ΑΡΙΣΤΟΤΕΛΕΙΟ
ΠΑΝΕΠΙΣΤΗΜΙΟ
ΘΕΣΣΑΛΟΝΙΚΗΣ

Πληροφορίες: Β. Τόμπρου
Τηλ. : 2310-99 6649
e-mail : gramm-syg@ad.auth.gr
Κτίριο : Διοίκησης «Κ. Καραθεοδωρή»

Θεσσαλονίκη, 15 -1-2026
Αριθμ. Πρωτ.: 38744

ΘΕΜΑ: Έγκριση ίδρυσης και Εσωτερικού Κανονισμού του Διατμηματικού Ξενόγλωσσου Προγράμματος Προπτυχιακών Σπουδών (Δ.Ξ.Π.Π.Σ.) με τίτλο "Materials Science and Engineering" των Τμημάτων Χημείας (επισπεύδον) και Φυσικής της Σχολής Θετικών Επιστημών και Μηχανολόγων Μηχανικών της Πολυτεχνικής Σχολής του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης (Α.Π.Θ.)

ΠΡΟΣ
Τη Μονάδα Διασφάλισης Ποιότητας του Α.Π.Θ.

ΚΟΙΝΟΠΟΙΗΣΗ
(με τα συνημμένα έγγραφα)
- Τμήμα Χημείας
- Τμήμα Φυσικής
- Τμήμα Μηχανολόγων Μηχανικών του Α.Π.Θ.

ΣΧΕΤ.: Το έγγραφο με αριθμ. πρωτ. 37330/12-1-2026 του Τμήματος Χημείας του Α.Π.Θ. με τα συνημμένα του.

Η Σύγκλητος του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης στη συνεδρίασή της με αριθμό 3175/14-1-2026, έχοντας υπόψη:

1. Τις διατάξεις του ν. 3341/1925 (ΦΕΚ 154/τ. Α΄/22-6-1925) «Περί ιδρύσεως Πανεπιστημίου εν Θεσσαλονίκη», με τον οποίο ιδρύθηκε το Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης ως «Πανεπιστήμιον Θεσσαλονίκης», όπως μετονομάστηκε σε «Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης» με το άρθρο 7 του ν. 3108/1954 (ΦΕΚ 314/τ.Α΄/30-12-1954).

2. Τις διατάξεις του Π.Δ. 98/2013 (ΦΕΚ 134/τ.Α΄/5-6-2013, διόρθωση σφάλματος ΦΕΚ 140/τ.Α΄/11-6-2013) «Κατάργηση του Γενικού Τμήματος, μεταφορά έδρας τμήματος και ίδρυση-συγκρότηση, μετονομασία και ανασυγκρότηση Σχολών στο Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης».

3. Τις διατάξεις των άρθρων 75-83 του ν. 4727/2020 (ΦΕΚ 184/τ.Α΄/23-9-2020) «Ψηφιακή Διακυβέρνηση (Ενσωμάτωση στην Ελληνική Νομοθεσία της Οδηγίας (ΕΕ) 2016/2102 και της Οδηγίας (ΕΕ) 2019/1024) - Ηλεκτρονικές Επικοινωνίες (Ενσωμάτωση στο Ελληνικό Δίκαιο της Οδηγίας (ΕΕ) 2018/1972) και άλλες διατάξεις».

4. Τις διατάξεις του άρθρου 16 και των Κεφαλαίων Ζ΄ και ΙΑ' του ν. 4957/2022 (ΦΕΚ 141/τ. Α΄/21-7-2022) «Νέοι Ορίζοντες στα Ανώτατα Εκπαιδευτικά Ιδρύματα: Ενίσχυση της ποιότητας, της λειτουργικότητας και της σύνδεσης των Α.Ε.Ι. με την κοινωνία και λοιπές διατάξεις», όπως τροποποιήθηκαν και ισχύουν.

5. Τις διατάξεις των άρθρων 14 και 15 του ν. 3374/2005 (ΦΕΚ 189/τ.Α΄/2-8-2005) «Διασφάλιση της ποιότητας στην ανώτατη εκπαίδευση. Σύστημα μεταφοράς και συσσώρευσης πιστωτικών μονάδων - Παράρτημα διπλώματος», όπως ισχύουν.

6. Τις διατάξεις της Υ.Α. με αριθμό Φ5/89656/Β3/13-8-2007 (ΦΕΚ 1466/τ.Β΄/13-8-2007) «Εφαρμογή του Συστήματος Μεταφοράς και Συσσώρευσης Πιστωτικών Μονάδων».

7. Τη με αριθμό 26770/24-11-2023 Διαπιστωτική Πράξη του Πρύτανη του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης (ΦΕΚ 1287/τ.Υ.Ο.Δ.Δ./29-11-2023), περί συγκρότησης του Συμβουλίου Διοίκησης του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης.

8. Τη με αριθμό 75140/11-6-2025 (ΦΕΚ 680/τ.Υ.Ο.Δ.Δ./12-6-2025) Διαπιστωτική Πράξη του ασκούντος καθήκοντα Πρύτανη του Α.Π.Θ., περί εκλογής του Κυριάκου Αναστασιάδη του Ηρακλή, Καθηγητή του Τμήματος Ιατρικής της Σχολής Επιστημών Υγείας, ως Πρύτανη του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης.

9. Τη με αριθμό 77939/23-6-2025 (ΦΕΚ 718/τ.Υ.Ο.Δ.Δ./23-6-2025) απόφαση του Συμβουλίου Διοίκησης του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης περί ορισμού τεσσάρων (4) Αντιπρυτάνεων στο Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης, βάσει της παρ. 2 του άρθρου 12 του ν. 4957/2022.

10. Τη με αριθμό 79214/26-6-2025 (ΦΕΚ 755/τ.Υ.Ο.Δ.Δ./27-6-2025) απόφαση του Συμβουλίου Διοίκησης του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης σχετικά με την αποδοχή παραίτησης της Ελευθερίας Θανούλη του Δημητρίου, Καθηγήτριας του Τμήματος Κινηματογράφου της Σχολής Καλών Τεχνών από τη θέση της Αντιπρυτάνεως του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης.

11. Τη με αριθμό 79632/27-6-2025 (ΦΕΚ 3336/τ.Β΄/30-6-2025) απόφαση του Πρύτανη του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης, περί καθορισμού των τομέων ευθύνης των Αντιπρυτάνεων και των αρμοδιοτήτων που τους μεταβιβάζονται, βάσει του ν. 4957/2022 (παρ. 3 του άρθρου 12) και καθορισμού της σειράς αναπλήρωσης του Πρύτανη, από τους Αντιπρυτάνεις, όταν απουσιάζει ή κωλύεται να ασκήσει τα καθήκοντά του, βάσει του ν. 4957/2022 (παρ. 2 του άρθρου 15).

12. Τη με αριθμό 300/1-9-2025 (ΑΔΑ: 624146Ψ8ΧΒ-2ΚΥ) Διαπιστωτική Πράξη του Πρύτανη του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης, περί συγκρότησης της Συγκλήτου του Α.Π.Θ. για το ακαδημαϊκό έτος 2025-2026 και τη με αριθμό 7250/23-9-2025 (ΑΔΑ: 91ΞΗ46Ψ8ΧΒ-5ΨΑ) Διαπιστωτική Πράξη του Πρύτανη του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης περί ανασυγκρότησης της Συγκλήτου του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης για το ακαδημαϊκό έτος 2025-2026.

13. Τις εισηγήσεις των Συνελεύσεων των Τμημάτων Χημείας(συνεδρίαση με αριθμό 886/9-1-2026) και Φυσικής (συνεδρίαση με αριθμό12/8-1-2026) της Σχολής Θετικών Επιστημών του Α.Π.Θ. και Μηχανολόγων Μηχανικών (συνεδρίαση με αριθμό 16/22-12-2025) της Πολυτεχνικής Σχολής του Α.Π.Θ. σχετικά με την ίδρυση του Διατμηματικού Ξενόγλωσσου Προγράμματος Προπτυχιακών Σπουδών (Δ.Ξ.Π.Π.Σ.) με τίτλο “Materials Science and Engineering”, με συνημμένα τη Μελέτη Σκοπιμότητας, την Έκθεση Βιωσιμότητας, την Ανάλυση του Προϋπολογισμού βάσει προβλέψεων εισαγωγής φοιτητών κατ’ έτος, το Ειδικό Πρωτόκολλο Συνεργασίαςμεταξύ των συνεργαζόμενων Τμημάτων και τον Εσωτερικό Κανονισμό του Δ.Ξ.Π.Π.Σ.

14. Το γεγονός ότι από τις διατάξεις της απόφασης αυτής δεν προκαλείται δαπάνη σε βάρος του Κρατικού Προϋπολογισμού.

15. Το γεγονός ότι οι διατάξεις της παρούσας απόφασης δεν αφορούν σε διοικητική διαδικασία για την οποία υπάρχει υποχρέωση καταχώρισης στο ΕΜΔΔ-ΜΙΤΟΣ, **αποφασίζει:**

Α. Την ίδρυση και λειτουργία, από το ακαδημαϊκό έτος 2026-2027, του Διατμηματικού Ξενόγλωσσου Προγράμματος Προπτυχιακών Σπουδών (Δ.Ξ.Π.Π.Σ.) με τίτλο “Materials Science and Engineering” των Τμημάτων Χημείας(επισπεύδον) και Φυσικής της Σχολής Θετικών Επιστημών και Μηχανολόγων Μηχανικών της Πολυτεχνικής Σχολής του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης, σύμφωνα με τις διατάξεις του ν. 4957/2022, όπως ισχύουν, ως εξής:

Article 1
Title, Content and Purpose of the Program

The Departments of Chemistry (the lead Department), Physics and Mechanical Engineering of the Aristotle University of Thessaloniki jointly organize and operate a Joint Undergraduate Program of Studies in English (hereinafter referred to as the "JEUPS.") in the field of Materials Science and Engineering. The Programme includes a curriculum guide and offers two educational tracks:

• a four-year course of study (1st to 8th semester), leading to the award of a Bachelor's Degree (Bachelor of Science in Materials Science and Engineering), and

• a five-year integrated course of study (1st to 10th semester), leading to the award of an integrated and indivisible postgraduate-level qualification (**Diploma with Integrated Master in Materials Science and Engineering**).

The qualification awarded upon completion of the four-year course corresponds to Level 6, while the qualification awarded upon completion of the five-year course corresponds to Level 7 of the National and European Qualifications Frameworks, in accordance with Article 47 of Law 4763/2020 (Government Gazette A' 254).

The **objective** of the Joint Undergraduate Program of Studies in English is the systematic education and specialization of students in Materials Science and Engineering, with emphasis on linking theoretical knowledge with applied research and industrial practice. The Programme provides students with the necessary knowledge and skills for access to scientific and technological professions related to the development, characterization, processing, and applications of advanced materials, as well as for any other professional or academic activity requiring high-level training in this field.

The **purpose** of the Programme is to provide high-level interdisciplinary education to an international audience through systematic familiarization with the principal scientific fields, contemporary technological developments, and the main directions of the field of Materials Science. The Programme aims:

- to cultivate abilities in analysis, critical evaluation, and the resolution of complex technical and scientific problems,
- to develop skills in experimental research, technological application, and innovation,
- to strengthen critical thinking, scientific advancement, and the creative utilization of knowledge,
- to promote the scientific work and academic profile of the Aristotle University of Thessaloniki within the international environment,
- as well as to generally enhance the international outreach of the participating Departments and the Institution.

Learning Outcomes and Qualifications

Upon successful completion of the JEUPS, students shall have acquired:

- solid theoretical knowledge in all major fields of Materials Science and Engineering,
- skills in understanding, analyzing, and synthesizing complex scientific issues and technical data,
- familiarity with contemporary research methodologies, laboratory tools and technological applications of the discipline,
- adequate scientific and technical training for employment in research centers, industrial units, and technological organizations,

- developed skills in intercultural communication, oral presentation, and written scientific documentation,
- the ability to pursue further studies in the second cycle of studies (Postgraduate Study Programmes) for individuals who have completed the four-year cycle, doctoral studies for individuals who have completed the five-year cycle, and, subject to applicable requirements, access to professional rights internationally.

The Programme provides students with the academic prerequisites for postgraduate and doctoral studies, as well as the professional qualifications necessary for careers in fields requiring documented scientific knowledge and technological competence. The degree/diploma awarded is equivalent to the degrees/diplomas granted by the Greek-language study programmes of Higher Education Institutions in Greece and is recognized as corresponding to the degrees/diplomas awarded by related programmes of foreign universities.

Article 2
Awarded Certification

The Joint Undergraduate Program of Studies in English (J.E.U.P.S.) of the Departments of Chemistry (the lead Department), Physics and Mechanical Engineering of the Aristotle University of Thessaloniki awards a Bachelor of Science in Materials Science and Engineering in its four-year track and a Diploma leading to the award of an integrated and indivisible postgraduate-level qualification, namely a "**Diploma with Integrated Master in Materials Science and Engineering**", in its five-year track.

Successful completion of the studies corresponds to Level 6 for the four-year track and Level 7 for the five-year track of the National and European Qualifications Frameworks, in accordance with Article 47 of Law 4763/2020 (Government Gazette A' 254).

Article 3
Number of Admitted Students – Selection Criteria and Required Supporting Documents

The maximum annual intake of students in the Joint Undergraduate Program of Studies in English (JEUPS) of the Departments of Chemistry (the lead Department), Physics and Mechanical Engineering is set at forty (40) eligible undergraduate students in accordance with applicable legislation, while the minimum number of admitted students required for the operation of the JEUPS is set at twenty-one (21) undergraduate students, who may enroll in the first year of study on an annual basis.

Upon recommendation of the Program of Studies Committee and by decision of the Senate of the Aristotle University of Thessaloniki and publication in the Government Gazette, the number of admitted students for each cycle of the Program may be modified.

The selection of admitted students is based on the candidates' curriculum vitae following evaluation of their application files and supporting documents by the Program of Studies Committee, as well as participation in the selection process. This process includes an oral interview conducted online by members of the Committee, which assesses communication and reasoning skills, academic and personal readiness, and general understanding of subjects in Chemistry, Physics, Mathematics and English.

By decision of the Program of Studies Committee, as specified in the call for applications, an English language knowledge test may be conducted prior to the interview, in a form and on thematic areas defined in each case by the relevant decision.

The specific selection criteria, required supporting documents and selection procedure are defined in Article 5 of the Internal Regulation of the JEUPS.

Article 4
Programme Resources – Tuition Fees

The resources of the Joint Undergraduate Program of Studies in English (JEUPS) of the Departments of Chemistry (the coordinating Department), Physics and Mechanical Engineering may derive from:

- tuition fees,
- donations, sponsorships and any form of financial support,
- bequests,
- funds from research projects or programmes, in particular those of the European Union,
- the University's own resources, the amount of which may not exceed five percent (5%) of the total budget of the JEUPS, and
- funds from any other lawful source.

For attendance in the JEUPS, total tuition fees amount to thirty-two thousand euros (€32,000) for the four-year programme and forty thousand euros (€40,000) for the five-year programme. The tuition fees payable by each student amount to eight thousand euros (€8,000) per year. Payment of tuition fees is made by the students themselves (or by a third natural or legal person on their behalf) in eight (8) and ten (10) equal instalments of four thousand euros (€4,000), respectively. The first instalment is paid upon the student's registration in the Programme and the subsequent instalments are paid prior to the beginning of each academic semester.

Aricle 5
Finance Budget of the Programme

The management of the resources of the Joint Undergraduate Program of Studies in English (JEUPS) in Materials Science and Engineering of the Departments of Chemistry (the coordinating Department), Physics and Mechanical Engineering is carried out by the Program of Studies Committee through the Special Account for Research Funds (ELKE) of the Aristotle University of Thessaloniki (AUTh). The funds are allocated on a priority basis to cover the operational needs of the JEUPS and, where cash surpluses exist, they may be used to cover other educational and development needs of the Departments of Chemistry, Physics and Mechanical Engineering, in proportions corresponding to the teaching workload of each Department (40%, 30% and 30%, respectively, for the first five-year operating cycle of the Program). These proportions may be modified by decision of the JEUPS Program of Studies Committee, in the event of a change in the contribution of teaching staff from the two Departments to the implementation of the JEUPS.

