



**EMBLEM OF THE HELLENIC REPUBLIC**  
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**DECISIONS**

No. 21/81

**Updating of the Rules of Procedure of the Inter-University Postgraduate Studies Programme (Α.Π.Μ.Σ) with title: "Quantum Computing and Quantum Technologies" of the Department of Electrical and Computer Engineering of the School of Engineering of Democritus University of Thrace, in cooperation with the National Research Centre for Scientific Research "Demokritos", based on the provisions of Law No. 4957/2022 (A' 141).**

THE SENATE

OF DEMOCRITUS UNIVERSITY OF THRACE

Taking into account:

1. Article 16 of Law 4957/2022 "New Horizons in Higher Education Institutions: Strengthening the quality, functionality and connection of higher education institutions with society and other provisions" (A' 141).
2. Para. 6 and 11 of Article 448 of Law No. 4957/2022 "New Horizons in Higher Education Institutions: Strengthening the quality, functionality and connection of higher education institutions with society and other provisions" (A' 141).
3. The sixty-sixth article of Law No. 4917/2022 (A' 67) as amended by Article 66 of Law No. 4950/2022 (A 128), according to which the term of office of serving Rector's Authorities expiring on 31.8.2022 is extended until the date of completion of the procedure of the appointment of the new single-member bodies and for a period of time which may not exceed 28.2.2023.



4. The Declaratory Act under reference No. 137509/Z1/2018 of the Minister of Education, Research and Religious Affairs (ΥΟΔΔ 490), which establishes the election of Rector and Vice Rectors of Democritus University of Thrace with a term of office of four (4) years, from 1.9.2018 to 31.8.2022.
5. The Act under reference No. ΔΠΘ/ΠΡ/4844/246/22.9.2022 (B' 5065) re-notified on 26.9.2022 of the Rector of Democritus University of Thrace (Δ.Π.Θ.) concerning the determination of the the area of responsibility and individual responsibilities of the (4) Vice Rectors of Democritus University of Thrace and the order of replacement of the Rector, in accordance with paragraph. 2 of article 15 of Law. 4957/2022(A' 141).
6. Law 3374/2005 "Quality assurance in higher education. System of transfer and accumulation of credits - Diploma Supplement" (A' 189).
7. Article 90 of the "Code of legislation on the Government and governmental institutions" (presidential decree 63/2005, A' 98), as maintained in force by par. 22 of Article 119 of Law No. 4622/2019 (A' 133).
8. Articles 79, 82, 88 and 455 of Law No. 4957/2022 (A' 141) and circular 135557/Z1/01.11.2022 of the Ministry of Education and Religious Affairs "New horizons in higher education institutions: "Improving the quality, functionality and connectivity of higher education institutions with society and other provisions" on the organization and operation of postgraduate programmes and other issues.
9. The decision of the Studies Program Committee (Ε.Π.Σ.) of the Inter-University Postgraduate Program (Δ.Π.Μ.Σ). No. 2/08.12.2022 and the extract of its minutes.
10. The decision of the Senate meeting No. 17/42/14.1.2021 (B'1408) which approved the Regulation of the Postgraduate Studies Programme.
11. The Special Protocol of Cooperation between the institutions.



12. The positive recommendation No. 09/42/19.12.2022 of the Postgraduate Studies Committee of Democritus University of Thrace (Δ.Π.Θ.) and the extract of its minutes.

13. The fact that by the provisions of this decision do not entail any expenditure for the budget of the institution, we hereby decide:

The updating of the Rules of Procedure of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ) with title: "Quantum Computing and Quantum Technologies" of the Department of Electrical and Computer Engineering of the School of Engineering of Democritus University of Thrace, in cooperation with the National Research Centre for Scientific Research "Demokritos", as follows:

### *Article 1*

#### **General provisions**

The second cycle of studies consists in the attendance of a Postgraduate Studies Programme (Π.Μ.Σ.) with a minimum number of sixty (60) credits (ECTS) and a minimum duration of two (2) academic semesters and is completed with the award of a Diploma of Postgraduate Studies (Δ.Μ.Σ.), level seven (7) of the National and European Qualifications Framework, in accordance with Article 47 of Law No. 4763/2020.

Postgraduate Studies Programmes are organised and operate:

- a) in autonomous Departments of D.U.Th. which offer first cycle studies,
- b) in non-autonomous Departments of Democritus University of Thrace that offer first cycle studies but which ensure all the necessary elements for the organization and operation of the Postgraduate Studies Programme (Π.Μ.Σ.) (e.g. Personnel, material infrastructure, equipment) resulting from the feasibility study and viability study,



- c) in Departments of D.U.Th. in cooperation with Departments of the same or another Higher Education Institution (A.E.I.) of the country,
- d) of the same or another higher education institution of the Greek language,
- e) the D.U.Th. may cooperate in the organisation of Postgraduate Studies Programme with Higher Military Educational Institutions, Higher Ecclesiastical Academies, research and technological institutions of Article 13A of Law No. 13A. 4310/2014 (A' 258), Research University Institutes, the Academy of Athens, the Foundation for Medical Biological Research of the Academy of Athens, as well as recognized scientific associations that operate in the form of a public entity,
- f) in Departments of the D.U.Th.in cooperation with Departments recognized as peer institutions or research organizations, European and international institutions abroad,
- g) by one (1) or more Departments of Higher Education Institutions (A.E.I.) in a specific subject field treated by the Department in order to to provide formal education at postgraduate level exclusively for the personnel of private or public sector institutions, within the framework of the implementation of a contract or programmatic agreement between the D.U.Th.and a private or public sector institution, which undertakes to finance the organisation and operation of the Postgraduate Studies Programme.

In the case of an interdepartmental, Inter-University or joint Postgraduate Studies Programme, a Special Cooperation Protocol (Ε.Π.Σ.) is drawn up and approved by the respective Senates and the collective governing bodies of the Research Centres or organisations.

The postgraduate studies at the D.U.Th. are included within the framework of its aims and general mission. They are related to its departments and aim at the transmission and and promotion of scientific knowledge to cover



educational, research and developmental activities in general development needs.

The completion of the process of establishing a Postgraduate Studies Programme and the start of operation require their prior accreditation by the Hellenic Authority for Higher Education (HAHE) (ΕΘ.Α.Α.Ε.).

### *Article 2*

#### **Validity of the Regulation on Postgraduate Studies**

The provisions of this Regulation shall specify and supplement the legislative framework governing postgraduate studies and in particular the provisions of Law No. 4957/2022 (A' 141) and contribute to the regulation in a uniform manner of the issues of the operation of the Postgraduate Programmes of Democritus University of Thrace.

During the establishment of the Postgraduate Studies Programme, the rules of procedure for Postgraduate Studies of the Postgraduate Studies Programme are established by decision of the Assembly of the Department, which is approved by the Senate, and if certified by the Hellenic Authority for Higher Education (HAHE), is published in the Official Journal of the Government of the Hellenic Republic, posted on the Department's website and notified to the Ministry of Education and Religious Affairs.

### *Article 3*

#### **Purpose of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ)**

The Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ) shall be part of the strategic planning and the National Centre for Scientific Research "DEMOCRITOS" (DEMOCRITOS NCSR), is governed by scientific coherence and



aims to the further advancement of knowledge, the development of science, research and technology and the provision of high quality training in the scientific and technological fields of Quantum Computing and Quantum Technologies. The Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ) aims to provide postgraduate studies of high quality and consequently to provide the appropriate theoretical and practical skills that will provide its graduates with the potentiality: on the one hand to pursue a research or academic career in the field of Quantum Computing and Quantum Technologies, continuing their studies at the doctoral level, and on the other hand to pursue a professional career in the field of Quantum Computing and Quantum Technologies while remaining creative and productive in a rapidly changing technological environment. In addition, the aim of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ) is the dissemination of knowledge and research at national level, European and international level and the establishment of links cooperation between Democritus University of Thrace and the National Centre for Scientific Research "DEMOCRITOS" (DEMOCRITOS NCSR) with National and European Educational and Research networks, as well as its contribution to the modernisation of industry and society through its interaction with productive and other social sectors, which will result in the transfer of know-how, the promotion of innovation and the overall satisfaction of educational, research, social, productive and developmental needs of the country.

#### ***Article 4***

#### **Bodies of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ)**

Competent Bodies for the establishment or modification, organization and operation of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.) are:

1. The Senate of the Institution, which is the competent body for the academic, administrative, organisational and financial issues of the Inter-University Postgraduate



Studies Programme (Δ.Π.Μ.Σ.), and exercises all those competences related to the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.) which are not specifically delegated by law to other bodies.

The Senate of Democritus University of Thrace has the following responsibilities:

- a) approve the establishment of a Postgraduate Studies Programme (Π.Μ.Σ.) or the amendment of the decision concerning the establishment of the Postgraduate Studies Programme,
- b) approve the extension of the duration of operation of the Postgraduate Studies Programme,
- c) establish the Studies Program Committee (Ε.Π.Σ.), in the case of interdepartmental, Inter-University or joint programmes
- d) decide on the abolition of the Postgraduate Studies Programme (Π.Μ.Σ.) offered by the D.U.Th.

## 2. The Postgraduate Studies Committee (MPC)

By decision of the Senate upon the proposal of the Dean's Offices of the Faculties of Democritus University of Thrace shall establish a Postgraduate Studies Committee (Ε.Μ.Σ.). The Committee consists of one (1) member of the Teaching and Research Staff (Δ.Ε.Π.) from each Faculty of the D.U.Th., one (1) member who comes from categories of members of the Special Educational Staff (Ε.Ε.Π.), Laboratory and Technical Staff (Ε.ΔΙ.Π.), and Special Laboratory and Technical Staff (Ε.Τ.Ε.Π.) of D.U.Th. and the Vice Rector, who is responsible for academic matters, as President. The members of the Committee have experience in organising and participating in study programmes of second cycle studies. The term of office of the Committee is two (2) academic years. In particular the higher education institutions where only one (1) Faculty operates, are exempted from the obligation to establish a Postgraduate Studies Committee.



The Committee's responsibilities are:

- a) the submission of an opinion to the Senate of Democritus University of Thrace, on the establishment of new postgraduate studies programmes or the modification of already operating postgraduate studies programmes, after evaluation of the requests of the Assemblies of the Departments for the establishment of new postgraduate studies programmes, their relevant feasibility and viability reports and the costing of operation of the Postgraduate Studies Programme as well as the possibility of their referral, if the proposal is not adequately justified or if the accompanying reports are not complete.
- b) the preparation of draft Regulations for programmes of second and third cycle of studies of D.U.Th. and its submission to the Senate,
- c) the planning of a model draft of the Regulations for the operation of a postgraduate studies programme,
- d) the control of the compliance of the Regulations for the operation of postgraduate studies programmes,
- e) the supervision of the implementation of the legislation, the Regulations and the decisions of the administrative bodies of Democritus University of Thrace by the postgraduate studies programmes,
- f) the supervision of the implementation of the procedure for exemption from the obligation to pay tuition fees
- g) any other competence defined by the Rules of Procedure.

3. The Assembly of the Department, the main competence of which is to recommend to the Senate through the Postgraduate Studies Committee, at least the cases (a) to (p) of paragraphs 3 and 4 of article 80 of Law 4957/2022 (A' 141), accompanied by the Rules of Procedure of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.), and the Diploma Supplement templates in Greek and English.

Also the Assembly of the Department has the following responsibilities:





- a) establishes Committees for the evaluation of applications from candidate postgraduate students; and  
approve their enrolment in the Inter-University Postgraduate Studies Programme,
- b) assigns the teaching work to the lecturers of the Inter-University Postgraduate Studies Programme
- c) recommends to the Senate the amendment of the decision to establish the Inter-University Postgraduate Studies Programme, and the extension of the duration of the Inter-University Postgraduate Studies Programme,
- d) establishes examination committees for the examination of graduate students' theses and designates the supervisor for each work,
- e) ascertains the successful completion of the course, in order to be awarded the title of the Inter-University Postgraduate Studies Programme
- f) approves the report of the Inter-University Postgraduate Studies Programme, following the recommendation of the Coordinating Committee (Σ.Ε.).

By decision of the Assembly of the Department, the responsibilities of para. a) and d) may be transferred to the Coordinating Committee (Σ.Ε.) or the Inter-University Postgraduate Studies Programme.

Exercises any other authority provided by the provisions of Chapter I (Θ) of Law 4957/2022.

In case of inter-departmental or inter-institutional or joint Postgraduate Studies Programme (Π.Μ.Σ.) competent body instead of the Assembly of the Department is the Studies Program Committee (Ε.Π.Σ.), which consists of members of Teaching and Research Staff (Δ.Ε.Π.) of the collaborating Departments and is established by decision of the Senate of the D.U.Th. which takes over the administration support of the Inter-University Postgraduate Studies Programme, upon recommendation of the Assemblies of the collaborating Departments or competent bodies of the cooperating agencies.



The Studies Programme Committee (Ε.Π.Σ.) consists of seven (7) members. The Studies programme Committee (Ε.Π.Σ.) is made up of four (4) members of the Teaching and Research Staff (Δ.Ε.Π.) of the Department of Electrical and Computer Engineering (THMMY) of D.U.Th. elected by the Assembly of the Department and three (3) Researchers of the National Research Centre for Scientific Research "DEMOKRITOS" appointed by the Board of Directors of the National Research Centre for Scientific Research "DEMOKRITOS".

