ARISTOTLE UNIVERSITY OF THESSALONIKI

School of Physics

Program of Postgraduate Studies

“Computational Physics”

A11 – Study Regulation

18 February 2026

PART A
STUDY REGULATIONS

The following Regulations are an extract from Senate Decision No. 84473/17-7-2025.

Article 1 – Subject and Aims of the MSc Programme

The Department of Physics of the School of Sciences of the Aristotle University of Thessaloniki (AUTH) organizes and operates an MSc Programme entitled “Computational Physics”.

The Programme is organized around the broad scientific field of Computational Physics. It aims to train scientists capable of applying advanced computational techniques to solve complex physics problems. By combining theoretical knowledge with practical programming and modelling skills, the Programme prepares students for innovative research and applications in academia, industry, and technology companies.

The aims of the Programme are:

- Continuous education of students on current issues of computational interest and new practices for addressing computational problems.
- Training in modern computational tools and techniques essential for current research and modern technological applications.
- Development of entrepreneurship and adaptability to the labor market in applied research and technology transfer.
- Familiarization of students with international activities through involvement in current research activities of faculty members and researchers supporting the Programme.

The learning outcomes and qualifications of graduates are:

- Specialized knowledge in advanced methods for studying complex systems.
- Programming skills and algorithm development for exploiting modern computational capabilities (object-oriented programming, parallel programming, graphics, etc.).
- Research skills through analysis of current research data, literature review, and scientific writing.
- Analytical and synthetic thinking for addressing complex physics problems and developing innovative solution methods.
- Technical skills for using specialized software, managing computational resources, and leveraging artificial intelligence.

Article 2 – Degree Awarded

The Programme awards a Master's Degree (M.Sc.) entitled "Computational Physics".

The Programme has no specializations.

Successful completion of the Programme leads to Level 7 of the National and European Qualifications Framework, in accordance with Article 47 of Law 4763/2020 (Government Gazette A′254).

Article 3 – Governing Bodies

The bodies responsible for the administration, organization, and operation of the Programme are:

I. The University Senate, which handles academic, administrative, and organizational matters of the MSc Programme and exercises any competences not assigned by law to other bodies.

II. The Postgraduate Studies Committee, constituted by Senate decision and consisting of the competent Vice-Rector (Chair) and one faculty member from each School of AUTH, plus one member from the categories of Special Educational Staff, Laboratory Teaching Staff, and Special Technical Laboratory Staff. Members serve for two academic years.

III. The Departmental Assembly, which:

- Constitutes committees to evaluate applications of prospective postgraduate students and approves their enrolment.
- Assigns teaching duties to the Programme's instructors.
- Recommends to the Senate modifications to the founding decision and extensions of the Programme's duration.
- Constitutes examining committees for thesis defense and appoints supervisors.
- Confirms successful completion of studies for the award of the degree.
- Approves the Programme's annual report, upon the recommendation of the Coordinating Committee.

IV. The Coordinating Committee (CC), comprising the Programme Director and four faculty members with relevant expertise who undertake teaching within the Programme. The CC is responsible for:

- Drafting and modifying the annual budget (where resources are available under Article 84 of Law 4957/2022).
- Preparing the annual report.
- Approving Programme expenditure.
- Approving the award of scholarships.
- Recommending teaching assignments to the Departmental Assembly.
- Recommending the invitation of Visiting Professors.
- Drafting proposals for curriculum modifications.

- Recommending redistribution of courses across semesters and quality improvements.

V. The Programme Director, a faculty member at the rank of Professor or Associate Professor (in order of priority), appointed by the Departmental Assembly for a two-year renewable term. The Director has the powers set out in Article 82(4) of Law 4957/2022.

Administrative support is provided by the Secretariat of the Department of Physics, which maintains student records, communicates with students, and prepares items for the Departmental Assembly.

Article 4 – Categories of Eligible Applicants

The Programme accepts holders of a first-cycle degree from Greek or equivalent foreign Higher Education Institutions, specifically:

1. Holders of a first-cycle degree from Faculties of Natural Sciences or Polytechnic Schools.
2. Holders of a first-cycle degree from Greek or equivalent foreign institutions in a field related or partially related to the Programme, as specified in the annual call for applications published on the websites of the Department of Physics and the Programme.

Recognition of foreign degrees for admission is carried out by the Department. Applicants who completed their undergraduate studies abroad are not required to obtain recognition from the Greek authority DOATAP; the Department has sole responsibility for academic recognition.

