

COURSE OUTLINE “EMBRYOLOGY AND MOLECULAR DEVELOPMENTAL BIOLOGY”

1. GENERAL

SCHOOL	HEALTH SCIENCES		
DEPARTMENT	MOLECULAR BIOLOGY AND GENETICS		
STUDY LEVEL	ISCED LEVEL 6		
COURSE CODE	MBG305	SEMESTER	5 th
COURSE TITLE	EMBRYOLOGY AND MOLECULAR DEVELOPMENTAL BIOLOGY		
TEACHING ACTIVITIES	HOURS/WEEK	ECTS CREDITS	
<i>In case credits are awarded to individual components of the course eg. Lectures, laboratory practicals, etc. If credit units are awarded for the whole course, indicate the weekly teaching hours and total credits</i>	3	4	
COURSE TYPE <i>General, Background, Scientific field course, Expertise Course, Skills Development etc</i>	SCIENTIFIC FIELD		
PREREQUISITE COURSES:	NO		
LANGUAGE OF TEACHING AND EXAMINATIONS:	GREEK		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	NO		
COURSE WEBSITE (URL)	https://eclass.duth.gr/courses/ALEX01137/		

2. LEARNING OUTCOMES

<p>Learning outcomes</p> <p><i>Describe the learning outcomes of the course, the specific knowledge, skills and competencies that students will acquire after successfully completing the course. Refer to Appendix A.</i></p> <ul style="list-style-type: none"> • Description of learning outcomes for the course according to the level of study - refer to the European Higher Education Area Qualifications Framework • Descriptive Indicators of Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Annex B Curriculum Vitae Summary Guide 												
<p>The main objectives of the course are:</p> <p>a) to acquire a basic knowledge of the Embryology of invertebrates and vertebrates through the study of embryogenesis of model organisms (<i>C. elegans</i>, <i>D. melanogaster</i>, <i>Xenopus laevis</i>, Zebrafish, Chick, Mouse).</p> <p>b) to study the molecular mechanisms underlying the development of animal model organisms and</p> <p>c) to realize that the basic molecular pathways implicated in development have been conserved during Evolution.</p> <p>Learning outcomes</p> <p>Upon successful completion of the course, the student is able to:</p> <ul style="list-style-type: none"> • Demonstrate an understanding of the Basic Embryology of the standard organisms • Demonstrate an understanding of the basic molecular mechanisms governing the development of model organizations • Comparatively discuss the molecular mechanisms underlying vertebrate & invertebrate development • Know and understand the experimental approaches in Developmental Biology and related basic and emerging technologies • Analyze and interpret experimental methods used in Developmental Biology • Propose solutions to problems / questions in Developmental Biology by formulating hypotheses and designing appropriate methodological approaches 												
<p>General Skills</p> <p><i>Which of the general competencies that the student will have acquired on the completion of the studies (see also the Diploma Supplement and below) are relevant to this course?</i></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><i>Research, analysis and synthesize of data and information, using the necessary technologies</i></td> <td style="width: 50%; border: none;"><i>Work in an interdisciplinary environment</i></td> </tr> <tr> <td style="border: none;"><i>Adaptation to new situations</i></td> <td style="border: none;"><i>Production of new research ideas</i></td> </tr> <tr> <td style="border: none;"><i>Decision making</i></td> <td style="border: none;"><i>Project design and management</i></td> </tr> <tr> <td style="border: none;"><i>Autonomous work</i></td> <td style="border: none;"><i>Respect for diversity and multiculturalism</i></td> </tr> <tr> <td style="border: none;"><i>Team work</i></td> <td style="border: none;"><i>Respect for the natural environment</i></td> </tr> <tr> <td style="border: none;"></td> <td style="border: none;"><i>Development of social, professional and moral responsibility and gender</i></td> </tr> </table>	<i>Research, analysis and synthesize of data and information, using the necessary technologies</i>	<i>Work in an interdisciplinary environment</i>	<i>Adaptation to new situations</i>	<i>Production of new research ideas</i>	<i>Decision making</i>	<i>Project design and management</i>	<i>Autonomous work</i>	<i>Respect for diversity and multiculturalism</i>	<i>Team work</i>	<i>Respect for the natural environment</i>		<i>Development of social, professional and moral responsibility and gender</i>
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Work in an international environment

sensitivity

Promotion of free, creative and inductive thinking

- Research, analysis and synthesize of data and information
- Development of research skills
- Production of new research ideas
- Development of critical thinking
- Promotion of free, creative and inductive reasoning
- Decision making
- Project design
- Exposure to the workplace environment of the Molecular Biologist-Geneticist