Emeritus Professors of the Department of Electrical and Computer Engineering (THMMY) of D.U.Th may participate, as long as they provide teaching work at the the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.).

4. The Coordinating Committee (Σ.Ε.) consists of the Director of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.) and four (4) members of the Teaching and Research Staff (Δ.Ε.Π.) of the Studies Programme Committee (Ε.Π.Σ.), which have a related discipline with that of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.) and undertake teaching work at the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.). The members of the Coordinating Committee (Σ.Ε.) are determined by decision the of Studies Programme Committee (Ε.Π.Σ.).

In case of inter-departmental or inter-institutional or joint Postgradue Studies Programme (Π.Μ.Σ.), by decision of the Studies Programme Committee a Coordinating Committee (Σ.Ε.) may be established, with a two-year tenure, in which the Director of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.) must participate and four (4) members of the Studies Programme Committee.

The Coordinating Committee (Σ.Ε.) is responsible for monitoring and coordinating the operation of the programme and in particular:

a) prepares the initial annual budget of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.) and its amendments, since the Inter-University Postgraduate



Studies Programme (Δ.Π.Μ.Σ.) allocates resources in accordance with Article 84, and recommends its approval to the Research Committee of the Special Account for Research Grants (Ε.Λ.Κ.Ε.),

b) draws up the report of the programme and recommends its approval to the Studies Programme Committee (Ε.Π.Σ.),

c) approves the incurring expenditure of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.),

d) approves the granting of scholarships, compensatory or not, according to what is defined in the decision establishing the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.) and the Regulations for postgraduate and doctoral studies,

e) recommends to the Studies Programme Committee (Ε.Π.Σ.) the distribution of teaching work, as well as the assignment of teaching work in the categories of teachers of article 83,

f) recommends to the Studies Programme Committee (Ε.Π.Σ.) the invitation of Visiting Professors to cover teaching needs of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.),

g) draws up a plan for the modification of the studies programme, which it submits to the Studies Programme Committee (Ε.Π.Σ.),

h) recommends to the Studies Programme Committee (Ε.Π.Σ.) the redistribution of courses between academic semesters, as well and issues related to quality improvement of the programme of studies.

Emeritus Professors of the Department of Electrical and Computer Engineering (THMMY) of D.U.Th may participate in the Coordinating Committee (Σ.Ε.), as long as they provide teaching work at the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.).

5. The Director of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.),



Comes from members of the the Teaching and Research Staff (Δ.Ε.Π.) of the Department of Electrical and Computer Engineering of D.U.Th. by priority of Professor or Associate Professor rank. The Director is appointed by decision of the Studies Programme Committee (Ε.Π.Σ.) for a two-year tenure, renewable without limitation.

The Director of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.), as well as the members of the Coordinating Committee (Σ.Ε.), and of the Studies Programme Committee (Ε.Π.Σ.) are not entitled to remuneration or any compensation for discharging the responsibilities assigned to them and related to the performance of their duties.

The Director of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.), has the following powers:

a) chairs the Coordinating Committee (Σ.Ε.), as well as the Studies Programme Committee (Ε.Π.Σ.), prepares the agenda and convenes its meetings,

b) recommends the matters concerning the organization and operation of the the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.), to the Studies Programme Committee (Ε.Π.Σ.),

c) recommends to the Coordinating Committee (Σ.Ε.), and the other bodies of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.) and of D.U.Th. issues related to the effective operation of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.),

d) is the Scientist Responsible of the programme in accordance with article 234 and exercises the corresponding responsibilities,

e) monitors the implementation of the decisions of bodies of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.) and the Rules of Procedure of postgraduate studies programmes, as well as the monitoring the execution of the budget of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.),



g) exercises any other authority, which is defined in the decision establishing the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.),

At the end of the tenure of the Coordinating Committee (Σ.Ε.), under the responsibility of the outgoing Director, a detailed report for the research and educational work of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.) as well as for its other activities, is drawn up, with the aim of upgrading the studies, the best utilization of human resources, optimization of existing infrastructures and social beneficial use of the available resources of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.). The report is submitted to the relevant Department, in which the Inter-University Postgraduate Studies Programme belongs.

#### **Article 5**

#### **Criteria for Maximum and Minimum Number of Admitted Students - Admission Criteria – Selection Procedure**

The maximum and minimum number of admitted Postgraduate students are specified per Postgraduate Studies Programme of D.U.Th. as well as the criteria based on which the minimum and maximum number of admitted students per postgraduate studies programme of D.U.Th.

The maximum number of admitted students in the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.) is defined to fifty (50) while the minimum number of admitted students Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.) is respectively defined in six (6) postgraduate students.

The Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.) provides one (1) specialization.

#### **Admitted Students Selection Criteria and Procedure**

i. Call for expression of interest.



The Department on dates set by the Studies Programme Committee (Ε.Π.Σ.), calls for expression of interest announcing positions with an open process for the admission of graduates to the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.).

The call states the conditions for admission, the categories of graduates and the number of admitted students, the mode of admission, the selection criteria, etc., the application deadlines as well as the supporting documents required.

The applications together with the necessary supporting documents are deposited in the Secretariat of the Department of Electrical and Computer Engineering (THMMY) of D.U.Th in electronic form.

ii. Admitted Students Selection Committee.

The selection of admitted students to the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.) is made from a Three-member Committee of teachers of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.), which is established by decision of the Studies Programme Committee (Ε.Π.Σ.).

iii. The conditions and criteria for selecting candidates are specific, quantitative and/or qualitative, and are made known to the candidates by means of an announcement of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.).

The selection criteria of the candidates, indicatively and may not exclusively include:

The conditions for admission to the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.) are:

a) Degree of D.U.Th.

b) Reference Letter. The required number and the type of reference letters from members of the Teaching and Research Staff (Δ.Ε.Π.), Special Educational Staff (Ε.Ε.Π.), Laboratory and Technical Staff (Ε.ΔΙ.Π.), employers, etc. determined by a decision of the Studies Programme Committee.



c) At least very good knowledge (C1) of English language. No certification is required for those who have obtained a degree, undergraduate or postgraduate diploma or doctoral diploma of any recognized institution of higher education of the country or abroad in which the teaching takes place in English. In case of not having a degree of a foreign language, the collaborating institutions may, without being obliged, to perform a special exam in the foreign language, to find out the level of knowledge in this language by the candidates.

3) Certificate of recognition of Degree or Diploma equivalence by the Hellenic NARIC (Hellenic National Academic Recognition and Information Center (Δ.Ο.Α.Τ.Α.Π)., for graduates of foreign Higher Education Institutions, which are not included in the relevant registry of the Hellenic NARIC.

The selection criteria for candidates may include, for example:

1. Degree/Diploma mark which cannot be less than six (6) with excellent ten (6/10). Senior students can apply, but they are accepted only if they present a "certificate of completion", before the Studies Programme Committee (Ε.Π.Σ.) meeting, which validates the list of admitted students.

2. Transcript of undergraduate courses, related to the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.),

3. Performance in the Diploma Thesis, where this is provided for in the first cycle of studies.

4. Knowledge of a second or other foreign language.

5. Relevant research or professional activity of the candidate related to the subject of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.),

6. Interview by a competent Committee.

7. Publications and authorship.



An electronic file is created for each candidate that includes all the supporting documents submitted. The files of the candidates are examined and scored. The maximum scoring of each file included is 75 points.

The interviews concern issues of familiarization and understanding of the subjects of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.), and in matters of knowledge of the wider scientific field. The motivations and desire of the candidates to successfully complete the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.), are also examined.

The maximum scoring of the interview is 25 points. The final selection of candidates is based on the scoring of the data submitted in the file as well as the score of the interview with maximum number of points, 100 points.

TABLE OF CANDIDATES' SCORING	
QUALIFICATIONS and INTERVIEW	Maximum number of points
Mark of Degree or Diploma. From 6.0 to 7.49 (included): 0 points From 7.50 to 8.99 (included): 7 points From 9.0 to 10 (included): 15 points	15
Carrying out an undergraduate Diploma or Degree thesis with a subject related to the subject of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.). Points 0 to 15 (included).	15
The candidate's relevant research or professional activity related to the subject of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.), Points 0 to 20 (included).	20





Publications in peer-reviewed international scientific journals. Points 0 to 15 (included), in proportion to the number of publications, as well as and to the relation fo the subkect of the publications with the subject of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.)	15
Presentation of projects in scientific congresses, as well ass the relation of the subject of the projects with the subject of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.)	10
Interview. Points 0 to 25 (included)	25
<b>TOTAL</b>	<b>100</b>

#### iv. Selection procedure

The relevant files of the interested parties are submitted at a specific time each year, on dates specified in the call for expression of interest.

Candidates are advised to carefully check the instructions regarding each individual criterion for their scoring, so that the file is submitted in full on the predetermined dates. Supplementary, incomplete or outdated documents are not accepted.

The selection process is as follows:

- 1) At first, a complete list of those who have applied is prepared by the Secretariat of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.),
- 2) The Admitted Students Selection Committee:
  - i. Rejects the candidates who do not fulfill the requirements.
  - ii. It ranks the candidates by their scoring and proceeds with the pre-publication of the provisional table of selection and announces the duration of objections.



iii. Invites to an interview (if provided for) those candidates decided to be called by the Admitted Students Selection Committee.

iv. After examining the objections and based on the candidate's final score, the Committee draws up the final selection table in order of evaluation.

3) The final list of successful candidates is validated by the Studies Programme Committee (Ε.Π.Σ.), and it is posted on the website of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.).

In the event of a tie, all candidates with equal grades are admitted, provided that they do not exceed the maximum number of admitted students set out in the Call for Expression of Interest. In the event that the maximum number of admitted students to the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.) is reached, the candidate with the highest degree mark will be admitted.

The successful candidates, after being informed by the Secretariat, are invited to respond in writing within a specific period of time defined in the Rules of Procedure of each Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.), as to whether they accept their inclusion in the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.) and its operating conditions. The response of the selected candidate not within the above deadline is equivalent to refusal of acceptance and the Secretariat of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.) informs the immediately next one in the evaluation rank from the relevant table of successful candidates.

v. Registration in the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.).

The Secretariat of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.) announces the duration of the registrations as well as the supporting documents required.



Successful candidates should submit for their registration in the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.) the relevant supporting documents electronically. Registration is considered complete when all required supporting documents are submitted.

The positions of successful candidates who do not register by the deadline are filled by other successful candidates drawn from the list of runners-up based on the order of success.

### **Article 6**

Categories of Candidates for studying at the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.).

Holders of a degree from the first cycle of studies in Higher Education Institutions (Universities and Technological Educational Institutions) of the country or of affiliated institutions abroad, are accepted.

The competent Secretariat checks whether the institution awarding the title of a foreign institution belongs to the National Registry of Foreign Recognized Higher Education Institutions and whether the type of this title belongs to the National Registry of Foreign Recognized Academic Title Types, which are posted on the website of the Hellenic NARIC. .

The members of the categories of the Teaching and Research Staff (Δ.Ε.Π.), Special Educational Staff (Ε.Ε.Π.), Laboratory and Technical Staff (Ε.ΔΙ.Π.), may upon application be registered as supernumerary/-ies, and only one per year and per Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.), as long as they serve in the relevant Department and the degree and the work they perform in the relevant Department are related to the subject of the Inter-University Postgraduate Studies Programme (Δ.Π.Μ.Σ.).



1. Graduates of Schools of Engineering of Universities of the country or correspondingly recognized ones of similar institutions abroad, specializing in Electrical and Computer Engineering, in Computer Engineering and Informatics, or any other relevant specialty.

2. Graduates of Departments of Sciences of Universities of the country, or recognized similar institutions abroad, specializing in Physics, Chemistry, Mathematics, Biology, Molecular Biology and Genetics, Materials Science, as well as any other relevant specialty.

3. Graduates of Departments of Informatics or Information Sciences of four-year attendance of Universities of the country or correspondingly recognized ones of similar institutions abroad.

4. Graduates of the Hellenic Army Academy, of the Hellenic Naval Academy and the Hellenic Air Force Academy.

In cases of a tie for the last place in the table of successful candidates, all candidates with the same score are selected, even if the number exceeds the maximum number of postgraduate students.

### *Article 7*

#### ***Duration of Studies – Part time attendance of studies –Intermission of studies***

##### ***1. Time duration of studies attendance***

The standard duration of studies in Inter –Institutional Postgraduate Program (Δ.Π.Μ.Σ) leading to obtaining/award of the Postgraduate Studies Diploma (Δ.Μ.Σ.) is defined to three (3) semesters minimum, which also includes the preparation and submission for valuation of the Post Graduate Diploma Dissertation (MSc Dissertation) (Μ.Δ.Ε). The time concerning Diploma Dissertation lasts one (1) semester. Maximum time period of studies lasts one (1) semester. Maximum duration of studies is six (6) semesters. The Post graduate student is required to fulfill his postgraduate studies



within twice the anticipated duration of Inter – University Postgraduate Program, that is within six (6) semesters.

Terms of studies (attendance) are included and specialized amongst others in Bylaws of each Inter –Institutional Postgraduate Program. Each candidate prior registration has to be informed as to the said Regulation and accept the rules of operation of Inter – University Postgraduate Program. Acceptance of the said Regulation consists is a prerequisite for attaining and keeping of postgraduate student capacity.