For a total annual intake of forty (40) admitted students, revenues are analyzed as follows: 40 students × €8,000 per student, total tuition fees = €320,000 in the first year of operation of the Program, €1,280,000 in the fourth year of operation, and €1,600,000 from the fifth year onwards. By way of indication, out of the total expected annual revenues of €320,000 and within a five-year study cycle framework, the relevant allocation and expenditure breakdown is as follows:

a) Teaching staff remuneration: €57,720 (and €323,220 from the fifth year onwards), assuming remuneration of €120 per hour for members of the academic staff and emeritus professors, €90

per hour for Readers and Special Teaching Staff (EDIP), and €800 per thesis supervision per diploma thesis.
b) Administrative support costs of the Program: €22,000 (with provision for €45,000 from the third year and €60,000 from the fifth year onwards).
c) €30,000 for promotion and communication activities of the Program.
d) Equipment procurement: €5,000 in the first year (corresponding to €500 per course), €10,000 in the second year, €15,000 in the third year, €26,000 in the fourth year, and €28,000 from the fifth year onwards.
e) Building infrastructure and maintenance: €10,000 per year.
f) Travel expenses and organization of events (such as the welcome of first-year students): €5,000 per year.
g) Expenses for invited speakers: €10,000 from the third year onwards.
h) Laboratory consumables and maintenance of laboratory equipment: €6,000 in the first year, €24,000 in the second year, €42,000 in the third year, €48,000 in the fourth year and onwards.
i) Additional remuneration for academic staff for thesis supervision: €32,000.
j) Provision of ten percent (10%) of the total budget for unforeseen expenses: €160,000.
k) Ten percent (10%) reimbursement fee to ELKE: €160,000.

Finally, from the utilization of cash reserves, which amount to **€128,280**, corresponding to more than **thirty-eight percent (37.6%)** already in the first year, reaching €559,850 (35%) by the fourth year of operation of the Program, **and €748,780 (46.8%)** by the fifth year of operation, the improvement of infrastructure and equipment of the participating Departments is foreseen, along with digitization actions, strengthening of human resources, and the establishment of a scholarship program as follows:
a) scholarship program for students of the Greek-language Undergraduate Study Programmes of the Departments of Chemistry, Physics and Mechanical Engineering based on financial criteria,
b) merit-based scholarships for research for graduates of the Greek-language Undergraduate Study Programmes, and
c) merit-based scholarships for students of the JEUPS.

The above-mentioned program is initiated from the first year of operation and, in line with the positive development of cash reserves and the gradual maturation of the Program, is expected to be systematically strengthened throughout its duration, aiming at a steady expansion in both the number and value of scholarships awarded.

Article 6
Duration and Terms of Studies

The duration of studies in the Joint Undergraduate Program of Studies in English (JEUPS) in Materials Science and Engineering, leading in the case of the four-year study cycle to the award of a Bachelor's Degree (Bachelor of Science in Materials Science and Engineering), is set at eight (8) academic semesters of full-time study. In the case of the five-year integrated study cycle, leading to the award of a **Diploma with Integrated Master (Diploma with Integrated Master in Materials Science and Engineering), the duration is set at ten (10) academic semesters of full-time study**. The maximum duration of studies is defined as the above period plus an additional four (4) and six (6) academic semesters respectively.

Students who have selected the four-year study cycle have the option to continue into the fifth year, leading to the award of the Diploma with Integrated Master.

Each semester course has a duration of thirteen (13) weeks. Teaching is delivered in person, utilizing the infrastructure of the Departments of Chemistry (the coordinating Department), Physics and Mechanical Engineering, with the provision for the exceptional use of synchronous distance learning methods.

The rights and obligations of students are described in Articles 6 and 7 of the Internal Regulation of the Program..

Aricle 7
Official Language of Instruction and Study Programme of the JEUPS.

English is defined as the official language of instruction of the Program.

The Joint Undergraduate Program of Studies in English (JEUPS) in "Materials Science and Engineering" offers a full-time study guide of four (4) academic years in the case of the four-year study cycle and five (5) academic years in the case of the five-year integrated study cycle, structured into eight (8) and ten (10) academic semesters respectively. The Program comprises fifty-eight (58) courses in total and a diploma thesis, of which forty (40) are mandatory courses and eighteen (18) are elective specialization courses.

Mandatory courses (M) in the case of the five-year integrated study cycle: the student is required to successfully attend and pass forty (40) mandatory courses, from which they will accumulate two hundred thirty-four (234) ECTS credits over the course of their studies. The mandatory courses aim to provide students with fundamental knowledge and methodology in the core disciplines that traditionally constitute the field of Materials Science and Engineering worldwide.

Mandatory specialization courses (S) in the case of the five-year integrated study cycle: eighteen (18) elective courses are offered across three different specializations (Materials Manufacturing and Circular Economy, Micro and Nanotechnology Engineering, Biomaterials and Biotechnology). During the seventh (7^{th}) and eighth (8^{th}) semesters, the student must select three (3) courses per semester: two (2) from the chosen specialization and one (1) from any other specialization and in any combination they wish, so that, upon successful completion of six (6) courses in total, they will obtain an additional thirty-six (36) ECTS credits during their studies. The specialization courses (S) aim to introduce students, according to their preference, to more specialized areas of knowledge.

During the ninth (9^{th}) and tenth (10^{th}) semesters, the student will undertake a diploma thesis, from which they will obtain thirty (30) ECTS credits. Successful completion of the Program corresponds to three hundred (300) ECTS credits.

In the case of the four-year study cycle, semesters 1 to 7 are identical, with the same number of courses, as in the five-year integrated cycle. The student is required to successfully attend and pass thirty-four (34) mandatory courses, from which they will accumulate two hundred four (204) ECTS credits. In the fourth year, the same three specializations are offered with eighteen (18) specialization courses (S), as in the five-year cycle. During the seventh (7^{th}) semester, the student selects three courses and during the eighth (8^{th}) semester one (1) course. Upon successful completion, they will accumulate a total of twenty-four (24) ECTS credits from specialization courses. In the eighth (8^{th}) semester, the student undertakes a diploma thesis from which they obtain twelve (12) ECTS, reaching a total of 240 ECTS credits overall. The only difference lies in the 8^{th} semester, where instead of selecting three specialization courses, students select one elective course and undertake the diploma thesis.

The maximum percentage of students per specialization may not exceed forty percent (40%) of the total number of students.

Attendance of courses is mandatory, and absences exceeding thirty percent (30%) of teaching hours per semester are not permitted, except in duly justified cases of force majeure.

The academic year is divided into two (2) semesters (winter and spring), each consisting of thirteen (13) weeks of teaching, with an examination period at the end of each semester. Successful completion of studies for the award of the degree requires the accumulation of three hundred (300) ECTS credits for the five-year cycle and two hundred forty (240) ECTS credits for the four-year cycle.

The language of instruction for all courses is English. Interested students have the opportunity to enroll in the School of Modern Greek Language of AUTh in order to learn Greek during the first three (3) years of study.

The Program does not include mandatory internship and provides the opportunity for those who wish to participate in international mobility programs.

The detailed curriculum is presented in Article 8 of the Internal Regulation of the Program.

Β. Την έγκριση του Εσωτερικού Κανονισμού του Διατμηματικού Ξενόγλωσσου Προγράμματος Προπτυχιακών Σπουδών (Δ.Ξ.Π.Π.Σ.) με τίτλο "Materials Science and Engineering" των Τμημάτων Χημείας (επισπεύδον) και Φυσικής της Σχολής Θετικών Επιστημών και Μηχανολόγων Μηχανικών της Πολυτεχνικής Σχολής του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης, ως ακολούθως:

Preamble

Ο πρώτος κύκλος σπουδών περιλαμβάνει την παρακολούθηση ενός Προγράμματος Προπτυχιακών Σπουδών (Π.Π.Σ.) και ολοκληρώνεται με την απονομή τίτλου Προπτυχιακών Σπουδών. Η επιτυχής ολοκλήρωση του προγράμματος οδηγεί σε απονομή Πτυχίου (Bachelor's Degree) σε επίπεδο έξι (6) για τον τετραετή κύκλο σπουδών και στην απονομή Διπλώματος με ενσωματωμένο Μεταπτυχιακό Τίτλο (*Diploma with Integrated Master*) σε επίπεδο επτά (7) για τον πενταετή κύκλο σπουδών, σύμφωνα με το Εθνικό και Ευρωπαϊκό Πλαίσιο Προσόντων.

Ο παρών Κανονισμός Προπτυχιακών Σπουδών συντάσσεται σύμφωνα με τις διατάξεις του Κεφαλαίου Ζ' του Ν. 4957/2022 (ΦΕΚ Α', 141/21.07.2022) «Νέοι Ορίζοντες στα Ανώτατα Εκπαιδευτικά Ιδρύματα: Ενίσχυση της ποιότητας, της λειτουργικότητας και της σύνδεσης των Α.Ε.Ι. με την κοινωνία και λοιπές διατάξεις», **που αφορούν την οργάνωση και λειτουργία των προγραμμάτων σπουδών, καθώς και του Κεφαλαίου ΙΑ' του ίδιου νόμου, που αφορά ειδικά τα Ξενόγλωσσα Προπτυχιακά Προγράμματα Σπουδών. Προσέτι, εναρμονίζεται με τον Κανονισμό Λειτουργίας Προγραμμάτων Προπτυχιακών Σπουδών του Α.Π.Θ. διασφαλίζοντας ότι οι ρυθμίσεις του παρόντος συμβαδίζουν με το ισχύον θεσμικό πλαίσιο του ιδρύματος.**

Article 1
Objective, Purpose of JEUPS

The Departments of Chemistry (the lead Department), Physics and Mechanical Engineering of the Aristotle University of Thessaloniki jointly organize and operate a Joint Undergraduate Programme of Studies in English (JEUPS) in Materials Science and Engineering. The Programme includes a study guide and offers two educational pathways:

• a four-year study cycle (1st to 8th academic semester) leading to the award of a Bachelor of Science in Materials Science and Engineering, and
• a five-year integrated study cycle (1st to 10th academic semester) leading to the award of an integrated and indivisible postgraduate-level qualification (Diploma with Integrated Master in Materials Science and Engineering).

The objective of the JEUPS is the systematic education and specialization of students in Materials Science and Engineering, with emphasis on linking theoretical knowledge with applied research and industrial practice. The Programme provides students with the necessary knowledge and skills for access to scientific and technological professions related to the development, characterization, processing and applications of advanced materials, as well as for any other professional or academic activity requiring high-level training in this field.

The purpose of the Programme is to provide high-level interdisciplinary education to an international audience through systematic familiarization with the main scientific fields, contemporary technological developments and the principal directions of the field of Materials Science. The Programme aims:
• to cultivate skills in analysis, critical evaluation and problem-solving of complex technical and scientific issues,
• to develop skills in experimental research, technological application and innovation,
• to strengthen critical thinking, scientific depth and the creative utilization of knowledge,
• to promote the scientific work and academic profile of the Aristotle University of Thessaloniki in the international environment,
• as well as to enhance the outward orientation of the participating Departments and the Institution.

Learning Outcomes and Qualifications
Upon successful completion of the JEUPS, students will have acquired:
• solid theoretical knowledge in all core fields of Materials Science and Engineering,
• skills in understanding, analyzing and synthesizing complex scientific issues and technical data,
• familiarity with contemporary research methodologies, laboratory tools and technological applications of the discipline,
• sufficient scientific and technical training for employment in research centres, industrial units and technological organizations,
• developed skills in intercultural communication, oral presentation and written scientific documentation,
• the ability to continue studies in the second cycle of studies (Postgraduate Programmes) for graduates of the four-year cycle, doctoral studies for graduates of the five-year cycle, and, under certain conditions, access to professional rights internationally.

The Programme provides students with the academic prerequisites for further postgraduate and doctoral studies, as well as the professional qualifications required for careers in fields demanding documented scientific knowledge and technological competence. The degree/diploma awarded is equivalent to the degrees/diplomas granted by the Greek-language study programmes of Higher Education Institutions in Greece and is recognized as corresponding to degrees/diplomas of similar programmes of foreign universities

Article 2
Awarded Certification of J.E.U.P.S.

The Joint Undergraduate Programme of Studies in English (JEUPS) of the Departments of Chemistry (the coordinating Department), Physics and Mechanical Engineering of the Aristotle University of Thessaloniki awards a Bachelor of Science in Materials Science and Engineering in its four-year version and a Diploma leading to the award of an integrated and indivisible postgraduate-level qualification, namely **a "Diploma with Integrated Master in Materials Science and Engineering**", in its five-year version.

Successful completion of studies corresponds to Level 6 for the four-year version of the Programme and Level 7 for the five-year version, according to the National and European Qualifications Frameworks, in accordance with the provisions of Article 47 of Law 4763/2020 (Government Gazette A' 254).

Article 3
The administration of the J.E.U.P.S.

The competent bodies for the organization, administration and operation of the Joint Undergraduate Program of Studies in English in "Materials Science and Engineering" of the Departments of Chemistry, Physics and Mechanical Engineering are the following:

1. The Senate of the Aristotle University of Thessaloniki (AUTh)
2. The Steering Committee of the JEUPS of the collaborating Departments
3. The Director of the JEUPS of the Department
4. The Assemblies of the participating Departments (Department of Chemistry, Department of Physics and Department of Mechanical Engineering)

More specifically:

1. The Senate of the Institution exercises the following competences:

a. Approves the establishment of the JEUPS, upon recommendation of the Department Assembly, as well as any amendment to the founding decision of the JEUPS, upon recommendation of the Steering Committee.

b. Approves the Internal Regulation of the JEUPS, upon recommendation of the Department Assembly, as well as any amendment thereof, upon recommendation of the Steering Committee.

c. Constitutes the Programme of Studies Committee of the JEUPS and appoints the Director of the JEUPS, upon recommendation of the Department Assembly.

d. Approves the abolition of the JEUPS, upon recommendation of the Department Assembly.

e. Exercises any other competence relating to academic, administrative, financial and organizational matters of the JEUPS which are not explicitly assigned by the present Regulation to other bodies.

2. The Steering Committee of the JEUPS consists of seven (7) members of the Teaching and Research Staff (DEP) of the Departments of Chemistry, Physics and Mechanical Engineering, of whom at least two (2) members are Professors or Associate Professors. In particular, it consists of three (3) members of the Teaching and Research Staff (DEP) of the Department of Chemistry, two (2) members of the Department of Physics and two (2) members of the Department of Mechanical Engineering. The Committee has a four-year term of office and is constituted by decision of the Senate of the Institution, following recommendation of the Department Assemblies. The members

of the Committee receive no remuneration for the performance of their administrative duties. The Steering Committee exercises the following competences:

a. Submits recommendations to the Senate regarding amendments to the founding decision of the JEUPS, as well as any other matter relating to its operation for which the Senate is the competent body.

b. Allocates teaching duties among the instructors of the JEUPS.

c. Prepares the annual budget of the JEUPS.

d. Approves all types of expenditures for the operation of the JEUPS.

e. Certifies the successful completion of studies for the award of the JEUPS qualification.

f. Exercises any other competence related to the organization, administration and management of the JEUPS.

3. The Director of Joint Undergraduate Program of Studies in English in Materials Science and Engineering is the Chair of the Department of Chemistry (the lead Department), in order to ensure a unified strategic and administrative supervision and orientation of both the Greek-language and English-language Study Programmes. The Director exercises, indicatively, the following competences:

a. Chairs the Steering Committee and convenes its meetings.

b. Submits proposals to the Steering Committee and other bodies of the Institution regarding the effective operation of the JEUPS.

c. Acts as Scientific Responsible of the JEUPS, in accordance with Article 234 of Law 4957/2022.

4. The Coordinator of the Joint Undergraduate Program of Studies in English: By decision of the Steering Committee, a Coordinator of the Programme may be appointed for a term equal to that of the Committee. The Coordinator is a member of the Teaching and Research Staff (DEP) of one of the Departments of Chemistry, Physics and Mechanical Engineering and works closely with the Director and the Committee, undertaking coordinating and organizational duties under their supervision. The Coordinator exercises, indicatively, the following competences upon assignment by the Steering Committee:

a. Monitors the smooth day-to-day operation of the Programme and ensures the timely implementation of decisions of the Committee and the Director.

b. Oversees the organization of the timetable and communication with teaching staff.

c. Cooperates with the Secretariat on matters relating to the operation of the Programme.

d. Ensures the information of students regarding the study programme, evaluation procedures, mobility opportunities, scholarships and any other academic or administrative matter.

e. In coordination with the Programme Secretariat, prepares and submits regular reports to the Committee and the Director on the operation of the Programme.

f. Represents, following relevant decision of the Committee or the Director, the Programme in administrative and/or academic relations with bodies within and outside AUTh.

g. Exercises, upon authorization of the Committee, any other competence assigned to the Director under the present Regulation.

