

## Course Outline: “3102 - Biochemistry”

### 1. General information

<b>FACULTY/SCHOOL</b>	Physical Education, Sport Science & Nutrition		
<b>DEPARTMENT</b>	Nutrition & Dietetics		
<b>LEVEL OF STUDY</b>	Undergraduate		
<b>COURSE UNIT CODE</b>	<b>3102</b>	<b>SEMESTER</b>	<b>3<sup>rd</sup></b>
<b>COURSE TITLE</b>	<b>Biochemistry</b>		
<b>INDEPENDENT TEACHING ACTIVITIES</b>		<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>
in case credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the entire course, give the weekly teaching hours and the total credits			
Lectures		3	
Laboratory Exercises		2	
<i>Add rows if necessary. The organization of teaching and the teaching methods used are described in detail under section 4</i>		<b>5</b>	<b>5</b>
<b>COURSE TYPE</b> <i>Background knowledge, Scientific expertise, General Knowledge, Skills Development</i>	General Knowledge		
<b>PREREQUISITE COURSES</b>	No		
<b>LANGUAGE OF INSTRUCTION</b>	Greek		
<b>LANGUAGE OF EXAMINATION/ASSESSMENT</b>	Greek		
<b>THE COURSE IS OFFERED TO ERASMUS STUDENTS</b>	Yes		
<b>COURSE WEBSITE (URL)</b>	<a href="https://eclass.uth.gr/cour3es/DND_U_157/">https://eclass.uth.gr/cour3es/DND_U_157/</a>		

### 2. LEARNING OUTCOMES

<p><b>Learning Outcomes</b></p> <p><i>The course learning outcomes, specific knowledge, skills and competences of an appropriate (certain) level, which students will acquire upon successful completion of the course, are described in detail. It is necessary to consult: Συμβουλευτείτε το <b>APPENDIX A</b></i></p> <ul style="list-style-type: none"> <li><i>Description of the level of learning outcomes for each level of study, in accordance with the European Higher Education Qualifications' Framework.</i></li> <li><i>Descriptive indicators for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and</i></li> </ul> <p><b>APPENDIX B</b></p> <ul style="list-style-type: none"> <li><i>Guidelines for writing Learning Outcomes</i></li> </ul>			
<p>Biochemistry is the scientific area that studies the chemical reactions which occur in the living organisms including humans, animals, plants and microorganisms at the molecular level. Upon completion of the lectures, the students will have acquired the necessary knowledge regarding the basic principles of Biochemistry. In particular, the structure and function of biomolecules (i.e., proteins, carbohydrates, lipids and nucleic acids) and cell membranes will have been analyzed. Furthermore, the course will delve into the basic principles of signal transduction and Food Biochemistry.</p>			
<p><b>General Competences</b></p> <p><i>Taking into consideration the general competences that students/graduates must acquire (as those are described in the Diploma Supplement and are mentioned below), at which of the following does the course attendance aim?</i></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> <i>Search for, analysis and synthesis of data and information by the use of appropriate technologies, Adapting to new situations Decision-making Individual/Independent work Group/Team work Working in an international environment Working in an interdisciplinary environment Introduction of innovative research</i> </td> <td style="width: 50%; border: none; vertical-align: top;"> <i>Project planning and management Respect for diversity and multiculturalism Environmental awareness Social, professional and ethical responsibility and sensitivity to gender issues Critical thinking Development of free, creative and inductive thinking ..... (Other.....citizenship, spiritual freedom, social awareness, altruism etc.) .....</i> </td> </tr> </table>		<i>Search for, analysis and synthesis of data and information by the use of appropriate technologies, Adapting to new situations Decision-making Individual/Independent work Group/Team work Working in an international environment Working in an interdisciplinary environment Introduction of innovative research</i>	<i>Project planning and management Respect for diversity and multiculturalism Environmental awareness Social, professional and ethical responsibility and sensitivity to gender issues Critical thinking Development of free, creative and inductive thinking ..... (Other.....citizenship, spiritual freedom, social awareness, altruism etc.) .....</i>
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<ul style="list-style-type: none"> <li>Individual/Independent work</li> <li>Group/Team work</li> <li>Working in an interdisciplinary environment</li> <li>Introduction of innovative research</li> </ul>			