Attendance at the program is considered to end with the completion of writing and public presentation of Postgraduate Diploma Dissertation.

### ***2. Part time attendance of studies***

Pursuant to pass. ζ) par 4 article 79 Law 4957/2022 (A' 141) postgraduate students are provided with the possibility of part-time attendance for working students, duration of which cannot exceed twice the anticipated duration of regular attendance.

In case aforesaid students have to produce supporting documents proving that they work at least 20 hours per week.

### ***3. Intermision/Respite of Studies***

In exceptional cases, postgraduate students are provided, following submission of the relevant justified application, temporary respite of studies, which cannot exceed two (2) consecutive semesters. During respite the postgraduate student forfeits student's status. The time of respite is not counted in maximum duration of regular attendance of studies.

The student upon resuming his/her studies, is still subject to the student status of his enrollment period as postgraduate student.

Respite is granted by decision of the Studies Program Committee (Ε.Π.Σ.) following motion of the Coordinating Committee which decides on terms of re-sitting the exams and grounds for crossing off.

Grounds for crossing off/removal are:



- a) No sufficient progress of the postgraduate student (which is documented with non-participation in educational procedure that is attendances, examinations).
- b) Failure of completion of the rest of obligations as set out with the relevant Regulation.
- c) Conduct offending academic ethics, such as i.e. plagiarism, and
- d) Application of the postgraduate student himself

### **Article 8**

#### ***Terms of Attendance of Studies***

Each candidate prior enrollment has to be informed as to the said Regulation and accepts rules of operation of the Inter – University Postgraduate Program (Δ.Π.Μ.Σ). Acceptance of the Regulation is essential for the attainment and keeping of postgraduate student capacity.

Candidate postgraduate students are enrolled and participate in Inter – University Postgraduate Program (Δ.Π.Μ.Σ) under terms and provisions provided.

If the postgraduate student fails in course or courses examination and considered as not having successfully fulfilled the program, is examined following his request by a three-member committee of faculty members in Inter – University Postgraduate Program (Δ.Π.Μ.Σ) who have the same or relevant gnostic subject with the course examined and are appointed by the Studies Program Committee (Ε.Π.Σ). The teacher responsible for the examination shall be excluded from the committee.

Each candidate bears the obligation to publicly present and support of Postgraduate Diploma Dissertation.

The language of teaching, examinations, writing and presentation of Post Graduate Diploma Dissertation is the English Language. The title of Inter – University Postgraduate Program (Δ.Π.Μ.Σ) in English shall be: “Quantum Computing and Quantum Technologies”, translation in Greek shall be «Κβαντική Υπολογιστική και



Κβαντικές Τεχνολογίες». In case of pure Greek-speaking audience, simultaneous usage of Greek language during oral teaching may be available.

### **Article 9**

#### **Curriculum Guide/Study Guide**

Every year the Curriculum Guide for the Inter – University Postgraduate Programs (Δ.Π.Μ.Σ) is issued to Postgraduate students. The said Study Guide shall include:

1. Courses program, the names of faculty members (professors), entitlements (social benefits, scholarships, loans, textbooks, resources, etc.) of postgraduate students, their obligations as well as information on operation of study halls, laboratories, clinics and libraries of the Department.
2. Total of credits (ECTS) required for obtaining the Post Graduate Diploma (Δ.Μ.Σ) in all courses which are divided in semesters of studies.
3. Detailed studies program, titles and short description (syllabus) of courses, seminars, laboratories and clinical practice of Inter – University Postgraduate Program (Δ.Π.Μ.Σ), elaboration of Diploma dissertation or undertaking other education and research activities defined as obligatory or elective for successful fulfillment of the Inter – University Postgraduate Program (Δ.Π.Μ.Σ), upon report of credits (European Credit Transfer and Accumulation System – ECTS) awarded case by case.
4. Official language for program implementation and Diploma Dissertation is the English language.

Directors of Inter – University Postgraduate Program (Δ.Π.Μ.Σ) shall issue and deliver academic calendar lay outs and timetables. The timetable includes dates of commencement and expiry of teaching periods, examination periods, holidays, courses teaching days and hours, dates of other events or obligations etc. The academic



calendars and timetables are forwarded to the Directorate of Academic Issues/Affairs and Special Accounts for Research Grants of Democritus University of Thrace.

Upon enrollment in the Inter – University Postgraduate Program the student receives from the Secretariat the annual Academic Calendar of the Program.

Valuation of courses is made following written or oral examination, project, presentation, report or combination of the said. Exact form of the valuation is defined by the faculty member or members (professors) related to the nature of each course as well.

Valuation terms for each course are notified by the faculty member / members (professors) on commencement of the course or in case of co teaching by the course coordinator.

Running Time for courses and duration of examination periods of Inter – University Postgraduate Program (Δ.Π.Μ.Σ) are determined by the Studies Program Committee (Ε.Π.Σ) of Inter – University Postgraduate Program (Δ.Π.Μ.Σ), following recommendation of the Coordinating Committee and the relevant Academic Calendar is drawn up, posted on webpage of Inter – University Postgraduate Program (Δ.Π.Μ.Σ). The Inter – University Postgraduate Program (Δ.Π.Μ.Σ) is organized to a percentage of 100% with methods of contemporary distance education and is accompanied by report including analysis of distance organization of educational process.

Report of organization and methods of distance teaching.

The Anglophone, International Inter – University Postgraduate Program (Δ.Π.Μ.Σ) entitled “Quantum Computing – and Quantum Technologies” operates with methods of 100% modern distance teaching and education. The Inter – University Postgraduate Program (Δ.Π.Μ.Σ) participates in “Quantum Educators Program” and “Quantum Researchers Program” programs of IBM, which renders distance access to its quantum computer cloud to postgraduate students (ΜΦ) of Inter – University Postgraduate Program (Δ.Π.Μ.Σ).





The Inter – University Postgraduate Program (Δ.Π.Μ.Σ) aims at attracting postgraduate students worldwide. Distance education shall have as a result the increase of participation of foreign students to Inter – University Postgraduate Program (Δ.Π.Μ.Σ). Modern Distance Learning/Distance contemporary teaching is offered for Inter – University Postgraduate Program (Δ.Π.Μ.Σ) and shall increase effectiveness thereof since electronic educational means shall be exploited, as described below.

1. Postgraduate students shall receive for free and shall install to their personal computer the Quantum Computer Simulator (QCS), the quantum games simulator and quantum walks.
2. Postgraduate students shall receive for free and shall install in their personal computer the IBM Quiskit Quantum Computer Simulator.
3. Postgraduate students shall receive for free and shall install in their personal computer the software package for quantum bits design, quantum circuits and quantum processors of superconducting technology.
4. Postgraduate students shall have access for free in IBM quantum calculations cloud aiming at their programming and execution of quantum algorithms.

The said shall allow Postgraduate Students to be educated under the direct supervision of Faculty members (professors) during distance teaching. In addition, following the end of their postgraduate studies, Postgraduate Students shall hold in their possession a total of simulation and design tools, which may be used in regard to their professional or academic activities.

Faculty members (professors) of Inter – University Postgraduate Program (Δ.Π.Μ.Σ), possess digital skills and fully corresponds to educational duties of distance learning. In regard to distance teaching, inter – University Postgraduate Program (Δ.Π.Μ.Σ) shall fully leverage current potentials rendered by the platforms of communication and distance education at the disposal of Democritus University of Thrace (Δ.Π.Θ) such as Microsoft Teams (for contemporary education) as well as Open eclass and One Drive.



Zoom platform of communication and distance education available by National Center for Scientific Research “DEMOKRITOS” (ΕΚΕΦΕ), shall be fully leveraged as well. Inter – University Postgraduate Program bears applied status and valuation of postgraduate students is made mainly upon elaboration of dissertation and topics during teaching of semester courses. During the examination weeks faculty members may call postgraduate students to present before the faculty member and his co students their distance dissertation selected by the faculty member.

Valuation of the faculty members and educational material by the postgraduate students shall be realized as well by distance electronic means, with the use of information system of Quality Assurance Unit (MODIP) of Democritus University of Thrace. Postgraduate students with the use of their institutional accounts are able to connect with MODIP Information system and electronically fill in the questionnaires for valuation for all postgraduate courses.

Courses attendance is obligatory and is ascertained upon responsibility of the faculty member. Up to three (3) absences are allowed in each semester course of Inter – University Postgraduate Program (Δ.Π.Μ.Σ). In case the number of absences is higher than three (3) and the grounds of absence are major, then following request of the interested party / postgraduate student the case is examined by the Coordinating Committee of the Inter – University Postgraduate Program (Δ.Π.Μ.Σ), which shall approve or not the request and put it forward to the Studies Program Committee (Ε.Π.Σ) for final approval.

In case the number of presentations aforesaid cannot be achieved, the student is considered as having failed in the said course.

Check as to individual courses is made upon written or oral examinations, elaboration of dissertation or combination of the above.

Grading scale for valuation of postgraduate student’s performance is defined from zero (0) up to ten (10):

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Excellent from eight and fifty (8.50) up to ten (10).

Very good from six and fifty (6.50) up to (included) eight and forty-nine (8,49).

Good from five (5) up to (included) six and forty-nine (6,49).

Results of courses grading are notified upon responsibility of the competent coordinator of the course to postgraduate students fifteen (15) days following the day of examination or in case the valuation is made based on dissertations, (20) twenty days following the dissertations delivery date.

Repeating examination is not allowed in order for the student to upgrade his grading.

Grade of the Diploma of Postgraduate Studies (ΔΜΣ) is defined by the grades of Program courses and the grade of his/her postgraduate dissertation, as follows:

(MSc) Diploma of Postgraduate Studies (ΔΜΣ) grade =  $MOY \times 0,35 + MOE \times 0,30 + B\Delta E \times 0,35$ , that is:

MOY = Grade point average for obligatory courses

MOE = Grade point average for elective courses

BΔE = Grade for Postgraduate Diploma Dissertation

Grade for (MSc) Diploma of Postgraduate Studies (ΔΜΣ) upon responsibility of the Secretariat is registered in the private file of the student.

### ***Article 10***

#### ***Studies Program***

The total of Credits (ECTS) required in order to obtain the Diploma of Postgraduate Studies (ΔΜΣ) rises to ninety (90) with duration of studies lasting three (3) semesters.

In order to obtain the Diploma of Postgraduate Studies (ΔΜΣ) obligatory attendance and successful examination of eight (8) courses is required which are divided in the first two semesters of studies (A' and B'). From the said, four (4) are obligatory and four (4) are elective. Obligatory courses correspond to 9 ECTS and elective to 6 ECTS.



During the third (C') semester of studies the Postgraduate Diploma Dissertation is elaborated, credits of which (ECTS) are defined to 30.

Writing language for the Post Graduate Diploma Dissertation is the English language.

Detailed program of studies in which the titles of courses are rendered in English is formed as follows:

<b>A' SEMESTER OF STUDIES</b>			
<b>Code</b>	<b>Course Title</b>	<b>Course Type</b>	<b>ECTS</b>
QY1	Quantum Computing	Y	9
QY2	Quantum devices	Y	9
Electing two (2) courses from the below elective courses:			
QE1	Optical and Quantum Communication	E	6
QE2	Computational Biology	E	6
QE3	Nanoelectronics	E	6
QE4	Quantum Solid state Physics	E	6
QE5	Applied Quantum Mechanics	E	6
QE6	Artificial Intelligence and Applications	E	6
QE7	Python Programming and Applications	E	6
WE8	Quantum Control	E	6
<b>TOTAL OF CREDITS OF A' SEMESTER</b>			<b>30</b>
<b>B' SEMESTER OF STUDIES</b>			
<b>Code</b>	<b>Course Title</b>	<b>Course Type</b>	<b>ECTS</b>
QY3	Quantum Algorithms and Quantum Information	Y	9



QY4	Qubit devices	Y	9
Electing two (2) courses from the below elective courses			
QE9	Quantum Machine learning	E	6
QE10	Natural and Unconventional Computing	E	6
QE11	Linear Algebra for Quantum Mechanics	E	6
QE12	Measurement and characterization Methods for Devices and Systems	E	6
QE13	Advanced Topics in Quantum Computing and Quantum Technologies	E	6
QE14	Quantum Optics	E	6
TOTAL OF CREDITS OF B' SEMESTER			30
C' SEMESTER OF STUDIES			
<b>Code</b>	<b>Course Title</b>	<b>Course Type</b>	<b>ECTS</b>
<b>QMD</b>	<b>MSc Dissertation</b>	<b>Y</b>	<b>30</b>
<b>TOTAL OF CREDITS OF C' SEMESTER</b>			<b>30</b>

Y Obligatory Course                      E: Elective course

In Curriculum Guide approved by Studies Program Committee (Ε.Π.Σ.) and issued in English language detailed description of courses are included in order to keep up with the rapid progress of science in courses of Inter – University Postgraduate Program (Δ.Π.Μ.Σ). The Studies Program Committee (Ε.Π.Σ.) upon decision thereof may permute courses from A' to B' Semester and vice versa.

Obligatory courses are taught in each academic year, whereas, following decision of the Studies Program Committee (Ε.Π.Σ.) elective courses may be not taught, provided that at least two elective courses will be available per studies semester.