Article 4
Candidates' Categories in J.E.U.P.S.

Eligibility to submit an application is granted to foreign candidates who are:

a) Graduates of secondary schools or equivalent institutions physically located abroad. Applicants who have completed full-time attendance in the last two (2) years of secondary

education in a foreign country must submit a secondary school leaving certificate or an equivalent upper secondary education qualification, which grants access to higher education institutions in the country of graduation.

b) Graduates of recognized foreign schools of other European Union Member States or third countries, legally operating in Greece, whose qualification grants access to higher education institutions in the country whose educational curriculum is followed by the respective foreign school, provided that:

ba) neither the candidates nor their parents hold Greek citizenship, and

bb) they have completed full-time attendance in at least the last two (2) years of secondary education.

c) Students of higher education institutions abroad who hold the certificate referred to in paragraph 1 of Article 314A of Law 4957/2022, in order to continue their studies in a corresponding semester and be awarded a degree by the JEUPS.

Foreign schools operating in Greece must be officially recognized for their legality by the competent Regional Directorate of Secondary Education.

The verification of the authenticity of the secondary school diploma and the applicant's transcript may be carried out as follows:

a) by Apostille certification, provided that the country of origin is a party to the Hague Convention Abolishing the Requirement of Legalisation for Foreign Public Documents;

b) by notarization;

c) by authentication from the Ministry of Foreign Affairs and/or the Ministry of Education of the issuing country;

d) by submission of the diploma and/or transcript with simultaneous notification of the foreign school by the applicant. Such notification shall be accompanied by an official email from the foreign school, enabling the Programme Secretariat to verify the authenticity of the documents.

Proof of English Language Proficiency

Applicants must demonstrate English language proficiency at a minimum level of B2, according to the Common European Framework of Reference for Languages (CEFR), in one of the following ways:

a) English as a native language;

b) possession of a language proficiency certificate of at least B2 level issued by a recognized examination body, in accordance with the applicable decisions of the Supreme Council for Civil Personnel Selection (ASEP) or the Ministry of Education regarding recognized language qualifications;

c) a Bachelor's, Master's or Doctoral degree from a recognized higher education institution in Greece or abroad in a relevant field;

d) a Bachelor's, Master's or Doctoral degree from a recognized foreign higher education institution, provided that the programme of study was conducted entirely in English;

e) a secondary school leaving certificate, provided that the candidate has attended at least the last two (2) years of secondary education in a school where English is the official language of instruction;

f) a teaching license in a foreign language does not constitute proof of language proficiency, as submission of the certified qualification on which the license was based is required, together with its official translation where necessary.

Article 5
Number of Admitted Students, Selection Criteria and Required Documents

The annual number of admitted students to the JEUPS "Materials Science and Engineering" is set at a maximum of forty [40] undergraduate students, while the minimum number required for the programme to operate is twenty-one (21) undergraduate students. Upon recommendation of the Programme Committee and decision of the Senate of AUTh and publication in the Government Gazette, the minimum and maximum intake numbers may be modified in each admission cycle.

In the event of a tie among candidates, admission is granted to all candidates tied with the last successful candidate, according to ranking order, up to the maximum number (forty).

Selection is based on the candidates' CVs following evaluation of the application file and supporting documents by the Programme Committee, as well as participation in the selection process. This includes an online interview conducted by members of the Committee, assessing communication skills and ability to substantiate reasoning, academic and personal readiness, and general understanding of issues related to Materials Science and Engineering. By decision of the Programme Committee, as stated in the call for applications, an English language knowledge test may be conducted prior to the interview, in formats and topics defined each time in the call.

The relevant call for applications and required documents are published on the Programme website every March.

Applications are submitted electronically throughout the year until all available places are filled. Candidates must submit their applications with all required documents to the Programme Secretariat in electronic form. The English language test and interviews are conducted on predetermined dates set by the Programme Committee, while the order of evaluation follows the chronological order of application submission.

Candidates must submit the following documents:

- Application form for the JEUPS available online on the Programme website
- Copy of both sides of identity card or passport
- Secondary school diploma (with official English translation)
- Transcript of all subjects from the final year of secondary school (with official English translation), showing successful completion in Mathematics, Physics, and Chemistry or equivalent subjects as stated in the diploma
- Certificate of English proficiency at least B2 level
- Motivation Letter (up to 500 words) describing interest in Materials Science and Engineering, motivation for applying, and future goals
- Short CV including studies, distinctions, volunteering, or other relevant activities

The above selection criteria and required documents may be modified following a proposal by the Programme Committee and approval by the Senate of AUTh.

Additionally, the following optional academic criteria are positively considered:

- Minimum overall secondary school grade: 70% of the maximum score or equivalent
- Admission test qualifications such as:

International Baccalaureate (IB): at least 28/45

GCE A-levels: at least ABB in 3 subjects, with emphasis on relevant subjects

Advanced Placement (AP): score 4 or 5 in relevant subjects (Chemistry, Physics, Mathematics)

SAT / ACT: SAT ≥ 1000/1600, ACT ≥ 25/36

TSA (Thinking Skills Assessment): ≥ 60/100 or raw score ≥ 25/50

These additional criteria are taken into account in the overall evaluation and may be revised according to the Steering Committee and the applicable legal framework.

Original documents may be requested to be submitted by post or in person to the Programme Secretariat.

The final selection process is conducted by the Programme Committee as follows: a full list of applicants is compiled; candidates not meeting minimum requirements are excluded; eligible candidates are invited for interview. After completion of the evaluation (file assessment, interview, and test if applicable), the final ranking list of successful candidates is prepared.

The final list of successful and alternate candidates is approved by the Programme Committee. The selection process, publication of results, and registration of admitted students must be completed by 30th September of each academic year, subject to filling vacancies arising from withdrawals. Vacancies are filled in order of priority from the reserve list.

Additionally to the above, students of foreign Higher Education Institutions holding a certificate of recognition of study periods completed abroad (Article 314A(1) of Law 4957/2022, as amended by Article 128 of Law 5094/2024) may apply for continuation of studies in the JEUPS "Materials Science and Engineering" at AUTh, in order to obtain the corresponding degree.

Applicants submit their application with required documents to the Programme Secretariat in paper or electronic form through the electronic enrolment system of the Ministry of Education, Religious Affairs and Sports.

Filling of vacant places

In the event of withdrawal or deregistration of a student, the Programme Committee may, by duly justified decision, fill the vacant place to ensure the smooth operation of the Programme and maintain a stable number of students per academic year.

The place may be filled by students enrolled in the same or higher semester in internationally recognised Higher Education Institutions abroad.

Candidates may be selected either from those who submitted applications in the initial call or through a separate public call.

Required documents:

- Copy of identity card or passport
- Secondary school diploma (original and official English translation)
- Transcript of the final year of secondary school (original and official English translation)
- Transcript from the home institution (for cases under Article 314A(1) of Law 4957/2022)
- Official study programme of the home institution for academic equivalence check (where applicable)
- Proof of English proficiency as specified in Article 4 of this Regulation
- Motivation letter
- CV

The Committee evaluates applications and may invite candidates to interview before issuing the final decision.

Appeals against results may be submitted within five (5) working days from notification, in writing to the Programme Secretariat.

Registration of successful candidates is completed within fifteen (15) days following announcement, upon submission of required documents. Failure to register and pay the required deposit is considered refusal of the position, which is then offered to the next candidate on the reserve list.

It is clarified that applications and admissions refer exclusively to the academic year stated in the call. No provisional admission is granted for future semesters or years, including for military service or personal reasons. Candidates wishing to enroll in a later year must reapply.

Exceptionally, the Steering Committee may approve, by justified decision, a one academic year deferral of enrolment where serious and duly documented reasons exist. The decision is at the Committee's sole discretion.

Article 6
Durations of Studies and Terms for J.E.U.P.S.

The duration of studies in the JEUPS "Materials Science and Engineering", in its 4-year version leading to the award of a Bachelor of Science in Materials Science and Engineering, is set at eight (8) teaching semesters of full-time study. In its 5-year version, which leads to the award of a degree with an integrated Master's qualification (Diploma with Integrated Master in Materials Science and Engineering), it is set at ten (10) teaching semesters of full-time study. The maximum duration of studies is defined as this period plus an additional four (4) and six (6) academic semesters respectively. Students who have selected the four-year study cycle have the possibility to continue into the 5th year, leading to the award of the Integrated Master's degree.

Each semester course is of thirteen (13) weeks' duration and is delivered through lectures, laboratory exercises, assignments, and other teaching activities, depending on the requirements of the course and the instructor's choice.

All courses are **delivered in person**, making use of the facilities of the Departments of Chemistry, Physics, and Mechanical Engineering. Exceptionally, synchronous **distance learning methods may be used** for teaching delivered by faculty members from foreign institutions or affiliated professors, or in cases of force majeure or exceptional circumstances where in-person delivery or the use of departmental infrastructure is not possible for educational, research, or other activities, including the organisation of advanced courses and tutorial sessions beyond the mandatory teaching hours per course. Distance learning is conducted through ICT tools, utilising the technical infrastructure of the Departments of Chemistry, Physics, and Mechanical Engineering, as well as the expertise and support of the Digital Governance Unit (DGU) of AUTh.

The minimum duration of studies required for the award of the degree is eight (8) and ten (10) academic semesters respectively, while the maximum duration is extended by four (4) and six (6) academic semesters for the 4-year and 5-year versions of the programme respectively.

Upon completion of the maximum duration of studies of fourteen (14) and sixteen (16) semesters, and without prejudice to the provisions of the applicable legislation on Higher Education Institutions, a decision of deregistration is issued by the competent body of the JEUPS.

Once registration has been completed and all formal procedures marking the official commencement of studies have been finalised, students who have not exceeded the maximum duration of studies referred to in paragraph 1 may request suspension of studies for a period not exceeding a total of two (2) academic years. The right to suspend studies may be exercised once or in parts, with a minimum duration of one (1) academic semester, but the total suspension period may not exceed two (2) years. Student status is suspended during the period of interruption, and participation in any educational process is not permitted. The suspension period is not counted towards the maximum duration of studies, and upon resumption, students return

to full-time status with all rights and obligations of the Programme. The relevant procedure is initiated through a written application submitted by the student to the JEUPS Secretariat, accompanied by the required documentation, and is evaluated by the Programme Committee.

In cases of serious health reasons concerning the student or a first-degree relative by blood, spouse, or a person with whom the student has entered into a civil partnership, an exceptional extension of the maximum duration of studies of up to one (1) year may be granted. Such extension is approved by the Programme Committee upon a fully justified and documented application by the student, and may not exceed two (2) consecutive academic semesters.

Part-time study is not available in the JEUPS.

For matters relating to re-examination of outstanding courses or deregistration due to:

a) insufficient academic progress (evidenced by lack of participation in the educational process such as attendance and examinations),

b) behaviour that violates academic ethics, and

c) request by the student,

the Steering Committee shall take the relevant decisions.

Article 7
Students' Rights and Obligations

Within the framework of the social policy of the Departments of Chemistry, Physics, and Mechanical Engineering, in collaboration with the Unit for Equal Access of the Aristotle University of Thessaloniki (AUTh), the full, equal, and effective participation of all students with disabilities or special educational needs is ensured in all educational, research, and administrative activities of the School in general and of the JEUPS in particular.

Access to teaching and examination facilities of the Departments of Chemistry, Physics, and Mechanical Engineering is facilitated through appropriate infrastructure, such as ramps, accessibility bars, and elevators. For students who, due to disability or learning difficulties, are unable to participate in written examinations, the possibility of oral examination is provided, either in person in an accessible room or remotely via a video-conferencing platform.

Students are enrolled in and participate in the JEUPS under the terms and conditions set out in this Regulation. Students of the programme **enjoy all rights**, benefits, and facilities provided to students of the Greek-language study programme, except for the right to free provision of textbooks. Furthermore, meals at the AUTh University Student Restaurant are provided upon payment of a small fee, as defined by the applicable operating regulations of the restaurant.

Students admitted to the JEUPS **are obliged to:**

1. Attend all courses of the Study Programme, whether conducted in person or, exceptionally, remotely, provided that the latter has been approved by the competent bodies of the Programme. Participation in lectures, exercises, examinations, public lectures, and all other educational activities is mandatory. Students are entitled to be absent for up to thirty percent (30%) of the total teaching hours of each course per semester. In cases of serious and justified impediments, make-up teaching hours may be arranged upon agreement with the course instructor and approval of the Programme Committee.

2. Submit all required assignments on time, where these are provided for in each course by the responsible instructor.

3. Declare, at the beginning of each semester, any courses from previous years in which they have not been successfully examined. Declarations are submitted electronically through

the *e*-secretariat system and are recorded in the student's academic file. Mandatory declaration is required in the final year for elective courses.

4. Procure or borrow the necessary textbooks, as recommended by the instructor of each course, where deemed necessary.

5. Regularly follow announcements from the Programme and the Secretariat and check their electronic correspondence frequently.

6. Obtain an academic identity card through the competent electronic service of the Ministry of Education, Religious Affairs and Sports.

7. Pay tuition fees on time before the winter (1st) and spring (2nd) semester of each academic year, in accordance with the specified deadlines.

8. Settle all financial or other outstanding obligations towards the Programme and the Institution prior to graduation. Otherwise, they are not entitled to participate in the graduation ceremony.

9. In the case of a scholarship with a reciprocal obligation, provide the required work, which may include supporting the educational or research activities of the Programme, the library, or other School needs.

10. Respect the decisions of the Programme bodies and comply with the rules of academic ethics.

Systematic or serious violation of the obligations arising from this Regulation, without sufficient and documented justification, may result in failure in a course, or, in serious cases, exclusion from educational activities and/or deregistration from the Programme, following a decision of the Steering Committee.

The same sanction may be imposed in cases of disciplinary misconduct that undermines the academic community and the dignity of its members, such as sexist, racist, homophobic, or transphobic behaviour, verbal or physical violence, inappropriate conduct in university premises, as well as any action contrary to the principles of respect, equality, and inclusion. Finally, the Committee reserves the right to refer relevant cases to the competent disciplinary bodies of the Institution or, where appropriate, to the competent law enforcement authorities, in accordance with applicable legislation.

The Departments of Chemistry, Physics, and Mechanical Engineering of AUTh provide the institution of the Academic Advisor. The role of the Academic Advisor is to guide students towards the successful completion of their studies and, based on their individual goals, to propose guidance and solutions for any issues that may arise and hinder their academic progress. The list of Academic Advisors is announced by the Secretariat on the Department's website, including contact details. All members of the Teaching and Research Staff (DEP) and Special Teaching Staff (EDIP) are required to serve as Academic Advisors, and assignment is made after the enrolment of new students at the beginning of each academic year. New students must contact their assigned Academic Advisor at the beginning of the winter semester of their year of admission. They are subsequently encouraged to maintain at least one communication per semester with their Academic Advisor. The Academic Advisor is committed to proposing solutions in cases where a student faces problems related to the smooth progress of their studies, in accordance with the study regulations of the Department and the broader regulations of AUTh, and also to respecting person

Article 8
Curriculum - Course Contents - Knowledge Test

The Joint Undergraduate Programme "Materials Science and Engineering" offers a full-time Programme of studies with an optional duration of four (4) and five (5) academic years, structured into eight (8) and ten (10) academic semesters respectively. The Programme includes a total of fifty-eight (58) courses, of which forty (40) are Mandatory Courses and eighteen (18) are Mandatory Specialisation Courses. As a general rule, the distribution of courses is five (5) courses per semester.

Mandatory Courses (M) in the case of the five-year integrated cycle of studies. The student is required to attend and successfully pass forty (40) mandatory courses, from which they will obtain two hundred and thirty-four (234) ECTS credits during their studies. The mandatory courses aim to provide the student with the fundamental knowledge and methodology of the scientific fields that traditionally constitute the core of Materials Science and Engineering worldwide.

Mandatory Specialisation Courses (S) in the case of the five-year integrated cycle of studies. Three (3) specialisations are offered (Materials Manufacturing and Circular Economy, Micro and Nanotechnology Engineering, Biomaterials and Biotechnology), comprising eighteen (18) mandatory specialisation courses (S). The student must select courses during the seventh (7th) and eighth (8th) semesters, three (3) courses per semester: two (2) courses per semester from the chosen specialisation and one (1) course per semester from any other specialisation and in any combination desired. In total, by successfully passing six (6) courses, the student obtains an additional thirty-six (36) ECTS credits during their studies. The specialisation courses (S) aim to introduce the student, according to their choice, to more specialised fields of knowledge.