Article 5 – Number of Admissions, Selection Criteria, and Procedure

The number of students admitted per year is set at a minimum of six (6) and a maximum of eighteen (18). The Programme cannot operate with fewer than six (6) postgraduate students.

The Programme publishes positions through an open call. The call specifies admission requirements, number of places, applicant categories, admission method, selection criteria, application deadlines, and required documents.

Necessary prerequisites for admission:

1. All applicants must have adequate knowledge of English; foreign nationals must additionally have adequate knowledge of Greek. Applicants who do not hold a valid certificate of at least B2-level English must sit an examination of their ability to translate scientific texts, administered by the Department of Physics during the admissions examination period. The same applies to foreign applicants without a valid B2-level Greek language certificate.

2. Applicants from insufficiently related departments must pass examinations in the undergraduate modules “Differential Equations” and “Theoretical Mechanics” from the Department of Physics undergraduate curriculum (syllabus specified in the call). Scores from these examinations are not included in the admission scoring.
3. Applicants must have graduated with a degree grade of at least 6.5 out of 10.
4. Successful participation (grade ≥ 5/10) in the mandatory admission examination in “Programming”.
5. Submission of two positive letters of recommendation from faculty/EDIP members.

Selection criteria:

1. Grade of the first-cycle degree.
2. Time taken to obtain the degree relative to the minimum required duration.
3. Grades in compulsory undergraduate modules in Physics and Mathematics (as specified in the scoring algorithm in Annex A).
4. Performance in the undergraduate thesis, with greater weight if the topic is related to Computational Physics.
5. Score in the mandatory Programming examination.
6. Other qualifications assessed by the Selection Committee (additional degrees, publications, conference participation, training programmes, etc.).
7. Two positive letters of recommendation from faculty/EDIP members.

The selection process is carried out by a three-member Selection and Examination Committee of faculty who teach in the Programme. The final ranking of successful applicants and a reserve list (30% of the number of places) is approved by the Departmental Assembly and published on the Department’s website. Appeals may be submitted within five (5) working days of the publication of results.

Article 6 – Duration and Conditions of Study

Duration

The normal duration of the Programme is three (3) semesters, including the period for completion and assessment of the master’s thesis. The maximum permitted duration is five (5) semesters.

Part-time study is available for students who demonstrably work at least twenty (20) hours per week, or for non-working students who are unable to meet the minimum requirements of full-time study due to illness, serious family circumstances, or force majeure, as decided by the Departmental Assembly upon submission of appropriate documentation. The duration of part-time study may not exceed double the normal duration.

Students who have not exceeded the maximum study duration may request a suspension of studies, not exceeding two (2) consecutive semesters (one year for part-time students). The suspension period is not counted towards the maximum duration.

Students may also request an extension of studies of up to two (2) additional semesters, provided they have accumulated at least 45 ECTS and there are serious reasons preventing timely completion.

A student may be deregistered from the Programme in the following cases:

- The maximum permitted duration has elapsed without completion of studies.
- The student has not completed 30% of the required ECTS within the minimum study duration.
- for academic misconduct. This case is examined by the Assembly of the Department upon request and a documented recommendation of the Coordinating Committee of the P.S.P. The Assembly, after taking into account the opinion of the Foundation's Ethics Committee, may delete the postgraduate student from the P.S.P. In particular, the case of plagiarism is referred to in article 15 of the present Operating Regulations of the P.S.P.

A graduate student can be automatically removed upon his/her application.

There are no tuition fees for the Programme.

Article 7 – Rights and Obligations of Students

Postgraduate students have all the rights, benefits, and facilities available to first-cycle students, except the right to free textbooks. The Department must ensure appropriate accommodations for students with disabilities or special educational needs.

Students enrolled in the Programme are required to:

1. Attend all courses regularly and without interruption; attendance at lectures and exercises is compulsory. Students must attend at least 70% of the teaching hours of each module.
2. Submit assignments on time.
3. Participate in all educational and research activities of the Programme.
4. Sit examinations.
5. Submit course registration declarations each semester on time.
6. Submit a declaration prior to thesis assessment confirming the absence of plagiarism.
7. Complete evaluation questionnaires for the Programme as requested.
8. Have settled all obligations to the Institution before the graduation ceremony.
9. If in receipt of a scholarship, provide reciprocal services as stipulated (tutorials, library support, research assistance, etc.).
10. Respect and comply with decisions of the Programme’s bodies and uphold academic integrity.