Each academic year and according to the number of registered students in Inter – University Postgraduate Program (Δ.Π.Μ.Σ), the Studies Program Committee (Ε.Π.Σ.) may set out lower limit and/ or higher limit as to number of students to be enrolled in each elective course. In case aforesaid and provided that the number of students is below the lower limit the elective course is not taught and students elect and are enrolled in another elective course.

Each course is taught by one or more faculty members. In each course a faculty member is appointed as responsible coordinator of the course by an Assembly or Studies Program Committee (Ε.Π.Σ.).

In addition, postgraduate courses of the following categories may be added:

- a) Postgraduate (MSc) intensive courses and, of short duration by distinguished Visiting Professors, Researchers and holders of Doctor's Diploma (PhD), professional occupation of whom is involved in courses of Inter – University Postgraduate Program (Δ.Π.Μ.Σ)
- b) Short duration Lectures of specialized issues.

Courses of the said categories (a) and (b) are not taken under consideration for forming students' GPA. Upon decision of the Coordinating Committee the relevant attendance certificates are rendered.

In the beginning of each semester the timetable of the semester is drawn up. Courses and seminars may be held in morning and afternoon hours. Upon decision of the Studies Program Committee (Ε.Π.Σ.) courses and seminars may be realized on Saturdays and holidays.

In extraordinary cases following the relevant request of the interested student upon concordant recommendation of the Coordinating Committee and upon decision of the Studies Program Committee (Ε.Π.Σ.) the replacement of initially elected postgraduate (MSc) courses with other elective postgraduate courses is allowed.



Each postgraduate course may include theory, exercises, laboratories, essays, presentations and discussions. Performance grading is made in a scale from zero (0) to ten (10). Performance in each course is considered sufficient if at least grade five (5) is achieved.

### ***Article 11***

#### ***Postgraduate Diploma (MSc) Dissertation***

- a) The postgraduate (MSc) student is obligated to elaborate and successfully support his postgraduate (MSc) diploma in the respective semester of studies mentioned in the Bylaws of Inter – University Postgraduate Program (Δ.Π.Μ.Σ).

The topic thereof has to be related to the subject matter of the Inter – University Postgraduate Program (Δ.Π.Μ.Σ) and leverage knowledge acquired in courses of Inter – University Postgraduate Program (Δ.Π.Μ.Σ) and in specific fields. Postgraduate (MSc) Diploma Dissertation is elaborated in English language.

In relevance to undertaking, elaboration and support of the Diploma Dissertation the following are set out:

#### ***Application – Topic Submission***

Postgraduate (MSc) student is individually obligated to elaborate and successfully support in public his Postgraduate (MSc) Diploma Dissertation during C' semester of studies.

The topic of the Postgraduate (MSc) Diploma Dissertation has to be relevant to the subject matter of the Inter – University Postgraduate Program (Δ.Π.Μ.Σ) and leverage knowledge obtained in courses of the Inter – University Postgraduate Program (Δ.Π.Μ.Σ). Maximum time for elaboration of Postgraduate (MSc) Diploma Dissertation corresponds to time period during which maximum time for studies is completed.



Up to the end of Winter semester recommended topics for elaboration of the Postgraduate (MSc) Diploma Dissertation are announced. Students study the topics and come to an agreement with the faculty members of Inter – University Postgraduate Program (Δ.Π.Μ.Σ) having recommended the topics, in order to select the final topic, they are interested in.

Further on, the student, until prior commencement of 3<sup>rd</sup> semester at the latest, files an application to the Secretariat in which the title of chosen Postgraduate Diploma Dissertation (MSc Dissertation), is registered.

Postgraduate (MSc) student is entitled to select a topic of Postgraduate Diploma Dissertation (MSc Dissertation) provided that he has successfully completed four (4) courses regardless of the semester of Inter – University Postgraduate Program (Δ.Π.Μ.Σ).

In addition, in the same time period the postgraduate student may file an application addressed to the Secretariat of the Inter – University Postgraduate Program (Δ.Π.Μ.Σ) in which the recommended title of the Dissertation and the recommended supervisor shall be registered and a summary of the recommended dissertation is attached herein. Postgraduate (MSc) students who do not apply within the time periods defined by the Bylaws, may adjourn upon their own liability per one semester at least the commencement of Postgraduate Diploma Dissertation (MSc Dissertation).

#### ***Supervision of Postgraduate Diploma Dissertation (MSc Dissertation)***

The coordinating committee upon application of the candidate appoints the supervisor of the said and constitutes the three-member examining committee for approval of the dissertation, one of the members of which is the supervisor.

Right of supervision of diploma dissertations (MSc Dissertation) bear the faculty members of Inter – University Postgraduate Program (Δ.Π.Μ.Σ). In addition, the right to supervise the diploma dissertations have the following as well:





- a) Members of the Teaching Research (Researching) Staff (Δ.Ε.Π) of the Department of Electrical and Computer Engineering (THMMY) of Democritus University of Thrace or Researchers of National Center for Scientific Research “DEMOKRITOS” (ΕΚΕΦΕ), with additional occupation beyond their legal obligations, if the Inter – University Postgraduate Program (Δ.Π.Μ.Σ) bears tuition for attending courses.
- b) Professors emeritus or faculty retirees of the Department of Electrical and Computer Engineering (THMMY) of Democritus University of Thrace (ΔΠΘ) or other departments of Democritus University of Thrace or other universities.
- c) Associate professors,
- d) Commissioned faculty members
- e) Visiting Professors or Visiting researchers.
- f) Researchers and special operations scientists of researching and technological agencies of article 13A law 4310/2014 (Α’ 258) or other research centers and institutes domestic or foreign provided that they are holders of Doctor’s diploma (PhD).

Upon decision of the competent body of the Inter – University Postgraduate Program (Δ.Π.Μ.Σ) supervision of diploma (MSc) dissertations may be assigned even to members of the Teaching Research Staff (Δ.Ε.Π), Staff Faculty Members (Ε.Ε.Π) and Laboratory Teaching Staff (ΕΔΙΠ) of the Department, who have not undertaken the teaching work in Inter – University Postgraduate Program (Δ.Π.Μ.Σ) as well as, to Researchers of National Center for Scientific Research “DEMOKRITOS” (ΕΚΕΦΕ). Members of the Three-member Examining Committee have to bear the same or relevant scientific specialty with the subject matter of Inter – University Postgraduate Program (Δ.Π.Μ.Σ).

In exceptional cases of loss, objective weakness to attend duties of supervision or significant ground, replacement of the supervisor may be made or, of member of the



three-member examining committee following decision of the Assembly of the Committee of Studies program (Ε.Π.Σ)

***Presentation and fulfillment of the Postgraduate Diploma (MSc) Dissertation.***

Following elaboration of the Postgraduate Diploma (MSc) Dissertation the postgraduate student submits to the supervisor and two other members of the three member examining committee copies of the final Postgraduate diploma (MSc) dissertation. Provided that there is positive feedback by the three-member examining committee, the date of presentation – oral examination is set out in time period of the previous paragraph. The extent and thoroughness of the oral examination on support is corresponding to the form of presentation of the dissertation.

Following presentation – support of the Postgraduate Diploma (MSc) Dissertation, the Examining committee shall draw up and sign the Minutes of Public Presentation of the Postgraduate Diploma (MSc) dissertation in which any observations or comments are written as well as, the final grade.

Following the approval by the committee, it is obligatorily posted on website of the relevant School.

In case of negative feedback there is the potential of resubmission following two months, after improvement of the dissertation by the postgraduate student pursuant to the remarks of the three-examining committee.

In case of negative feedback even after the second submission, the postgraduate student bears the right, in the following academic year to change the topic and the supervisor.

In case of a second failure the postgraduate student is excluded from the award of Postgraduate Diploma (MSc).

Final full copy of the Postgraduate Diploma (MSc) Dissertation (Μ.Δ.Ε) is submitted following acceptance thereof, in the library of Democritus University of Thrace (Δ.Π.Θ) as well as the file in electronic form kept with the Department. Postgraduate Diploma (MSc) Dissertations (Μ.Δ.Ε) constitute property of the Inter – University



Postgraduate Program (Δ.Π.Μ.Σ) entitled to use and reproduce for didactic and research purposes.

Postgraduate Diploma (MSc) Dissertation (Μ.Δ.Ε) may be theoretical, applied or experimental and includes recognizable records of originality and contribution to scientific knowledge.

The text has to fulfill qualifications and structure of a scientific project that is to include description of the topic of the dissertation, description of findings – outcome of the project, methodology, assumptions, bibliography and any other requisite, supportive and explanatory elements (required shapes, diagrams, photographs, images etc.).

It is drawn up in English language.

### ***Article 12***

#### ***Entitlements and benefits***

Postgraduate (MSc) students bear all entitlements, benefits and facilitations provided for students of the first studies cycle as well, apart from the entitlement of granting free course books (teaching material).

The Department ought to ensure for disabled postgraduate students or/and, of special educational needs, accessibility to the recommended course books (teaching material) and teaching or other facilitations.

These facilitations shall have to be in detail set out by the Departments (i.e. manner of examination, access to teaching areas, laboratories etc.).

### ***Article 13***

#### ***Obligations of postgraduate students***

Postgraduate (MSc) students have the following obligations:

Constantly attend courses of the studies program in force or the current studies program.

Submit the required dissertations within the defined time periods.

Sit for the examinations provided for.



Submit to the Secretariat prior valuation of their Diploma MSc dissertation a solemn declaration that their diploma (MCs) dissertation aforesaid does not constitute a product of plagiarism neither in its entirety nor in its sub-sections.

Pay tuition for attendance of studies as defined with the present regulation.

Respect and abide by the present Regulation of Postgraduate Studies (MSc), decisions of the bodies of Inter – University Postgraduate Program (Δ.Π.Μ.Σ), of the Department and Democritus University of Thrace (Δ.Π.Θ), as well as academic ethics.

#### ***Article 14***

##### ***Tuition for attendance of studies***

The Inter – University Postgraduate Program (Δ.Π.Μ.Σ) operates upon tuition for attendance of studies.

Postgraduate students are obligated to payment of tuition. The level of tuition provided, for the total of the program of Inter – University Postgraduate Program (Δ.Π.Μ.Σ) rises to four thousand five hundred (4.500) euro. Level of tuition may be amended by decisions of competent bodies pursuant to applicable legal framework.

Payment of tuition may be made by installments and in particular payment of the first installment of one thousand five hundred (1.500) euro on enrollment of the student and the other two installments, each of one thousand five hundred (1.500) euro prior commencement of B' and C' semester on dates defined by the Secretariat. Policy of exploitation of tuition is described below.

1. The said Inter – University Postgraduate Program (Δ.Π.Μ.Σ) is not financed by the regular budget of Democritus University of Thrace (Δ.Π.Θ), National Center for Scientific Research “DEMOKRITOS” (ΕΚΕΦΕ), and the Ministry of Education and Religious Affairs.



2. In order to render high level education, constant updating of faculty members is requisite regarding rapidly developed field of Quantum Computing and Quantum Technologies.
3. Tuition fees are disposed on:
  - Remuneration of faculty members
  - Cost covering for secretarial support
  - Purchase of disposables
  - Transport costs for the faculty members.
4. Pursuant to passage b' paragraph 4 article 37 Law 4485/2017 thirty per cent (30%) is allocated to cover operational costs of the Institution prioritizing covering of the needs of Postgraduate Studies Program (Π.Μ.Σ) operating on non-tuition.

Seventy per cent (70%) of the overall cost of operation of Postgraduate Studies Program (Π.Μ.Σ) concerns operating costs.

Pursuant to ministerial decision (B'4334) under records 216772/Z1/8.12.2017, percentage of seventy per cent (70%) of operating costs from budget of Inter – University Postgraduate Program (Δ.Π.Μ.Σ), is divided.

Payment of tuition is made in the Special Accounts for Research Grants (Ε.Λ.Κ.Ε) of Democritus University of Thrace (Δ.Π.Θ). which is competent for management thereof. Provided that tuition fees have been defrayed are not returnable on any grounds whatsoever.

Postgraduate students ought to have settled all their financial obligations prior award of the Postgraduate (MSc) Diploma (MSc) (Δ.Μ.Σ).

In programs of Postgraduate Studies (MSc) on tuition, the possibility of exemption is provided, pursuant to legislation in force.

### ***Article 15***



### ***Scholarships***

Upon Decision of the Studies Program Committee (Ε.Π.Σ), grants of scholarships, financial support/stipends or awards of excellence, may be accepted, to postgraduate students which are offered by and derive from public or private agencies, natural entities or legal persons as well as from enterprises, the subject of which is related to the subject of Inter – University Postgraduate Program (Δ.Π.Μ.Σ). Scholarships are granted based on subjective criteria, such as regular attendance, GPA of the previous semester, or service offering.

The amount of scholarships, supporting documents and procedure of granting scholarships and the obligations and entitlements of scholars are defined by Studies Program Committee (Ε.Π.Σ), of the Inter – University Postgraduate Program (Δ.Π.Μ.Σ).

