

## Syllabus

### Subject

|                                |  |
|--------------------------------|--|
| <b>Subject / Group</b>         | 11241 - Cognitive Psychophysiology / 1 |
| <b>Degree</b>                  | Master's in Neuroscience               |
| <b>Credits</b>                 | 5                                      |
| <b>Period</b>                  | 1st semester                           |
| <b>Language of instruction</b> | English                                |

### Professors

| Lecturers  | Office hours for students   |                |         |            |            |                   |
|--|---|----------------|---------|------------|------------|-------------------|
|  | Starting time   | Finishing time | Day     | Start date | End date   | Office / Building |
| Pedro José Montoya Jiménez<br><i>(Responsible)</i><br><a href="mailto:pedro.montoya@uib.es">pedro.montoya@uib.es</a> | 12:00   | 13:00          | Tuesday | 18/09/2017 | 31/07/2018 | 015 - IUNICS      |
| Niels Peter Birbaumer -  | You need to book a date with the professor in order to attend a tutoring session. |                |         |            |            |                   |

### Context

Cognitive Neuroscience is a subject devoted to the study of brain, behaviour and cognition in humans taking into account the most recent advances in neuroimaging techniques. A central feature of the course is the exploration of brain mechanisms involved in psychological processes such as emotion, learning, memory, and executive functions. The starting point of the course is the discussion about the impact of new neuroimaging techniques for the study of the brain and behaviour. You will then move on to examine the neural basis of each psychological process and the most relevant scientific findings by reading and discussing recently published papers in the field. You will also have the opportunity to develop your skills for further postgraduate study or as grounding if you intend to undertake research in Cognitive Neuroscience.

### Requirements

#### Recommended

You should expect to be reading original research articles as well as textbooks in English. It is also highly recommended to have basic knowledge on Statistics.

### Skills

#### Specific

- \* To be able to demonstrate an understanding of cognitive processes from neuroscientific perspective .



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- \* To critically assess primary literature about the study of cognition using neuroimaging techniques .
- \* To prepare an extended and original paper that summarizes a particular aspect of the involvement of brain in cognitive processes .

### Generic

- \* To develop skills of critical analysis and evaluation to assess how experimental paradigms are adequate to explore scientific problems .
- \* To develop advanced skills you will need if you intend to undertake research .

### Basic

- \* You may consult the basic competencies students will have to achieve by the end of the Master's degree at the following address: [http://estudis.uib.cat/master/comp\\_basiques/](http://estudis.uib.cat/master/comp_basiques/)

## Content

### Range of topics

- Unit 1.. Methods and research techniques in Cognitive Neuroscience  
Principles of brain functioning. Techniques for the study of CNS: EEG and functional magnetic resonance imaging. Techniques for the study of behavior and cognition.
- Unit 2.. Emotion and the brain  
Definition and type of emotions. Methods for induction of emotion. Functional neuroanatomy of emotion: amygdala, anterior cingulate cortex, prefrontal cortex. Emotional influences on cognitive functions. Social cognition.
- Unit 3.. Neuropsychology of memory  
Principles of memory and learning. Declarative and non-declarative memory. Working memory.
- Unit 4.. Brain correlates of executive functions  
Attention and stimulus processing. Attentional control systems. Executive control systems. Decision making: Neuroeconomics.

## Teaching methodology

### In-class work activities (1.2 credits, 30 hours)

| Modality               | Name             | Typ. Grp.        | Description  | Hours |
|------------------------|------------------|------------------|--|-------|
| Theory classes         | Lectures         | Large group (G)  | The teacher will present and discuss the major research lines in the topic.          | 9     |
| Seminars and workshops | Paper discussion | Medium group (M) | Students will be encouraged to read and to discuss several papers during the course. | 8     |
| Practical classes      | Lab activities   | Medium group (M) | Practical demonstration of how EEG data can be collected and analyzed in the lab.    | 8     |

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| Modality       | Name                                    | Typ. Grp.        | Description   | Hours |
|----------------|---|------------------|---|-------|
| ECTS tutorials | ECTS tutorials                          | Medium group (M) | To explain the major points of the syllabus and to discuss difficulties regarding the learning process. One session will be scheduled at the beginning of the course. | 1     |
| Assessment     | Presentation of one topic of the course | Large group (G)  | Presentation and discussion of one topic of the course based on the reading of one paper.   | 4     |

At the beginning of the semester a schedule of the subject will be made available to students through the UIBdigital platform. The schedule shall at least include the dates when the continuing assessment tests will be conducted and the hand-in dates for the assignments. In addition, the lecturer shall inform students as to whether the subject work plan will be carried out through the schedule or through another way included in the Aula Digital platform.