In the ninth (9^{th}) and tenth (10^{th}) semesters, the student undertakes a diploma thesis, from which they obtain 30 ECTS credits, reaching a total of 300 ECTS credits. The successful completion of the Programme corresponds to three hundred (300) ECTS credits.

In the case of the four-year cycle of studies, semesters 1 to 7 are identical, with the same number of courses, as in the five-year integrated cycle. The student is required to attend and successfully pass thirty-four (34) mandatory courses, from which they obtain two hundred and four (204) ECTS credits during their studies. In the fourth year, the same three (3) specialisations are offered, with eighteen (18) specialisation courses (S), as in the five-year cycle. The student must select, in the seventh (7th) semester, three courses and in the eighth (8th) semester one (1) course, so that, upon successful completion, they obtain a total of twenty-four (24) ECTS credits during their studies. In the eighth (8th) semester, the student undertakes a diploma thesis, from which they obtain 12 ECTS credits, reaching a total of 240 ECTS credits. The successful completion of the Programme corresponds to two hundred and forty (240) ECTS credits. The only difference is that in the 8th semester students, instead of selecting three (3) specialisation courses from their chosen track, select one (1) specialisation course and may undertake a diploma thesis.

The maximum percentage of students per specialisation cannot exceed forty per cent (40%) of the total number of students.

Teaching is conducted in person, with provision for digital support for educational material and communication between students and instructors through the e-learning platform of the Aristotle University of Thessaloniki. Attendance of courses is mandatory, and absences exceeding thirty per cent (30%) of the teaching hours of each semester are not permitted, unless justified by documented force majeure reasons.

The academic year is structured into two (2) semesters (winter and spring), each containing thirteen (13) weeks of teaching, with an examination period at the end of each semester. Successful completion of studies for the award of the degree requires the accumulation of three hundred (300) ECTS credits for the five-year (5) cycle and two hundred and forty (240) ECTS credits for the four-year (4) cycle.

The language of instruction for all courses is English. Students have access to optional courses in Greek terminology, especially in the fourth (4th) year, aimed at facilitating those who wish to pursue their professional career in Greece, as well as specialised elective courses. The Programme does not include mandatory internship, however advisory support is provided, along with opportunities to participate in research projects and in international mobility programmes.

Study Programme

Code	CURRICULUM | Mandatory Courses	Hours/week	ECTS
	1st Semester	**[20]**	**[30]**
MSEN 101	Introduction to Materials Science and Engineering	4	6
MSEN 102	Fundamentals of Chemistry	4	6
MSEN 103	Physics for Scientists and Engineers I – Mechanics & Waves	4	6
MSEN 104	Mathematics I – Algebra, Analytic Geometry and Introduction to Calculus	4	6
MSEN 105	Materials Informatics	4	6
	2nd Semester	**[20]**	**[30]**
MSEN 201	OrganicChemistry	4	6
MSEN 202	Fundamentals of Chemistry Laboratory	4	6
MSEN 203	Physics for Scientists and Engineers II– Electricity & Magnetism	4	6
MSEN 204	Mathematics II – Advanced Calculus	4	6
MSEN 205	Bonding, Crystallography, CrystalDefects	4	6
	3rd Semester	**[20]**	**[30]**
MSEN 301	Physical Chemistry	4	6
MSEN 302	Organic Chemistry Laboratory	4	6
MSEN 303	Data Analysis – Statistics	4	6
MSEN 304	Thermodynamics	4	6
MSEN 305	Introductionto Solid Mechanics	4	6
	4th Semester	**[20]**	**[30]**
MSEN 401	Inorganic materials chemistry	4	6
MSEN 402	Physical Chemistry Laboratory	4	6
MSEN 403	Design and Analysis of Materials Experiments	4	6
MSEN 404	Condensed Matter Physics	4	6
MSEN 405	Polymer Science and Engineering: Theory and Laboratory	4	6
	5th Semester	**[20]**	**[30]**
MSEN 501	Inorganic Materials Chemistry Laboratory	4	6
MSEN 502	Materials Characterization	4	6
MSEN 503	Ceramics	4	6
MSEN 504	Chemical Process Engineering	4	6
MSEN 505	Mechanical Behavior of Engineering Materials	4	6

6th Semester [20] [30]

MSEN 601	Design of materials in the atomic scale	4	6
MSEN 602	Materials Characterization Laboratory	4	6
MSEN 603	Industrial Process Design and Economics	4	6
MSEN 604	Engineering Laboratory (mechanical testing, non-destructive testing)	4	6
MSEN 605	Composite materials	4	6

7th Semester [20] [30]

MSEN 701	Materials selection in engineering design	4	6
MSEN 702	Materials Processing	4	6
Area 1: *Materials Manufacturing and Circular Economy*			
MSEN 711	*Fundamentals of Additive Manufacturing*	4	6
MSEN 712	*Powder metallurgy*	4	6
MSEN 713	*Materials Circular Economy and LCA*	4	6
Area 2: *Micro and Nanotechnology Engineering*			
MSEN 721	*Surfaces and Interfaces and Thin-Film Materials Science*	4	6
MSEN 722	*Nanomaterials and Nanotechnologies*	4	6
MSEN 723	*Fundamentals of Semiconductor Materials*	4	6
Area 3: *Biomaterials and Biotechnology*			
MSEN 731	*Bio- organicmaterials*	4	6
MSEN 732	*BiochemistryTheory and Laboratory*	4	6
MSEN 733	*Bio inorganic materials for biomedical and clinical applications*	4	6

8th Semester 20 30

MSEN 801	CAD-CAE in materials	4	6
MSEN 802	Deformation and Failure of Engineering Materials	4	6
Area 1: *Materials Manufacturing and Circular Economy*			
MSEN 811	Solidification, Casting and Welding	4	6
MSEN 812	*Waste Valorization and Advanced Recycling Technologies*	4	6
MSEN 813	*Criticalrawmaterials*	4	6
Area 2: *Micro and Nanotechnology Engineering*			
MSEN 821	*Optoelectronics and Sensors: Materials and Applications*	4	6
MSEN 822	*Materials and systems in Energy Technologies*	4	6
MSEN 823	*Electronic Materials Processing*	4	6
Area 3: *Biomaterials and Biotechnology*			
MSEN 831	*Bio-inspired Engineering*	4	6
MSEN 832	*Biomechanics*	4	6
MSEN 833	*Structura lBiochemistry and Bioinformatics*	4	6
*Diploma Thesis			12

9th Semester		20	30
MSEN 901	Computational Methods in Engineering Design	4	6
MSEN 902	Materials and Environment	4	6
MSEN 903	Research Methodology	2	3
MSEN 904	DiplomaThesis I		15

10th Semester		20	30
MSEN 1001	Smart Materials and Systems	4	6
MSEN 1002	AI and Machine learning in materials science and engineering	4	6
MSEN 1003	Seminars (soft skills, entrepreneurship & innovation, IP rights, patents, startups)	2	3
MSEN 1004	DiplomaThesis II		15

Courses Content

A. MANDATORY COURSES

[MSEN 101] – Introduction to Materials Science and Engineering

COURSE CONTENT: This course provides a comprehensive introduction to Materials Science and Engineering, focusing on the fundamental relationships between structure, properties, processing, and performance of materials. It presents the materials paradigm and highlights key design trade-offs that engineers face when selecting materials for specific applications. The course introduces the main classes of materials and their typical uses, alongside the concept of microstructure and its critical role in determining material behavior. Atomic bonding, crystal structures, and amorphous solids are examined to establish an understanding of how materials are built at the atomic scale. Common crystal defects, including vacancies, dislocations, and grain boundaries, are discussed together with basic diffusion concepts. The fundamentals of phase diagrams, phases, the lever rule, eutectic systems, and an introduction to phase transformations are also covered. Mechanical behavior is addressed through elastic and plastic deformation, strengthening mechanisms, and fracture basics. An overview of functional properties—electrical, thermal, magnetic, and optical—is provided, along with corrosion fundamentals. Finally, the course introduces major processing routes, modern manufacturing approaches, materials selection concepts, and sustainability considerations.

[MSEN 102] –Fundamentals of Chemistry

COURSE CONTENT: This course provides a comprehensive introduction to Chemistry, integrating fundamental concepts from inorganic, physical, and organic chemistry to build a coherent understanding of matter at the atomic and molecular levels. In Part 1, key principles of inorganic chemistry are introduced, including atomic structure, electromagnetic radiation, quantum mechanics, and electronic structure, with emphasis on periodic trends and the nature of chemical bonding. Ionic and covalent bonding models are explored through Lewis structures, VSEPR

theory, valence bond theory, and molecular orbital theory, extending to solids, acids, and bases. Part 2 focuses on introductory physical chemistry, examining states of matter, gas laws, intermolecular forces, phase equilibria, and the molecular basis of liquids and solids. The interaction of light with matter is presented through rotational, vibrational, electronic, IR, Raman, and UV–visible spectroscopy, highlighting spectroscopy as a powerful structural tool. Electrolyte solutions and acid–base behavior in aqueous systems are also covered. Part 3 introduces organic chemistry, emphasizing structure, bonding, reaction types, stereochemistry, hydrocarbons, aromatic systems, and functional groups relevant to organic materials, along with NMR spectroscopy and its applications.

[MSEN 103] – Physics for Scientists and Engineers I – Mechanics & Waves

COURSE CONTENT: This course provides a foundational understanding of how objects move and interact, and how mechanical waves propagate. The course focuses on core principles that underpin all of classical mechanics and wave phenomena. It establishes the mathematical and conceptual tools needed for advanced physics and engineering.

[MSEN 104] – Mathematics I - Algebra, Analytic Geometry and Introduction to Calculus

COURSE CONTENT: This course builds the mathematical foundation required for advanced study in materials engineering, emphasizing algebraic methods, geometric interpretation, and introductory calculus tools used in material behavior modeling, structural analysis, and process calculations.

1. Algebra (Engineering Foundations): Essential for material property calculations and processing equations. Applicable to stress–strain relationships, thermal expansion, and phase boundaries.
2. Analytical Geometry for microstructure imaging, crystallography projections, and mechanical plotting, modeling stress distributions, heat transfer paths, and optical properties, crystallographic directions, force systems, and material deformation analysis.
3. Introduction to Calculus: foundational for understanding rate-based material processes, Rates of change in thermal/chemical processes, Optimization in materials design and processing, identifying maximum strength points, minimum energy configurations, and analyzing dynamic systems. Accumulated change in heat or mass transport, Foundation for later courses in thermodynamics and transport phenomena.
4. Relevance to Materials Engineering: Students learn mathematical tools that support: Mechanical behavior and elasticity analysis, Diffusion and kinetics modeling. Thermal processes and phase transformation calculations, Data analysis from material testing, Engineering design and optimization

[MSEN 105] – Materials Informatics

COURSE CONTENT: The Material Informatics course aims to cultivate computational problem-solving skills. Upon completion of the course, students should be able to use a computer for problem-solving, as well as for data analysis and the creation of basic simulations. More specifically, they should be able to theoretically analyze a problem, formulate a solution algorithm, and solve it practically by developing an appropriate computer program, adhering to fundamental programming principles. The final grade is determined by examinations as well as the evaluation of assignments and projects. The course utilizes the MATLAB computational environment and programming language, while also including elements of Python.

[MSEN 201] – Organic Chemistry

COURSE CONTENT: This course provides a comprehensive introduction to Organic Chemistry, emphasizing the relationship between molecular structure, bonding, reactivity, and properties of organic compounds. It begins with fundamental concepts of structure and bonding and an overview of organic reactions, establishing the mechanistic framework needed to understand chemical transformations. Stereochemistry at tetrahedral centers is introduced to explain three-dimensional molecular structure and its impact on chemical behavior. The chemistry of hydrocarbons is examined in detail, covering alkanes, cycloalkanes, alkenes, and alkynes, with emphasis on reactivity, reaction mechanisms, stereochemistry, and synthetic strategies. The course then explores organohalides, focusing on nucleophilic substitution and elimination reactions of alkyl halides. Methods for structure determination are presented through spectroscopic and chromatographic techniques, highlighting their role in molecular identification and analysis. Conjugated systems and ultraviolet spectroscopy are discussed to link electronic structure with optical properties. The chemistry of benzene, aromaticity, and electrophilic aromatic substitution reactions is examined, including polyaromatic compounds. Finally, the course covers characteristic polar functional groups in organic materials, carbonyl compounds and their condensation reactions, anionic polymerization, and the chemistry of carboxylic acids, amines, and their derivatives.

[MSEN 202] – Fundamentals of Chemistry Laboratory

This laboratory course introduces students to fundamental experimental concepts in Physical, Inorganic and Organic Chemistry, with strong emphasis on laboratory safety and good experimental practice. Students begin by learning safety regulations, chemical hazards, and proper techniques for accurate measurement of mass and volume, as well as the expression and preparation of solutions with specified concentrations. The course then examines homogeneous and heterogeneous equilibria, including the effects of concentration and temperature, with particular focus on aqueous electrolyte systems. Key topics include the behavior of weak acids and bases, pH measurement, determination of pK values, preparation and evaluation of buffer solutions, and estimation of salt hydrolysis constants. Fundamental principles and techniques of volumetric analysis are covered, including acid–base, complexometric, and redox titrations. Students also study redox reactions, the reactivity series of elements, electrochemical cells, and electrolysis, along with their practical applications. In addition, the course introduces essential organic chemistry laboratory techniques such as distillation and liquid–liquid extraction for purification and separation of organic compounds. Physicochemical experiments involving surface tension, viscosity, refractive index, and temperature-dependent solubility are conducted, enabling students to link molecular interactions to macroscopic properties while developing skills in data analysis, uncertainty estimation, and experimental interpretation.

[MSEN 203] – Physics for Scientists and Engineers II – Electricity & Magnetism

COURSE CONTENT: This course introduces the fundamental laws governing electric and magnetic fields, how they interact with matter, and how they combine to produce electromagnetic waves. Students learn how charges create electric fields, how currents produce magnetic fields, how changing fields generate induction, and how Maxwell's equations unify all of classical electromagnetism. The course builds strong physical intuition supported by calculus and vector analysis.

[MSEN 204] – Mathematics II - Advanced Calculus

COURSE CONTENT: This course covers advanced calculus tools essential for analyzing and modeling materials engineering systems. Topics include higher-order derivatives, Taylor series,

multivariable calculus, partial derivatives, optimization, multiple integrals, vector calculus, and key theorems such as Green's, Stokes', and Divergence Theorem. Students also study ordinary and partial differential equations, Laplace transforms, and basic numerical methods. Emphasis is placed on applications to heat transfer, diffusion, stress analysis, and other core materials engineering processes.

[MSEN 205] – Bonding, Crystallography, Crystal Defects

COURSE CONTENT: Fundamental crystallographic concepts; Structure of crystals: lattice, basis, translational symmetry; Connection between crystallographic theory and X-ray techniques; Introduction to X-ray diffraction (XRD); Bragg's law and structure factor; Interaction of X-rays with matter; Experimental Verification of Bragg's Law; Structure–property relationships; Crystal Defects: Point, Line and Planar defects; Impact of defects on the properties of materials.

[MSEN 301] – Physical Chemistry

COURSE CONTENT: This course introduces the essential principles of Physical Chemistry. Core topics include the thermodynamic properties of gases, liquids and solids; the First, Second and Third Laws of Thermodynamics; and chemical and phase equilibria in multicomponent systems. Students explore the properties of solutions and electrolytes, ionic activity, and introductory electrochemistry. Fundamental concepts of chemical kinetics, chemical reactions and catalysis are also covered, focusing on reaction rates, temperature effects and mechanisms.

[MSEN 302] – Organic Chemistry Laboratory

COURSE CONTENT: This laboratory course provides hands-on training in fundamental experimental techniques of organic chemistry relevant to materials science and engineering. Through a series of guided experiments, students gain practical experience in the synthesis, isolation, purification, and characterization of organic compounds used as material precursors. The laboratory begins with hydrolysis reactions and the isolation of benzoic acid using recrystallization, introducing essential purification methods. Students then perform esterification reactions and apply acid–base extraction techniques for compound separation. Photochemical synthesis experiments illustrate radical processes through the dimerization reaction leading to benzopinacol. Carbon–carbon bond formation is explored via aldol condensation reactions for the synthesis of conjugated enones, highlighting pathways to functional organic materials. Pericyclic reactions are introduced through cycloaddition reactions used in the synthesis of polyaromatic materials. Emphasis is placed on modern characterization techniques, including nuclear magnetic resonance (NMR) spectroscopy, for the analysis of organic precursors. Finally, students learn structure determination by combining spectroscopic methods with chromatographic techniques. The course strengthens experimental skills, reinforces reaction mechanisms taught in lectures, and develops the ability to analyze and interpret experimental data in the context of organic materials chemistry.

