

## COURSE OUTLINE

### 1. GENERAL

<b>SCHOOL</b>	NATURAL SCIENCES		
<b>ACADEMIC UNIT</b>	BIOLOGY		
<b>LEVEL OF STUDIES</b>	UNDERGRADUATE		
<b>COURSE CODE</b>	<b>BIO_BY02</b>	<b>SEMESTER</b>	<b>2d</b>
<b>COURSE TITLE</b>	BIOCHEMISTRY I		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>	<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>	
Lectures and Laboratory work	6	8	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	Specialised general knowledge		
<b>PREREQUISITE COURSES:</b>	PHYSICS, INORGANIC/ORGANIC CHEMISTRY, MATHEMATICS		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	Yes (in English)		
<b>COURSE WEBSITE (URL)</b>	<a href="http://www.biology.upatras.gr/">http://www.biology.upatras.gr/</a>		

### 2. LEARNING OUTCOMES

#### Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area
- Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B
- Guidelines for writing Learning Outcomes

Upon course completion, students will have acquired knowledge in biochemistry, and will have understood fundamental principles related to cell process at molecular level via studying:

- The roles of main biomolecules in life
- The structures and functionalities of lipids, carbohydrates, proteins (enzymes) and nucleic acids
- The ways of energy production and storage

#### General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology  
Adapting to new situations

Project planning and management  
Respect for difference and multiculturalism  
Respect for the natural environment

<i>Decision-making</i> <i>Working independently</i> <i>Team work</i> <i>Working in an international environment</i> <i>Working in an interdisciplinary environment</i> <i>Production of new research ideas</i>	<i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i> <i>Criticism and self-criticism</i> <i>Production of free, creative and inductive thinking</i> ..... <i>Others...</i> .....
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- Working independently
- Team work
- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Production of free, creative and inductive thinking
- Decision-making
- Criticism and self-criticism
- Adapting to new situations

### 3. COURSE CONTENT

1. Acids/ bases and buffer solutions.
2. Biochemical role of amino acids (categories, physicochemical properties, structure).
3. Structure of proteins (biochemical properties, categories, structure, introduction to protein crystallography).
4. Relation between protein structure and function.
5. Enzymes (kinetics, inhibition, allosteric enzymes, mechanisms of catalytic activity).
6. Biochemical role of carbohydrates.
7. Biochemistry of lipids as components of biological membranes and membrane proteins.
8. Structure of DNA (DNA conformations and effects of physicochemical parameters).
9. Structure of RNA.
10. Basic principles of physical chemistry and their applications in biochemistry.
11. Redox reactions and biological oxidative processes, bioenergetics (oxidative phosphorylation).
12. Roles of main biomolecules in metabolism.

#### Laboratory Exercises

- Kinetics of the enzyme: acid phosphatase
- Spectrophotometric determination of pKa of a weak acid.
- Photometric spectra of hemoglobin.
- Titration of glycine.

Methodology and Implementation of the teaching and pedagogical approach in Biochemistry.

### 4. TEACHING and LEARNING METHODS - EVALUATION

<b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i>	Face-to-face. Discussion during lecture. Encouragement in keeping notes.
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<p align="center"><b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b></p> <p align="center"><i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<p>Power-Point lectures. Laboratory work using essential equipment for biochemical analyses. Discussion during lectures and practicals. Teaching material available from the platform e-class.</p>	
<p align="center"><b>TEACHING METHODS</b></p> <p><i>The manner and methods of teaching are described in detail.</i></p> <p><i>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i></p> <p><i>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i></p>	<p><b>Activity</b></p>	<p><b>Semester workload</b></p>
	Lectures	40
	Laboratory work in small groups of students	15
	Independent Study	145
Course total	<b>200</b>	
<p align="center"><b>STUDENT PERFORMANCE EVALUATION</b></p> <p><i>Description of the evaluation procedure</i></p> <p><i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<ol style="list-style-type: none"> <li>1. Written exams at the end of the semester (70%).</li> <li>2. Laboratory reports and exams on the practical part of the course (30%).</li> </ol>	

## 5. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- Related academic journals:

1. BERG JEREMY M. TYMOCZKO JOHN L. STRYER LUBERT

BIOXHMEIA(Greek translation of the 7th American edition).

2. Teaching material is available from the e-class platform (Course code: BIO255).