

## COURSE OUTLINE

### (1) GENERAL

<b>SCHOOL</b>	Health Sciences		
<b>ACADEMIC UNIT</b>	Medicine		
<b>LEVEL OF STUDIES</b>	Post-graduate		
<b>COURSE CODE</b>	MKBB101	<b>SEMESTER</b>	A (1 <sup>st</sup> )
<b>COURSE TITLE</b>	Topics in Molecular and Cellular Biology		
<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	5	10	
<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 (post-graduate course)		
<b>PREREQUISITE COURSES:</b>			
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek and English		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	Yes		
<b>COURSE WEBSITE (URL)</b>	<a href="http://ecourse.uoi.gr/enrol/index.php?id=1812">http://ecourse.uoi.gr/enrol/index.php?id=1812</a>		

### (2) LEARNING OUTCOMES

<p><b>Learning outcomes</b></p> <p><i>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.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> <li>• <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i></li> <li>• <i>Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i></li> <li>• <i>Guidelines for writing Learning Outcomes</i></li> </ul>																		
<p>Students are expected to understand the interconnection of basic principles of biology with current research developments and approaches in molecular and cellular biology.</p>																		
<p><b>General Competences</b></p> <p><i>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?</i></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i></td> <td style="width: 50%; border: none;"><i>Project planning and management</i></td> </tr> <tr> <td style="border: none;"><i>Adapting to new situations</i></td> <td style="border: none;"><i>Respect for difference and multiculturalism</i></td> </tr> <tr> <td style="border: none;"><i>Decision-making</i></td> <td style="border: none;"><i>Respect for the natural environment</i></td> </tr> <tr> <td style="border: none;"><i>Working independently</i></td> <td style="border: none;"><i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i></td> </tr> <tr> <td style="border: none;"><i>Team work</i></td> <td style="border: none;"><i>Criticism and self-criticism</i></td> </tr> <tr> <td style="border: none;"><i>Working in an international environment</i></td> <td style="border: none;"><i>Production of free, creative and inductive thinking</i></td> </tr> <tr> <td style="border: none;"><i>Working in an interdisciplinary environment</i></td> <td style="border: none;"><i>.....</i></td> </tr> <tr> <td style="border: none;"><i>Production of new research ideas</i></td> <td style="border: none;"><i>Others...</i></td> </tr> <tr> <td style="border: none;"></td> <td style="border: none;"><i>.....</i></td> </tr> </table>	<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>.....</i>	<i>Production of new research ideas</i>	<i>Others...</i>		<i>.....</i>
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- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Respect for difference and multiculturalism
- Criticism and self-criticism

### (3) SYLLABUS

- **Section 1: Cellular organization and function**

Themes taught

Organismal evolution, Molecular evolution, Chromatin, nuclear envelope and nucleo-cytoplasmic traffic, Biosynthetic secretory pathway, Protein folding *in vivo*, Unfolded protein response stress, Mechanisms of vesicle-mediated exocytosis, Extracellular vesicles, Endocytosis: mechanisms and role in regulation of cellular function, Transmembrane transport, Ion channels and neurological disorders, Mitochondrial transporters in human physiology and pathology, The role of cytoskeleton in cellular functions, Mitotic spindle organization

- **Section 2: Genomes and gene regulation**

Themes taught

Genome organization and evolution, Bioinformatic genome analysis, Transposable elements and diseases, Mechanisms of gene expression regulation in bacteria, RNA-dependent regulation of transcription and translation, The role of translational control in nervous system function, Cell cycle regulation, Cell cycle in oocytes and in egg cells, Cell signaling: The PI3K/PTEN pathway, The Wnt pathway, The role of NO in regulation of metabolism.

#### **Objectives**

Interconnection of basic principles of biology with current research developments and approaches in molecular and cellular biology.