### ***Article 16***

#### ***Postgraduate (MSc) Diploma (Δ.Μ.Σ)***

The title of Postgraduate (MSc) Diploma (Δ.Μ.Σ) is a public document. Its type is defined upon decision of the Senate and signed by the Dean of Democritus University of Thrace (Δ.Π.Θ), the chairman of Department of Electrical and Computer Engineering (THMMY) of Democritus University of Thrace (Δ.Π.Θ), the Clerk of (THMMY) of Democritus University of Thrace (Δ.Π.Θ), or /and their legal alternates thereof. In the title, there are mentioned the Department of Electrical and Computer Engineering (THMMY) of Democritus University of Thrace (Δ.Π.Θ) and National Center for Scientific Research “DEMOKRITOS” (ΕΚΕΦΕ), logos of Democritus University of Thrace (Δ.Π.Θ) and National Center for Scientific Research “DEMOKRITOS” (ΕΚΕΦΕ) and signed by the respective bodies of Democritus University of Thrace (Δ.Π.Θ) bearing administrative support of Inter – University Postgraduate Program (Δ.Π.Μ.Σ).



A certificate of successful fulfillment of attending Inter – University Postgraduate Program (Δ.Π.Μ.Σ) may be granted to the graduate of Inter – University Postgraduate Program (Δ.Π.Μ.Σ).

To the Diploma of Postgraduate (MSc) studies an Appendix of the Diploma is attached related to which regulations of article 15 Law 374/2005 are in force and ministerial decision under records Φ5/89656/BE/13.8.2007 (B' 1466) which constitutes an explanatory document rendering information in relevance to nature, field, general framework of education, content and status of studies, successfully fulfilled, and, does not substitute the official title of studies granted by the Democritus University of Thrace (Δ.Π.Θ) or detailed grading of courses granted by Department of Electrical and Computer Engineering (THMMY) of Democritus University of Thrace (Δ.Π.Θ).

## **Article 17**

### **Teaching Faculty**

Teaching work of Inter –University Postgraduate Programs (Δ.Π.Μ.Σ) is assigned, following decision of the competent body of Inter – University Postgraduate Program (Δ.Π.Μ.Σ) to the following categories of faculty members:

- a) Members of the Teaching Research Staff (Δ.Ε.Π) / Department of Electrical and Computer Engineering (THMMY) of Democritus University of Thrace (Δ.Π.Θ)
- b) Researchers of National Center for Scientific Research “DEMOKRITOS” (ΕΚΕΦΕ)
- c) Members of Teaching Research Staff (Δ.Ε.Π), Special Staff Faculty Members (Ε.Ε.Π), Laboratory Teaching Staff (ΕΔΠΠ), and Specialized and Laboratory Teaching Staff (member of) (ΕΤΕΠΠ), other departments of Democritus University of Thrace (Δ.Π.Θ) or other University (ΑΕΙ) or Higher Military Educational Establishments (ΑΣΕΙ) with additional occupation beyond their



- legal obligations, if, Inter – University Postgraduate Program (Δ.Π.Μ.Σ) bears tuition fees.
- d) Professors emeritus or faculty retirees of the Department of Electrical and Computers Engineering THMMY of Democritus University of Thrace (ΔΠΘ) or other departments of the same or other university.
  - e) Associate professors,
  - f) Commissioned faculty members
  - g) Visiting professors or Visiting Researchers.
  - h) Researchers and special operations scientists of researching and technological agencies of article 13A law 4310/2014 (A' 258) or other research centers and institutes domestic or foreign.
  - i) Scientists of recognized authority, who possess specialized knowledge and relevant experience in gnostic subject of the Inter –University Postgraduate Program (Δ.Π.Μ.Σ).
2. Assignment of teaching work of Inter – University Postgraduate Program (Δ.Π.Μ.Σ) is implemented upon decision of the competent body following introduction of the Coordinating Committee of Inter – University Postgraduate Program (Δ.Π.Μ.Σ). More specialized provisions in relevance to assignment of teaching work may be defined in the decision of establishment of Inter – University Postgraduate Program (Δ.Π.Μ.Σ).
3. The right of supervising Diploma (MSc) Dissertations (degree thesis) bear the faculty members of pass a) through f) of paragraph 1 on the condition that they are PhD holders.

Upon decision of the competent body of Inter –University Postgraduate Program (Δ.Π.Μ.Σ), supervision of diploma dissertations (degree thesis) is assigned even to members of (ΔΕΠ), (ΕΕΠ) and (Ε.ΔΙ.Π) of the Department not having undertaken teaching work in Inter – University Postgraduate Program (Δ.Π.Μ.Σ).





4. All categories of faculty members may be exclusively paid from sources of Inter –University Postgraduate Program (Δ.Π.Μ.Σ). No Fee defrayal or other grant is permitted by the state budget or public investments program. Upon decision of Studies Program Committee (Ε.Π.Σ) of Inter –University Postgraduate Program (Δ.Π.Μ.Σ), concerning assignment of teaching work, the level of fee of each faculty member is defined. Especially faculty members bearing membership of (ΔΕΠ) may be paid additionally for the work offered by the Inter – University Postgraduate Program (Δ.Π.Μ.Σ), provided that they fulfill minimum obligations as derived by the law, defined in paragraph 2 article 155 Law 4957/2022. Last passage is applied accordingly to members of Staff Faculty Members (Ε.Ε.Π) and Laboratory Teaching Staff (ΕΔΙΠ), and Specialized and Laboratory Teaching Staff (member of) (ΕΤΕΠ), provided that they fulfill minimum obligations as deriving by the law.

Supervision of Diploma (MSc) dissertations (Degree thesis) and internship may be paid, provided that the hours occupied exceed obligations as derived by the law.

5. Upon decision of the Studies Program Committee (Ε.Π.Σ), auxiliary teaching work may be assigned to candidate Doctors of the Department or of the School upon supervision of the Faculty Member of Inter –University Postgraduate Program (Δ.Π.Μ.Σ)
6. Members of the Teaching Research Staff (Δ.Ε.Π), Special Staff Faculty Members (Ε.Ε.Π), Laboratory Teaching Staff (ΕΔΙΠ), and, Specialized and Laboratory Teaching Staff (member of) (ΕΤΕΠ), of the Department may be occupied in Inter –University Postgraduate Programs (Δ.Π.Μ.Σ) only on the condition of fulfillment of minimum obligations concerning grant of teaching work. Occupation of Teaching Researching Staff (ΔΕΠ) members exclusively in Inter –University Postgraduate Programs (Δ.Π.Μ.Σ) of the Department or of the School is not permitted.



## **Article 18**

### **Administrative Support**

- a) Director's for each Inter –University Postgraduate Programs (Δ.Π.Μ.Σ) in that Department of DEMOCRITUS University of Thrace which bears responsibility of organizing and operation is created.
- b) The director for each Inters –University Postgraduate Program (Δ.Π.Μ.Σ) is a member of the Coordinating Committee for a two-year period, to be renewed without any limitation.
- c) The Director presides over the Coordinating Committee, is member of Teaching Research Staff (Δ.Ε.Π), of first grade or alternate's grade, is of the same or similar gnostic subject with the gnostic subject of Inter –University Postgraduate Program (Δ.Π.Μ.Σ). In case of inter- departmental, inter-University or joint Inter –University Postgraduate Program (Δ.Π.Μ.Σ), a (1) a member of the said is defined by the Studies Program Committee, as Director.
- d) His/her duties are set out in the law and Bylaws of Post graduate studies. The director of the Inter –University Postgraduate Program (Δ.Π.Μ.Σ). is introduced to the competent bodies of the Institution for each topic concerning effective operation of the program. The Director is entitled to additional fee for his/her administrative work as Director.
- e) The Director of the Postgraduate Program (Π.Μ.Σ) is in addition competent following the expiry of his/her term in the Coordinating Committee for drawing up the report of the Program of research and educational work of Inter –University Postgraduate Program (Δ.Π.Μ.Σ), as well as of the other activities thereof, aiming at studies upgrading, better exploitation of human resources, optimization of current structures and socially advantageous use of available sources of Inter –University Postgraduate Program (Δ.Π.Μ.Σ).



In order to draw up and implement the review, the director is aided by the Special Accounts for Research Grants (Ε.Λ.Κ.Ε) of Democritus University of Thrace (Δ.Π.Θ).

- f) The director of the Inter –University Postgraduate Program (Δ.Π.Μ.Σ) as Scientist Responsible for the corresponding project, issues and signs payment orders of the relevant costs and jointly signs the contracts of work assignment, pursuant to the approved budget. In addition, the scientist responsible for the project shall be responsible for proper implementation and certification of the natural subject of Inter –University Postgraduate Program (Δ.Π.Μ.Σ), feasibility of costs related to execution thereof and attends the financial subject of his/hers. Especially for Inter –University Postgraduate Programs (Δ.Π.Μ.Σ), with available sources pursuant to article 84 Law 4957/2022, the Director who simultaneously is the Scientific Responsible of the program, may request by the Research Committee of the Special Accounts for Research Grants the appointment of an Alternate Scientist Responsible for the needs of financial management of Inter –University Postgraduate Program (Δ.Π.Μ.Σ), pursuant to paragraph 4 article 234 of Law 4957/2022. In order to evaluate the necessity, the request of the Director of Inter –University Postgraduate Program (Δ.Π.Μ.Σ) is recommended to be accompanied by the decision of the competent body of Inter –University Postgraduate Program (Δ.Π.Μ.Σ) (Assembly of the Department or Committee of Studies Program).
- g) Representatives of the Departments in Studies Program Committee bear the obligation to update the Assemblies of the Departments, when this is asked by the Chairman of each Department.
- h) The Director himself/herself of the Inter –University Postgraduate Program (Δ.Π.Μ.Σ), or of the Inter –Departmental, inter – University Postgraduate Program (Δ.Δ.Π.Μ.Σ) has to be available for updating, if requested, the Assembly or in case of Inter- departmental Inter University Postgraduate



Programs (Δ.Δ.Π.Μ.Σ), the Assemblies of the Departments cooperating in the Program for each issue concerning effective operation. The Director of the Inter –University Postgraduate Program (Δ.Π.Μ.Σ) or of the Inter –Departmental, inter – University Postgraduate Program (Δ.Δ.Π.Μ.Σ) has to recommend to the Assembly or Committee of Studies Program (Ε.Π.Σ.) issues of their competency and see to application of decisions thereof.

## **2. Obligations of the Secretariat**

The Department which belongs to the Inter –University Postgraduate Program (Δ.Π.Μ.Σ) undertakes the administrative support of the Program in case of Inter – departmental or Inter – University or Joint Inter –University Postgraduate Programs (Δ.Π.Μ.Σ). The relevant adjustment is provided for in Founding Decision of each Inter –University Postgraduate Program (Δ.Π.Μ.Σ).

The administrative employees supporting the Inter –University Postgraduate Programs (Δ.Π.Μ.Σ), outside their working hours in the University, as well as those to whom a project has been assigned in relevance to Inter –University Postgraduate Programs may be paid for additional work (apart from that of their contractual obligations of their principal employment) rendered.

### ***Article 19***

#### **Study of the feasibility - viability**

- a) Necessity of establishing the Postgraduate Program (Π.Μ.Σ) and description of targets.

Operation of the Inter –University Postgraduate Program (Δ.Π.Μ.Σ), is essential and necessary since it will result to active participation of the Department of Electrical and Computer Engineering (THMMY) of Democritus University of Thrace in the second quantum revolution, which includes quantum computing, quantum metrology and quantum telecommunications. Quantum computing and quantum technologies are as



important for the research and financial development, of Greece and European Union as well, in order to constitute one of the two research flagships of the European Union which bears the title : “Quantum Flagship” (<https://qt.eu>) .Quantum computing and quantum technologies are disruptive technologies which are anticipated to have significant effect to the fields of computers, communications, energy, health and economy replacing a significant part of techniques and methods used at present. In addition, new products are anticipated to ensue in the context of the second quantum revolution.

The new disruptive quantum technologies have at present intense dynamics, rapidly changing and require the creation of not only a specialized scientific staff, but also scientists who will have taken all the necessary supplies in order to progress and adjust rapidly and effectively to this new environment. The Inter –University Postgraduate Program (Δ.Π.Μ.Σ), will cover this need with the supply of high level specialization, and also with the creation of substantial gnostic substructure to its graduates in order for them to be able to adjust in the rapidly chancing scientific environment of quantum computing and quantum technologies.

Choosing English language as the language of teaching, exams and Diploma dissertations (Degree thesis), characterizes extroversion and intense wish for more international co- operations of the Department of Electrical and Computer Engineering (THMMY) as well as of National Center for Scientific Research “DEMOKRITOS” (ΕΚΕΦΕ). An additional ground for which the operation of the Inter –University Postgraduate Program (Δ.Π.Μ.Σ), is essential, is the intention as well of the Department of Electrical and Computer Engineering (THMMY) to be activated in international studies by attracting foreign students for high quality postgraduate programs (MSc).

- b) Relevance of Inter –University Postgraduate Program (Δ.Π.Μ.Σ), with the subject of the first studies circle



The first studies circle of the Department of Electrical and Computer Engineering (THMMY) is absolutely related to the subject of Inter –University Postgraduate Program (Δ.Π.Μ.Σ), given the fact that amongst others its subjects are, the computer science and IT, artificial intelligence, robotics, electric power production and distribution systems, alternative energy sources, software, Internet and telecommunications. The subject of Inter–University Postgraduate Program (Δ.Π.Μ.Σ), constitutes the extent of subjects of first circle in the field of second quantum revolution.

c) Scientific competence of teachers.