[MSEN 303] – Data Analysis - Statistics

COURSE CONTENT: This course introduces statistical methods and data analysis techniques essential for materials engineering. Topics include descriptive statistics, probability, inferential statistics, correlation and regression, ANOVA, and statistical quality control. Emphasis is placed on applying these methods to analyze experimental data, predict material behavior, optimize processes, and support decision-making. Students also learn to use computational tools for data visualization, simulation, and statistical analysis.

[MSEN 304] – Thermodynamics

COURSE CONTENT: This course introduces the fundamental principles of thermodynamics with a strong focus on applications in Materials Science and Engineering. It begins with thermodynamic variables, state functions, and the first and second laws of thermodynamics, establishing the conceptual and mathematical framework of the subject. Key thermodynamic quantities such as entropy, enthalpy, and the Helmholtz and Gibbs free energies are examined, along with Maxwell relations and their physical interpretation. Special emphasis is placed on chemical potential, phase equilibrium, and the phase rule, including applications of the Clapeyron and Clausius–Clapeyron equations. The thermodynamics of solutions is explored through ideal and regular solution models, activities, and partial molar quantities. Binary phase diagrams and common invariant reactions, such as eutectic and peritectic transformations and miscibility gaps, are analyzed in detail. The course further addresses the thermodynamics of phase transformations and nucleation, highlighting driving force concepts relevant to materials processing and stability. Thermochemistry and chemical reactions in materials are discussed, including Ellingham-type analyses where appropriate. Finally, the course introduces essential concepts of statistical thermodynamics and provides an overview of computational thermodynamics, focusing on the CALPHAD methodology and the use of thermodynamic databases through demonstrations.

[MSEN 305] – Introduction to Solid Mechanics

COURSE CONTENT: This course provides the foundation of engineering analysis and introduces the fundamental principles governing force systems acting on bodies. It aims to develop a clear understanding of how structures and mechanical components respond to applied loads through systematic modeling and equilibrium analysis. A central focus of the course is the construction and interpretation of Free-Body Diagrams, which form the basis for translating physical systems into solvable engineering problems. Students learn to apply equilibrium equations to determine external reactions and internal force distributions within structural members. Emphasis is placed on the calculation of axial forces, shear forces, and bending moments, as well as on understanding how these internal actions vary along a structure. The course also introduces the geometric properties of cross-sections, including the determination of centroids and moments of inertia, and explains their significance in structural behavior. Through problem-solving and analytical reasoning, students develop essential skills and mechanical intuition required for advanced studies in mechanics, structural analysis, and engineering design.

[MSEN 401] – Inorganic materials chemistry

COURSE CONTENT: This course provides a comprehensive introduction to Inorganic Materials Chemistry, focusing on the structural, electronic, synthetic, and functional aspects of inorganic materials. It begins with a detailed description of crystal structures, including unit cells, symmetry, close-packed structures, and the role of interstitial sites. The structures of metals, alloys, and ionic solids are examined, emphasizing lattice energetics, lattice enthalpy, Born–Haber cycles, and the influence of defects and non-stoichiometry on material properties. The course then introduces the electronic structures of inorganic solids, covering electrical conductivity, band theory, and semiconducting behavior. Key methods for the synthesis of inorganic materials, including high-temperature solid-state reactions and solution-based approaches, are presented alongside modern characterization techniques such as diffraction, spectroscopy, microscopy, magnetometry, and electrochemical analysis. Major classes of inorganic materials are explored, including metal oxides, nitrides, fluorides, sulfides, intercalation compounds, and framework structures such as zeolites used in heterogeneous catalysis. Additional topics include ion transport and solid electrolytes, hydrides for hydrogen storage, optical and semiconducting

materials, molecular solids, and nanomaterials. Emphasis is placed on structure–property relationships and on understanding how composition, defects, and dimensionality govern the performance of advanced inorganic materials.

[MSEN 402] – Physical Chemistry Laboratory

COURSE CONTENT: The laboratory component introduces students to key experimental techniques for the characterization of the physical and chemical behavior of systems. Through a series of structured laboratory experiments, students become familiar with thermal analysis methods such as calorimetry, as well as the determination of boiling points and the study of mixing point distributions. Emphasis is placed on the measurement of electrolytic conductivity of solutions and on the investigation of acid–base properties through pH measurements and the determination of acid dissociation constants (pK values). The effect of temperature and ionic strength on reaction rates is systematically examined. The laboratory develops practical experimental skills, data analysis and interpretation abilities, and a deeper understanding of the factors governing physicochemical behavior in solution.

[MSEN 403] – Design and Analysis of Materials Experiments

COURSE CONTENT: This course bridges the gap between material characterization and statistical decision-making. Students will move beyond "trial-and-error" approaches, learning to systematically vary multiple processing parameters simultaneously. The curriculum focuses on identifying critical factors that influence material performance and optimizing processes to achieve superior material properties.

[MSEN 404] – Condensed Matter Physics

COURSE CONTENT: This course covers the physical principles underlying the structure and properties of solids, including crystal structures, lattice vibrations, electronic, thermal, optical, and magnetic properties. Students will learn characterization techniques such as X-ray diffraction, explore superconductivity and modern nanomaterials, and apply these concepts to understand and engineer material behavior in practical applications.

[MSEN 405] – Polymer Science and Engineering: Theory and Laboratory

COURSE CONTENT: This course provides a comprehensive introduction to Polymer Science and Engineering, covering the fundamental concepts that govern the synthesis, structure, properties, and processing of polymeric materials. It begins with the concept of the macromolecule, polymer classification and nomenclature, and the structure and dimensions of polymer chains. The course examines the main polymerization reactions, highlighting similarities and differences among free radical, controlled radical, ionic, and step-growth polymerization mechanisms, together with reaction kinetics, molecular weight development, and distribution. Typical commercial polymers, including polyolefins, vinyl polymers, polyesters, polyamides, polyurethanes, and resins, are discussed in relation to their structure and applications. Emphasis is placed on copolymerization, molecular weight averages, and experimental techniques for polymer characterization. The solid-state behavior of polymers, including crystallization kinetics and glass transition phenomena, is analyzed. The course further introduces polymer reaction and process engineering, focusing on viscoelasticity, non-Newtonian flow, rheology, and modeling of polymerization processes. Environmental aspects of polymers, such as recycling technologies, microplastics, and hazardous substances, are also addressed. Laboratory sessions complement the lectures through polymer synthesis and characterization experiments, reinforcing theoretical concepts with practical experience.

[MSEN 501] – Inorganic Materials Chemistry Laboratory

COURSE CONTENT: This laboratory course provides hands-on experience in the synthesis, processing, and characterization of advanced inorganic and functional materials. Through a series of structured experiments, students become familiar with key experimental approaches used in modern materials research and development. The course includes solid-state synthesis of crystalline materials such as spinel oxides, emphasizing phase formation, thermal treatment, and structural characterization. Solution-based methods are introduced through sol–gel synthesis of metal oxide nanoparticles, highlighting control over composition, particle size, and morphology. Students also prepare doped phosphor materials and investigate their photophysical properties, gaining insight into luminescence mechanisms. Solvothermal synthesis techniques are applied to the fabrication of metal–organic frameworks (MOFs), followed by characterization of their structure and properties. Functional device-oriented experiments include the fabrication and testing of a conducting oxide material and the assembly and performance evaluation of a dye-sensitized solar cell (DSSC). Throughout the course, students use a range of characterization techniques, such as diffraction, spectroscopy, and electrical measurements, to analyze structure–property relationships. The laboratory develops experimental skills, data interpretation abilities, and an understanding of how synthesis routes influence the performance of functional materials.

[MSEN 502] – Materials Characterization

COURSE CONTENT: The course *Materials Characterization* provides a comprehensive introduction to the fundamental principles and techniques used to investigate the structure, composition, and properties of materials. Students are introduced to different types of radiation, their energy–wavelength relationships, atomic theory, and electronic energy levels, followed by the interaction of radiation with matter, including elastic scattering and absorption phenomena. The course covers X-ray diffraction (XRD), including X-ray generation, detection, and basic crystallography concepts, emphasizing phase identification, crystallinity, and crystallite size determination. Surface and near-surface analysis techniques such as X-ray Photoelectron Spectroscopy (XPS), Auger Electron Spectroscopy (AES), and Energy Dispersive X-ray Spectroscopy (EDS) are presented, highlighting their principles, instrumentation, and applications. Electron microscopy, including Scanning Electron Microscopy (SEM) and Transmission Electron Microscopy (TEM), is introduced, with attention to imaging, analytical capabilities, and integration with spectroscopic methods. Optical spectroscopic techniques, including UV–visible spectroscopy, Fourier Transform Infrared (FT-IR) spectroscopy, and Raman spectroscopy, are also examined, focusing on molecular and electronic transitions, instrumentation, and interpretation of spectra. Through lectures, practical examples, and case studies, students gain the knowledge and skills to select and apply appropriate characterization methods, interpret results critically, and evaluate structural and chemical information for various materials, preparing them for research and industrial applications.

[MSEN 503] – Ceramics

COURSE CONTENT: The course Ceramic Materials provides a comprehensive introduction to the science, technology, and applications of ceramics in materials science and industry. It begins with an overview of ceramics in various industrial and technological contexts and a discussion of raw materials and their properties. Students study the classification of ceramics into traditional and advanced categories and learn about processing and shaping techniques, including powder processing, sintering, and forming methods, as well as ceramic coatings. The course covers the atomic and crystalline structures of ceramics, as well as non-crystalline solids such as glasses, and

introduces phase diagrams to understand phase equilibria and transformations. Key concepts of nucleation, crystal growth, devitrification, solid-state reactions, and non-equilibrium processing are addressed to explain microstructural development. Students explore the relationship between microstructure and a wide range of properties, including mechanical (strength, toughness), thermal (conductivity, expansion), optical (transparency, refractive index), electrical (dielectric, conductive behavior), and chemical stability (corrosion, oxidation). Emphasis is placed on understanding the interdependence of processing, structure, and properties, and on the critical evaluation of ceramics for engineering and technological applications. Through lectures, case studies, and practical examples, students develop the knowledge and skills necessary to select, design, and optimize ceramic materials for diverse applications.

[MSEN 504] – Chemical Process Engineering

COURSE CONTENT: This undergraduate course introduces the fundamental principles of process systems engineering with emphasis on mass and energy transport phenomena in engineering applications. The course begins with basic concepts and definitions, followed by the formulation and application of general mass and heat balances in macroscopic systems, which form the foundation for analyzing and designing chemical and biological processes. Students are then introduced to mass transfer at the microscopic scale, focusing on diffusion phenomena and the diffusion equation as a key mathematical model. Building on these fundamentals, the course explores selected applications of process systems engineering. Topics include heterogeneous reaction engineering, fixed-bed adsorption, and membrane technologies for gas separation processes. Core concepts of crystallization and filtration are also introduced, highlighting their importance in industrial separation and purification operations. In addition, the course examines fuel cell systems as an example of integrated energy conversion technologies. Finally, the course provides an introduction to biomedical applications, with particular emphasis on controlled drug release systems and their underlying transport mechanisms. Throughout the course, theoretical principles are linked to practical examples, enabling students to develop problem-solving skills and a solid understanding of how transport phenomena govern the performance of engineered systems.

[MSEN 505] – Mechanical Behavior of Engineering Materials

COURSE CONTENT: This course establishes the fundamental principles required to analyze the mechanical behavior of solid bodies under load. Bridging the gap between static equilibrium and structural design, students will explore the relationships between external loads, internal stresses, strains, and deformations. The course emphasizes the sizing and analysis of structural members—both statically determinate and indeterminate—subjected to various loading conditions, including tension, compression, bending, and torsion.

[MSEN 601] – Design of materials in the atomic scale

COURSE CONTENT: This course provides an in-depth introduction to atomic-scale materials science, focusing on how atomic and molecular structure governs the properties and performance of engineering materials. It begins with the fundamentals of atomic structure, bonding, crystal structures, and defects, emphasizing their role in determining mechanical, thermal, electronic, and optical behavior. Students explore structure–property relationships and how atomic arrangement translates into macroscopic material performance. The course introduces modern computational modeling and simulation techniques, including molecular dynamics, Monte Carlo methods, and the basic principles of density functional theory, as tools for predicting material behavior and guiding materials design. Emphasis is placed on using simulations to understand deformation,

diffusion, phase stability, and functional responses at the atomic scale. Building on these foundations, the course examines materials design strategies that tailor atomic structure to achieve targeted properties, including the design of alloys, composites, and nanostructured materials. Case studies of engineered materials illustrate how atomic-scale insights inform real-world design decisions. The course concludes by linking atomic-scale modeling and design concepts to applications in materials engineering, such as advanced functional materials, nanoengineered devices, and industrially relevant material systems.

[MSEN 602] – Materials Characterization Laboratory

COURSE CONTENT: This course provides a comprehensive introduction to the experimental techniques used for the characterization of materials and the interpretation of structure–property relationships. Through a combination of lectures and hands-on laboratory sessions, students gain practical experience with modern characterization tools commonly used in materials science and engineering. Topics covered include crystallographic analysis using X-ray diffraction (XRD), microstructural characterization with optical microscopy and scanning electron microscopy (SEM), elemental analysis through energy-dispersive X-ray spectroscopy (EDS) and spectroscopy techniques (FT-IR and Raman). Additional experiments introduce thermal analysis techniques such as differential scanning calorimetry (DSC), as well as mechanical characterization methods including hardness testing and basic tensile testing. Emphasis is placed on proper sample preparation, experimental design, data acquisition, and quantitative data analysis. Students learn how to critically evaluate experimental results, identify sources of error, and relate observed material behavior to underlying atomic and microstructural features. By the end of the course, students will be able to select appropriate characterization techniques for different classes of materials, operate laboratory instrumentation safely and effectively, and communicate experimental findings clearly through written laboratory reports and oral presentations.

[MSEN 603] – Industrial Process Design and Economics

COURSE CONTENT: The course introduces students to the application of techno-economic feasibility studies in chemical process industries, with particular emphasis on materials processing industrial plants. It is based on a thorough feasibility study of a selected plant, which varies each year, and the preparation of a detailed report that constitutes an important part of the overall course grade. The course covers the development and interpretation of methodological flow diagrams and the application of mass and energy balances for process analysis. Students learn the preliminary sizing and selection of key process equipment, as well as methods for cost estimation, economic evaluation, and assessment of project profitability. To support this, the course includes an extensive lab component where students use specialized software tools for plant design and economic evaluation. The course also addresses throughput analysis, identification of bottlenecks, and strategies for process optimization. Additionally, students explore the optimization of operating conditions using techno-economic criteria and the principles of process scale-up. Finally, the course examines the determination and evaluation of processing parameters in outlet streams to ensure compliance with material quality standards and sustainable operation.

[MSEN 604] – Engineering Laboratory (mechanical testing, non-destructive testing)

COURSE CONTENT: This course provides a comprehensive introduction to experimental methods used for the mechanical characterization and non-destructive evaluation of engineering materials and components. The course integrates theoretical background with hands-on laboratory practice, enabling students to understand material behavior under different loading and service conditions. Laboratory experiments focus on mechanical testing techniques such as tensile,

compression, bending, impact, fatigue, and hardness testing. Students investigate elastic and plastic deformation, fracture mechanisms, and failure modes in metals, polymers, ceramics, and composite materials. Data acquisition systems and standardized testing procedures (ASTM/ISO) are emphasized. In parallel, the course introduces fundamental non-destructive testing (NDT) methods used in industrial quality control and structural integrity assessment. Techniques include ultrasonic testing, radiographic inspection, magnetic particle testing, dye penetrant testing, and basic eddy current methods. Students learn the principles, capabilities, and limitations of each technique. Emphasis is placed on experimental planning, safe laboratory practice, data analysis, uncertainty evaluation, and technical reporting. Upon completion, students will be able to select appropriate mechanical and non-destructive testing methods, interpret experimental results, and assess material performance and structural reliability in engineering applications.

