# COURSE OUTLINE

## (1) GENERAL

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|---|---|---|---|
| **FACULTY** | SCIENCES | | |
| **SCHOOL** | CHEMISTRY | | |
| **LEVEL OF STUDY** | UNDERGRATUATE | | |
| **MODULE CODE** | **YN405** | **SEMESTER** | **4th** |
| **TITLE** | Introduction to Biology | | |
| **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 | 2 | 3 |
| | | | |
| | | | |
| *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 BACKGROUND | | |
| **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 Biology and the basic structures and functions of cells. At the end of the module, the student will have acquired the following skills:

1. To understand the basic principles and issues of biology, the origin of life and the evolution of species, and the relationships between species based on scientific research
2. To understand the importance of cells as fundamental Units of Life
3. To understand the importance of the chemical framework of life based on the Chemical Composition of Cells and the importance of the structure and function of important molecules such as water but also of large biological molecules for the molecular diversity of life
4. To be able to identify by navigating the cell all the cellular organelles and molecular complexes from which the basic functions of cells originate

5. To understand the importance of the structure and function of membranes and membrane transport both for the cell as well as for the subcellular organelles and intracellular compartments, as well as in cellular communication and signaling
6. To understand the basic points of metabolism and the role of subcellular organelles such as mitochondria for cellular respiration and chloroplasts for photosynthesis
7. To understand and describe the molecular and cellular basis of inheritance and gene expression and their regulation
8. To understand and describe basic concepts of the cell cycle and cell division (Mitosis)
9. To understand and describe basic concepts of Reduction and sexual biological cycles per type of organism-cell and issues of sexual reproduction and genetics
10. To understand and describe how the concept of the gene and the chromosomal basis of inheritance emerged from Mendel's experiments and observations
11. To understands how modern genetics can be applied as an experimental tool with knowledge of the rational use of viruses, plasmid DNA and modern DNA techniques for biotechnological and medical applications
12. To understand how the evolution of species is related to the evolution of genes and genomes
13. To recognize the importance of biology 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 Biology.
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 module 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.
Teamwork.
Exercise of criticism and self-criticism.
Respect for the natural environment.
Promotion of free, creative and inductive thinking
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**(3) MODULE CONTENT**

**THEORY**

1. Evolution, Biology Topics and Scientific Research
2. Cells: The Fundamental Units of Life – The Chemical Framework of Life and Chemical Composition of Cells. - Water and Life - Carbon and the Molecular Diversity of Life - Structure and Function of Large Biological Molecules
3. Exploring the Cell - Structure and Function of Membranes - Membrane Transport
4. Introduction to Metabolism - Mitochondria, Cellular Respiration and Fermentation - Chloroplasts and Photosynthesis
5. Intracellular Compartments and Transport - Cell Communication - Cell Signaling
6. The Molecular Basis of Inheritance (DNA and Chromosomes)
7. From Gene to Protein - The Molecular Basis of Gene Expression and Its Regulation
8. The Cell Division Cycle - Mitosis
9. Reduction and Sexual Biological Cycles - Sexual Reproduction and Genetics
10. Mendel and the Concept of the Gene - The Chromosomal Basis of inheritance
11. Genetics as an Experimental Tool - Viruses - Plasmid DNA - DNA Technology and Biotechnology
12. Evolution of Genes and Genomes

## (3) TEACHING AND LEARNING METHODS - EVALUATION

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|---|---|
| **TEACHING METHODOLOGY**<br>*Face to face, Distance learning, etc.* | Face-to-face lectures |
| **USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT)**<br>*Use of ICT in Teaching, Laboratory Education, and Communication with Students* | • Organization of the material in ppt slides.<br>• Learning process support through the electronic platform e-class<br>• Communication via email. |
| **TEACHING ORGANIZATION**<br>*The teaching methods and methods are described in detail.*<br>*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.*<br><br>*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* | |
| **STUDENT EVALUATION**<br>*Description of the assessment process*<br><br>*Language of Assessment, Assessment Methods, Formative or Inferential, 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*<br><br>*Expressly specified assessment criteria are stated and whether and where they are accessible to students.* | • Written Exam (Progress and Final Exam)<br>• Assignment Assessment<br>• Interactive Teaching Assignment Assessment |

| ***Activity*** | ***Semester Workload*** |
|---|---|
| Attending Lectures | 26 |
| Μελέτη & ανάλυση βιβλιογραφίας | 18 |
| Assignment of an Essay | 18 |
| Interactive Teaching | 13 |
| | |
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| Total 75 of workload in the Semester, which corresponds to 3 credits. (25 hours of workload per credit for 13 weeks) | ***75 hours/Semester*** |

## (4) RECOMMENDED BIBLIOGRAPHY

1. *CAMPBELL ΒΙΟΛΟΓΙΑ Ι, Κωδικός Βιβλίου στον Εύδοξο: 122077936, Έκδοση: 1η/2023, Συγγραφείς: LISA A. URRY, MICHAEL L. CAIN, PETER V. MINORSKY, STEVEN A. WASSERMAN, REBECCA B. ORR, ISBN: 9789605249342, Τύπος: Σύγγραμμα, Διαθέτης (Εκδότης): ΙΔΡΥΜΑ ΤΕΧΝΟΛΟΓΙΑΣ & ΕΡΕΥΝΑΣ-ΠΑΝΕΠΙΣΤΗΜΙΑΚΕΣ ΕΚΔΟΣΕΙΣ ΚΡΗΤΗΣ*
2. *Basic pronciples of Cell Biology 5th Edition, Evdoxos book code: 102069992, Edition: 5/2021, Authors: Alberts Bruce, Hopkin Karen, Johnson Alexander, Morgan David, Raff Martin, Roberts Keith, Walter Peter, ISBN: 9789925588145, Type: Book, Publisher: BROKEN HILL PUBLISHERS LTD*
3. *3. Various scientific papers or commentary articles which may be of general interest or include recent developments in the subject of Biology (but also more broadly in the biological sciences) 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:*

- Life Sciences
- Current Biology
- The International Journal of Biochemistry & Cell Biology
- Cell Chemical Biology
- Journal of Molecular Biology
- Journal of Genetics and Genomics
- Prostaglandins & Other Lipid Mediators
- International Journal of Molecular Sciences
- Frontiers in Biosciences Landmark

- Metabolism
- Comparative Biochemistry and Physiology - Part B: Biochemistry & Molecular Biology
- Trends in Genetics
- Current opinion in Cell Biology
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