In cases of extremely serious and documented reasons for absence, the Programme Studies Committee (PSC) may justify certain absences, the maximum number of which cannot exceed 1/3 of the lectures of a course. A postgraduate student who has not completed the required number of attendances in a course has the right to repeat the course (or another equivalent one determined by the PSC) during the next and final academic year of studies.
- The grading in courses is done on a scale of 0-10, without fractional parts, with a minimum passing grade of 5. The course grade is determined not only by the final examination but also significantly by the performance in applied teaching methods (labs, computer labs, seminars, fieldwork, projects, group work with personal presentations) adopted during the course, with a relative weight determined for each course by the responsible instructor, which cannot be less than 30% of the total course grade. It is clarified that only the grade of the Master's Thesis, given by the individual examiners and as an average, may include half a fractional unit.
- The final examination takes place after the end of the teaching period of the academic semester, during a two-week examination period, in accordance with the Unified Academic Calendar of the Institution's Postgraduate Studies and the specific decisions of the PSC.
- There is no provision for a resit examination. In exceptional cases, the PSC may, with its documented decision, accept an additional extraordinary examination for up to two (2) courses per student per academic year, if the postgraduate student was unable to take the examination due to force majeure. The PSC may also, in exceptional cases, schedule resit examinations.
- Students who fail in courses can re-register for the same (or different if elective) courses the following year.

  If a postgraduate student fails in the examination of up to two courses, so that according to the provisions of these Regulations it is considered that they have not successfully completed the

program, they may be examined following a documented decision of the PSC, upon their request, by a three-member committee of School Faculty members, who have the same or related subject matter expertise as the course under examination and are appointed by the PSC of the MSc program. The instructors of the course are excluded from the committee.

- Classes that were not conducted must be rescheduled to ensure that the number of 13 educational weeks for all courses is completed. The rescheduling is decided and announced by the PSC of the MSc program, ensuring compliance with the academic calendar, as far as possible.

## 3.3 Academic Counselor

Upon admission, each postgraduate student is assigned a dedicated academic advisor by the Programme Studies Committee, based on the student's area of specialization. The advisor guides students throughout their studies — from selecting elective courses to monitoring academic progress and addressing any prerequisites — while also directing them, where appropriate, to NTUA's Structure for Support of Social and Student Welfare for psychological support. Students are encouraged to reach out to their advisor at any time to discuss challenges, seek guidance, or explore their academic and professional goals. It is worth noting that the academic advisor is not necessarily the thesis supervisor, and any faculty member teaching in the program may take on this role.

## 3.4. Master's Thesis

- The undertaking of the Master's Thesis (MT) can take place after the end of the 2nd semester of the first year of studies, provided that the postgraduate student has successfully completed at least half of the postgraduate courses required for the acquisition of the Master's degree by that time. For postgraduate students who re-enroll for courses of the 1st or 2nd semester in the following year, the decision for the undertaking of the MT is made by the Postgraduate Studies Committee (PSC) from the beginning of the 2nd academic year of studies.
- The postgraduate student submits an application, including the proposed title of the MT, the proposed supervisor, and an abstract of the proposed work. The supervision of the MT is assigned to instructors (members of the Faculty, emeritus Professors or retired members of the Faculty, collaborating professors, appointed instructors, visiting professors or visiting researchers) of the MSc. The PSC, based on the application, appoints the supervisor of the MT and constitutes a three-member examination committee for the evaluation and approval of the work.
- The three-member examination committee is constituted following a proposal by the supervisor and includes the supervisor and two other members of the Faculty, at least one of whom is a teacher of the MSc. The members of the examination committee must have the same or related scientific expertise as the subject of the MSc.
- With the proposal of the supervisor, doctoral scientists, doctoral candidates, and other scientific collaborators of the NTUA or invited instructors from outside the NTUA may assist in the elaboration of the MT. It is also possible for auxiliary technical staff (Teaching or Research Fellows, Special Technical Laboratory Staff, Teaching and Research Staff, etc.) to participate, if required.
- The grading of the MT results from the average of the grades of the three examiners on a scale of 1-10 and is rounded to the nearest half unit, based on a minimum pass grade of 5.5 (five and fifty percent). The PSC establishes uniform evaluation criteria for the MT.

