COURSE OUTLINE

(1) GENERAL

FACULTY	SCIENCES		
SCHOOL	CHEMISTRY		
LEVEL OF STUDY	UNDERGRATUATE		
MODULE CODE	**YN603**	**ΕΞΑΜΗΝΟ ΣΠΟΥΔΩΝ**	**6th**
TITLE	Biochemistry II		

INDEPENDENT TEACHING ACTIVITIES In case the credits are awarded in distinct parts of the course e.g. Lectures, Laboratory Exercises etc. If the credits are awarded uniformly for the entire course, indicate the weekly teaching hours and the total number of credits	**WEEKLY TEACHING HOURS**	**CREDITS**
THEORY	3	5
Add rows if necessary. The teaching organization and teaching methods used are described in detail in (d)		

MODULE TYPE general background, specialist background, specialization, general knowledge, skills development	General and specialist background, General Knowledge and specialization, skills development
PREREQUISITE MODULES:	NO
LANGUAGE OF LECTURING-TUTORING and EXAMS:	GREEK
THE MODULE IS OFFERED TO ERASMUS STUDENTS	NO
WEBPAGE OF MODULE (URL)	

(2) LEARNING OUTCOMES

Learning Outcomes

The learning outcomes of the module are described as the specific knowledge, skills and abilities of an appropriate level that students will acquire after successful completion of the course.

Consult Appendix A

• Description of the Level of Learning Outcomes for each cycle of study according to the Qualifications Framework of the European Higher Education Area

• Descriptive Indicators of Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B

- *• Summary Guide for Writing Learning Outcomes*

The module aims to introduce students to the basic concepts of the science of Biochemistry and the basic energy metabolism of cells. At the end of the module, the student will have acquired the following skills:

1. Understand the relationship of bioenergetics depending on the type of biochemical reactions
2. Understand the basic metabolic processes and the basic metabolic pathways in the cell. and the basic anabolic and catabolic pathways of (a) carbohydrates, (b), (c) amino acids and proteins, (d) nucleic acids and (e) steroids.
3. Understand and describe the basic anabolic and catabolic pathways of Carbohydrates (Glycolysis, gluconeogenesis and pentose phosphate pathway, Glycogen metabolism and completion of carbohydrate metabolism
4. Understand and describe the importance of the citric acid cycle and the respiratory chain as basic biochemical metabolic processes of life

5. Understand and describe the basic anabolic and catabolic pathways of fats, lipids, polar lipids and steroids and the importance of the structure and function of lipoproteins
6. Understand and describe the basic anabolic and catabolic pathways of amino acids, nucleotides and related molecules and the importance of urea production and its metabolic cycle
7. Understand and describe the importance of photosynthesis and carbohydrate synthesis in plants as basic biochemical metabolic processes of life
8. To understand and describe the principles of metabolic regulation, hormonal regulation and integration of metabolism in mammals
9. To understand and describe the principles of Regulation of gene expression
10. To understand modern genomics techniques
11. To understand the molecular, genetic and metabolic basis of certain diseases
12. To recognize the importance of biochemistry in everyday life in the 21st century.

General Skills

Taking into account the general competencies that the graduate must have acquired (as listed in the Diploma Supplement and listed below), which of these does the module aim to achieve?

Searching, analyzing and synthesizing data and information, using the necessary technologies	*Project planning and management*
Adapting to new situations	*Respect for diversity and multiculturalism*
Decision-making	*Respect for the natural environment*
Autonomous work	*Demonstration of social, professional and ethical responsibility and sensitivity to gender issues*
Teamwork	*Exercise of criticism and self-criticism*
Working in an international environment	*Promotion of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Generating new research ideas	*Other…*
	…….

At the end of this module the student will have further developed the following skills (generic competencies):
1. Ability to demonstrate knowledge and understanding of essential data, concepts, theories and applications related to Biochemistry.
2. Ability to apply this knowledge and understanding to the solution of problems of an unfamiliar nature.
3. Ability to adopt and apply methodology to the solution of unfamiliar problems.
4. Study skills needed for continued professional development.
5. Ability to interact with others in problems of an interdisciplinary nature.