### Distance education tasks (3.8 credits, 95 hours)

| Modality              | Name  | Description   | Hours |
|-----------------------|---|---|-------|
| Individual self-study | Preparing and writing assignments about research papers | Time for preparation of written assignments about the research papers which will be discussed in the seminar. | 30    |
| Individual self-study | Study of the course units                               | Time for preparation of course units.   | 65    |

### Specific risks and protective measures

The learning activities of this course do not entail specific health or safety risks for the students and therefore no special protective measures are needed.

### Student learning assessment

The continuous assessment approach entails the systematic study of the subject over the whole semester. Therefore, class attendance and active participation are considered of special importance. If you will not be able to have at least 80% attendance for the course, please contact the teacher during the first week.

Final grades will be based on the combination of all the above components.

For all the writing assignments in the course, you will be required to use APA format.

Please note that all work you submit for evaluation must be your own work. Honesty in our academic work is vital, and we will not knowingly act in ways which erode that integrity. Accordingly, we pledge not to cheat, nor to tolerate cheating, nor to plagiarize the work of others.

### Frau en elements d'avaluació

In accordance with article 33 of Academic regulations, "regardless of the disciplinary procedure that may be followed against the offending student, the demonstrably fraudulent performance of any of the evaluation elements included in the teaching guides of the subjects will lead, at the discretion of the teacher, a

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undervaluation in the qualification that may involve the qualification of "suspense 0" in the annual evaluation of the subject".

### Paper discussion

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|                     |   |
|---------------------|---|
| Modality            | Seminars and workshops  |
| Technique           | Attitude scales ( <b>non-retrievable</b> )  |
| Description         | Students will be encouraged to read and to discuss several papers during the course.  |
| Assessment criteria | To present the major research lines in Cognitive Neuroscience. Students will be encouraged to read and to discuss several papers during the course. Active participation during class discussion will be positively assessed. |

Final grade percentage: 10%

### Lab activities

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|                     |  |
|---------------------|--|
| Modality            | Practical classes  |
| Technique           | Student internship dissertation ( <b>non-retrievable</b> )   |
| Description         | Practical demonstration of how EEG data can be collected and analyzed in the lab.  |
| Assessment criteria | Students will be encouraged to write a lab report (1-2 pages) about what they learn during the lab activities. The lab report should consist of the following sections: <ul style="list-style-type: none"><li>- Title: The student should select one title for the lab report (it must be different from any other title already used in posters and publications of the lab).</li><li>- Introduction: It should contain a brief description of what is the relevant research problem and what hypotheses are being tested.</li><li>- Materials and methods: It should contain a brief description of what kind of subjects are usually examined in the lab, and what kind of procedures and techniques are mainly used in the lab.</li><li>- Results: It should contain a brief summary of relevant findings from the lab (please take this information from posters or publications of the lab).</li><li>- Discussion: It should contain a brief description about the meaning of results.</li><li>- Conclusion: Explain what did you learn from the lab activities.</li></ul> The lab report will be due one week after the course. |

Final grade percentage: 30%

### Presentation of one topic of the course

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|                     |   |
|---------------------|---|
| Modality            | Assessment  |
| Technique           | Oral tests ( <b>retrievable</b> )   |
| Description         | Presentation and discussion of one topic of the course based on the reading of one paper.                         |
| Assessment criteria | Students will present one paper during 20 minutes followed by questions by the teacher and the rest of the class. |

Final grade percentage: 30%

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### Preparing and writing assignments about research papers

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|                     |   |
|---------------------|---|
| Modality            | Individual self-study   |
| Technique           | Papers and projects ( <b>retrievable</b> )  |
| Description         | Time for preparation of written assignments about the research papers which will be discussed in the seminar.   |
| Assessment criteria | <p>The student should write a 1-2 pages summary of each paper discussed in the seminar.</p> <p>The assignment will be due two weeks after the course. The assignment should present the summary in a clear and concise form, demonstrating knowledge, comprehension, and synthesis of the topic. Grading will be based on following criteria:</p> <ul style="list-style-type: none"><li>- Concise statement of the rationale, purpose, and structure (max. 3 points).</li><li>- Theoretical framework and core constructs clearly identified (max. 3 points).</li><li>- Clear and logical conclusions drawn from the paper with well-founded recommendations for further research and some creative thoughts (max. 4 points).</li></ul> |

Final grade percentage: 30%

### Resources, bibliography and additional documentation

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#### Basic bibliography

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Purves, D., Brannon, E.M., Cabeza, R., Huettel, S.A., LaBar, K.S., Platt, M.L., & Woldorff, M.G. (2008). Principles of Cognitive Neuroscience. Sinauer Associates, Inc.

#### Complementary bibliography

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Gazzaniga, M.S., Ivry, R.B., & Mangun, G.R. (2008). Cognitive Neuroscience: The Biology of the Mind (Third Edition). W.W. Norton & Co.

#### Other resources

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Recent research papers on Cognitive Neuroscience will be available at the beginning of the course through Campus Extens.