- The text of the MT is composed in the English language with text processing in the letterhead of the approval of the PSC, is submitted electronically but also in printed form if requested by the examination committee and the Library of NTUA, and includes a table of contents, references, and an abstract of 300 to 500 words. After the approval of the MT by the Examination Committee, the postgraduate student is obliged to deposit an electronic file of the work in the Central Library of NTUA, to submit electronically the file of the work to the Institutional Repository of NTUA and to the Repository of the School of Electrical and Computer Engineering. MTs approved by the Examination Committee are posted on the website of the MSc.
- If the MT is not successfully completed within the 3rd semester of studies, it may continue for one more academic period. In this case, the postgraduate student is obliged to submit a progress report of the MT, with a detailed description of the actions taken, a detailed timetable of the next significant steps, and the expected completion date of the MT. The progress report of the MT is co-signed by the postgraduate student and the supervisor and is submitted to the PSC for consideration.

## 3.5. Awarding of Specialized Postgraduate Diploma (Master's Degree)

- For the award of the MSc, successful attendance and examination in the prescribed number of postgraduate courses and successful completion and examination of the MT are required. If this is not achieved within the maximum prescribed duration of studies, the postgraduate student receives a simple certificate of attendance for the postgraduate courses in which they have been successfully examined.
- The overall grade of the MSc is determined as the weighted average of the grades of the postgraduate courses and the MT, which is considered equivalent to one (1) semester of courses.
- Once a year, specifically in November, the Secretariat of the graduating School prepares a list of graduates including those who have successfully completed all the obligations of the MSc by the end of the academic year. The degrees are awarded annually by the graduating Schools, in a special ceremony, by the Chancellor of the graduating School and the Director of the MSc.

## 3.6. Student Mobility - Scholarships

The MSc program "Translational Engineering in Health and Medicine" offers selected students opportunities for internships at the Department of Biomedical Engineering of Columbia University in the city of New York (CU), with the support of the Bodossakis Foundation.

The internship takes place during the summer and lasts for 1-2 months. The internship topics offered include Medical Imaging, Biomechanics, Tissue Engineering, and Neuroengineering.

Interested students, invited to apply at the beginning of the spring semester, are asked to express their interest in an internship at Columbia University by sending an email to masterteam-info@ece.ntua.gr, including a recent curriculum vitae (up to 2 pages) and a statement of purpose (up to 1 page) indicating their preferred topic.

The evaluation of applications is carried out by a selection committee appointed by the Program of Studies (EPS), based on the curriculum vitae and the statement of purpose, as well as the performance of students

in the courses of the MSc program during their first semester of studies. Candidates selected and included in the shortlist are invited to an interview conducted by professors from the NTUA and CU.

For the final selection among candidates, the interview is evaluated, taking into account the total amount of available funding and the number of positions offered in the receiving laboratories of Columbia University.

The internships of the students are supported by scholarships provided by the Bodossakis Foundation and Columbia University. Scholarships cover travel expenses (ticket, visa issuance, etc.) and accommodation at the Guest Housing of Columbia University.

In addition, postgraduate students can complete their Master's Thesis for an academic semester abroad either (a) within the framework of cooperation with Columbia University, (b) within the framework of the Erasmus+ program for studies at a Higher Education Institution in a program country, where an Erasmus Charter for Higher Education has been awarded, or (c) within the framework of academic collaborations established by the MSc program with research bodies, organizations, NGOs, public and private sector companies, or Higher Education Institutions in Greece and abroad.

## 3.7. Duration of Enrollment

- The minimum duration of study in the MSc program is 3 academic semesters, and the maximum duration of enrollment is 2 years.
- In exceptional cases, where a postgraduate student successfully completes the requirements for obtaining the MSc in a period shorter than the minimum prescribed duration of the MSc program, but in any case not less than one (1) year, the Postgraduate Studies Committee (PSC) may, by decision, recommend to the Senate of the NTUA the award of the MSc degree.
- The maximum length of stay in the MSc program, calculated from the regular registration, is two (2) years. Upon completion of the second year, the PSC decides to terminate the enrollment and issues a certificate with the courses and the corresponding grades in which the student has been successfully examined. As an exception, in special cases, a small extension of up to one (1) additional year may be granted, following a justified decision of the PSC.
- Postgraduate students have the option to temporarily suspend their studies with a written request, for a period not exceeding two (2) consecutive semesters. The semesters of suspension of student status are not counted towards the prescribed maximum duration of regular enrollment.

## 3.8 Extension, Interruption and Termination of Studies

As stated in section 3.7, the maximum duration of study in the Master's Program, calculated from the date of initial enrollment, is two (2) years. In special cases, an extension of no more than one (1) year may be granted, following a reasoned decision by the PSC. A prerequisite for granting the extension is that the student has not exercised the right to temporarily suspend their studies, in accordance with the following paragraph, and is able to demonstrate significant progress in the preparation of the Master's Thesis during the standard two-year period of study, as certified by the advisor.