### (4) TEACHING and LEARNING METHODS - EVALUATION

<p style="text-align: center;"><b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i></p>	<p>Teaching courses to small groups of students given by several instructors (academic personnel from different disciplines and research specialties).</p>
<p style="text-align: center;"><b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<p>Powerpoint slides and videos are used in the lectures. Predicted use of electronic voting systems. The powerpoint slides and videos presented, as well as complementary teaching material (videos, links to important research articles or related textbooks, etc.), are freely accessible to the students through the e-course system of the University of Ioannina. Teaching material is updated at least annually. Other possibilities offered by the e-course system are also applied (e.g. uploading of quizzes or short problems of study and feedback to the students' answers with comments by the teaching staff). The e-course is also used for communication with the students (<a href="http://ecourse.uoi.gr/enrol/index.php?id=1812">http://ecourse.uoi.gr/enrol/index.php?id=1812</a>).</p>

	E-mail addresses of the teaching staff are made available to the students and are also freely used as a means of communication.	
<p style="text-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>	<b>Activity</b>	<b>Semester workload</b>
	Lectures	54
	Seminars (delivered by external lecturers)	6
	Analysis of bibliography	10
<b>Course total</b>	<b>70</b>	
<p style="text-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>	<p>Language of evaluation: Greek and English</p> <p><b>Methods:</b></p> <p>(a) Intermediate evaluation through short questions and quizzes that are discussed with the students in the context of each thematic module taught.</p> <p>(b) Evaluation of the students in the analysis and presentation of peer-reviewed articles that are assigned to them by the teaching staff: presentations are given at the end of the semester and the grades from these presentations contribute by 20% to their final grade</p> <p>(c) Written exam (which contributes to their final grade by 80%)</p> <p>Each written exam may include:</p> <p>Short-answer questions</p> <p>Open-ended questions</p> <p>Questions requiring combination of knowledge from different chapters</p> <p>Questions requiring critical thinking/interpretation</p> <p><b>Evaluation criteria:</b></p> <p>Successful performance (grade 5/10) in the written exam evaluating students on comprehension of the course material, based on the lessons taught and the corpus of teaching material that is accessible in page <a href="http://ecourse.uoi.gr/enrol/index.php?id=1812">http://ecourse.uoi.gr/enrol/index.php?id=1812</a>.</p> <p>Student grades are based on a decimal scale and are given with accuracy of <math>\pm 0.5</math> (grades from +0.25 and above or +0.75 and above are approximated by +0.5 or +1.0, respectively; grades below +0.25 or +0.75 are approximated by +0.0 or +0.5 respectively). The final grade includes a 20% contribution from student grades in article presentations. Written exams are kept officially in the PPS files (Director's office) for at least two years and are accessible to students for analysis of questions and comments on the themes and the student answers. Reexamination dates after exam failure are scheduled in collaboration with the course Coordinator until the end of the second (first re-exam) or the third semester (second re-exam), at</p>	

	latest. Failure in the second re-exam is considered as a reason for discontinuation of the student affiliation to the program by the Steering Committee. All exam procedures and evaluation criteria are included in the study program rules and regulations, which are accessible at the website <a href="http://msc-mcbb.ac.uoi.gr">http://msc-mcbb.ac.uoi.gr</a> .
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## (5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

Peer-reviewed articles from the literature and textbook chapters that are suggested by the academic teachers on the thematic chapter they teach. This bibliography is available to the students in the corresponding webpage at e-course. Indicatively, the proposed bibliography includes chapters from books *Molecular Cell Biology 8e* (Lodish, 2019), *Introduction to Genomics 2e* (Lesk, 2012), *Evolution* (Barton, 2011), *Brock Biology of Microorganisms 14e* (Madigan, 2015), review and/or original research articles from *Nature*, *Cell*, *Science*, *Mol Cell*, *Mol Cell Biol*, *Dev Biol*, *J Cell Sci*, *J Mol Biol*, *Current Biology*, etc..

- Related academic journals:

See <http://ecourse.uoi.gr/enrol/index.php?id=1812>