The teachers of Inter –University Postgraduate Program (Δ.Π.Μ.Σ) are members of Teaching Researching Staff (Δ.Ε.Π) of the Department of Electrical and Computer Engineering (THMMY) of Democritus University of Thrace (Δ.Π.Θ), members of Teaching Researching Staff (Δ.Ε.Π) of other departments of Democritus University of Thrace (Δ.Π.Θ), members of Teaching Research Staff (Δ.Ε.Π) of other Universities and Researchers of National Center for Scientific Research “DEMOKRITOS” (ΕΚΕΦΕ). They possess the gnostic subject which integrates in the subject of Inter –University Postgraduate Program (Δ.Π.Μ.Σ). They are highly experienced and they bear as well great experience in supervision of degree theses, undergraduate diploma theses and Doctoral (PhD) theses. Their research work is extended, of high quality and has been published in excellent international scientific journals and congresses. Teachers have also participated in many competitive research programs inland as well as worldwide, as scientists responsible and researchers.

d) Criteria and valuation procedure

Those are the criteria as defined by (ΑΔΠΙ)

- 1) Teaching Methods
- 2) Analogy of teachers – students
- 3) Cooperation between students
- 4) Alternative manners of courses examination



- 5) Use of technological educational means i.e. software learning, use of educational software, contemporary distance education)
- 6) Educational material quality
- 7) Teaching and research connection in addition:
  - a) Postgraduate programs listing organized by the Department
    1. A Postgraduate Program (Π.Μ.Σ) entitled: “Electrical and Computer Engineering Advanced Technologies” is available with the Department of Electrical and Computers Engineering (THMMY).
    2. An Inter–University Postgraduate Program (Δ.Π.Μ.Σ) entitled: “Technological and Management Advances on Intelligent Transportation Electrification Systems” is available in the Department of Electrical and Computer Engineering (THMMY).

The Department of Electrical and Computers Engineering (THMMY), following recommendation thereof, for the establishment of the Inter –University Postgraduate Program (Δ.Π.Μ.Σ) entitled “Quantum Computing and Quantum Technologies” ascertained that the operation of the above Inter –University Postgraduate Program (Δ.Π.Μ.Σ) does not hinder the rest of educational research and administrative operations of the Department.

- b) Listing of relevant content (gnostic subject) programs organized inland.

Post graduate studies Programs of relevant content with the aforementioned Inter – University Postgraduate Program (Δ.Π.Μ.Σ) are not organized inland. In addition, the Inter –University Postgraduate Program (Δ.Π.Μ.Σ) aims at attracting students from countries abroad, by selecting the English language as the language of carrying out the said.

- c) Listing of alternative financing sources

The alternative financing sources provided for, excepting the tuition fees increase, if the number of students is not the anticipated in order for the recommended budget to



be implemented, is the quest of sponsorships especially from the private sector, and especially from enterprises for which the use of quantum computers and quantum technologies will bear significant changes in their structure and products. Education of scientists in the context of the said Inter –University Postgraduate Program (Δ.Π.Μ.Σ) will produce highly trained executives who shall be very useful to the development of the said enterprises.

- d) The availability of basic infrastructure and necessary equipment for the operation of the program.

In order to implement the Inter –University Postgraduate Program (Δ.Π.Μ.Σ) the already occurring logistics of the Department of Electrical and Computer Engineering (THMMY), of Democritus University of Thrace (Δ.Π.Θ) and National Center for Scientific Research “DEMOKRITOS” (ΕΚΕΦΕ) will be applied.

The Teaching Faculty of Inter –University Postgraduate Program (Δ.Π.Μ.Σ), possess the digital skills and fully corresponds to educational duties of distance education. In fully distance teaching the Inter –University Postgraduate Program (Δ.Π.Μ.Σ), will fully leverage the occurring potentials rendered by the communication platforms and distance education available at Democritus University of Thrace (Δ.Π.Θ) such as Microsoft Teams (for contemporary education) as well as Open eclass and One Drive. The platform of communication and Zoom distance education available at National Center for Scientific Research “DEMOKRITOS” (ΕΚΕΦΕ) will be fully leveraged.

Logistics will comprise amongst others:

1. Two (2) computer chambers of the Department of Electrical and Computer Engineering (THMMY), of Democritus University of Thrace (Δ.Π.Θ) with 30 personal computers in each chamber.
2. Fully equipped distance education chambers in buildings of the Department of Electrical and Computers Engineering (THMMY), of Democritus University of Thrace (Δ.Π.Θ).





3. Chamber of teleconferences and distance education of National Center for Scientific Research “DEMOKRITOS” (ΕΚΕΦΕ) for carrying out the courses.
4. Workshop equipment of the Institutes of National Center for Scientific Research “DEMOKRITOS” (ΕΚΕΦΕ).

### **Article 20**

#### **Financing –financial management of the Inter –University Postgraduate Program (Δ.Π.Μ.Σ)**

1. Sources and financing of a Postgraduate Program (Δ.Π.Μ.Σ), may derive from:
  - a) Tuition fees
  - b) Donations, sponsorships and any kind of financial aids,
  - c) Inheritances
  - d) Sources from research projects or programs
  - e) Own sources of Democritus University of Thrace (Δ.Π.Θ), and
  - f) State budget or Public investments program
2. Payment of tuition fees, in case it is provided for, is realized by the student himself/herself or by a third party, natural or legal entity, in lieu of the student, in case this is provided for in the decision of establishment of the Inter – University Postgraduate Program (Δ.Π.Μ.Σ).
3. Sources management of Inter –University Postgraduate Program (Δ.Π.Μ.Σ) of the Democritus University of Thrace (Δ.Π.Θ), is realized from the Special Accounts for Research Grants (Ε.Λ.Κ.Ε) of Democritus University of Thrace (Δ.Π.Θ) having undertaken administrative support of the program in case of an inter - university or joint Inter –University Postgraduate Program (Δ.Π.Μ.Σ).
4. Sources of the Inter –University Postgraduate Programs (Δ.Π.Μ.Σ) are divided as follows:



- a) Amount corresponding to thirty per cent (30%) of overall income deriving from tuition fees is withheld by the Special Accounts for Research Grants (Ε.Λ.Κ.Ε). In the said amount, a withholding percentage is included in favor of the Special Accounts for Research Grants (Ε.Λ.Κ.Ε) for financial management of Inter – University Postgraduate Programs (Δ.Π.Μ.Σ). Upon decision of the Administration Committee taken up to the end of March of each year it is decided that the remaining amount following deduction of withholding in favor of Special Accounts for Research Grants (Ε.Λ.Κ.Ε) is transferred to the regular budget or is available for the creation of works /programs through the Special Accounts for Research Grants (Ε.Λ.Κ.Ε) aiming at covering per priority the needs of (Δ.Π.Μ.Σ) which operate without tuition fees and covering of research educational and operating needs of the Democritus University of Thrace (Δ.Π.Θ). Withholding in favor of the Special Accounts for Research Grants (Ε.Λ.Κ.Ε) in force for revenues from related financing sources, is realized in revenues of Inter –University Postgraduate Programs (Δ.Π.Μ.Σ) of cases b) through d) of paragraph 1.
- b) The remaining amount of the overall revenues of the Inter –University Postgraduate Program (Δ.Π.Μ.Σ) is available for covering operating revenues of the Inter –University Postgraduate Programs (Δ.Π.Μ.Σ).

In regard to costs the categories of operating costs and the relevant amounts – predicted outputs, are registered.

In particular, a percentage seventy per cent (70%) of operating costs of Inter – University Postgraduate Program (Δ.Π.Μ.Σ) is divided to:

- a) Fees for administrative - technical support
- b) Fees for teaching staff
- c) Transport costs
- d) Equipment and logistics



e) Other operating costs (case a of paragraph 4 article 80).

Fees of regular teaching staff technical and administrative staff of the Institutions concerns work exceeding their legal obligations.

### **Methodology of drawing up revenues budget**

In regard to revenues, the financing sources are registered pursuant to paragraph 1 and 2 of article 84 Law 4957/2022, and the related amounts – predicted outputs from each financing source.

Below is set out the detailed operation budget per categories:

<i>Revenues – Financing</i>	<i>Amount in euro</i>
1. Attendance of studies tuition fees	225.000 x 0.7 – 157.500
2. Donations, sponsorships and any kind of financial aids	0
3. Inheritances	0
4. Sources from research projects or programs	0
5. Own sources of Democritus University of Thrace (Δ.Π.Θ)	0
6. State budget or Public investments program	0
<b>PARTIAL TOTAL (70%)</b>	
7. Institutions Operating costs (30%) ΕΛΚΕ	225.000 X 0,30 - 67.500
<b>TOTAL</b>	<b>225.000</b>

It refers to the Budget of a full circle of attendance of studies of the Program for entrants of the said year.

Pursuant to paragraph 4 article 84 Law 4957/2022 thirty per cent (30%) of the overall revenues deriving from tuition fees is withheld by (ΕΛΚΕ). In the said amount the withholding percentage in favor of ΕΛΚΕ for financial management of Postgraduate program (Π.Μ.Σ) is included.



### Detailed Costs Budget

In particular a percentage seventy per cent (70%) of operating costs of Inter –University Postgraduate Program (Δ.Π.Μ.Σ) is divided to:

- a) Fees for administrative - technical support
- b) Fees for teaching staff
- c) Transport costs
- d) Equipment and logistics
- e) Other operating costs (case a of paragraph 4 article 80).

Fees of regular teaching staff technical and administrative staff of the Institutions concerns work exceeding their legal obligations.

Below is set out the detailed operation budget per cost categories annually, it will have to be drawn up for five (5) consecutive years in Bylaws of the Postgraduate Program (Π.Μ.Σ.)

In the below table it is factored in that the 30% of students may be released from tuition.

Overall predicted annual revenues of the Inter –University Postgraduate Program (Δ.Π.Μ.Σ) shall be  $50 \times 4500 = 225.000$  euro. 30% (15 out of 40) of the students may be released from tuition and the relevant cost is  $15 \times 4.500 = 67.500$  euro. The amount to be divided is:  $225.000 - 67.500 = 157.500$  euro, and it is divided pursuant to the below table:

	Costs- Categories of costs	1 <sup>st</sup> operation year	2 <sup>nd</sup> operation year	3 <sup>rd</sup> operation year	4 <sup>th</sup> operation year	5 <sup>th</sup> operation year
1	a) Fees for administrative - technical support	12.000	12.000	12.000	12.000	12.000
2	a) Fees for teaching staff	91.000	91.000	91.000	91.000	91.000



3	a) Transport costs	3.000	3.000	2.000	3.000	3.000
4	a) Equipment and logistics	2.000	2.000	2.000	2.000	2.000
5	Other operating costs	2.250	3.200	3.200	3.200	3.200
SUB TOTAL (70%)						
6	Institutions operating costs	47.250	47.250	47.250	47.250	47.250
TOTAL		157.000	157.500	157.500	157.500	157.500

Each year the Studies program Committee (Ε.Π.Σ) reviews the budget according to the number of students who have been enrolled in Inter –University Postgraduate Program (Δ.Π.Μ.Σ) and are obligated to payment of tuition.

Financial management of each Inter –University Postgraduate Program (Δ.Π.Μ.Σ) constitutes an integral project implemented by the (Ε.Λ.Κ.Ε) of the Democritus University of Thrace (Δ.Π.Θ) and it is made pursuant to the purposes of Inter – University Postgraduate Programs (Δ.Π.Μ.Σ) and legal operating framework of the Special Accounts for Research Grants (Ε.Λ.Κ.Ε) of the Democritus University of Thrace (Δ.Π.Θ). As circle of Inter –University Postgraduate Programs (Δ.Π.Μ.Σ) is considered the overall duration of each (Δ.Π.Μ.Σ) as defined by the establishing Decision of each (Δ.Π.Μ.Σ).

Financial management of each implemented work of each Inter –University Postgraduate Program (Δ.Π.Μ.Σ) is implemented by the Special Accounts for Research Grants (Ε.Λ.Κ.Ε) of the Democritus University of Thrace (Δ.Π.Θ) based of the budget thereof, approved by the Senate following motion by the competent Assembly of the Department or Studies Program Committee in case of Interdepartmental or Inter -university or Joint Programs and upon acceptance of the



request of undertaking of financial management by the Committee of Researches of the Democritus University of Thrace (Δ.Π.Θ).

Scientist Responsible of the integrated projects of Inter –University Postgraduate Program (Δ.Π.Μ.Σ), is defined the Director of each (Δ.Π.Μ.Σ) who shall undertake the duties and obligations and competencies of the Scientist Responsible as defined by the law and in the Management and Funding Guide of the Special Accounts for Research Grants (Ε.Λ.Κ.Ε) of the Democritus University of Thrace (Δ.Π.Θ).

For more effective implementation of the approved, by the competent Assembly of the Department or Program Studies Committee, in case of interdepartmental or inter university program, budget of the Inter –University Postgraduate Program (Δ.Π.Μ.Σ), and adjustment of the said in necessities from time to time the Director and Scientist Responsible of the Inter –University Postgraduate Program (Δ.Π.Μ.Σ), may, upon previous concordant opinion of the said competent bodies to apply to the Researches Committee for approval of the increase-decrease or / and re distribution of pre calculated amounts in each cost category of the budget. In case of amendment of tuition fees, publication of the relevant amendment in the Official Gazette is a pre-requisite.