In the event that there are exceptionally serious and documented reasons preventing a graduate student from attending the program, they may apply to the PSC for a temporary suspension of their studies for a period not exceeding two (2) consecutive semesters. The request may be granted provided that the

graduate student has already completed the first semester of study and has successfully passed at least two (2) courses. The PSC decides whether to accept the request, as well as the duration of the suspension, which does not count toward the maximum duration of regular study. The option to temporarily suspend studies may be exercised only once during a student's enrollment in the Program.

During the first-semester examinations, the graduate student must receive a passing grade in at least two (2) courses in order to continue their studies in the second semester. Similarly, graduate students must receive a passing grade in at least two (2) courses in the second semester to be eligible to continue their studies in the third semester. Otherwise, the student is dismissed from the Program and is issued a certificate of attendance for the courses in which they received a passing grade.

If a student fails a course examination during their second year in the Program, there is, in principle, no provision for a retake. As an exception, in the case of failure in up to two (2) courses, and upon the student's request, an evaluation may be conducted by a three-member committee of faculty members specializing in the same or a related field as the course in question, appointed by the PSC. The course instructor(s) may be excluded from the committee at the student's request. This option is available only once, and the outcome of the evaluation is final.

Failure by a student to successfully complete their course requirements during the second year of enrollment results in dismissal from the Program, with the issuance of a certificate of attendance for the courses in which they have received a passing grade.

The PSC decides on the termination of enrollment in the Program in cases of serious misconduct, such as academic dishonesty, false attendance claims, inappropriate academic conduct, or similar violations.

# 4. Program of Studies

## 4.1. Organization of Courses

The IPPS consists of two (2) semesters of courses and one (1) semester for the completion of the Master's Thesis (MT). To obtain the MSc degree, students are required to attend and successfully pass 12 courses (7 compulsory courses and 5 elective courses out of the 7 offered) totaling 60 European Credit Transfer and Accumulation System (ECTS) credits, while the completion and successful defense of the MT is equivalent to 30 ECTS credits. The distribution of credits per semester is presented in Table 2.
The detailed curriculum of the MSc program "Translational Engineering in Health and Medicine" is provided in Tables 3 and 4.
It is noted that during the first semester of studies, students who are Engineers or graduates of departments of natural sciences attend the course "Life Sciences for Engineering", while students who are graduates of health science departments attend the course "Engineering for Biomedicine". The remaining three compulsory courses are common for all students.

**Table 2.** Courses/MT and Credits (ECTS) per Semester of Study

| FIRST SEMESTER | |
|---|---|
| COURSES | **ECTS** |
| COMPULSORY COURSES (4) | 20 |
| ELECTIVE COURSES (2) | 10 |
| TOTAL SEMESTER (6 courses total) | **30** |
| | |
| SECOND SEMESTER | |
| COURSES | **ECTS** |
| COMPULSORY COURSES (3) | 15 |
| ELECTIVE COURSES (3) | 15 |
| TOTAL SEMESTER (6 courses total) | **30** |
| | |
| THIRD SEMESTER | |
| MASTER'S THESIS | **ECTS** |
| COMPLETION OF MASTER'S THESIS | 30 |
| | |
| OVERALL TOTAL | **90** |

**Table 3.** Winter Semester Courses

| Course Code | Course | ECTS |
|---|---|---|
| | **COMPULSORY** | |
| 1000 | Life Sciences for Engineering* | 5 |
| 1001 | Engineering for Biomedicine** | 5 |
| 1002 | Biostatistics and Machine Learning | 5 |
| 1003 | Biosignal acquisition and processing | 5 |
| 1004 | Research methodology | 5 |
| | **ELECTIVE (choose 2 out of 3)** | |
| 1100 | Translational bioinformatics | 5 |
| 1101 | Biomechanics | 5 |
| 1102 | Biodesign fundamentals | 5 |

**Table 4. Spring Semester Courses**

| Course Code | Course | ECTS |
|---|---|---|
| | **COMPULSORY** | |
| 1005 | Biomedical imaging and image analysis | 5 |
| 1006 | Computational modeling and simulation for medicine | 5 |
| 1107 | Artificial Intelligence in healthcare | 5 |
| | **ELECTIVE** (**choose 3 out of 4**) | |
| 1103 | BioMacroElectroMechanical Systems (BioMEMS) | 5 |
| 1104 | Introduction to neuroscience and neural engineering | 5 |
| 1105 | Healthcare robotics | 5 |
| 1106 | Biodesign innovation process*** | 5 |

* Compulsory course for Engineers and graduates of STEM field
**Compulsory course for graduates of health sciences
***Prerequisite: Biodesign Fundamentals