[MSEN 605] – Composite materials

COURSE CONTENT: This course provides a comprehensive introduction to the science and engineering of composite materials, emphasizing their structure, properties, processing, and applications. It begins with an overview of composites, including classification, advantages, and limitations of different material systems. Reinforcements such as particles, whiskers, continuous fibers, and textile architectures are discussed in relation to their influence on mechanical performance. The course covers polymer matrix composites, including common processing methods such as hand lay-up, resin transfer molding (RTM), and prepreg/autoclave techniques, as well as defect formation and quality assurance. Metal matrix and ceramic matrix composites are examined with respect to processing routes and high-temperature behavior. Fundamental micromechanics concepts are introduced, including stiffness prediction, load transfer, and laminate theory. Interfaces and interphases are explored, highlighting bonding, residual stresses, and environmental degradation. Failure mechanisms and damage in composites, such as matrix cracking, delamination, impact, and fatigue, are analyzed, along with an overview of non-destructive testing techniques. Case studies demonstrate the design and application of composites in aerospace, automotive, energy, and civil engineering. Finally, the course addresses sustainability and recycling challenges associated with composite materials, emphasizing environmental considerations in modern materials engineering.

[MSEN 701] – Materials selection in engineering design

COURSE CONTENT: This course provides a comprehensive introduction to the principles and practices of materials selection in engineering design, emphasizing how materials choices impact product performance, reliability, and sustainability. It begins by examining the role of materials in product development, including design requirements, functional constraints, and performance targets. Students learn to apply performance indices and Ashby-type methodologies for systematic screening, ranking, and selection of materials. The course covers the use of materials property charts, multi-objective selection, and trade-offs between competing properties. Considerations of materials and process compatibility are discussed, including joining techniques, surface engineering, and integration with manufacturing processes. Economic factors are introduced through cost modeling, sensitivity analysis, and evaluation of availability and supply risk. Degradation and reliability issues, such as corrosion, wear, and fatigue, are addressed alongside basic principles of failure analysis. Selection for functional requirements, including thermal, electrical, optical, and magnetic performance, is explored, along with sustainability and circularity metrics in material choice. Case studies using real components and databases reinforce

the application of these concepts, equipping students with practical skills to make informed, balanced materials selection decisions in modern engineering design.

[MSEN 702] – Materials Processing

COURSE CONTENT: This course provides a comprehensive introduction to the fundamental principles of materials processing and manufacturing. Topics include solidification, phase transformations, and microstructural evolution during processing, as well as processing methods for metals, polymers, ceramics, and composite materials. The influence of processing routes on mechanical, thermal, and functional properties is examined, with emphasis on process selection, defect formation, and performance optimization in engineering applications.

[MSEN 801] – CAD-CAE in materials

COURSE CONTENT: This course bridges the gap between material science theory and computational mechanics, introducing students to the practical application of the Finite Element Method (FEM) in engineering design. Moving beyond simple geometric modeling, students will learn to translate physical problems into accurate Computer-Aided Engineering (CAE) models. The curriculum emphasizes the theoretical foundations and inherent limitations of numerical simulation.

[MSEN 802] – Deformation and Failure of Engineering Materials

COURSE CONTENT: This course provides an insight into the mechanical response of engineering materials, with a primary focus on cyclic loading and fatigue failure, while foundational topics in plastic deformation and static fracture are covered. The course bridges theory and application, equipping students with the analytical tools to predict component life. Emphasis is placed on modern approaches to fatigue design, including fracture mechanics and strain-based methods used in the automotive and aerospace industries.

[MSEN 901] – Computational Methods in Engineering Design

COURSE CONTENT: This course provides a comprehensive framework for applying computational software and techniques to the engineering design process. Shifting beyond basic stress analysis, students will learn to utilize commercial simulation software as a primary tool for design synthesis and optimization.

[MSEN 902] – Materials and Environment

COURSE CONTENT: The course *Materials and Environment* introduces students to the fundamental principles of environmental engineering and the interactions between materials and the environment. It begins with an overview of environmental pollution, including the generation, transport, and fate of pollutants in air, water, and soil, and discusses applied technologies for pollution control and environmental protection. Students study the role of materials in pollution mitigation, focusing on their physicochemical and structural properties, surface interactions, and key processes in anti-pollution technologies. Specific topics include catalysis and catalytic materials, heterogeneous photocatalysis and photocatalytic materials, adsorption and adsorbent materials, molecular imprinting for pollutant removal, and the management of special solid wastes. The course also examines polymers, including their properties, environmental behavior, ecological impacts, and waste management strategies, as well as biodegradable polymers and their applications. Asbestos, cement, and concrete are discussed regarding their properties, environmental impacts, toxicity, and life-cycle considerations. Emphasis is placed on life-cycle assessment (LCA) of materials to evaluate sustainability and environmental performance. Through lectures, case studies, and practical examples, students gain the knowledge and skills

necessary to understand, evaluate, and apply materials-based strategies for environmental protection and sustainable engineering.

[MSEN 903] – Research Methodology

COURSE CONTENT: This course provides a comprehensive introduction to the principles of scientific research and methodology as applied to Materials Science and Engineering. It covers the scientific method and hypothesis-driven research, the formulation of research questions and objectives, and the main research designs used in the field, including both experimental and computational approaches. Emphasis is placed on effective strategies for literature searching, critical reading and evaluation of scientific publications, as well as proper reference management and the use of international citation styles. The course also addresses research planning and organization, including the definition of milestones, the use of Gantt charts, risk assessment, and safety considerations in laboratory environments. Furthermore, topics related to research data management are discussed, such as maintaining laboratory notebooks and applying FAIR data principles. Students are introduced to basic statistical concepts, uncertainty analysis, and error propagation. The course concludes with key aspects of research integrity, including plagiarism avoidance, authorship, peer review, research ethics, open science, and reproducibility. Students also gain practical skills in preparing research proposals and effectively communicating scientific results through written and oral presentations.

[MSEN 904] – Diploma Thesis I

COURSE CONTENT: Topic definition and proposal; literature review; methodology selection; experimental/computational execution; data analysis and validation; drafting of thesis; final revisions; presentation and oral defense.

The exact content is tailored to the chosen thesis topic and may involve laboratory work, simulations, materials design, processing, characterization, performance evaluation, sustainability analysis, or industrial case studies.

[MSEN 1001] – Smart Materials and Systems

COURSE CONTENT: This course provides a comprehensive introduction to the principles, behavior, and applications of smart materials and adaptive systems. Topics include shape memory alloys, piezoelectric and magnetostrictive materials, electroactive polymers, and stimuli-responsive composites. Students explore the mechanisms that enable materials to sense, respond, and adapt to environmental changes, and examine how these materials are integrated into devices and systems for actuation, sensing, and energy harvesting. Applications in robotics, aerospace, biomedical devices, and structural health monitoring are emphasized throughout.

[MSEN 1002] – AI and Machine learning in materials science and engineering

COURSE CONTENT: This course introduces the principles and applications of artificial intelligence (AI) and machine learning (ML) in materials science and engineering. Students begin with a review of mathematical foundations, including linear algebra, calculus, and differential equations, which underpin AI/ML techniques. Supervised learning methods such as regression, classification, decision trees, and random forests are explored, along with neural networks, covering fundamentals, backpropagation, and deep learning architectures. Unsupervised learning techniques, including clustering and dimensionality reduction methods like PCA and t-SNE, are discussed, as well as the basics of reinforcement learning and its potential applications in materials design. Model evaluation concepts, including performance metrics, cross-validation, and overfitting/underfitting, are emphasized. Practical applications highlight energy-related and

materials-focused case studies, such as battery materials (lithium-ion and solid-state), catalysts for sustainable energy, polymer design and recycling pathways, and defect engineering in crystallography. Integration of ML with molecular simulations, including molecular dynamics and density functional theory (DFT) data, is demonstrated. Ethical and practical considerations in AI-driven materials discovery are discussed. The course culminates in student-led projects, where participants apply AI/ML techniques to real-world materials problems, analyze data, and present their findings, bridging theoretical knowledge with hands-on computational materials engineering practice.

[MSEN 1003] – Seminars (soft skills, entrepreneurship & innovation, IP rights, patents, startups)

COURSE CONTENT: Soft skills: communication, technical writing, presentations, teamwork, leadership, negotiation, conflict management, project management. Entrepreneurship & innovation: ideation, customer discovery, value proposition, business model basics, go-to-market, funding landscape. IP and patents: types of IP, patentability criteria, prior-art search, patent drafting overview, freedom-to-operate basics, licensing. Startups and innovation ecosystem: incubators/accelerators, spin-offs, regulatory basics (where relevant), case studies from materials/medtech/energy domains, guest speakers from industry and technology transfer offices.

[MSEN 1004] – Diploma Thesis II

COURSE CONTENT: Topic definition and proposal; literature review; methodology selection; experimental/computational execution; data analysis and validation; drafting of thesis; final revisions; presentation and oral defense.

The exact content is tailored to the chosen thesis topic and may involve laboratory work, simulations, materials design, processing, characterization, performance evaluation, sustainability analysis, or industrial case studies.

B. ELECTIVE COURSES

[MSEN 711] – Fundamentals of Additive Manufacturing

COURSE CONTENT: This course provides a comprehensive introduction to additive manufacturing (AM), exploring its principles, technologies, and applications across polymers, metals, ceramics, and composites. Students learn the opportunities and limitations of AM and its adoption in industrial settings. The course covers polymer AM methods, including material extrusion, vat photopolymerization, and powder bed fusion, as well as metal AM processes such as laser and electron-beam powder bed fusion and directed energy deposition, including feedstocks and machinery. Emerging topics such as ceramic and composite AM, multi-material printing, and design for additive manufacturing (DfAM) are introduced, with an overview of topology optimization, lattice structures, and support strategies. Emphasis is placed on the relationships between process, structure, and properties, including thermal histories, anisotropy, microstructure, and residual stresses. Students also study quality assurance, including in-situ monitoring, inspection, mechanical testing, and standards. Post-processing techniques such as stress relief, heat treatment, hot isostatic pressing, machining, and surface finishing are discussed. The course concludes with economic and sustainability considerations, reinforced by case studies and a team project. By the end, students gain the knowledge and skills to design, analyze, and evaluate AM processes and materials for engineering applications.

[MSEN 712] – Powder metallurgy

COURSE CONTENT: This course provides a comprehensive introduction to powder metallurgy (PM), focusing on the principles, processes, and applications of powder-based materials in engineering. It begins with an overview of PM applications, including structural components, filters, magnetic materials, and hardmetals. Students learn powder production methods such as atomization, reduction, electrolysis, and mechanical milling, along with approaches for powder recycling. The course covers powder characterization, including particle size and shape distributions, surface area, flowability, and apparent and tap densities. Compaction and shaping techniques are explored, including uniaxial pressing, cold isostatic pressing (CIP), and powder injection molding, with a discussion of binders and lubricants. Fundamental sintering concepts are presented, including diffusion mechanisms, neck growth, densification, grain growth, and liquid-phase sintering. Post-processing techniques such as sizing, heat treatment, infiltration, and surface treatments are also addressed. Advanced full-density processes, including hot isostatic pressing (HIP), hot pressing, and forging or rolling of PM preforms, are linked to additive manufacturing (powder bed fusion). Students examine defect formation, quality assurance, standards, and safety considerations. The course concludes with design principles for powder metallurgy and practical case studies, equipping students with the knowledge to optimize PM processes and materials for industrial applications.

[MSEN 713] – Materials Circular Economy and LCA

COURSE CONTENT: This course provides a comprehensive introduction to sustainability and circular economy principles in materials engineering, focusing on the environmental, economic, and social aspects of material use throughout the product life cycle. It begins with an overview of materials and sustainability, including resource consumption, emissions, and circularity metrics. Students explore circular economy strategies, emphasizing design for reuse, repair, remanufacture, and recycling (the "R" strategies). Life cycle thinking is introduced to analyze product systems, functional units, system boundaries, and allocation methods. The course covers life cycle inventory (LCI), including data collection from primary and secondary sources and assessment of data quality, and life cycle impact assessment (LCIA), examining major impact categories, interpretation, and limitations. Life cycle costing (LCC) and social LCA are discussed to provide a broader sustainability perspective. Circularity indicators and their integration with LCA are highlighted, along with design-integrated approaches to support sustainable materials selection and product development. Case studies address metals, polymers, batteries and critical materials, composites, and end-of-life scenarios. Practical software and laboratory sessions enable students to perform simplified LCA modeling, compare scenarios, and develop an applied understanding of circularity and sustainability in materials engineering.

[MSEN 721] – Surfaces and Interfaces and Thin-Film Materials Science

COURSE CONTENT: The course covers fundamental concepts of surfaces, interfaces, and thin-film materials, including surface energy, adsorption, wetting, and interfacial phenomena. Students will study thin-film growth mechanisms, deposition techniques, and characterization methods, and explore how surfaces and interfaces influence mechanical, thermal, optical, and electronic properties. Applications in coatings, microelectronics, and nanostructured materials are emphasized throughout.

[MSEN 722] – Nanomaterials and Nanotechnologies

COURSE CONTENT: This course provides a comprehensive introduction to the science, properties, and applications of nanomaterials. Topics include the synthesis, structure, and characterization of nanoparticles, nanowires, nanotubes, and thin nanostructured films. Students explore size-dependent physical, chemical, mechanical, and electronic properties, as well as the principles underlying quantum effects at the nanoscale. The course also covers fabrication techniques, self-assembly, and integration of nanomaterials into functional devices and systems. Applications in electronics, energy storage and conversion, catalysis, biomedical devices, and advanced coatings are emphasized throughout.

[MSEN 723] – Fundamentals of Semiconductor Materials

COURSE CONTENT: This course covers the structure, electronic properties, defects, and doping of semiconductor materials. Students will learn about charge carriers, band theory, transport phenomena, and characterization techniques, and explore applications in electronic and optoelectronic devices such as diodes, transistors, LEDs, and solar cells. Emphasis is placed on linking atomic- and micro-scale material behavior to device performance.

[MSEN 731] – Bio- organic materials

COURSE CONTENT: This course provides a comprehensive introduction to bioorganic materials, emphasizing the intersection of organic chemistry, biology, and materials science. Students explore the structure, properties, and applications of biomaterials derived from biological building blocks, including peptides and proteins, nucleic acids such as DNA, polysaccharides, and lipids and their derivatives. The course covers organic synthesis strategies for creating functional biomaterials and probes, enabling targeted applications in diagnostics, biosensing, and drug delivery systems. Emphasis is placed on understanding how molecular design influences biological function and material performance, including biocompatibility, stability, and responsiveness. Sustainable and biodegradable materials are also addressed, highlighting their role in environmentally conscious design and biomedical applications. Through case studies and practical examples, students learn how to integrate bioorganic materials into functional devices and therapeutic systems. By the end of the course, students gain the knowledge and skills to design, synthesize, and apply bioorganic materials for cutting-edge applications at the interface of chemistry, biology, and materials engineering.

[MSEN 732] – Biochemistry Theory and Laboratory

COURSE CONTENT: This course provides a thorough introduction to biochemistry, covering fundamental concepts of water, amino acids, proteins, enzymes, and nucleic acids, along with their biological roles and applications. Students study the physical properties of water, hydrogen bonding, pH, and the suitability of aqueous environments for life. Amino acids are examined as building blocks of proteins, exploring their stereochemistry, acid–base properties, common and rare types, and chemical reactivity. Protein structure and function are emphasized, including primary, secondary, tertiary, and quaternary structures, denaturation, and the relationship between structure and biological activity. Enzyme theory is covered in depth, including classification, kinetics, cofactors, inhibition, substrate specificity, and regulation, as well as isoenzymes. Nucleic acids are studied from primary to secondary structure, with focus on DNA and RNA properties, nucleotide biosynthesis and catabolism, recombinant DNA, replication, transcription, and repair. Protein synthesis, covalent modifications, and subcellular localization are also addressed, alongside cellular defense mechanisms and recombinant DNA technology. The laboratory component provides hands-on experience in quantitative protein analysis, purification, electrophoresis, enzyme kinetics, PCR, DNA isolation, restriction digestion, ligation, and bacterial

transformation, reinforcing theoretical concepts and developing practical molecular biology skills for research and biotechnology applications.

[MSEN 733] – Bio inorganic materials for biomedical and clinical applications

COURSE CONTENT: This course provides an in-depth introduction to bioinorganic chemistry, focusing on the roles of metals and inorganic compounds in biological systems and their applications in medicine and materials science. Students explore metalloproteins and their biological functions, examining how metal ions contribute to enzymatic activity, electron transfer, and structural stability. The course covers metal-based drugs and their mechanisms of action, along with the properties of inorganic materials at the nanoscale. Emphasis is placed on inorganic-based nanomedicine and nanopharmaceuticals, including the design and functionalization of nanoarchitectures for targeted therapeutic and diagnostic applications. Topics include magnetic nanoparticles for therapy and diagnosis, such as drug delivery carriers, hyperthermia agents, magnetomechanical induction systems, and contrast agents in MRI and PET imaging. Additional applications of inorganic nanoparticles, including antimicrobial activity and photodynamic therapy, are discussed. Through case studies and practical examples, students gain insight into the chemical modifications that enable specific functionality, biocompatibility, and responsiveness in complex biological environments. By the end of the course, students acquire the knowledge and skills to understand, design, and apply inorganic-based materials and nanostructures for advanced biomedical applications.