Article 8 – Curriculum and Assessment

A) Curriculum

The Programme is structured over three (3) semesters. All courses are taught in person. The official language of instruction is Greek. The master's thesis may be written in Greek or English.

1st Semester – Four (4) compulsory modules (30 ECTS):

Module	ECTS
1. Computational Mathematics	7.5
2. Programming I	7.5
3. Tools for Scientific Programming	7.5
4. Data Analysis	7.5
Total ECTS – 1st Semester	30

2nd Semester – Four (4) modules: students choose two (2) compulsory electives (CE) from the following four, plus two (2) elective modules (E):

Module	ECTS
Two (2) of the following compulsory electives (CE) (students may also take remaining CEs as electives)	
a) Computational Quantum Physics (CE)	7.5
b) Computational Statistical Physics (CE)	7.5
c) Computational Astrodynamics (CE)	7.5
d) Artificial Intelligence and Machine Learning in Physics (CE)	7.5
Elective (E)	7.5
Elective (E)	7.5
Total ECTS – 2nd Semester	30

3rd Semester – Two (2) elective modules and Master's Thesis:

Module	ECTS
Elective (E)	7.5
Elective (E)	7.5
Master's Thesis	15
Total ECTS – 3rd Semester	30

Available elective modules:

Elective Module	Semester	ECTS
1. Computational Solid State Physics	2nd	7.5

2. Computational Quantum Mechanics and Applications	3rd	7.5
3. Computational Astrophysics	2nd	7.5
4. Computational Electromagnetism	2nd	7.5
5. Computational Nuclear Physics	2nd	7.5
6. Computational Particle Physics and Detector Simulation	3rd	7.5
7. Programming II	2nd	7.5
8. Modelling and Simulation of Dynamical Systems	2nd	7.5
9. Quantum Information and Quantum Computing	2nd	7.5
10. Monte Carlo Methods and Applications	2nd	7.5
11. Astronomical Data Analysis	3rd	7.5
12. Computational Models in Environmental Physics	3rd	7.5
13. Computational Biophysics	3rd	7.5
14. Computational Fluid Dynamics	2nd	7.5
15. Computational Methods in Econophysics	2nd	7.5
16. Theory of Complex Systems and Networks	2nd	7.5
17. Mathematical Methods of Physics	3rd	7.5
18. Computational Methods in Applied Physics	2nd	7.5
19. Computer Graphics	2nd	7.5
Free choice*	2nd or 3rd	7.5

* Free choice: With approval from the Coordinating Committee, students may choose as electives courses related to the Programme offered by other AUTH MSc programmes, contributing up to a maximum of 15 ECTS.

B) Assessment

Assessment is carried out exclusively by the teaching staff of the Programme. Examination of individual modules is by written or oral examination, coursework, or a combination thereof, as determined by the instructor at the start of the academic semester. Grades must be submitted to the Secretariat within two (2) weeks of the end of the examination period. A resit examination period is held in September for all modules.

Grading scale:

- Excellent: 8.5 to 10
- Very Good: 6.5 to 8.5 (exclusive)
- Good: 6.0 to 6.5 (exclusive)
- Pass mark: 6.0 and above

A student who fails a module in both the regular examination session and the September resit may either repeat the module in the following academic year or

request re-examination by a three-member committee of faculty with relevant expertise, to be held within two weeks of the committee's appointment.

The final MSc degree grade is the weighted average of all module grades and the thesis grade (weighted by ECTS):

Degree Grade = ($Grade_1 \times ECTS_1 + Grade_2 \times ECTS_2 + \ldots +$ Thesis Grade × Thesis ECTS) / Total ECTS

C) Master's Thesis

A student who has passed modules totaling at least 45 ECTS may commence the thesis process at the start of the 3rd semester. The student submits a request to the Departmental Assembly specifying the proposed thesis title, proposed supervisor, and a thesis abstract. The supervisor must be an instructor in the Programme. A three-member Examining Committee (including the supervisor) is constituted by the Departmental Assembly.

Supervisors and Examining Committee members must have the same or related scientific specialisation as the Programme's subject matter. At least two of the three committee members must be faculty of the Department of Physics.

The thesis may be written in Greek or English. If written in English, it must include an extended summary in Greek describing the methodology and main findings. The thesis must include computational results, either using existing software or original code. The thesis must follow the standard structure of scientific works (introduction, main chapters, conclusions, bibliography, appendices) with standard fonts and formatting. A template and detailed writing guidelines will be available on the Programme's website.