## 4.2. Course Content

**Winter Semester Courses**

***Life Sciences for Engineering***

An introductory outline of the basic anatomy and physiology of the human body for engineers. The objective of this course is to present the various levels of structural organization of the body, from chemical through cellular and tissue organization to organ, system, and whole body structure and function. The role of physical principles and phenomena as they are known to exist and apply to living systems will be highlighted in engineering terms. The aim is to (i) develop a quantitative intuition of biological systems; (ii) understand how principles in engineering can be used to study biological processes; and (iii) understand the relationships between structure and function at different size and time scales. Guest lectures will include engineers and medical scientists to discuss the relationship between recent advances in biomedical engineering and the underlying anatomy and physiology.

Instructors: Y. Anagnostopoulou, S. Golemati, K. Nikita

***Engineering for Biomedicine***

The course is mandatory for Health Sciences graduates and provides an overview of the fundamental concepts and principles of engineering as it applies to biology, medicine, and healthcare. Basic principles of mathematics, computational thinking, physics, mechanics, mechanical design, and electronics will be covered, along with medical use cases, so as to achieve an understanding of advanced technological achievements in healthcare and medicine. A problem-based introduction to building algorithms and data structures to solve problems in medicine and healthcare with a computer will also be provided. The course will include an introduction to (i) Matlab, as a standard tool to the fundamentals of computer programming and (ii) Python, via Google's Colaboratory (Colab) and DataCamp, focusing on the analysis and visualization of biomedical data. The course will empower those with non-engineering backgrounds with the knowledge required to critically evaluate and use these technologies in healthcare and medicine.

Instructors: S. Golemati, I. Delis, Ch. Manopoulos

***Biostatistics and Machine Learning***

This course provides an introduction to statistical methods used in biological and medical research. Elementary probability theory, basic concepts of statistical inference, regression and correlation methods, and sample size estimation are covered, with emphasis on applications to medical problems. New statistical techniques for both predictive and descriptive learning as applied to the rapidly growing in amount and complexity data collected in imaging, genomic, health registries, wearables are also covered. Machine learning algorithms for classification and prediction, particularly useful for big and complex data, will be presented. Topics include principles of supervised learning, including Bayesian classifiers, decision trees, regression models, support vector machines (SVMs), as well as principles of unsupervised learning, including clustering and density estimation.

Instructors: M. Anagnostakis, A. Voulodimos, G. Alexandridis

***Biosignal acquisition and processing***

In this course, students learn about different physiological signals of electrical type such as Electrocardiography (ECG), Electroencephalography (EEG), Electromyography (EMG), and of non-electrical type such as blood pressure, blood flowrate, cardiac output, cardiac rate, heart sound, respiratory rate, blood PH, plethysmography, blood gas analysis, etc. Students learn the origins of the biosignals, how they are collected and measured, what kind of sensor technology is required, and how they are analyzed. Signal processing techniques for different types of biosignals are discussed, including

preprocessing for the removal of artifacts, coding, feature extraction, and modeling. The course includes hands-on sessions aiming to program these techniques in Matlab/Python, apply them to biomedical signals, and critically evaluate their performance.

Instructors: G. Matsopoulos, O. Petropoulou

***Research methodology***

This course provides an opportunity for students to establish or advance their understanding of research through critical exploration of research language, ethics, and approaches. It focuses on translational research and provides the fundamentals towards the design and conduct of "use-inspired" research, by building upon basic scientific research and synthesizing knowledge to develop a new or improved drug, device, diagnostic, or behavioral intervention. The elements of the research process within quantitative, qualitative, and mixed methods approaches are introduced. Topics to be covered include: Searching and critically analyzing the latest research, Understanding statistics in quantitative research, Critical appraisal, Writing a research protocol, The setting up of a project, Patient and public involvement in research, Selecting robust outcome measures, Qualitative research methods, Writing a scientific manuscript, Assessing the impact of research, Getting research funding, Disseminating research. The course includes hands-on exercises and "journal clubs", where students evaluate and present the research methodology of specific scientific publications of interest.

Instructors: G. Stamatakos, I. Delis

***Translational Bioinformatics***

The course aims at presenting both algorithms and technologies for the analysis of biomedical data at the cellular and subcellular level (e.g. genomics and proteomics) and their translation into diagnostic, prognostic, and therapeutic applications in medicine. The course presents: a) the principles of molecular biology related to cell characteristics, DNA, RNA and gene analysis, focusing on the relation of biology with computer science, b) the basic techniques and algorithms for sequence comparison and statistical data processing, c) the basic IT infrastructure in which biological data is stored, with particular emphasis on online accessible databases along with the most important software tools used for their analysis (processing, cross-referencing, sharing and archiving of bioinformatics data, etc.), d) utility and limitations of public biomedical resources, e) issues and opportunities in drug discovery, and mobile/digital health solutions.