### *Article 21*

#### **Plagiarism**

The post graduate student by filing any post graduate thesis is obligated to refer reference if he has used the work and views of others.

Copying is considered a serious academic offence. Thesis copying of any other person is considered as plagiarism, as well as the use of another person's thesis published or not – without the appropriate reference. The quote of any documentation material, even from studies as well of the candidate himself/ herself,



without the relevant report, may compose a decision of the Assembly of the relevant Department for crossing off.

In cases aforesaid following justified recommendation of the supervising Professor, the Assembly of the relevant Department or the Program Studies Committee may decide crossing off, of him/her.

Any offence or violation of academic ethics is referred to the Coordinating Committee of the Inter –University Postgraduate Program (Δ.Π.Μ.Σ), in order to be adjudicated and for recommendation for dealing with the problem at the Department’s Assembly.

As violations are considered even the offences of copying or plagiarism and in general any violation of the provisions concerning copyright by a postgraduate student during writing of theses in the context of courses or elaboration of postgraduate Diploma thesis.

### ***Article 22***

#### **Interdepartmental or interuniversity or Joint Inter –University Postgraduate Programs (Δ.Π.Μ.Σ)**

The departments of the Democritus University of Thrace (Δ.Π.Θ) may cooperate as to organization of the Inter –University Postgraduate Programs (Δ.Π.Μ.Σ) as provided for in paragraphs 5 and 6 of article 80 of Law 4957/2022. In particular:

- a. If the organization of Inter –University Postgraduate Program (Δ.Π.Μ.Σ) is realized in more than one (1) departments of the same or other University inland, as interdepartmental or inter university Inter –University Postgraduate Program (Δ.Π.Μ.Σ), respectively, a special protocol of cooperation is drawn up which includes all records of paragraph 3 and 4 of article 80 Law 4957/2022, obligations of each cooperating Department, the number of members of the Studies program committee, participation and representation of each



cooperating Department to bodies of the Inter –University Postgraduate Program (Δ.Π.Μ.Σ), the procedure of appointing the Director of the Inter –University Postgraduate Program (Δ.Π.Μ.Σ), the University undertaking administrative support of the program methodology of distribution of the Inter –University Postgraduate Program (Δ.Π.Μ.Σ)’s sources, and any other issue necessary for proper operation.

By decision of the Senate of the Democritus University of Thrace upon recommendation of the Assembly of each cooperating department, the special protocol of cooperation is approved. The decision of establishment is accelerated by the University having undertaken the administrative support of the program.

b. The universities may cooperate for the organization of the Inter –University Postgraduate Programs with Higher Military Educational Establishments, Higher Church Academies, researching and technological carriers of article 13A OF Law 4310/2014 (A’ 258), Research University Institute, the Athens Academy, the Biomedical Research Foundation Academy of Athens(BRFAA) (IIBEAA), institutes and research organizations abroad, European and international carriers and organizations as well as recognized scientific carriers and unions operating under the form of Public Entity.

The cooperation with educational carriers of nonstandard post lyceum education of law 3696/2008 (A’ 177) is not allowed.

Upon Decision of the Senate of the University the special protocol of cooperation for the organization of joint Inter –University Postgraduate Programs, which includes minimum the records of paragraph 3 article 80 Law 4957/2022 and contribution of each cooperating carrier in human resources, use of laboratory substructures ad practical exercise. Especially for the Inter –University Postgraduate Programs organized in cooperation with the institutions abroad (joint Inter –University Postgraduate Programs – (ΔΠΜΣ) the special protocol of





cooperation provides if the successful implementation of the joint ΔΠΜΣ implies a single studies title obtaining from the cooperating institutions or obtaining distinguished studies titles from each cooperating institution.

### **Article 23**

#### **Post graduate students' appeals complaints management mechanism**

Processing of complaints submitted electronically on webpage of the Post graduate Program of the Department

1. Complaints received (by the Secretariat of Inter –University Postgraduate Program) through a platform are sent directly through e mail to the Director of the Inter –University Postgraduate Program
2. The Director communicates with person referred to with the complaint abiding by issues of anonymity, discretion, confidentiality and personal data, and moves solutions.
3. If it is deemed necessary he/she will update the academic advisor of the student as well. Academic advisors are teachers of the Inter –University Postgraduate Programs (Δ.Π.Μ.Σ.) and are defined by the Committee of Studies Program. Duties of the academic advisors are defined by the relevant decision of the Senate of the Democritus University of Thrace (Δ.Π.Θ).
4. In case of no solution found the Director may according to their discretion convene an “ad hoc” meeting with the academic advisor, the person referred to, and / or other members of Teaching Research Staff (Δ.Ε.Π) based on their experience.
5. Following the Director suggests ways of solving.
6. If this is not feasible, he/she refers them (the complaints) to the Assembly of the Department



7. In case of very severe complaints and non-solution the Director according to their discretion updates the competent carriers and services of the Institution (Deputy Rector of Academic Cases and Student Care, Student's Advocate etc.). Complaints have to be solved within 20 working days.

#### **Article 24**

##### **Webpage of Inter –University Postgraduate Programs (Δ.Π.Μ.Σ.)**

Each Inter –University Postgraduate Program (Δ.Π.Μ.Σ.) has each own webpage in Greek and English language or and in any other language decided by the Department especially for cases of Programs in cooperation with Universities abroad. The official webpage of each Inter –University Postgraduate Program (Δ.Π.Μ.Σ.) is updated constantly and contains all the information and notifications of the Program and constitutes the official updating domain of students.

#### **Article 25**

##### **Valuation of the Inter –University Postgraduate Programs (Δ.Π.Μ.Σ.)**

1. Annual interior valuation of the Inter –University Postgraduate Program is made in cooperation with the Quality Assurance Unit (ΜΟ.ΔΙ. Π) (MODIP) of the Democritus University of Thrace (Δ.Π.Θ) in the context of interior valuation of academic unit in which it belongs to and pursuant to the corresponding elaboration of the interior Quality Assurance System of the Institution. External valuation of the Inter –University Postgraduate Programs is carried out in cooperation with MODIP in the context of their certification pursuant to the prescribed procedure by the Hellenic Authority for Higher Education. Pursuant to article 87 Law 4957/2022, the Inter –University Postgraduate Programs of each Department, in which the Interdepartmental, Interinstitutional and joint Inter –University Postgraduate Programs are included, the Department



of which undertakes the administrative support, are valued in the context of periodical valuation / certification of the academic Unit by the Hellenic Authority for Higher Education. In the said context even the overall assessment of the project accomplished by each Inter –University Postgraduate Program is included, the degree of fulfillment of the targets that had been placed on establishment viability, absorption of graduates in labor market, the degree of their contribution in research, interior valuation thereof by the postgraduate students, feasibility of operation extent, as well as other records in relevance to quality of the project produced and contribution to national strategy for higher education.

If a Inter –University Postgraduate Program during the stage of each valuation pursuant to the said paragraph is deemed as not fulfilling the provisions for continuance of its operation, the operation of the said is fulfilled with the graduation of the already enrolled students pursuant to the decision of the establishment and regulation of postgraduate and PhD studies programs.

Upon responsibility of the Director of Inter –University Postgraduate Program, meetings are organized having as subject the discussion- study of the courses of the Inter –University Postgraduate Program (Δ.Π.Μ.Σ) and their content, in order to assess amongst others, the degree to which the program is connected with the progress of science the labor market and the needs of the society in general. On expiry of the term of the Coordinating Committee, upon responsibility of the Director outgoing, a detailed budget of the research and educational work of the Inter –University Postgraduate Program is drawn up, as well as of the rest of the activities thereof, aiming at upgrading of studies, better valuation of human resources, amelioration of current substructures and socially beneficial use of available sources of the Inter –University Postgraduate



Program. The budget is filed in the relevant Department, the Inter –University Postgraduate Program (Δ.Π.Μ.Σ) belongs to.

### **Article 26**

#### **Special provisions**

Any issue ensuing, in the future not covered by the relevant legislation or the present Regulation of Post Graduate Studies shall be dealt with upon decisions of the Studies Program Committee and the Senate of the Institution following amendment of the Regulation and publication in Official Gazette.

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## **APPENDICES**

(As integral part of the Post graduate Studies Regulation)

Inter –University Postgraduate Program (Δ.Π.Μ.Σ)

“Quantum Computing and Quantum Technologies”

(Curriculum and Syllabus)

### **QY1. Quantum Computing**

Elements of Quantum Mechanics. States of quantum systems. Vectors and operators in Hilbert space. Two-state quantum systems. Bras and Kets. The quantum bit (qubit). Qubit representation in the Bloch sphere. Quantum registers. Basis states of qubits and quantum registers. One-qubit quantum gates: The Hadamard, the phase-shift and the inertial quantum gates. Pauli quantum gates. Two-qubit quantum gates: The controlled- not (CNOT) and the controlled-phase-shift quantum gates. Three-qubit quantum gates: The controlled-controlled-Not (CCNOT) and the Fredkin quantum gates. The circuit model of quantum computation. Quantum circuits and the principle of quantum computation. Quantum computations. The Deutsch quantum algorithm. The Grover quantum algorithm. Quantum Fourier transform. Entanglement. The Shor quantum algorithm. Quantum teleportation. The quantum computer simulator (QCS). The Qiskit quantum simulator. Quantum algorithms on real quantum computers.

### **QY2. Quantum Devices**

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Semiconducting devices: quantum wells - 2DEG devices (HEMT) -quantum dots - Coulomb blockade- Single Electron Transistor (SET) - Tunnel FET. Superconducting devices: Josephson effect - Josephson junctions - superconducting electronic circuits – dc and ac squid sensors. Molecular Magnets: definition (description of the compounds) -organic molecules - transition metal and rare earth ions mono-and poly-nuclear compounds - molecular spins (endohedral fullerenes and/or encapsulated atoms) - impurities in solids

### **QY3. Quantum Algorithms and Quantum Information**

Quantum computing in noisy environments. Quantum error correction. The nine-qubit error correcting code. Stabilizer codes. Surface error correcting codes. The density operator. The reduced density operator. Pure and mixed quantum states. Measurement and partial measurement of quantum states. Ensembles of quantum states. Quantum simulators. Quantum algorithms. Entropy and quantum information. Von Neumann entropy. Elements of quantum cryptography: quantum key distribution. The BB84 and novel quantum key distribution protocols.

The quantum walk model of quantum computation. Quantum walks in one and two dimensions. Adiabatic quantum computation. The quantum Ising model for optimization. Variational quantum algorithms and eigensolvers. Applications of quantum computing.

### **QY4. Qubit devices**

CMOS qubits (QD FET - P-dopants in Si devices – Nitrogen vacancies in Diamond – topological insulators) - Superconducting qubits - Molecular magnets – Atom traps.

### **QE1. Optical and quantum communications**

Essential basics: Wave nature of light, E/M waves, physical optics, optical waveguiding. Key components and modules: Optical fiber (operation, characteristics, types), passive elements (couplers, isolators, filters, multiplexers/demultiplexers), active devices (sources, modulators, amplifiers, photodetectors). Optical signal processing:

Optical nonlinearities, nonlinear media, modern switching and limitations, optical switches and gates, applications to sequential and combinational circuits, optical interconnects, photonic integration. Optical communications systems: Basic parts, technological evolution, performance limitations and characterization, design of real systems. Optical communications networks: Topologies, Wavelength Division Multiplexing, optical data centers, optical access networks, passive optical networks. Optical quantum communications: Concept, infrastructure, networks, limitations, challenges.



## **QE2. Computational Biology**

What is life? From molecules to organisms and back. Fundamentals of evolution. Genomes, sequencing, sequences, and their databases. Homology and similarity: sequence alignments. Database searches: BLAST and friends. Protein families, motifs, and their databases. Connecting the dots: sequence-based phylogenetic analysis and clustering. Gene expression, networks, pathways and their databases. Genetic variation: characterization, analysis and databases. Atoms, molecules and energy: getting up- close-and-personal with life. Structures illustrated: from the double helix to the ribosome. Making structures: homology modelling, docking and drug design. Protein folding: energy, structure, function and evolution.

## **QE3. Nanoelectronics**

Quantum mechanical description of nanomaterials - Nanoelectronic and spintronic devices: quantum dots, nanowires, nanopillars, quantum transport and tunneling effects, magnetoresistance, spin-dependent electron transport, molecular electronics, and graphene and 2D nanomaterials.

## **QE4. Quantum Solid State Physics**

Semiconductor nanostructures – Quantum confinement – Semiconductor heterostructures – Quantum Hall effect – Semiconductor/dielectric tunnel junctions – Superconductivity and physics of superconductors - Static Magnetic properties (Hyperfine interactions, Spin orbit coupling and single ion anisotropy, Exchange coupling) - Dynamic Magnetic properties (Real and imaginary magnetic susceptibility, Spin Relaxation times, Rabi oscillations).

