

Physical Chemistry Laboratory

1. GENERAL			
SCHOOL	Faculty of Sciences in collaboration with Faculty of Engineering, Aristotle University of Thessaloniki		
DEPARTMENT	Materials Science and Engineering		
LEVEL OF STUDIES	ISCED level 7 (5-year Integrated Master's programme) ISCED level 6 (4-year BSc programme)		
COURSE CODE	MSEN 402	SEMESTER	4 th Semester
COURSE TITLE	Physical Chemistry Laboratory		
TEACHING ACTIVITIES	TEACHING HOURS PER WEEK	ECTS CREDITS	
Lectures, tutorials/problem sessions, laboratory/computer exercises (where applicable), case studies and guided self-study.	Lectures: 1 Lab work: 3 Total: 4	6	
COURSE TYPE	Background, General Knowledge		
PREREQUISITES	No prerequisites		
TEACHING AND EXAMINATION METHODS	English		
COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE URL	https://elearning.auth.gr/course/view.php?id=xxxxx		

2. LEARNING OUTCOMES	
Learning Outcomes	<p>The goal of the Physical Chemistry Laboratory, through its operation and the training it provides to students on selected and representative laboratory exercises, is on the one hand to support the course of Physical Chemistry with an in-depth understanding of the basic principles and laws, on the other hand and the familiarization and reconciliation of the student with the laboratory environment. These exercises are internationally and widely accepted and wellknown over time and are taught in the four semester of studies in the Departments of Materials Science as well as (several of them) in the Department of Chemistry (Department of Chemistry) of our University. The aim is also to develop the reflection and practice of the student to think in the language of Science, to observe and not to see, to interpret the phenomena and not to memorize theories. The aim is to develop his research disposition, his training in the correct presentation and processing of experimental results as well as in the protection and safe use of laboratory equipment. The form and content of these laboratory exercises have been organized based on the experience in the</p>

	<p>student laboratories and the evaluation of the current and future direction of the field of Physical Chemistry of the materials.</p> <p>Upon successful completion of the course the student will be able to:</p> <ul style="list-style-type: none"> • form the composition of the working group in order to achieve the maximum result. • work in a team with a spirit of cooperation and creative coexistence. • Handle and use the capabilities of the programs: ORIGIN, EXCEL, ChemOffice, ChemDraw, etc. • look for the relevant literature which becomes necessary for the comparison and confirmation of his experimental results. • Understand differently and in depth the concepts of physicochemistry that are established through laboratory practice. <p>judge, to compare and interpret phenomena.</p>
General Skills	<ul style="list-style-type: none"> • Applying knowledge in practice • Searching, analyzing and synthesizing data and information • Independent work • Teamwork • Promoting free, creative and inductive thinking • Solving real-world problems • Working in a multidisciplinary environment

3. COURSE CONTENT

Laboratory experiments introduce key experimental techniques for the characterization of physical and chemical behavior, covering the following areas:

- Calorimetry
- Boiling Points. Mixing Points Distribution
- Electrolytic conductivity solutions
- pH metry determination pK acids
- The effect of temperature and ionic strength on reaction rate.

Conductometric, spectrophotometric and polosimetric monitoring of reaction kinetics.

4. LEARNING & TEACHING METHODS - EVALUATION

Teaching method	Face-to-face.
Use of ICT	<p>ICT will be used in teaching the course, and in communication with students:</p> <ul style="list-style-type: none"> • teaching of the course with modern distance learning (ZOOM) and asynchronous education tools via elearning platform of AUTH, • communication with students via email, ZOOM, and elearning platform of AUTH.

Teaching organization	The supervised and unsupervised workload per activity is indicated below (total workload complies with ECTS standards).														
	<table border="1"> <thead> <tr> <th>Activity</th> <th>Workload/semester (hours)</th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td>13</td> </tr> <tr> <td>Bibliographic written, research and problem solving</td> <td>55</td> </tr> <tr> <td>Laboratory exercises</td> <td>39</td> </tr> <tr> <td>Written assignments</td> <td>41</td> </tr> <tr> <td>Exams</td> <td>2</td> </tr> <tr> <td>Total</td> <td>150</td> </tr> </tbody> </table>	Activity	Workload/semester (hours)	Lectures	13	Bibliographic written, research and problem solving	55	Laboratory exercises	39	Written assignments	41	Exams	2	Total	150
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Student evaluation	Assessment Language: English Assessment Methods: <ul style="list-style-type: none"> • Written assignment • Problem Solving • Laboratory report • Written exams 														
5. SUGGESTED BIBLIOGRAPHY															
EUDOXUS															
"Physical Chemistry", Peter Atkins, Julio de Paula, James Keeler, Oxford University Press, 2023 "Physical Chemistry for the Chemical Sciences", Raymond Chang, Jr. Thoman John W., University Science Books, 2014 "Physical Chemistry", David W. Ball, Cengage Learning, 2014															
Additional bibliography for study															
Teaching material slides															