Instructors: G. Matsopoulos, O. Petropoulou

***Biomechanics***

This course introduces students to the mechanical principles that can be applied to study the structure function relationship at different scales, from the molecular and cellular to the tissue and system scales. At the molecular and cellular levels, the course examines how mechanical quantities and processes such as force, motion and deformation influence molecular and cell behavior and function, with an emphasis on the connection between mechanics and biochemistry. At the tissue and system levels, solid and fluid mechanics are introduced, and applications in the musculoskeletal, respiratory, cardiovascular and urinary systems are discussed.

Instructors: Chr. Manopoulos, V. Spitas, A. Raptis

***Biodesign Fundamentals***

This is the first part of a two-semester course. Multidisciplinary teams of students identify real-world medical needs, evaluate their potential health and commercial impact, invent new health technology

products to address those needs, and plan their full implementation into patient care. In this first course, the students either bring their own ideas or identify real-world needs by visiting clinical settings and interviewing end-users. Via a well-structured process that includes stakeholder analysis and market analysis, the students prioritize the ideas and select the ones that will be implemented in the subsequent semester in the course "Biodesign Innovation Process".

Instructors: D. Koulocheris, K. Nikita, V. Papakonstantinou

**Courses of the Spring Semester**

***Biomedical Imaging and Image Analysis***

The course is aimed to teach the principles of biomedical imaging and the foundation techniques required to process, analyze, and use biomedical images for scientific discovery and applications The first part of the course will provide students with the underlying principles of biomedical imaging including the basic physics and mathematics associated with each modality (X-ray CT, SPECT, PET, ultrasound, and MRI). The second part of the course will introduce concepts of digital images and will focus on analytic, storage, retrieval, and interpretive methods to optimally use the increasingly voluminous imaging data and integrate and understand them in the context of complementary molecular and clinical information to improve diagnosis and therapy in medicine.

The use of Machine Learning to improve performance of sensing and imaging algorithms will be covered along with principles and algorithms of deep learning to process and analyze biomedical images. Topics covered in the course include: Types of imaging methods and how they are used in medicine; Image processing, enhancement, and visualization; Computer-assisted detection, diagnosis, and decision support; Access and utility of publicly available image data sources; Linking imaging data to clinical data and phenotypes.

Instructors: M. Anagnostakis, S. Golemati, I. Delis

***Computational modeling and simulation for Medicine***

Primary focus is on quantitative and computational methods to understand and/or model the pathophysiology of complex biological systems and develop efficient therapeutic interventions. Methods for multiscale/multilevel modeling and system identification are covered as applied towards understanding and analyzing biology, from individual molecules in cells to entire organs, organisms, and populations. Some examples include modeling of the glucose-insulin metabolic system, multi-scale cancer modeling and in silico oncology, construction of models to study cardiovascular system health. Modeling and simulation of medical devices such as artificial kidney, artificial heart and heart valves, are also covered, along with prototype manufacturing using 3D printing technology.

Instructors: Chr. Manopoulos, V. Spitas, G. Stamatakos, A. Raptis

***Artificial Intelligence in Healthcare***

This course involves a deep dive into recent advances in AI in healthcare, focusing in particular on deep learning approaches for medicine and healthcare problems. The course will start from foundations of neural networks and will then cover cutting-edge deep learning models in the context of a variety of healthcare data including image, text, multimodal and time-series data. Metrics unique to healthcare, as well as best practices for designing, building, and evaluating AI-based approaches in healthcare will be presented. Advanced topics on open challenges of integrating AI in healthcare, including interpretability, robustness, privacy and fairness will also be covered. The course aims to provide students from diverse

backgrounds with both conceptual understanding and practical grounding of cutting-edge research on AI in healthcare.

Instructors: K. Nikita, A. Voulodimos, G. Stamou, G. Alexandridis

***BioMicroElectroMechanical Systems (BioMEMS)***
This course targets to: (1) introduce fundamental design and microfabrication concepts of BioMEMS (including microfluidics and lab-on-chip systems) and (2) expose students to the relevant biomedical and biological applications of BioMEMS. The course is divided into three main sections: (i) Microfabrication and Materials of BioMEMS, (ii) Design of BioMEMS sensors and actuators, and (iii) BioMEMS applications.