[MSEN 811] – Solidification, Casting and Welding

COURSE CONTENT: This course provides a comprehensive introduction to the fundamentals of solidification and welding processes, with an emphasis on microstructure development, defect formation, and materials reliability. Students study the principles of solidification, including nucleation, growth, thermal gradients, and cooling rates, as well as the effects of segregation, constitutional supercooling, and dendritic structures on grain refinement. Casting processes such as sand casting, investment casting, die casting, and continuous casting are examined, alongside gating and risering concepts. The course addresses common solidification defects, including porosity, shrinkage, and hot tearing, and strategies for defect prevention. Microstructure control through alloying, inoculation, and heat treatment is introduced, providing insight into material performance optimization. Welding fundamentals are covered, including energy sources, key processes (arc, resistance, laser), and weld metallurgy, with a focus on fusion zones, heat-affected zones, solidification cracking, and phase transformations. Residual stresses, distortion, and welding defects are discussed, along with inspection and quality assurance practices. Case studies link processing parameters to component failures and reliability, equipping students with the knowledge to predict, analyze, and control microstructural evolution and defects in metal manufacturing and joining processes.

[MSEN 812] – Waste Valorization and Advanced Recycling Technologies

COURSE CONTENT: This course provides a comprehensive overview of waste valorization and recycling strategies, emphasizing the recovery of secondary raw materials and their integration into circular economy approaches. Students explore the definitions and characteristics of waste streams, including quality and contamination challenges, and study mechanical recycling techniques such as sorting, size reduction, and separation methods, as well as the limitations of polymer reprocessing. Thermal and chemical recycling routes, including depolymerization and solvent-based processes, are introduced, alongside metals recycling through collection, shredding, and basic pyrometallurgical and hydrometallurgical methods. The course also addresses e-waste

and battery recycling, highlighting concepts for recovering critical materials, as well as construction, demolition, glass, and ceramics waste streams. Pathways for transforming waste into materials, including upcycling, composites, fillers, and links to circular product design, are examined. Emphasis is placed on techno-economic and environmental assessment, integrating life cycle assessment (LCA) principles. Through case studies and a team project, students apply theoretical knowledge to practical waste valorization challenges, developing strategies to optimize material recovery, sustainability, and economic feasibility. By the end of the course, students gain a holistic understanding of recycling processes and the design of circular material flows.

[MSEN 813] – Critical raw materials

COURSE CONTENT: This course provides an in-depth exploration of critical raw materials (CRMs), emphasizing their strategic importance, supply risks, and sustainable management in modern industries. Students study the concepts of criticality, assessment frameworks, key indicators, and data sources, gaining an understanding of how materials are evaluated for economic, technological, and geopolitical relevance. The course examines the full value chain of raw materials, from mining, beneficiation, and refining to materials production, manufacturing, usage, and end-of-life. Drivers of demand and technology dependencies are analyzed, with particular focus on batteries, magnets, photovoltaics, catalysts, and semiconductors. Supply concentration, geopolitical considerations, trade, and resilience strategies are discussed alongside environmental and social impacts of extraction and processing. Students learn substitution and material efficiency strategies, including design approaches to reduce criticality, as well as recycling, urban mining, and the constraints of secondary supply. Policy and regulatory frameworks, including EU critical raw materials concepts and global perspectives, are reviewed. Case studies and student-led briefs on selected critical materials allow practical application of concepts, equipping students with the knowledge to assess risks, optimize resource use, and contribute to sustainable material strategies in industrial and technological contexts.

[MSEN 821] – Optoelectronic and Sensors: Materials and Applications

COURSE CONTENT: This course provides a comprehensive introduction to the materials, principles, and applications of optoelectronic devices and sensors. Topics include semiconductors, photonic materials, light–matter interactions, and the design and operation of photodetectors, light-emitting devices, and optical sensors. Students explore the mechanisms of signal transduction, sensitivity, and selectivity, as well as methods for material characterization and device fabrication. Emphasis is placed on applications in communications, imaging, environmental monitoring, healthcare, and wearable technologies, highlighting how material properties influence device performance and functionality.

[MSEN 822] – Materials and systems in Energy Technologies

COURSE CONTENT: This course introduces materials-oriented principles underlying energy technologies, with emphasis on how material properties, interfaces and architectures govern the performance of functional devices and engineered systems. Building on concepts from electrochemical and materials science, students examine the role of electrodes, electrolytes, interfaces and composite structures in representative energy technologies such as batteries, electrochemical capacitors and fuel cells. The course highlights structure-property-performance relationships, materials selection criteria, transport phenomena and degradation mechanisms relevant to materials used in energy-related applications. Attention is given to how processing routes, microstructure and interfacial design influence efficiency, durability and reliability at the

device and subsystem level. Laboratory demonstrations focus on materials characterization and performance assessment within energy-related systems, including electrochemical response, stability metrics and diagnostic analysis. By the end of the course, students will understand how materials science principles enable the design, optimization and integration of materials into complex energy technologies.

[MSEN 823] – Electronic Materials Processing

COURSE CONTENT: This course introduces the principles and techniques used to process materials for electronic applications. It covers the properties of semiconductors, conductors, insulators, and other functional materials, linking their structure and composition to performance in devices. Students learn about crystal growth, thin-film deposition, doping, diffusion, lithography, etching, and packaging processes. The course also emphasizes characterization techniques to evaluate structural, electrical, optical, and surface properties. Practical laboratory sessions develop skills in material fabrication, testing, and analysis. By the end, students will be able to select appropriate materials and processing methods, analyze defects, and understand their impact on electronic device functionality.

[MSEN 831] – Bio- inspired Engineering

COURSE CONTENT: Nature-inspired methodology is introduced as a powerful approach to guide the design of new processes for applications ranging from energy and energy efficiency to chemical production and therapeutics, etc. The module will illustrate and empower the students to apply fundamental engineering principles, underpinning desirable properties observed in nature, to achieve higher performance (efficiency, scalability, robustness, etc.) and come up with innovative approaches in interdisciplinary teams to solve challenging problems by taking guidance from natural systems that are ideally structured to achieve this high performance.

[MSEN 832] – Biomechanics

COURSE CONTENT: This course provides a comprehensive introduction to biomechanics, exploring the mechanical behavior of biological tissues and their relevance to medical devices and implants. Students examine biomechanics across multiple scales, learning about loading conditions and modeling approaches. Fundamental concepts of stress, strain, constitutive models, anisotropy, and incompressibility are reviewed, forming the basis for understanding tissue mechanics. The mechanical behavior of biological tissues is covered, including viscoelasticity and poroelasticity, with emphasis on bone biomechanics, its structure, remodeling, fracture, and fatigue concepts. Soft tissue biomechanics is addressed, focusing on tendons, ligaments, cartilage, and basic muscle mechanics. The course introduces cellular mechanobiology, including adhesion, cytoskeletal mechanics, and mechanotransduction processes. Students explore the application of biomechanics in medical devices and implants, considering materials selection and design principles. Experimental methods are presented, including mechanical testing of tissues, imaging techniques, and digital image correlation. Case studies and problem sets provide practical applications, helping students link theoretical concepts to real-world scenarios. By the end of the course, students will understand tissue mechanics, design considerations for biomedical applications, and fundamental experimental approaches in biomechanics.

[MSEN 833] – Structural Biochemistry and Bioinformatics

COURSE CONTENT: This course provides a comprehensive introduction to structural and computational biology, focusing on the molecular architecture and dynamics of biomolecules. Students examine the levels of protein structure—primary, secondary, tertiary, and quaternary—

and the non-covalent interactions, such as hydrogen bonding, hydrophobic effects, and electrostatics, that govern folding and stability. The structure and dynamics of nucleic acids, including DNA, RNA, and hybrid forms, are explored alongside lipid membranes and supramolecular assemblies. Advanced experimental techniques for structural analysis, such as NMR spectroscopy, cryo-electron microscopy, single-particle analysis, and mass spectrometry, are introduced, emphasizing the integration of data into protein modeling. The course also covers bioinformatics, including biological databases (UniProt, PDB, GenBank), sequence alignment methods (BLAST, FASTA, multiple sequence alignment), genome annotation, and functional prediction. Structural bioinformatics is explored through protein structure prediction approaches, including homology modeling, threading, and ab initio methods, as well as molecular visualization and analysis of structure–function relationships, active sites, and ligand binding. Computational tools and algorithms, such as molecular dynamics simulations, docking methods for protein–ligand and protein–protein interactions, and machine learning applications like AlphaFold, provide students with practical skills to analyze, predict, and model biomolecular structures in modern research.

Teaching – Knowledge Assessment – Student Evaluation

The Joint English Undergraduate Programme of Studies (JEUPS.) is taught with the physical presence of instructors and students in lecture rooms. By decision of the Programme Studies Committee, a weekly online education slot may be established, common to all students of the Δ.Ξ.Π.Π.Σ., which may be used for tutorials and/or seminar courses and, exceptionally, for make-up classes in cases where lecture rooms are not available on other days of the week for this purpose. In exceptional cases of force majeure or emergency conditions preventing in-person teaching, lectures may, by a duly reasoned decision of the Dean of the School and Director of the Programme, be delivered online for a limited period of time necessary to address the extraordinary circumstances justifying a short-term transition to distance learning.

Similarly, examinations are conducted with the physical presence of students and examiners in the School's lecture rooms, whether written or oral. Exceptionally, oral examinations only may be conducted remotely, provided that candidate identification is ensured and best practices for online oral examinations are applied in order to safeguard academic integrity. Remote written examinations are not permitted, except in cases and under conditions explicitly provided for by applicable legislation. By decision of the Steering Committee, written examinations may be conducted using tablet, laptop, or PC, provided that they take place with the physical presence and supervision of candidates in the School's lecture rooms, under a comprehensive examination framework ensuring academic integrity and equal treatment of examinees.

Attendance of lectures, tutorials, and all other organised educational activities of the Joint Undergraduate Program of Studies in English is mandatory. Students may be absent for up to thirty per cent (30%) of the total teaching hours of each course per semester, while deviations from this limit are permitted only in exceptional cases, upon approval of the Programme Studies Committee. Regular participation in lectures, tutorials, and examinations is considered an essential element of academic progress within the Programme.

Prior to the beginning of each semester, the Secretariat of the JEUPS prepares and publishes the detailed timetable of the semester, ensuring, as far as possible, that compulsory and elective courses (a) are evenly distributed across all weekdays, (b) do not have excessive time gaps between lectures on the same day, and (c) do not overlap with the teaching of other compulsory or specialisation courses of the same semester.

Upon completion of the tenth (10th) teaching week of each semester, students are invited to participate in an anonymous online evaluation of the courses they attend, as well as of the instructors, with the aim of improving the quality of studies.

Students Assessment

1. Students of the JEUPS are assessed through written or oral examinations conducted at the end of each semester for the courses taught in that semester, with consideration also given to any assignments or interim assessments, weighted as specified in the course description. All courses are examined during the re-sit examination period in September. Participation in an oral examination excludes participation in the written examination of the same course in the same examination period.

2. The instructor is required to submit a single final grade at the end of each examination period, which incorporates: (a) the student's performance during the course (continuous assessment grade) and (b) the student's performance in the final assessment, written or oral (final examination grade). The final grade is determined as a weighted combination of these components, with weighting defined by the instructor.

3. Instructors make special provisions for the oral examination of students with documented dyslexia prior to admission to the Programme, or with severe mobility impairments or visual impairments that substantially hinder participation in written examinations, in accordance with applicable regulations.

4. The Programme Secretariat publishes in a timely manner the detailed schedule of written examinations for each upcoming examination period. Instructors, supported by the Secretariat, ensure an adequate number of invigilators from doctoral candidates and postgraduate students. Instructors are required to be continuously present in examination areas, to supervise the proper and secure conduct of examinations, and to take all necessary measures to that effect.

5. Each examinee must verify, prior to the examination, that their name appears on the official list issued by the Secretariat of eligible candidates for the specific course. It is prohibited to copy or otherwise falsify examination results, as well as to bring books, notes, study aids, or electronic communication devices into examination rooms. Any attempt to use electronic communication devices during examinations constitutes a particularly aggravating offence. Students are also prohibited from using separate sheets as draft paper; instead, the last page of the examination script may be used. In case of violation, the examination script is annulled as an internal disciplinary measure, without prejudice to any other sanctions under applicable provisions.

6. Invigilators must verify student identity using academic identification cards, confirm the student's name and registration number on the script, initial each script, supervise to prevent copying or communication, monitor entrances and exits (especially at the end of the examination), and ensure that no student leaves the room within thirty (30) minutes from the distribution of exam papers.

7. The duration of each written examination is a maximum of two (2) hours.

8. After submission, invigilators count the scripts and certify the number received. The scripts are then delivered to the instructor, who verifies the count and signs accordingly in the presence of the invigilator.

9. Instructors must submit examination results to the Programme Secretariat within twenty-five (25) days of each examination, in a unified grade list. In oral examinations,

instructors are not permitted to announce individual results to students but only overall results collectively, either orally or in writing.

10. In all courses, performance is graded numerically from zero (0) to ten (10). A fail is recorded for grades from zero (0) to four (4), and a pass for grades from five (5) to ten (10).

11. Publication of examination results with students' full names is not permitted; only student registration numbers (AEM) may be used.

12. Grade transfer between examination periods is not permitted. Any annotations on examination scripts requesting conditional grading or referencing remaining course requirements are invalid and disregarded.

13. Examination answers may be discussed after results are announced during designated office hours. Students have the right to review their scripts and request clarification on grading. Instructors must upload model solutions to the course e-learning platform.

14. For degree classification in the five-year cycle, the calculation includes forty (40) mandatory courses (234 ECTS), six (6) elective courses (36 ECTS), and the diploma thesis (30 ECTS), totalling 300 ECTS. For the four-year cycle, the calculation includes thirty-four (34) compulsory courses (204 ECTS), four (4) elective courses (24 ECTS), and the diploma thesis (12 ECTS), totalling 240 ECTS.

Article 9
Scholaships

Within the framework of the Joint Engligh-taught Undergraduate Programme of Studies, there is provision for awarding scholarships to students, based on academic and objective criteria and following a decision of the Programme Committee. Indicatively:

● Up to three (3) scholarships per academic year may be awarded to students who distinguish themselves during the admission process, based on the overall evaluation of their qualifications (including the results of the oral interview), and who are ranked among the top admitted candidates of the intake cycle. These scholarships consist of full exemption from tuition fees for the first academic year.

● An excellence scholarship granting a fifty percent (50%) reduction in tuition fees for the subsequent academic year may be awarded to the student who achieves the highest average academic performance across all courses of each year, provided that they have successfully completed all courses within the prescribed timeframe. In case of a tie, the scholarship may be awarded to more than one student.

● The Programme Committee may award excellence prizes to students who demonstrate outstanding performance during their studies. These awards may include an honorary distinction and/or a monetary prize. In particular, at the end of each academic year, a "top student of the year" award may be granted, based on overall performance in all courses and consistency in attendance. Similarly, a "distinguished graduate" award may be granted to the student with the highest academic performance over the entire study cycle.

● Full or partial exemption from tuition fees may be provided, following a reasoned decision of the Programme Committee, for students originating from war zones or who are under international or subsidiary protection status, based on documented social and humanitarian criteria.

● In exceptional cases, a social scholarship may be granted to applicants or students of the Programme who face serious financial difficulties, health issues, loss of a parent, or who live under conditions of emergency or prolonged crisis, following the examination of the relevant application and supporting documents by the Programme Committee.

● There is also provision for work-study (reciprocal) scholarships, consisting of partial exemption from tuition fees in exchange for the student providing specific services in support of the Programme. Such work may include assistance in the library, administrative support, contribution to research projects, or other activities determined by the Programme Committee in coordination with the Secretariat and faculty members. The duration and content of the work-study scholarship are clearly defined upon award, and failure to fulfil the obligations may result in its revocation.

The granting of the above-mentioned scholarships and/or excellence awards, as well as their specific terms, obligations, and rights of recipients, are determined by decision of the Programme Committee and lie within its exclusive discretion, based on the financial capacity of the Programme and its available reserves.