More generally, upon completion of this course the student will have further developed the following generic competencies:
Search, analysis and synthesis of data and information, using the necessary technologies
Adaptation to new situations.
Decision-making.
Autonomous work.
Group work.
Exercise of criticism and self-criticism.
Respect for the natural environment.
Promotion of free, creative and inductive thinking
–

(3) MODULE CONTENT

THEORY

1. Bioenergetics and types of biochemical reactions
2. Carbohydrate metabolism: Glycolysis, gluconeogenesis and the pentose phosphate pathway
3. Glycogen and the completion of carbohydrate metabolism - Principles of metabolic regulation
4. The citric acid cycle
5. Catabolism of fatty acids
6. Amino acid oxidation and urea production
7. Oxidative phosphorylation
8. Photosynthesis and carbohydrate synthesis in plants
9. Lipid biosynthesis
10. Biosynthesis of amino acids, nucleotides and related molecules
11. Hormonal regulation and integration of metabolism in mammals
12. Regulation of gene expression
13. Modern genomic techniques
14. Molecular, genetic and metabolic basis of certain diseases

(3) TEACHING AND LEARNING METHODS - EVALUATION

<table>
<tr><td>TEACHING METHODOLOGY
Face to face, Distance learning, etc.</td><td>Face-to-face lectures</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT)
Use of ICT in Teaching, Laboratory Education, and Communication with Students</td><td>• Organization of the material in ppt slides.
• Learning process support through the electronic platform e-class
• Communication via email.</td></tr>
<tr><td>TEACHING ORGANIZATION
The teaching methods and methods are described in detail.
Lectures, Seminars, Laboratory Exercise, Field Exercise, Literature Study & Analysis, Tutorial, Internship (Placement), Clinical Exercise, Artistic Laboratory, Interactive Teaching, Educational Visits, Study Preparation (Project), Writing of Paper/Thesis, Artistic Creation, etc.

The student's study hours for each learning activity are listed as well as the hours of unguided study according to the principles of ECTs</td><td>
<table>
<tr><th>Δραστηριότητα</th><th>Φόρτος Εργασίας Εξαμήνου</th></tr>
<tr><td>Attending Lectures</td><td>39</td></tr>
<tr><td>Literature study & analysis</td><td>43</td></tr>
<tr><td>Assignment of an Essay</td><td>30</td></tr>
<tr><td>Interactive Teaching</td><td>13</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Total 125 hours of Workload per Semester, which corresponds to 5 credits (25 hours per credit for 13 weeks)</td><td>125 ώρες/εξάμηνο</td></tr>
</table>
</td></tr>
<tr><td>STUDENT EVALUATION
Description of the assessment process

Assessment Language, Assessment Methods, Formative or Summative, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Clinical Examination of a Patient, Artistic Interpretation, Other / Others

Evaluation criteria are explicitly stated and whether and where they are accessible to students.</td><td>• Written Exam (Progress and Final Exam)
• Assignment Assessment
• Interactive Teaching Assignment Assessment</td></tr>
</table>

(4) RECOMMENDED-BIBLIOGRAPHY

1. Lehninger's basic Principles in Biochemistry 3rd Edition, Evdoxos Book Code: 133026881, Edition: 3/2024, Authors: Nelson David L., Cox Michael M., ISBN: 9789925351602, Type: Book, Publisher: BROKEN HILL PUBLISHERS LTD
2. BIOCHEMISTRY, Evdoxos Book Code: 102074412, Edition: 1η/2021, Authors: Jeremy M. Berg, John L. Tymoczko, Gregory J. Gatto, Jr., Lubert Stryer, ISBN: 9789605246365, Type: Book, Publisher: FOUNDATION OF TECHNOLOGY & RESEARCH-UNIVERSITY PUBLICATIONS OF CRETE
3. Biochemistry, Evdoxos Book Code: 122092146, Edition: 7th US-2nd Greek/2024, Authors: Reginald H. Garrett, Charles M. Grisham, ISBN: 9786185800079, Type: Book, Publisher: UTOPIA PUBLICATIONS M. EPE.
4. Various scientific papers or commentary articles which may be of general interest or include recent developments in the subject of Biochemistry (but also more broadly in the biosciences fields), which (as is the case everywhere) are slow to be incorporated into textbooks and which may change every year, are posted on the e-class platform.

- Relevant Scientific Journals:

- Biochemistry
- The Journal of Biochemistry
- The International Journal of Biochemistry & Cell Biology
- Clinical Biochemistry
- Trends in Biochemical Sciences
- Journal of Biological Chemistry
- Prostaglandins & Other Lipid Mediators
- International Journal of Molecular Sciences
- Frontiers in Biosciences Landmark
- Metabolism
- Metabolites