The thesis defence is public. The date and venue are set by the Coordinating Committee upon recommendation of the supervisor and announced on the Programme's website at least three (3) days in advance. The examination process may not exceed two (2) hours. The thesis is subsequently uploaded to the Department's/School's website or the AUTH repository.

If the assessment is negative, the student may resubmit after incorporating the committee's suggestions within a timeframe set by the committee. A second negative assessment results in loss of the right to be awarded the degree.

Article 9 – Scholarships

Subject to available funding, the Programme may award up to three (3) scholarships per year of up to €1,000 each, on academic merit, to full-time students who have passed all modules of previous semesters. Scholarships may entail reciprocal services to the Programme (marking assignments, invigilating examinations, supporting computer laboratories, etc.).

Article 10 – Teaching Staff

Teaching duties are assigned, upon recommendation of the Coordinating Committee and decision of the Departmental Assembly, to the following categories of instructors:

- Faculty members (DEP, EEP, EDIP, ETEP) of the Department or other AUTH or other university departments.
- Emeritus or retired faculty members of the Department or other AUTH or other university departments.
- Collaborating professors.
- Contracted instructors.
- Visiting professors or visiting researchers.
- Researchers and specialist scientists from research and technology institutions.
- Scientists of recognised standing with specialised knowledge and relevant experience.

Decisions on teaching assignments must include the instructor's full name, status, type of teaching assigned per instructor, and number of teaching hours per module or seminar.

At the start of the Programme, each postgraduate student is assigned a permanent faculty member as Academic Advisor. The Advisor monitors the student's academic progress, informs the student of repeated absences that may result in failure, and assists with thesis topic selection. Students must contact their Academic Advisor for any matter that may affect their studies.

Doctoral candidates may be assigned supplementary teaching duties (tutorials, laboratory exercises, invigilation, marking) under the supervision of an instructor, subject to Departmental Assembly decision.

Article 11 – Financial Resources and Management

Resources of the Programme may come from:

- Donations, sponsorships, and other financial contributions.
- Bequests.
- Research projects or programmes, especially from the European Union.
- AUTH's own resources.
- Any other lawful source.

There are no tuition fees. Financial management is handled by the Special Research Account (ELKE) of AUTH.

Article 12 – Administrative Support and Infrastructure

The Department of Physics provides teaching spaces (lecture rooms, computer laboratories, and research laboratories) for the Programme's academic activities. Departments with instructors in the Programme must cooperate in providing spaces for lectures, presentations, and laboratories.

Administrative and secretarial support is provided by the Secretariat of the Department of Physics, covering: the annual call for applications, collection of applications and documents, enrolment of admitted students, grade recording, processing of student requests, completion checks, and issuance of the degree and Diploma Supplement.

Article 13 – Graduation Ceremony

The oath-taking ceremony is not a constitutive element of the successful completion of studies, but is a necessary prerequisite for the issuance of the physical degree certificate. The ceremony takes place within the Departmental Assembly in the presence of the Programme Director, the Head of Department/Dean, and, where possible, a representative of the Rector.

Students who have successfully completed the Programme may, in exceptional cases (studies, residence, or employment abroad; health reasons, etc.), request exemption from the oath-taking obligation from the Departmental Secretariat.

Article 14 – Degree Certificate

The MSc degree certificate is a public document awarded by the “Computational Physics” MSc Programme of the Department of Physics, AUTH. The degree is issued by the Departmental Secretariat and includes the Department, the AUTH emblem, the date of completion of studies, the date of issue, the protocol number, the Programme title, the student’s details, and the classification (Good, Very Good, or Excellent).

Prior to the award of the degree, a certificate of successful completion of the Programme may be issued to the graduate.

In addition to the degree certificate, a Diploma Supplement is issued (in accordance with Article 15 of Law 3374/2005 and Ministerial Decision F5/89656/B3/13-8-2007, Government Gazette 1466/B′), providing explanatory information on the nature, level, general educational context, content, and status of the studies completed. It does not replace the official degree certificate or the academic transcript.

Article 15 – Plagiarism

When submitting any postgraduate work, the student must indicate whether they used the work and ideas of others. Plagiarism is regarded as a serious academic offence. It includes copying another person’s work and using another’s work – published or unpublished – without proper citation. Any citation of documentary material, including the student’s own previous work, without a corresponding reference, may constitute grounds for deregistration from the Programme by decision of the Departmental Assembly.