3. COURSE CONTENT

1. Basic concepts, model organisms & techniques for the study of Development.
2. Embryology of *C. elegans*.
3. Pattern formation in invertebrates /molecular mechanisms Part I: *C. elegans*.
4. Embryology of *D. melanogaster*
5. Pattern formation in invertebrates /molecular mechanisms Part II: *D. melanogaster*.
6. Embryology of *X. laevis*
7. Pattern formation in vertebrates /molecular mechanisms Part I: *X. laevis*.
8. Chick embryology - Pattern formation in vertebrates /molecular mechanisms Part II: Chick.
9. Embryology of the mouse
10. Pattern formation in vertebrates /molecular mechanisms Part III: Mouse - Human.
11. Organogenesis: Development of somites and their derivatives.
12. Organogenesis: Development of limbs and kidneys
13. Organogenesis: Development of the heart and hematopoietic system
14. Evolution and Development Mechanisms (Evo-Devo)

4. TEACHING and LEARNING METHODS - EVALUATION

<p>TYPE OF TRAINING <i>Face-to-face, Distance learning, etc..</i></p>	Face to face										
<p>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, and in communication with the students</i></p>	<p>Use of ICT in Teaching Use of ICT in Communication with students</p>										
<p>MODES OF DELIVERY <i>Describe the teaching methods in detail. Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, practicum, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc. 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>In order to support and develop the student's scientific thinking, participatory teaching methods are used. Therefore, the student not only acquires knowledge, but also develops experimental design and interpretation skills, while at the same time he/she cooperates with both his/her colleagues and the instructor.</p> <table border="1" data-bbox="644 1435 1362 1659"> <thead> <tr> <th>Activity</th> <th>Workload/semester</th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td>20</td> </tr> <tr> <td>Interactive teaching</td> <td>20</td> </tr> <tr> <td>Study & analysis of bibliography</td> <td>80</td> </tr> <tr> <td>Course Total</td> <td>120</td> </tr> </tbody> </table>	Activity	Workload/semester	Lectures	20	Interactive teaching	20	Study & analysis of bibliography	80	Course Total	120
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<p style="text-align: center;">STUDENT PERFORMANCE EVALUATION</p> <p style="text-align: center;"><i>Describe of the methods of evaluation language, methods of evaluation, types of exams, 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 style="text-align: center;"><i>Are evaluation criteria known to the students?</i></p>	<p>Student evaluation languages Greek</p> <p>Method (Formative or Concluding) Formative</p> <p>Student evaluation methods Written exam with multiple choice test (25%) Written Exam with Short Answer Questions (25%) Written Exam with Essay Development Questions (25%) Written Exam with Problem Solving (25%)</p> <p>The evaluation criteria are presented in the course guide available on the course's website.</p>
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5. SUGGESTED BIBLIOGRAPHY

Title: Essential Developmental Biology (greek translation), 3rd Edition Author: JMW Slack, Eudoxus Code: 26242.

Course Notes

The course notes are available through the e-class platform.

1. Title: The Developmental Biology of *D. melanogaster* Author: G. Skadis - M. Grigoriou Place & Publication Year: Alexandroupolis, 2005.

2. Title: Early development of *C. elegans* Author: M. Grigoriou-G. Skadis Place & Publication Year: Alexandroupolis, 2005.

3. Title: Embryology and Molecular Development Biology - Course Presentations & handouts Author: M. Grigoriou - G. Skadis Place & Publication Year: Alexandroupolis, 2018