Article 10
Teaching Staff of J.E.U.P.S.

The teaching work of the Joint Undergraduate Programme of Studies (JEUPS) is allocated by decision of the Programme Committee to instructors whose academic field is relevant to the subject matter of the teaching assigned to them. By decision of the Programme Committee, the teaching assignments for the courses of the Programme for the following academic year are allocated to the teaching staff. In particular, the following categories may be engaged as teaching personnel of the I.F.L.U.S.P.:

a. members of the Teaching and Research Staff (D.E.P.) of the Departments of Chemistry, Physics, and Mechanical Engineering, or other Departments of Aristotle University of Thessaloniki (A.U.Th.) or another Higher Education Institution (H.E.I.), with additional employment beyond their statutory obligations as defined by applicable legislation,

b. Emeritus Professors or retired members of the D.E.P. of the Departments of Chemistry, Physics, and Mechanical Engineering, or other Departments of A.U.Th. or another H.E.I.,

c. members of the Special Teaching Staff (E.E.P.), Laboratory Teaching Staff (E.DI.P.), and Special Technical Laboratory Staff (E.T.E.P.) of H.E.I.s, who hold a doctoral degree and have teaching experience, as well as sufficient scientific, publishing, or research activity,

d. contracted lecturers,

e. visiting professors and visiting researchers,

f. contract-based researchers,

g. researchers and special functional scientists of research centres under Article 13A of Law 4310/2014 (A' 258) or other research organisations in Greece or abroad, who hold a doctoral degree and have teaching experience and sufficient scientific, publishing, or research activity,

h. postdoctoral researchers and early-stage scientists, holders of at least a doctoral degree, who possess specialised knowledge or relevant experience in the academic field of the JEUPS.,

i. collaborating professors.

The assignment of teaching duties within the JEUPS is carried out by decision of the Steering Committee, following a proposal by the Programme Director, who collaborates for this purpose with the Chairs of the participating Departments. The decision of the Steering Committee ensures that teaching and other educational activities assigned to members of the D.E.P. of the participating Departments within the Joint Undergraduate Program of Studies in English do not in any way affect their other teaching, research, and administrative obligations towards their respective Departments and Greek-language study programmes.

The decision of the Steering Committee regarding teaching assignments is issued no later than the commencement of each academic semester and must include the instructors of the JEUPS the courses, the educational activities, and the total number of teaching hours assigned to each instructor in accordance with the curriculum per academic semester, as well as the total remuneration cost, where remuneration is preconsidered, and is promptly communicated to the Special Account for Research Funds (E.L.K.E.) of A.U.Th. All categories of teaching personnel are compensated exclusively from the resources of the JEUPS, where remuneration is provided. The level of remuneration per category of teaching staff is determined by decision of the Steering Committee and in accordance with the rules governing the E.L.K.E. of A.U.Th. Regarding personnel contracts, external collaborators, additional teaching work, and the total teaching hours assigned in each case.

The obligations of instructors include, among others, the course or lecture description, the examination method of the course, and the communication with students required for the academic purposes of the Programme.

Instructors are obliged to adhere to the weekly teaching schedule in accordance with the timetable as formulated and defined by the Committee, and to comply with the examination and assessment procedures as described in the present Regulation.

Article 11
Revenue - Tuition Fees - Financial Management Process of JEUPS

The resources of the Joint Undergraduate Program of Studies in English in Materials Science and Engineering of the Departments of Chemistry, Physics, and Mechanical Engineering of Aristotle University of Thessaloniki (A.U.Th.) may originate from:

a. tuition fees,

b. donations, sponsorships, and all forms of financial support,

c. bequests,

d. resources from research projects or programmes, particularly those of the European Union,

e. internal resources of A.U.Th., the amount of which may not exceed five percent (5%) of the total budget of the Programme, and

f. any other lawful source.

Tuition Fees

For attendance in the Programme, total tuition fees amount to forty thousand euros (€40,000), distributed as eight thousand euros (€8,000) per academic year. The level of tuition fees is determined and may be amended by decision of the Senate of A.U.Th., while the method and timing of payment may be adjusted by decision of the Steering Committee.

Tuition fees are paid by the students themselves (or by a third natural or legal person on their behalf) into a designated bank account of the Special Account for Research Funds (E.L.K.E.) of A.U.Th., in ten (10) equal instalments of four thousand euros (€4,000): the first instalment upon student registration in the Programme, and the subsequent instalments prior to the commencement of each semester. After payment, the relevant receipt is issued and the student is informed electronically.

Payment is made electronically, according to the instructions sent upon confirmation of application receipt. The amount is deposited into the E.L.K.E. of A.U.Th. and is non-refundable in the case of non-acceptance or withdrawal of the application.

In case of acceptance into the Programme, candidates are required to pay an additional amount of one thousand euros (€1,000) as an advance tuition payment. This amount is also deposited into the E.L.K.E. of A.U.Th. and is non-refundable in the event of withdrawal from studies.

Financial Management Procedure

The management of the Programme's resources, with the Department of Chemistry acting as the coordinating body in cooperation with the Department of Physics and the Department of Mechanical Engineering, is carried out by the Steering Committee through the Special Account for Research Funds (E.L.K.E.) of A.U.Th. Funds are allocated primarily to cover the operational needs of the Programme and, where surplus liquidity exists, they may be used to cover other educational and development needs of the participating Departments.

By decision of the Governing Council, following a proposal of the Research Committee of the E.L.K.E., the percentage of withholding in favour of the E.L.K.E. of A.U.Th. is determined.

Operational expenses of the Programme include the remuneration of instructors and visiting professors. The level of remuneration per category of teaching staff is determined by the Steering Committee, in accordance with the remuneration regulations of the E.L.K.E. of A.U.Th. and up to the maximum permitted limit per teaching hour. The Committee may decide on a tiered differentiation of remuneration depending on the number of admitted students per academic year.

Furthermore, operational expenses include travel costs incurred for the organisation and operation of the Programme, which are approved by the Steering Committee. Travel expenses are charged to the Programme budget and are reimbursed upon submission of the relevant supporting documents, in accordance with Article 248 of Law 4957/2022 and subsequent amendments.

The Programme's resources are allocated as follows:

a. an amount corresponding to ten percent (10%) of total tuition fee revenues is withheld by the E.L.K.E. for the financial management of the Programme. By decision of the Governing Council, it is determined whether the remaining amount, after deduction of the E.L.K.E. withholding, is transferred to the regular state budget or allocated to the creation of projects/programmes through the E.L.K.E. of A.U.Th., primarily aiming to cover the needs of the tuition-free Greek-language Undergraduate Programmes of the Departments of Chemistry, Physics, and Mechanical Engineering, as well as research, educational, and operational needs of A.U.Th. Revenues from categories (b) to (d) of Article 11 are subject to the standard E.L.K.E. withholding applicable to corresponding funding sources,

b. the remaining balance of the Programme's total revenues is allocated to the coverage of its operational expenses.

Article 12
Administrative Support – Means and Infrastructure

The Foreign Students Support Unit is responsible for supporting the foreign students of the Joint Undergraduate Program of Studies in English, pursuant to Article 212 of Law 4957/2022. The mission of the Foreign Students Support Unit is to provide support to foreign students enrolled in first, second, and third-cycle study programmes of the Higher Education Institution. In particular, the responsibilities of the Foreign Students Support Unit are:

a. Supporting foreign students in the enrolment process for foreign-language study programmes of the Aristotle University of Thessaloniki.

b. Assisting foreign students in obtaining entry visas and residence permits for study purposes in the host country, as well as liaising with the relevant public authorities on these matters.

c. Supporting the procedure for concluding agreements for expedited issuance of residence permits for study purposes, in accordance with Article 37 of Law 4251/2014 (A' 80).

d. Supporting students during their settlement in the host country.

e. Cooperating with the relevant services of the Aristotle University of Thessaloniki for the servicing of foreign students.

f. Arranging the organisation of Greek language courses or other foreign language courses in cooperation with the relevant units of the Aristotle University of Thessaloniki.

g. Exercising any other competence defined in the Statute of the Higher Education Institution and related to the scope of the Foreign Students Support Unit.

Administrative Support of the Programme

The Department of Chemistry (lead department) of the Aristotle University of Thessaloniki, drawing on its long-standing experience in the organisation and implementation of first, second, and third-cycle study programmes, undertakes the overall administrative and technical support of the present Joint Undergraduate Program of Studies in English. The secretarial support of the Programme is provided by the Secretariat of the Programme, which may be staffed by personnel of the Secretariat of the Department of Chemistry, forming a key operational arm of its administration and operating under the supervision of the Steering Committee.

More specifically, the Programme Secretariat:

a. Provides administrative support to the Committee and the Director of the Joint Undergraduate Program of Studies in English.

b. Handles all matters relating to the student lifecycle, from enrolment to graduation and the issuance of the degree certificate.

c. Maintains the protocol and the physical and digital archive of the Programme.

d. Manages administrative procedures concerning the teaching staff of the Programme (contracts, transfers, etc.).

e. Cooperates with the Special Account for Research Funds of the Aristotle University of Thessaloniki for the financial management of the Programme and the support of related procedures.

The **coordination of the Programme** Secretariat, as well as the keeping of minutes of the Programme Committee, is assigned to a staff member of the Secretariat of the Greek-language Undergraduate Study Programme, who possesses the formal qualifications required for head-of-unit duties, in accordance with Article 1 of Law 3839/2010. The relevant assignment is made by decision of the Programme Committee.

In this context, and for the support of the Programme's needs, the following may be employed, in accordance with Article 104 of Law 4957/2022:

a. Members of the permanent administrative staff of the Aristotle University of Thessaloniki, with additional employment beyond their statutory duties, following a decision of the Research Committee of the Special Account for Research Funds, upon recommendation of the Steering Committee.

b. Additional personnel selected in accordance with the procedure of Article 243 of Law

4957/2022.

The cost of remuneration for all categories of personnel is borne exclusively by the Programme budget.

The technical support of the Programme's operation is centrally ensured by specialised personnel of the Digital Governance Unit of the Aristotle University of Thessaloniki, the existing technical staff of the General Directorate of Technical Services and Computerisation of the Aristotle University of Thessaloniki, and the technical staff of the School of Sciences.

For the implementation of teaching activities of the Programme, the existing building and material-technical infrastructure of the participating Departments of the Aristotle University of Thessaloniki is used.

Article 13
Class of the awarded Certification

The Degree/Diploma of Joint Undergraduate Program of Studies in English is a public document and is awarded to the graduates of the Programme.

The degree/diploma is issued by the Secretariat of the Department of Chemistry. It bears the signatures of the Departments of Chemistry, Physics, and Mechanical Engineering, as well as of the Institution, the emblem of the Aristotle University of Thessaloniki, the year of completion of studies, the year of issuance of the degree, the protocol number of graduation, the title of the Joint Undergraduate Program of Studies in English, the grade of the degree/diploma, the student's personal details, and the classification of the final result: "Good", "Very Good", "Excellent".

Prior to its formal awarding, a certificate of successful completion and graduation from the Programme may be issued to the graduate.

In addition to the Degree, a Diploma Supplement is also issued in accordance with Article 15 of Law 3374/2005 and Ministerial Decision Φ5/89656/Β3/13-8-2007 (Government Gazette 1466/Β). The Diploma Supplement is an explanatory document that provides detailed information regarding the nature, level, content, educational framework, and legal status of the studies successfully completed. It does not replace the official qualification or the academic transcript issued by the Institution.

Article 14
Certification - Evaluation of JEUPS.

After the issuance of the decision establishing the Joint Undergraduate Program of Studies in English and prior to the commencement of its operation, accreditation of the Programme by the Hellenic Authority for Higher Education (HAHE), in accordance with case (c) of paragraph 1 of Article 8 of Law 4653/2020 (A' 12), is required. Following their establishment, such Programmes are periodically accredited in accordance with subcase (bb) of case (b) of paragraph 1 of Article 8 of Law 4653/2020, within the framework of the evaluation of the academic unit to which they are attached.

The Joint Undergraduate Program of Studies in English is evaluated within the framework of the periodic evaluation/accreditation of the academic unit by the Hellenic Authority for Higher Education. In particular, the evaluation examines the overall assessment of the work carried out within the Programme, the degree of fulfilment of the objectives set upon its establishment, its sustainability, the employability of its graduates, the degree of its contribution to research, its

internal evaluation by graduates, the appropriateness of continuing its operation, as well as other elements relating to the quality of the work produced and its contribution to the national strategy for higher education.

If, during the evaluation stage, the Programme is deemed not to meet the conditions for continuation of its operation, it shall be completed with the graduation of the already enrolled students in accordance with the founding decision.

Internal Evaluation by MODIP

With the aim of ensuring and improving the quality of the Interdepartmental Foreign-Language Undergraduate Study Programme, the Quality Assurance Unit of the Aristotle University of Thessaloniki (MODIP-AUTH) conducts periodic internal evaluation of the Programme within the framework of the Internal Quality Assurance System of the Institution and in accordance with the guidelines and directions of HAHE.

The obligations of the governing bodies and teaching staff of the Programme include all procedures provided for under the applicable guidelines and directives of MODIP-AUTH regarding the internal and external evaluation and accreditation of Study Programmes and academic units.

Evaluation of teaching staff and courses by students

For the sole purpose of improving the quality of studies of the Interdepartmental Foreign-Language Undergraduate Study Programme and with full assurance of anonymity, students are invited to evaluate the courses and teaching staff each semester.

For the purposes of consistent statistical data collection and the extraction of useful conclusions for the educational work of Schools, Departments and the Institution as a whole, the evaluation questionnaires are designed by MODIP and may be partially adapted according to the specific characteristics and needs of each academic unit and/or each course. They are completed electronically.

The evaluation process is conducted under the responsibility of the Internal Evaluation Group (OMEA) of the Interdepartmental Foreign-Language Undergraduate Study Programme, composed of three (3) members of the teaching staff of the Department of Chemistry, two (2) members of the teaching staff of the Department of Mechanical Engineering, and two (2) members of the teaching staff of the Department of Physics, in cooperation with MODIP of the Aristotle University of Thessaloniki, and is carried out through the Quality Management Information System of the latter. The administration and the OMEA are obliged to take systematic measures to ensure student participation in the evaluation, in accordance with the guidelines of MODIP and the relevant decisions of the Senate.

The OMEA of the Interdepartmental Foreign-Language Undergraduate Study Programme monitors, through MODIP's Quality Management Information System, the level of student participation in the evaluation process, analyses the relevant results, and informs the governing bodies of the Programme and the respective academic unit. The evaluation questionnaires concern each taught course and each instructor separately.

The governing bodies of the Programme and the academic unit, in cooperation with the relevant OMEA, are required to study the evaluation results, announce their conclusions, decide on the publication of summary results where necessary and in any case after the announcement of course grades for the semester, in accordance with applicable personal data protection legislation, and undertake actions to address any issues or improve the Programme.

Article 15
Study Guide of JEUPS

The Joint Undergraduate Program of Studies in English issues a Study Guide in English for the purpose of informing students about its operation. It is published on the website of the Interdepartmental Programme, which is managed by the Programme Committee, and is updated at regular intervals. The Study Guide includes:

1. General information as well as useful online resources about the Institution and the School, in particular administrative services or collective bodies that undergraduate students may contact for the successful completion of their studies.

2. The purpose and scope of the Interdepartmental Foreign-Language Undergraduate Study Programme, as well as the qualifications acquired upon the awarding of the degree.

3. The academic calendar, which includes the start and end dates of academic semesters, examination periods, holidays, and any other obligations such as seminars, conferences, etc.

4. The programme of courses, ECTS credits, study regulations, teaching staff, as well as students' rights and obligations.

5. The official language of instruction.

6. The Steering Committee of Joint Undergraduate Program of Studies in English.

7. Databases and other services.

8. Use of the Library, depending on the needs of the courses of the Foreign-Language Study Programme.

9. Learning outcomes and qualifications upon graduation.

10. Institutional services provided to students.

Article 16
Transitional regulations

Any issue that arises during the operation of the Joint Undergraduate Program of Studies in English and is not covered by the relevant legislation or by the present Regulation shall be addressed by decisions of the Programme's governing bodies, through amendment of the relevant Regulation.

Please proceed with the necessary actions.

INTERNAL DISTRIBUTION

-Rector's Office and Vice-Rectors' Offices
-Deanship of the School of Sciences
-Deanship of the School of Engineering
-Secretariat of the Senate
-General Registry Department

The University Rector

Kyriakos Anastasiadis
Professor of Medicine