Instructors: N. Chronis, A. Markopoulos

***Introduction to neuroscience and neural engineering***
This course examines a range of neural engineering approaches to investigating and intervening in the nervous system, emphasizing quantitative understanding and fundamental engineering concepts. Modern neural engineering techniques to measure and modulate neural activity and manipulate how an organism perceives, thinks, and acts are covered. The course focuses on the computing essence of neural processes and explores the relationship with molecules, spikes and synapses. Topics related to synaptic plasticity, learning and memory are examined. Based on the biophysics of brain computation, neurons are also explored as spike processing machines for creating intelligent algorithms inspired by the brain's complexity and self-organization.

Instructors: I. Delis

***Healthcare robotics***
The course intends to explore human robot interaction (HRI) in healthcare and cover the entire continuum of care from hospital to home, by tackling robotic challenges in surgery, assistance, and rehabilitation — three domains where robots are having the biggest impact. The course will also explore how artificial intelligence is used in surgical procedures, to improve precision diagnostics, in exoskeleton technology, and for patient care. Topics to be covered include: medical imaging-guided surgery; minimally-invasive surgery through miniaturization, novel actuation and sensing; robotic surgery at tissue and cell levels; autonomous robotic systems to assist with daily living activities; multi-modal robot interfaces; robotics-based rehabilitation technologies; upper limb rehabilitation robots; wearable exoskeletons and sensors; implanted neural interfaces.

Instructors: P. Marangos, I. Poulakakis, K. Tzafestas, P. Vartholomaios

***Biodesign innovation process (prerequisite: Biodesign fundamentals)***
In this course, students are introduced to various aspects of medical device entrepreneurship. The students acquire a very diverse set of soft skills and are exposed in all steps required to bring a research discovery to a medical product or service. Lectures will be centered around case studies and often given by guest speakers from start-ups, regulatory experts, patent attorneys, clinical trial specialists, and investment firms to give students a sense of the process and challenges in developing their own business idea. Students will have the opportunity to discuss case studies based on other people's experience of bringing medical devices to market and the specific challenges associated with the development of new products in the medical sector.

Instructors: K. Nikita, D. Koulocheris, V. Papakonstantinou

In accordance with Senate's decision (meeting of August 30, 2024), the following elective courses have been included in the curriculum of the Master's Program in Translational Engineering in Health and Medicine:

- Communication Skills for Engineers (written and oral communication for engineers), winter semester, taught by Ms. Goni Togia (NTUA)

This course is designed to enhance students' knowledge of written and oral communication skills in an engineering context. The course will help students to properly structure and write their course assignments and dissertation. In particular, students will learn how to manage and evaluate relevant and reliable sources, cite sources appropriately in their written material, write abstracts and reports concisely and meaningfully, write critical literature reviews and critically analyse key issues in engineering topics both in a written and an oral format. This course is interdisciplinary and is mainly based on the use of case studies addressing a number of topical engineering issues (e.g. sustainability, engineering failure analysis, engineering ethics, energy transition, etc.). By engaging with these case studies, students will not only refine their communication skills, but also deepen their understanding of specialised engineering terminology while gaining valuable insights into the principal challenges faced today.

- European and Technical Law (European and Greek Technical Legislation), spring semester, taught by Ms. Evgenia Tzannini (Assistant Professor, School of Applied Mathematical and Physical Sciences, NTUA)

Communication Skills for Engineers:

The aim of this course is to bring young engineers in touch with concepts of Law that affect their working fields. The course aims to help them understand and be able to resolve issues that arise during the drafting of public/private project contracts and the relevant licensing procedures. In addition, it aims to provide students with general knowledge of legal rules and how to interpret them, as well as to make them familiar with the way of operation and delivery of justice and the concept of judicial reasoning. Within the complexity of their fields, the young engineers should be able to understand basic concepts of Public and Technical Law and to gain some familiarity with Public Works contracts, Maritime Law, and the Law of the Sea, as well as with the particularities of the tax environment across the EU, within which they will pursue a career. International and European Law are also taught aiming to provide the young engineers with broad knowledge on energy related investments, on issues regarding the transit and the cross-border energy transport, on how the EU institutions operate and last but quite crucial, on how the EU energy and environmental Law and Policy are being shaped and developed. Finally, Energy Law is taught, and students are introduced to the field of Energy Law and in particular: the evolution of the energy sector historically, the concept of energy security, the environmental and energy strategies of the European Union. Under that prism, students are also introduced to the operation of the Target Model, the tendency for the digitalization of Energy and the problems in contractualization of purchase and sale transactions, as well as to the evolution of the Renewable Energy Sources sector and to the Licensing Process of energy and environmental projects

Each course consists of 2 hours of instruction per week and corresponds to 3 ECTS credits. The grade awarded for these courses is not included in the degree GPA. The courses will be listed in the degree supplement.