- Development of free, creative and inductive thinking

### 3. COURSE CONTENT

- Introduction to Biochemistry
- Water
- Buffer solutions
- Amino acids, peptides, proteins
- The structure of proteins
- Non-catalytic functions of proteins
- Enzymology
- Carbohydrates - Glycobiology
- Nucleotides and nucleic acids
- Lipids
- Biological membranes
- Signal transduction
- Basic principles of Food Biochemistry

#### Laboratory exercises

- Introduction - Safety and function rules of the Biochemistry Lab
- Laboratory mathematics
- Preparation of solutions
- Introduction in enzymology and enzyme kinetics
- Catalytic action of alkaline phosphatase
- Effect of substrate concentration on the catalytic action of alkaline phosphatase
- Effect of an inhibitor on the catalytic action of alkaline phosphatase
- Evaluation of the concentration of alkaline phosphatase
- Microscopic observation of cancer cells
- Staining and destaining of protein electrophoresis gel and observation of the protein bands
- Measurement of catalase activity in red blood cell lysate
- Measurement of protein concentration using the Bradford reagent
- Review

### 4. TEACHING METHODS - ASSESSMENT

<p style="text-align: center;"><b>MODES OF DELIVERY</b></p> <p style="text-align: center;"><i>Face-to-face, in-class lecturing, distance teaching and distance learning etc..</i></p>	Face to face	
<p style="text-align: center;"><b>USE OF INFORMATION AND COMMUNICATION TECHNOLOGY</b></p> <p style="text-align: center;"><i>Use of ICT in teaching, Laboratory Education, Communication with students</i></p>	<p>1. Lectures in power point documents</p> <p>2. Research or review papers in pdf documents</p> <p>3. Laptops for the projection of relevant videos</p> <p>4. The lectures in pdf documents that are announced to the students through the eclass platform</p> <p>The students get in touch with the instructor either directly (through face to face contact or email) or indirectly (through notes posted on the poster boards and the website of the Department).</p>	
<p style="text-align: center;"><b>COURSE DESIGN</b></p> <p style="text-align: center;"><i>Description of teaching techniques, practices and methods: Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, Internship, Art Workshop, Interactive teaching, Educational visits, projects, Essay writing, Artistic creativity, etc. The study hours for each learning activity as well as the hours of self-directed study are given following the principles of the ECTS.</i></p>	<b>Activity/Method</b>	<b>Semester workload</b>
	Lectures	3 × 13 = 39
	Laboratory exercises	2 × 13 = 26
	Literature analysis	15
	Preparation for the exams	45
<p style="text-align: center;"><b>STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS</b></p>	<b>Total</b>	<b>125</b>
	<p>For both the Theory and the Lab, the performance of the students is assessed through written exams (100%).</p>	

*Detailed description of the evaluation procedures:*

*Language of evaluation, assessment methods, formative or summative (conclusive), multiple choice tests, short- answer questions, open-ended questions, problem solving, written work, essay/report, oral exam, presentation, laboratory work, other.....etc.*

*Specifically defined evaluation criteria are stated, as well as if and where they are accessible by the students.*

## **5. SUGGESTED BIBLIOGRAPHY**

*- Suggested bibliography:*

- Nelson David L., Cox Michael M. Lehninger Principles of Biochemistry. W.H. Freeman, 8th Edition, 2021.

- Gregory Gatto, Jeremy M. Berg, John L. Tymoczko, Lubert Stryer. Biochemistry. MACMILLAN, 2019.

*- Scientific journals:*

- Biochemistry

- Biochemical journal

- Journal of Biological Chemistry

- PNAS

- EMBO Journal