Any academic integrity violation is referred to the Coordinating Committee for consideration and recommendation to the Departmental Assembly. Academic integrity violations are also investigated by the Institution's Ethics Committee.

Article 16 – Programme Accreditation and Evaluation

Before commencing operation, a new MSc Programme must be accredited by the Hellenic Authority for Higher Education (HEL.A.H.E.E.) in accordance with Article 8(1)(c) of Law 4653/2020. Subsequently, Programmes are periodically re-accredited within the framework of the periodic evaluation/accreditation of the relevant academic unit.

If a modification to the founding decision is made, re-accreditation by HEL.A.H.E.E. is required where the modification concerns the subject matter, aims, learning outcomes, qualifications, or specialisations of the Programme.

The Programme's evaluation covers: overall assessment of work accomplished, degree of achievement of original objectives, sustainability, graduate employability, contribution to research, student evaluation, and relevance to national higher education strategy.

Internal Evaluation by MODIP

The AUTH Quality Assurance Unit (MODIP) carries out periodic internal evaluation of the Programme within the Internal Quality Assurance System and in accordance with HEL.A.H.E.E. guidelines.

Student Evaluation of Instructors and Modules

Students are invited to evaluate all modules and instructors each semester, with complete anonymity guaranteed. Questionnaires are prepared by MODIP and completed electronically via the Quality Management Information System. The Departmental Assembly analyses the results, announces findings, and takes action to address any issues identified.

Article 17 – Programme Guide

The Programme publishes a Programme Guide to inform postgraduate students of its operation. The Guide may include:

1. General information and useful electronic information about the Institution and the Department, particularly regarding administrative services or collective bodies to which students may turn.
2. The aims and subject matter of the Programme and the qualifications obtained upon award of the MSc degree.

3. The academic calendar (start and end dates of academic semesters, examination periods, holidays, thesis presentation periods, and other obligations such as internships, seminars, conferences, etc.).
4. The curriculum and module content, ECTS credits, teaching staff, and student rights and obligations.
5. The official language of instruction and of thesis writing.
6. The governance of the Programme.
7. Databases.
8. Library use.
9. Student services.

Article 18 – Transitional Provisions

Any matter arising in the future that is not covered by the relevant legislation, the AUTH Postgraduate Studies Regulations, or these Programme Regulations shall be addressed by decisions of the competent collective bodies and by amendment of these Regulations.

ANNEX A – Applicant Scoring Criteria

Scores are calculated to two decimal places.

1. Undergraduate degree grade (UG), graded out of 10 (for UG > 6.5):

$N_1 = (120/7) \times X - (120/49) \times X^2$, where $X = UG - 6.5$ (maximum 30)

2. Semesters of study (SS) relative to minimum required (MR):

$N_2 = 10 \times (3 - 2 \times SS/MR)$ — if $N_2 < 0$ then $N_2 = 0$ (maximum 10)

3. Undergraduate thesis (grade P out of 10):

$N_3 = \varepsilon \times P$ (maximum 10), where $\varepsilon = 0.5$ (general case) or $\varepsilon = 1$ (if topic is in Computational Physics)

4. Up to four (4) core modules with grade X_i and ECTS E_i:

$N_4 = (X_1 \times E_1 + X_2 \times E_2 + X_3 \times E_3 + X_4 \times E_4) / 24$ — if $N_4 > 15$ then $N_4 = 15$ (maximum 15)

Each applicant may nominate up to four (4) compulsory Physics or Mathematics modules from the 4th semester onwards of their undergraduate programme. The Selection Committee must approve the modules selected.

5. Programming examination grade (B out of 10, one decimal place):

$N_5 = 1.5 \times B$ (maximum 15)

Applicants scoring below 5/10 are rejected.

6. Additional degree (second undergraduate degree, master's degree, or doctorate): 5 points ($N_6 \leq 5$). Multiple additional degrees are not cumulatively scored.

7. Conference/school participation (2 points each) or training seminars (1 point each): maximum 5 points ($N_7 \leq 5$).

8. Publications in scientific journals (3 points each) or conference proceedings (2 points each): maximum 5 points ($N_8 \leq 5$).

9. Interview: maximum 5 points ($N_9 \leq 5$).

TOTAL SCORE: $TS = N_1 + N_2 + N_3 + N_4 + N_5 + N_6 + N_7 + N_8 + N_9$ (maximum 100)