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-104**	SEMESTER	**depending on availability**
COURSE TITLE	Immunohistochemistry and electron microscopy		

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	9-27
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 and Cellular Neuroscience Also recommended: B&M-205 Synaptic Interactions in the Cortex
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=4455

(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 aim of the research conducted at the Laboratory of Cellular Physiology, Faculty of Medicine, University of Crete, is the characterization of brain neurons using *in vivo* electrophysiological recording, juxtacellular labeling, and detailed reconstruction of labeled neurons, as well as immunohistochemistry for both light and electron microscopy. At the same time, the laboratory collaborates with other research groups studying the nervous system, offering its expertise in electron microscopy.

Upon completion of the laboratory exercise, the student:

- Integrates and applies the knowledge acquired from the study of compulsory and elective courses of the program within the research framework of their exercise topic.
- Acquires skills for the planning and successful execution of experiments.
- Is able to use knowledge as a basis for original ideas and research.
- Can think conceptually, develop, and deepen arguments.
- Analyzes and carries out complex scientific tasks.
- Can collaborate with colleagues and supervisors.
- Assumes responsibility for the results of their work.
- Communicates, both to specialized and non-specialized audiences, conclusions and knowledge—potentially derived from original research, self-study, or experience—with clarity and precision.

If the laboratory exercise evolves into a thesis project, further engagement with the research topic enables the student to:

- Independently carry out fundamental research based on methodological knowledge.
- Contribute originally to the development and application of ideas in the field of research.
- Recognize the limitations of existing knowledge in their scientific field and at the interface between related scientific domains, and adapt their actions 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, according to the context, using conventions relevant to the field of expertise.

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 on topics related to the characterization of brain neurons, particularly those involved in eye movement. Depending on the availability of experimental material and the duration of the training (3 or 6 months), the student will be trained in all or some of the following procedures:

- Preparation of thin brain sections for electron microscopy.
- Cutting and processing ultrathin sections for observation under an electron microscope.
- Immunohistochemical labeling of neurons.
- Identification of neuronal structures in the electron microscope.
- Reconstruction of labeled neurons by combining light microscopy and appropriate software.
- *In vivo* extracellular recording and juxtacellular labeling of single neurons.
- Basic surgical techniques.
- Analysis of electrophysiological data and basic principles of programming.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Use of software for image analysis and design. Use of publishers' databases / electronic repositories of scientific articles. Use of online platforms for sharing analysis code.
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*	*Activity* / *Semester workload* Study and analysis of bibliography: 50-150 project: 100-300 essay writing: 25-75 non-directed study: 50-150 Course total: ***225-675***
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.*	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.

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

Scientific articles published in reputable scientific journals relevant to the research interests of the Laboratory of Cellular Physiology, School of Medicine, University of Crete.