## **QE5. Applied Quantum Mechanics**

Basic features: Schrödinger's equation, operators, expectation values, probability density and probability current density, superposition principle, eigenvalues, uncertainty principle. One dimensional problems: free-particle, symmetric quantum wells, combination of infinite and finite-barrier potential well, delta function potential, combination of delta function potentials and heterostructures or quantum wells, triangular potential. Scattering in one dimension: transmission and reflection coefficients, tunneling and resonant tunneling in simple and complex barriers, the propagation matrix method, WKB approximation for tunneling. Periodic potential and the Kronig-Penney model. Additional mathematical issues: More on operators, eigenstates and the measurement problem, Dirac notation. Harmonic oscillator: Algebraic method of the harmonic oscillator, creation and annihilation operators, calculation of the wavefunctions with the algebraic method and calculation of expectation values, Stark effect in the harmonic oscillator, quantization of the LC circuit, quantization of lattice vibrations-phonons, free electron in a magnetic field - Landau states and connection to the semiclassical orbit. Electron in a central

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potential: angular momentum, application to spherical "hard" potential and finite spherical potential, solution for hydrogen-like systems and applications in excitons in semiconductors. Spin: an intrinsic angular momentum and its description, addition of angular momentum. Approximation methods: time-independent non-degenerate perturbation theory and time-independent degenerate perturbation theory and their applications, the variational method, WKB approximation for stationary states and its applications, the sudden approximation. Identical particles, Pauli exclusion principle and the symmetry of the wavefunctions. Applications in atoms, molecules, nanostructures, and solids.

### **QE6. Artificial Intelligence and Applications**

Overview of the current Artificial Intelligence (AI) domain. AI applications. Current and future AI challenges in a Quantum Computing world. The interaction of Quantum Physics and AI. Introduction to the scientific method for AI. Hypothesis testing as a research tool. Risks and pitfalls in hypothesis testing. Scientific error and lies. Scientific reviewing. Communicating research results. Legal and ethical challenges of AI. Societal impact of AI and Quantum Computing.

### **QE7. Python Programming and Applications**

Introduction to data programming. Python programming. Data stream processing. Data acquisition: web services, streams, data transfer. Octave/Matlab/R for data analysis. Optimisation considerations, vectorisation, GPUs. Use-case combining batch processing, streaming and analysis; quantum physics data analysis use case. Open quantum computing in Python (ProjectQ).

### **QE8. Quantum Control**

The purpose of this course is to introduce the student to basic quantum dynamics and to different methods for its control using external fields, as well as to show the connection of the quantum control methods in applications in quantum technologies. The course syllabus include: Coherent vs incoherent dynamics. Incoherent dynamics and rate equations. Coherent dynamics, time-dependent Schrödinger equation, and probability amplitudes. Open quantum systems and the relevant equations for the density operator. Dynamics of specific quantum systems, for example, the two-level quantum system. Weak field dynamics, time-dependent perturbation theory, and coherent control of weak excitation by a field and its harmonics. Fermi's golden rule. Exactly solvable models for the control of quantum dynamics in two and three-level systems and their applications. Adiabatic methods for the control of quantum dynamics, rapid adiabatic passage (RAP) and stimulated Raman adiabatic passage (STIRAP), and their applications. Shortcut to adiabaticity and its applications. Optimal control and its applications. Other methods of quantum



control and their applications. Examples of applications of quantum control methods in quantum technologies and connection to current research.

### **QE9. Quantum Machine Learning**

What is machine learning, data mining and quantum computing? Preliminaries from Probability and Stochastic Processes. Learning theory: Data-Driven Models, Feature Space, Classification, Regression, Supervised and Unsupervised Learning, Generalization Performance, Model Complexity. Brief review on quantum mechanics and quantum computations. Unsupervised Learning: Principal Component Analysis, K- Means and K-Medians Clustering, Hierarchical Clustering, Density-Based Clustering. Pattern Recognition and Neural Networks: The Perceptron, Feed-forward Networks, Deep Learning, Computational Complexity. Supervised Learning and Support Vector Machines: K-Nearest Neighbors, Optimal Margin Classifiers, Soft Margins, Nonlinearity and Kernel Functions, Least-Squares Formulation, Generalization Performance, Multiclass Problems, Computational Complexity. Regression Analysis: Linear Least Squares, Nonlinear Regression, Nonparametric Regression, Computational Complexity. Clustering and Quantum Computing: Quantum Random Access Memory Calculating Dot Products, Quantum Principal Component Analysis, Quantum K-Means, Quantum K-Medians, Quantum Hierarchical Clustering, Computational Complexity. Quantum Pattern Recognition: The Quantum Perceptron, Quantum Neural Networks, Computational Complexity. Quantum Classification: Nearest Neighbors, Support Vector Machines with Grover's Search, Support Vector Machines with Exponential Speedup, Computational Complexity.

### **QE10. Natural and Unconventional computing**

Cellular automata. Rules and evolution of cellular automata. Quantum Cellular Automata. Computing processes in biological systems. The computing amoeba. Bio-inspired computation systems. Memristors and memristive circuits. In-Memory- Computing. Memristive computation architectures and systems. Memristive learning cellular automata. Memristive Quantum Simulators and Circuits. Neurons and Neuromorphic computation. Emergent computing. Crowd dynamics. Swarm intelligence. Cytoskeleton computing models. Random walks. Cellular ants computing.

### **QE11. Linear Algebra for Quantum Mechanics**

Eigenvalues and eigenvectors. Matrix diagonalization. Jordan canonical form. Vector spaces and vector subspaces. Linear dependence and linear independence. Basis of a vector space. Dimension of a vector space. Inner products. Inner product spaces. Best approximation. Orthogonal projection. Gram-Smidt orthonormalization. Linear operators. Adjoint operators. Operators in inner product





spaces. Orthonormal operators. Isomorphisms. Normal operators. Transformation of symmetric matrices to diagonal form.

### **QE12. Measurement and Characterization Methods for Devices and Systems**

Hall effect and Resistivity measurements - DC FET characterization (QD-MOSFET, HEMT, SET, T-FET) – RF measurements (instrumentation and device structures) – DC/RF SQUID – Characterization techniques of Josephson junctions - Methods for manipulating spin quantum information (Magnetic resonance - EPR – NMR) - Cryogenic systems and technology Methods for manipulating spin quantum information.

### **QE13. Advanced Topics in Quantum Computing and Quantum Technologies**

Anyons. Topological quantum computing. Adiabatic quantum computing. Quantum transport. Tight-binding Hamiltonians. Green's functions in quantum technology. Non- equilibrium Green functions method. Quantum carrier transport. Quantum effects in bio-systems. Sensors and quantum sensors. Semiconductor and silicon qubit fabrication. Fabrication and characterization of quantum devices. Advanced topics in material science. Advanced topics in quantum fabrication technologies. Metrology and quantum metrology. Novel quantum technologies.

### **QE14. Quantum Optics**

The purpose of this course is to introduce the student to basic quantum optics phenomena and connect them with applications in quantum technologies. The course syllabus include: Semiclassical light-matter interaction, probability amplitude approach, two-level system, and Rabi oscillations. Optical Bloch equations. Nonlinear optical response of the two-level system. Three-level systems, CPT and EIT. Quantization of the electromagnetic field, (Fock states, coherent states, squeezed states and their properties). Correlations and photon statistics. Spatial and temporal coherence. Intensity fluctuations, Hanbury Brown & Twiss Experiment. Quantized light-matter interaction and the Jaynes-Cummings model. Dressed state picture. Quantum Rabi oscillations and collapse and revival. Wigner-Weisskopf theory of spontaneous emission. Resonance fluorescence and the Mollow triplet. Cavity quantum electrodynamics, quantum systems in cavities. Applications of quantum optics in quantum technologies.



- 1) Type of Postgraduate Studies Degree (**Master of Science Degree**) of the Inter –University Postgraduate Program (Δ.Π.Μ.Σ)
- 2) Type of Certificate of Post Graduate Studies Completion
- 3) Type of Transcript of detailed grading of Inter –University Postgraduate Program (Δ.Π.Μ.Σ) student.



1) Type of Postgraduate Studies Degree (Master of Science Degree) of the Inter-University Postgraduate Program (Δ.Π.Μ.Σ)

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SCHOOL OF ENGINEERING  
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING  
IN COLABORATION WITH



NATIONAL CENTRE FOR SCIENTIFIC RESEARCH "DEMOKRITOS"  
INTER UNIVERSITY POSTGRADUATE STUDIES PROGRAMME  
«QUANTUM COMPUTING AND QUANTUM TECHNOLOGIES»  
MASTER OF SCIENCE DEGREE

(Student's full name), diploma holder / graduate of (Department of Undergraduate Studies) of (University of Undergraduate Studies), after the successful completion of the required courses of the Interinstitutional Postgraduate program "Quantum Computing and Quantum Technologies" of the Department of Electrical and Computer Engineering of Democritus University of Thrace and the National Centre For Scientific Research "Demokritos" and the fulfillment of the programs' rules of assessment was deemed worthy of the award of the present Postgraduate Studies Degree (Master of Science) at (date) achieving the grade:



«DISTINCTION» nine (9.0)

The present certificate is issued in credit of the above.

(Place of Issue) - [Issue Date (day- month- year)]

THE RECTOR OF DEMOCRITUS UNIVERSITY OF THRACE

THE HEAD OF THE DEPARTMENT OF ELECTRICAL AND  
COMPUTER ENGINEERING OF DEMOCRITUS  
UNIVERSITY OF THRACE

THE SECRETARY OF THE DEPARTMENT OF ELECTRICAL AND COMPUTER  
ENGINEERING OF  
DEMOCRITUS UNIVERSITY OF THRACE



2) Type of Certificate of Post Graduate Studies Completion

HELLENIC REPUBLIC

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SCHOOL OF ENGINEERING

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

IN COLABORATION WITH



NATIONAL CENTRE FOR SCIENTIFIC RESEARCH "DEMOKRITOS"

CERTIFICATE NUMBER...

CERTIFICATE OF COMPLETION OF STUDIES

It is certified that:

(Student's full name), diploma holder / graduate of (Department of Undergraduate Studies) of (University of Undergraduate Studies), after the successful completion of the required courses of the Interinstitutional Postgraduate Studies program "Quantum Computing and Quantum Technologies" of the Department of Electrical and Computer Engineering of Democritus University of Thrace and the National Centre For Scientific Research "Demokritos", and the fulfillment of the programs' rules of assessment was awarded the Postgraduate Studies Degree (Master of Science) of the Interinstitutional Postgraduate Studies Program "Quantum Computing and Quantum Technologies" of the Department of Electrical and Computer Engineering, of the School of Engineering of Democritus University of Thrace, graded:

"DISTINCTION"

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Eight and seventy centimes (8.70)

The present carries the value of a Postgraduate Degree (Master of Science) copy.  
The present certificate is issued to whom it may concern upon request of the person  
of interest.

Place (Place of issue) Date [Date of issue (day-month-year)]

The Department's Secretary

(signature-seal)



3) Type of Transcript of detailed grading of Inter –University Postgraduate Program (Δ.Π.Μ.Σ) student.

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SCHOOL OF ENGINEERING  
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

(Place of issue): .....

Certificate/Protocol No.: .....

**CERTIFICATE**

According to the academic records held by the Program’s administrative support department, Mr/Mrs/Ms/Other Title (Full Name), diploma holder / graduate of (School /University) was registered as a postgraduate student in the academic year (Academic Year) to the three academic semester Interinstitutional Postgraduate Program “Quantum Computing and Quantum Technologies”

The aforementioned has successfully completed the postgraduate study program (Master of Science) as follows:

3) CURRICULUM

4) Quantum Computing and Quantum Technologies

CODE	COURSE	ECTS	SEMESTER
QMD	POSTGRADUATE THESIS	.....	...
QY1	.....	.....	...
QY2	.....	.....	...
QY3	.....	.....	...
QY4	.....	.....	...
QE1	.....	.....	...
QE2	.....	.....	...

GRADE AVERAGE ... ..

Mr/Mrs/Ms/Other Title (Full Name) has defended his/her postgraduate thesis to an examination committee in public on (full date). The thesis was accepted, graded

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(grade mark) and the committee proposed the award of the Postgraduate Studies Degree (Master of Science) of the Department of Electrical and Computer Engineering, of the School of Engineering of Democritus University of Thrace to the aforementioned. The Grade Average (two decimal places accuracy), accounting the teaching units (ECTS) of distinct successfully completed courses (number of courses, ECTS) and the grading of the Postgraduate Thesis (30 ECTS) is 9.50 “DISTINCTION”  
The present certificate is issued to whom it may concern upon request of the person of interest.

Place of issue).....(Date of issue).....

By order of the Rector  
The Department’s Secretary  
(signature-seal)

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This decision to be published in the Official Gazette

KOMOTINI 19 DECEMBER 2022

THE RECTOR

ALEXANDROS POLYCHRONIDIS

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I, VICTORIA STENTOUMI A CERTIFIED TRANSLATOR OF THE MINISTRY OF FOREIGN AFFAIRS OF THE HELLENIC REPUBLIC (Register Number: 122), MINISTERIAL DECISION No. Π23MET-34908/19.07.2021 OF THE MINISTER OF FOREIGN AFFAIRS (OFFICIAL JOURNAL B 3149), do hereby certify that the foregoing is a true translation and representation of the contents of the document from Greek into English /without any amendments. The translator assumes no liability for the content of the original document.

ATHENS 6/10/2023