

Module Outline

1. GENERAL

SCHOOL	OF SCIENCE AND TECHNOLOGY		
PROGRAMME	Studies in Natural Sciences		
LEVEL OF STUDIES	Undergraduate		
MODULE CODE	FYE43	YEAR	4th
MODULE TITLE	Genetics - Evolution		
INDEPENDENT TEACHING ACTIVITIES <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>		HOURS	CREDITS
Weekly workload: (12-13 hours) x 32 weeks		392	14 ECTS
MODULE TYPE <i>Compulsory/Elective/ Mandatory Optional</i>	Compulsory		
MODULE DESCRIPTION <i>general background, special background, specialised, general knowledge, skills development</i>	<i>general background, , specialised</i>		
PREREQUISITE MODULES	Simultaneous attendance or completion of FYE31 (cell structure and function) module is required		
LANGUAGE OF INSTRUCTION and EXAMINATIONS	Greek		
IS THE MODULE OFFERED TO ERASMUS STUDENTS	no		
MODULE WEBSITE (URL)	The Module has its own space in the digital learning environment of HOU (https://study.eap.gr/login/index.php) with controlled access (using a code) for students and Teaching Staff.		

2. LEARNING OUTCOMES

Learning outcomes

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

LEARNING OUTCOMES

Knowledge:

Upon successful completion of the Module, students are expected to:

- -Describe the Mendelian hereditary rules
- Distinguish the complex molecular interactions that contribute to the inheritance of characters in daughter cells
- Explain the flow of genetic information in cells and describe the relevance of inheritance patterns in all organisms
- Describe the relationship between phenotype and genotype

- Describe the fundamental concepts of gene linkage and mapping
- Explain the basic principles of mutagenesis
- Describe the basic principles of developmental genetics
- Discuss the basic principles of genetic engineering
- Describe the basic principles and theories of evolution
- Explain the processes and mechanisms of evolution

Skills:

Upon successful completion of the Module, students are expected to:

- Apply the basic laws of inheritance to solve genetic problems.
- Analyze and interpret genetic data and patterns of inheritance.
- Use fundamental methods of genetic mapping and gene linkage analysis.
- Interpret the relationship between genotype and phenotype across different biological systems.
- Evaluate the effects of mutations on the structure and function of organisms.
- Relate concepts of molecular genetics to evolutionary processes.
- Use basic genetic scientific terminology accurately in both oral and written communication.

Competences:

Upon successful completion of the Module, students are expected to:

- Synthesize knowledge of genetics to understand complex biological phenomena.
- Critically evaluate scientific information and applications of genetic engineering.
- Recognize the ethical, social, and scientific dimensions of genetic applications.
- Work both independently and collaboratively to solve genetics-related problems.
- Apply the principles of the scientific method to the study of biological systems.
- Transfer and apply genetic knowledge to new or interdisciplinary contexts.

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 Module aim?

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

The general skills that the students will acquire are:

- Search for, analysis and synthesis of data and information by the use of appropriate technologies
- Adapting to new situations
- Decision-making
- Individual/Independent work
- Development of free, creative and inductive thinking

3. SYLLABUS

Purpose of Module

The module covers key areas of modern biology, including Genetics (Heredity, Gene Regulation, Molecular Genetics), Chromosomal Rearrangements and Mutations, and Evolution and Phylogenetic Analysis. Particular emphasis is placed on understanding the interaction between genetic variation and the evolutionary forces that act upon it.

Subjects covered

1. Mendelian Inheritance and Its Extensions

2. Chromosomal Rearrangements and Mutations
3. Evolution

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	- Distance teaching - Students participate in six (6) Group Counseling Meetings (GCMs) and at least three (3) supporting GCMs during the academic year - Personal communication and feedback (advisory role of Adjunct Faculty).														
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	Group Counseling Meetings (GCMs) are delivered with: • remote meeting tools (webex) • presentation software (powerpoint type) • educational videos In addition, students: • use office automation tools, web browsers as well as e-readers for digital books. - • watch alternative teaching material (webcasts) posted on the digital repository (http://apothesis.eap.gr)														
TEACHING METHODS <i>The manner and methods of teaching are described in detail.</i> <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> <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>	<table border="1"> <thead> <tr> <th><i>Activity/Method</i></th><th><i>Annual workload</i></th></tr> </thead> <tbody> <tr> <td>6 (GCMs) (x4 hours each)</td><td>24</td></tr> <tr> <td>3 supporting GCMs (X2 hours each)</td><td>6</td></tr> <tr> <td>6 written assessments or projects</td><td>60</td></tr> <tr> <td>Study and analysis of bibliography (9-10 hours x 32 weeks)</td><td>290</td></tr> <tr> <td>Exams</td><td>12</td></tr> <tr> <td>Total hours</td><td>392</td></tr> </tbody> </table>	<i>Activity/Method</i>	<i>Annual workload</i>	6 (GCMs) (x4 hours each)	24	3 supporting GCMs (X2 hours each)	6	6 written assessments or projects	60	Study and analysis of bibliography (9-10 hours x 32 weeks)	290	Exams	12	Total hours	392
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STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure</i> <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> <i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i>	Students' evaluation – Grade assessment of a Module: Final grade of the module is formed by six (6) written assignments or projects, which are elaborated by the students during the academic year and their average grade is considered up to 30%, and final exams participating with 70%. Language of evaluation: Greek														

5. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- Hartwell L., Hood L., Goldberg M., Reynolds A., Silver L., Genetics: From genes to genomes, Utopia Publishing, 2014

- Campbell Neil and Reece Jane, Biology, volume II, Crete University Press
- Sadava D, Hillis D,M, Heller , Hacker SD The Science of Biology: Basic Biology, Genetics, Evolution. Papazisis ed 2022

Additional and alternative teaching materials (webcasts) are posted on HOU websites:

- <https://apothesis.eap.gr/>
- <https://study.eap.gr/>