COURSE OUTLINE

(1) GENERAL

SCHOOL			
ACADEMIC UNIT	**Interdisciplinary Graduate Programme in the BRAIN and MIND sciences**		
LEVEL OF STUDIES	7		
COURSE CODE	**B&M-R-108**	SEMESTER	**depending on availability**
COURSE TITLE	Molecular Neurobiology		

INDEPENDENT TEACHING ACTIVITIES *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*	WEEKLY TEACHING HOURS	CREDITS
laboratory exercises	6	9-18
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Special background, skills development
PREREQUISITE COURSES:	B&M-105 Introduction to Molecular & Cellular Neuroscience Also recommended: B&M -227 Introduction to Molecular Neurobiology B&M -239 Introduction to Experimental Methods in Neuroscience
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	English
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES
COURSE WEBSITE (URL)	https://elearn.uoc.gr/course/view.php?id=4449

(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*

The research conducted at the Regenerative Pharmacology Laboratory of the Medical School of the University of Crete aims at the study and pharmacological characterization of endogenous and synthetic biological molecules with neuroprotective and neuroregenerative activity. During the training, emphasis will be placed on introducing and training students to basic techniques of cellular and molecular neurobiology, using in vitro and/or in vivo models. Students will be trained and will carry out basic research protocols: neural cell culture (cell lines, as well as isolation and culture of primary neural, neural stem and glial cells), isolation of proteins and DNA/RNA, immunoprecipitation, electrophoresis of proteins and nucleic acids, immunohistochemical methods and flow cytometry. They will also have a basic understanding of handling and administrating drugs to experimental animals

(rodents).

At the end of the laboratory exercise, the student:

- reproduces, analyzes, integrates and applies the knowledge acquired from the study of the mandatory and optional mandatory courses of the program in the research context of the subject of his/her exercise
- is able to use this knowledge as a basis for original scientific analysis
- can use the acquired knowledge at a high level of abstraction
- can think conceptually, develop and deepen arguments
- analyzes and carries out complex scientific work
- is able to collaborate with colleagues and supervisors
- assumes responsibility for the results of the work
- communicates to a specialized and non-specialist audience with clarity and precision conclusions and knowledge that may be the result of original research, self-study or experience

If the laboratory exercise develops into a diploma thesis, the student's further engagement with the research topic enables them to:

- independently complete fundamental research based on methodological knowledge
- contribute primarily to the development and application of research ideas in the field of a specific research topic
- recognize the limitations of existing knowledge in the scientific field and at the interface between neighboring scientific fields and adjust their action accordingly
- identify and analyze complex problems and solve them strategically and creatively
- take responsibility for managing complex processes
- communicate in a targeted manner with colleagues, specialists and non-specialists, as well as supervisors, depending on the context, using conventions related to the field of knowledge

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
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
……
Others…
…….

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

(3) SYLLABUS

Training in research methods and topics related to the investigation of endogenous neurotrophic factors, as well as their synthetic chemical analogues, with neurogenic and neuroprotective activity against neurodegenerative diseases.

In particular, the student will be trained in one or more of the following areas:

- effect of endogenous trophic factors as well as newly synthesized chemical molecules which act as neurotrophic factors, and study their action on cell survival.
- molecular and cellular characterization of the effects of small molecules and drugs on the signaling and function of neural and glial cells.
- Isolation and culture of primary neural (hippocampus, cerebellum, dorsal ganglion root) and glial (astrocytes, oligodendrocytes), as well as their precursors.
- Flow cytometry, fluorescence microscopy and confocal microscopy studies.
- Use and administration of drugs in experimental animals (rodents).
- Isolation of brain regions from rodents and immunohistochemical staining of brain tissue sections for the detection of specific proteins.

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Use of wet biology lab, microscopes, RT-PCR, flow cytometry.
Use of publisher databases/electronic repositories of scientific articles</td></tr>
<tr><td>TEACHING METHODS
The manner and methods of teaching are described in detail.
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.

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</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Study and analysis of bibliography</td><td>50-100</td></tr>
<tr><td>project</td><td>100-200</td></tr>
<tr><td>essay writing</td><td>25-50</td></tr>
<tr><td>non-directed study</td><td>50-100</td></tr>
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<tr><td>Course total</td><td>225-450</td></tr>
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<tr><td>STUDENT PERFORMANCE EVALUATION
Description of the evaluation procedure

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

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Evaluation Language: English
The student's dedication to conducting the study, autonomy and independence, critical review and analysis of the literature, progress over time, and the quality of the report are evaluated.
Evaluation criteria are outlined in the study guide and communicated to students at the beginning of the course.</td></tr>
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(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:
Scientific articles published in reputable scientific journals within the research interests of the Laboratory of Regenerative Pharmacology.