

## COURSE OUTLINE

### (1) GENERAL

<b>SCHOOL</b>	MEDICINE		
<b>ACADEMIC UNIT</b>	NEUROSCIENCE GRADUATE PROGRAM		
<b>LEVEL OF STUDIES</b>	GRADUATE		
<b>COURSE CODE</b>	NEURO 207	<b>SEMESTER</b>	2 <sup>ND</sup> SEMESTER
<b>COURSE TITLE</b>	CELLULAR-MECHANISMS OF LEARNING AND MEMORY		
<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 AND STUDENT PRESENTATIONS		3HRS/WEEK FOR 10 WEEKS	6
<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>	SPECIALIZED GENERAL KNOWLEDGE, SKILLS DEVELOPMENT, ELECTIVE		
<b>PREREQUISITE COURSES:</b>	NONE		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	ENGLISH		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	YES		
<b>COURSE WEBSITE (URL)</b>	ELEARN PLATFORM		

### (2) LEARNING OUTCOMES

<p><b>Learning outcomes</b> <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>This course aims to engage students to general and specialized knowledge of the learning and memory field. Specifically, students will</p> <ul style="list-style-type: none"> <li>• Learn the current state-of-the-art knowledge on the cellular mechanisms of learning and memory</li> <li>• Become familiarized with a significant portion of the scientific literature in the field of learning and memory</li> <li>• Improve their critical reading skills of a scientific article</li> <li>• be trained in searching for scientific literature on a specific subject</li> <li>• be trained on presentation and discussion of a scientific article</li> <li>• gain experience with writing a critical review of a scientific topic related to learning and memory</li> </ul>
<p><b>General Competences</b> <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>

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

### (3) SYLLABUS

- 1) The hippocampus and the processes of learning and memory: An overview of the cellular mechanisms of learning and memory.
- 2) Long-term potentiation: Presynaptic and postsynaptic mechanisms
- 3) Memory engram: The role of intrinsic excitability and ion channels in learning and memory
- 4) The role of place cells in learning and memory
- 5) The prefrontal cortex, working memory and adaptive behavior
- 6) Persistent activity as the mechanisms of working memory
- 7) Neuronal oscillations as the mechanisms of working memory
- 8) Neurobiological substrate of adaptive behavior

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

<p style="text-align: center;"><b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i></p>	Face-to-face in the classroom	
<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>	Use of the elearn platform	
<p style="text-align: center;"><b>TEACHING METHODS</b> <i>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.</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	24
	Student presentations	6
	Independent study	60 (for each lecture hour, 2 hours of study/preparation are required)
	Critical review – groups of 2 students	40 (for each student)
	Presentations – groups of 2 students	20 (for each student)
Course total	<b>150</b>	
<p style="text-align: center;"><b>STUDENT PERFORMANCE EVALUATION</b> <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>Student evaluation is performed in the English language.</p> <p>1) Class participation – 20%</p> <p>2) Presentation of a scientific paper – 40%</p> <p>3) Written critical review of a scientific topic related to learning and memory – 40%</p> <p>The evaluate procedure will be announced in the 1<sup>st</sup> day of class and will be uploaded in the elearn platform</p>	

#### (5) ATTACHED BIBLIOGRAPHY

<p>- Suggested bibliography:</p> <ul style="list-style-type: none"> <li>• R. von Bernhardi, J. Eugenin, K. J. Muller (editors) (2017) <i>The Plastic Brain</i>, Springer International Publishing</li> </ul> <p>- Related academic journals: <i>Journal of Neuroscience, Cerebral Cortex, Nature, Science, Nature Neuroscience, Journal of Neurophysiology, Cell, Neuron and other neuroscience journals</i></p>
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