## 4.3. Academic Calendar

**Winter Semester Schedule**

- 22.09.2025: Start of registrations
- 10.10.2025: End of registrations
- 29.09.2025: Start of classes
- 17.10.2025: Issuance of lists by the Secretariat of postgraduate students in each course
- 09.01.2026: End of classes
- 12.01.2026: Start of period for other educational needs and examinations
- 06.02.2026: End of examination period
- 10.02.2026: Submission of grades

**Spring Semester Schedule**

- 09.02.2026: Start of classes and registrations
- 18.02.2026: End of registrations
- 20.02.2026: Issuance of lists by the Secretariat of postgraduate students in each course
- 22.05.2026: End of classes
- 25.05.2026: Start of period for other educational needs and examinations
- 19.06.2026: End of examination period
- 01.07.2026: Submission of grades

**Holidays**

- 28th October
- 17th November
- Christmas and New Year Break (23.12 – 06.01)
- 30th January
- Clean Monday (23.02)
- 25th March
- Easter Break (starting from Holy Monday and ending on Thomas Sunday, 06.04 - 17.04)
- Labour Day (01.05)
- Holy Spirit Day (01.06)

**Student Access and Support Services**

**Access**

Zografou Campus of the National Technical University of Athens

The School of Electrical and Computer Engineering (SEMMY) is housed in two buildings within the Zografou Campus of the National Technical University of Athens: the Old and the New Buildings. The Secretariat and administrative services are located in the New Buildings, while faculty offices are situated both in the New Buildings (Phase B) and in the Old Buildings. Courses are held in classrooms within the New Buildings. Student laboratory exercises take place in laboratories located in both the Old and New Buildings, as well as in the facilities of the School of Mechanical Engineering.

## Transport Services

Bus Service:

Bus line 242 (Katechaki Metro Station – Zografou Campus) accesses the canpus via the gate on Kokkinopoulou Street or Katechaki Street, depending on the time of day, and follows a route around the campus perimeter.
Bus line 140 (Polygono – Glyfada) serves a stop directly outside the campus gate on Kokkinopoulou Street.
Bus lines 608 (Galatsi – Akadimia – Zografou) and 230 (Acropolis – Zografou) now serve the vicinity of Zografou Gate, at the 8th Zografou Stop.

Metro:

The nearest metro station is Katechaki Station. From there, you can transfer to bus lines 140 and 242. Daily, between 8:00 and 9:30 AM, the National Technical University of Athens (NTUA) is connected to Katechaki Station by a university shuttle bus.

By car:

Cars (private vehicles or taxis) can enter through the gate on Kokkinopoulou Street and the new gate on Katechaki Avenue. Entry through the Zografou Gate on Iroon Polytechneiou Street is allowed for cars during the morning hours from 07:00 to 09:00, and exit is permitted from 14:00 to 16:00. Within the university campus, there are adequate parking facilities for members of the university community as well as for visitors.

Postal Address:

National Technical University of Athens
School of Electrical and Computer Engineering
9 Iroon Polytechneiou Street
Athens, 15772, Greece

## Student Services

### Academic ID (Student Card)

All students, both undergraduates and postgraduates, receive a student ID card, which proves that they have been students for no longer than the normal period required to obtain a degree plus two

years. It is valid for one academic year and entitles the holder to a discount of between 25% and 50% on tickets for buses, trains, ships, museums and art exhibitions. It is issued to students by the School Secretariats following registration at the beginning of the academic year, and requires a photograph. http://academicid.minedu.gov.gr/

**Student Eating card**

The Meal Card provides free meals at the NTUA cafeterias (at the Zografou Campus and Patission Campus) for students whose family income is below a specified threshold. Information and the required documentation for obtaining a Meal Card are provided by the Student Welfare Department (Thomaidio Publishing Building). For other students, meals at the aforementioned cafeterias are available for a small fee. Information: Ms. K. Giakoumaki: +30 210 772 2192, Ms. G. Sotiropoulou: +30 210 772 2154. https://www.ntua.gr/images/various/AITISI.docx

