

COURSE OUTLINE

(1) GENERAL

SCHOOL			
ACADEMIC UNIT	Interdisciplinary Graduate Programme in the BRAIN and MIND sciences		
LEVEL OF STUDIES	7		
COURSE CODE	B&M-210	SEMESTER	Fall
COURSE TITLE	Cerebral Cortex: Perception & Movement		
INDEPENDENT TEACHING ACTIVITIES <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>	WEEKLY TEACHING HOURS	CREDITS	
lectures		1	
study and analysis of bibliography		8	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Special background		
PREREQUISITE COURSES:	B&M-105 Introduction to Molecular & Cellular Neuroscience B&M -102 Introduction to Systems Neuroscience I. Perception B&M -102A Introduction to Systems Neuroscience II. Movement & Cognitive Functions B&M -103 Introduction to Computational Neuroscience B&M -107 Introduction to Psychology & the Social Neuroscience B&M -106 Introduction to Philosophy of Mind B&M 232 Introduction to Statistics and Programming in Matlab Also recommended: 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)			

(2) LEARNING OUTCOMES

<p>Learning outcomes</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"> • <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i> • <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i> • <i>Guidelines for writing Learning Outcomes</i> <p>Through the critical review of scientific articles, students acquire specialized knowledge and gain an understanding of recent findings in cutting-edge areas of perception and movement, which serve as a foundation for creative thinking.</p>

Upon successful completion of the course, students:

- Possess highly specialized and advanced knowledge of aspects of perception and movement at the level of neural networks, through the lens of methodological approaches in basic neuroscience research.
- Have a critical understanding of a range of theories, principles, and concepts shaped by cutting-edge research findings.
- Are able to follow the chronological development of knowledge as it emerges from findings of approaches whose capabilities evolve alongside technological advancements.
- Can evaluate highly specialized new knowledge.
- Independently define and critically analyze complex problems, substantiate conclusions, and conduct additional analysis by referencing and assessing supplementary literature.
- Design research experiments, proposing the appropriate methodology to address specific research questions.
- Are able to summarize and present research hypotheses, experimental approaches, and research findings to an audience with a similar scientific background.

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

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Others...

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- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Working independently
- Team work
- Working in an interdisciplinary environment
- Production of new research ideas
- Criticism and self-criticism
- Production of free, creative and inductive thinking

(3) SYLLABUS

- Primary and secondary visual cortex. Functional properties of neurons and topographic organization.
- Middle temporal area. Methodological approaches to explore the relationship between neuronal function and behavior.
 - Visual area V4.
 - Inferior temporal cortex (IT). Coding of complex stimuli in the brain.
 - From the basic properties of visual neurons to visual perception.
 - Frontal eye fields (FEF) and lateral intraparietal area (LIP).
 - Neuronal mechanisms of visual attention.
- Brain circuits for the control of grasping movements: ventral premotor area F5 – anterior intraparietal area (AIP).
- Brain circuits for the control of grasping movements: ventral premotor area F5 – primary motor cortex.
- Brain circuits for the control of space: ventral premotor area F4 – ventral intraparietal area (VIP).

- Mirror neurons
- Brain circuits for the control of reaching movements: dorsal premotor area F2 – posterior parietal area V6A.
- Premotor areas of the mesial surface of the cerebral hemispheres and their role in the execution of sequences and memorized movements.
- Prefrontal cortex.
- Action perception.

(4) TEACHING and LEARNING METHODS - EVALUATION

<p>DELIVERY <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, communication with students</i></p>	<p>Integration of ICT in teaching Utilizing the elearn platform for uploading teaching materials Communication via "e-learn" and e-mail Use of publisher databases/electronic repositories of scientific articles</p>	
<p>TEACHING METHODS <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>	Activity	Semester workload
	Lectures	6
	Study and analysis of bibliography	39
	non-directed study	180
Course total	225	
<p>STUDENT PERFORMANCE EVALUATION <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>Evaluation Language: English Assessment Methods: The quality of the presentations and participation in the discussion of the presented articles are evaluated.</p> <p>Evaluation criteria are outlined in the study guide and communicated to students at the beginning of the course.</p>	

(5) ATTACHED BIBLIOGRAPHY

<p>- Suggested bibliography: Scientific articles published in reputable scientific journals within the broader field of neuroscience.</p>
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