**Health care**

All students are entitled to free healthcare. It can be obtained with a student health book issued at the Zografou Health Centre on presentation of an identity card, student ID card, photographs and a sworn statement as per Law 1599/86. Healthcare includes immediate medical assistance, pharmaceutical care, dental care, treatment by a doctor, hospital care for inpatients and outpatients, health centre examinations and special treatment, and care for chronic diseases.
Pharmaceutical care involves the granting of free medicine to students from designated pharmacies.
Medical and dental care provides the same care as for civil servants. This care can also be provided by designated dentists at no charge to students. A list of designated doctors and pharmacies is provided by the M edical Service. Home treatment is available only in serious circumstances or emergencies.
Hospital care is provided to every patient who is a student at the University after a medical diagnosis and the approval of the M edical Service. Tests are conducted at public clinics. Because NTUA has a microbiology laboratory which belongs to the Medical Service, it is able to serve students directly.
Prescriptions and referrals for health centre examinations from private doctors not designated by the Student Club are recognised if they are approved by the NTUA Medical Service. Provision of healthcare applies for the years of study, defined as the normal length of undergraduate or postgraduate studies in a School, plus 2 years. In the final year of studies healthcare is extended beyond the end of the academic year until 31st December of the same year for any students who have not yet received their degrees. More Information: 210-772-1566 Mrs. M. Katrani

**Special Counselor**

At the National Technical University of Athens, a group of experts-counselors provide their services to students who face difficulties in relation to their studies, stress and anxiety, difficulty in dealing with student life or living in the city, or other problems such as those related to social relations (conflicts with the family, or friends), feelings of isolation and mood change, health problems, and other personal issues. For further information, contact the Career Office career@central.ntua.gr and specifically Ms Eleni Paspaliari and Ms S. Nika.

**Zografou Halls of Residence**

At the Zografou campus, there are two Halls of residence: the old building and the new buildings at Zografou. The old 12-storey building has been open since 1975 (Iroon Polytechneiou Street) and is

mainly used by students of other Universities (only 1% of NTUA students live there). The new Halls of Residence (15 buildings at Kokkinopoulou Street, 6A)), which are monitored by The Youth & Lifelong Learning Foundation, have been open since 2005.

**Employment and Innovation Offices**

NTUA houses offices that serves students and new graduates of the university in the first stages of their academic and professional careers. All students and graduates of NTUA have access to a specially equipped area with a computer network where they can get information in printed and electronic form on: Postgraduate studies in Greece and abroad, Scholarships, Continuing or supplementary education, Careers advice, Jobs (summer, part-time or full-time)

**The Employement and Career offices of the NTUA are the following**

Practical Training Office http://praktiki.ntua.gr/

Innovation and Entrepreneurship Unit http://mkentua.gr/

**Career Office**

The Career Office (https://career.ntua.gr/) has been set up to offer to students and recent graduates of the NTUA, support and systematic information on matters concerning their studies and on issues related to the planning of their professional career. Students and graduates who wish to do so may arrange a meeting with the specialized advisors available at the Office in order to discuss any matters of concern to them. With a specialized career consultant with whom they can discuss, by appointment, on specific issues such as drafting a curriculum vitae, planning their career, the difficulties that they may encounter during their studies etc. With a consultant who can advise them on matters of postgraduate studies and scholarships. With a specialized counselor who can offer them psychological support and help them cope with the challenges stemming either from their academic or their personal life. By scheduling an appointment, they can discuss their difficulties and work together on acquiring the skills they need to manage them effectively.

**The Student's Advocate**

The Student's Advocate has been established by Ar. 55 of Law 4009/2011 and updated by Ar. 130 of Law 4957/2022 and its main goal is to facilitate the mediation between students and professors or administrative services of the University; to safeguard the compliance with legality in the framework of academic freedom; to deal with maladministration phenomena and to safeguard the University's smooth operation as well. The Student's Advocate has no authority on issues related to exams and the students' grades. Among the responsibilities of the Student's Advocate is to Investigate cases, either ex officio or following a student's report and mediates with the University's competent bodies for the resolution of these cases. In order to achieve its mission, the Student's Advocate may request from the University's services any information, document or other kind of evidence for each case, while it may also examine persons, perform autopsies and order an expert's opinion. If it is found that in a specific case the law has not been respected, or there are phenomena of maladministration or that the smooth operation of the University is disturbed, the Student's Advocate reaches a conclusion with which the professor concerned or the competent administrative department concerned and the student who submitted the petition, are being informed. Then, the Student's Advocate mediates, with any means,

in order to solve the problem. The Student's Advocate may, by its act, place in the file a petition that is deemed clearly vague, unfounded, or inadequately supported. If the Student's Advocate considers that there are indications of a disciplinary offense, the case is being forwarded to the competent disciplinary body. Information / Request Submission: stua@mail.ntua.gr

**Alumni Association**

At the same time, the Alumni Association operates at the Zografou Campus, functioning as part of the University's Public Relations and serving the graduates of the University, with a focus on strengthening the relationships among NTUA alumni as well as between the alumni and the University.