UAB
Universitat Autònoma
de Barcelona

Study Abroad
Programmes
Universitat Autònoma
de Barcelona

PRE-ESTABLISHED PROGRAMME
BEHAVIORAL NEUROSCIENCE

Course contact hours: 45
Recommended credits: 6 ECTS – 3 US
Language: English

Prerequisites

There are no prerequisites. Nevertheless, it is highly recommended that students have some prior knowledge of basic concepts related to the biology of the nervous system.

Objectives and Contextualisation

The general objective of this course is to understand and explore the knowledge of the neurobiological bases of the main human behaviours, specifically, the stages of sleep and awake, the motivated behaviours, the addiction process, the nature of emotions and learning and memory processes.

Behavioural neuroscience has a multidisciplinary character since it requires the knowledge of many sciences, mainly psychology, biology and chemistry. Neuroscience covers a variety of topics related to health, society, and education. One of its branches focuses on the study of the biological substrates of behaviour and the underlying mental processes. To understand behaviour, and the mind, it is necessary to know how the components of the nervous system are organized and how their interactions result in normal function. This course will provide students with the necessary knowledge to understand how the brain works in health and disease.

At the end of the course, students will be able to do the following:

1. To explain the neurobiological basis of sleep and wakefulness rhythms, the functions of sleep and some sleep disorders.
2. To explain the neurobiological basis and functions of the reward system. To describe the neurobiological changes associated with addictive behaviour.
3. To describe the neural and hormonal control of sexual and parental behaviours.
4. To explain the neurobiological basis of emotions and their implications in health.
5. To explain the neurobiological basis of learning and memory processes.
6. To describe and interpret graphs and results of neuroscientific articles.
7. To present and discuss applied topics of the course content.

Competences
- Analyse scientific papers in the field of neuroscience.
- Identify, describe and relate the biology of human behaviour and psychological functions from an inclusive perspective.
- Identify, describe and relate the structures and processes involved in basic psychological functions.

- Maintain a favourable attitude towards the permanent updating through critical evaluation of scientific documentation, taking into account its origin, situating it in an epistemological framework and identifying and contrasting its contributions in relation to the available disciplinary knowledge.
- Recognise the determinants and risk factors for health and also the interaction between people and their physical and social environment.
- Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
- Students must be capable of collecting and interpreting relevant data (usually within their area of study) to make statements that reflect social, scientific, or ethical relevant issues.
- Use different ICTs for different purposes.
- Work in a team.

Learning Outcomes

1. Understand and describe the main brain structures and neurochemical systems.
2. Analyse the influence of the determinant physical and social factors on neurobiology of mental processes for the purpose of understanding the bases of health psychology.
3. Understand the changes in the sleep-wake rhythms in relation to changes in the underlying neurophysiological and neurohormonal mechanisms.
4. Describe the neuronal circuits, the neurophysiological, neurochemical and hormonal mechanisms in motivated behaviours.
5. Understand the neuronal circuits, the neurophysiological, neurochemical and hormonal mechanisms involved in emotions.
6. Analyse the neuronal circuits, the neurophysiological, neurochemical and hormonal mechanisms involved in learning from memory.
7. Evaluate the contributions of a psychobiological approach to advancing understanding of the rhythms of sleep and wakefulness, motivated behaviours, emotions and learning and memory processes.
8. Identify and recognise the mutual interaction between the physical and social environment of the person and the genetic, hormonal and neural factors that affect health.
9. Maintain a favourable attitude towards permanent updating through critical evaluation of scientific documentation, taking into account its origin, situating it in an epistemological framework and identifying and contrasting its contributions in relation to the available disciplinary knowledge.
10. Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
11. Students must be capable of collecting and interpreting relevant data (usually within their area of study) to make statements that reflect social, scientific or ethical relevant issues.

Content

1. Unit 1. Introduction to Behavioural Neuroscience:
   a. Breaking down myths about the brain.
   b. Neuroanatomy.
   c. Brain development.
2. Unit 2. Sleep and biological rhythms:
   a. What is sleep?
   b. Why do we sleep?
   c. Physiological mechanisms.
3. Unit 3. Reward and addiction:
   a. Brain and reinforcement.
   b. Substance abuse.
4. Unit 4. Sexual Behaviour:
   a. Sexual development.
   b. Hormonal and neural control of sexual behaviour.
5. Unit 5. Emotion:
   a. Fear, aggression.
   b. Feelings and emotions.
   c. Stress.
6. Unit 6. Learning and memory:
   a. Types of learning and memory.
   b. Brain plasticity.

Methodology

DIRECTED ACTIVITY (30%)

a) Master Classes (20 sessions; 1,40 h) based on:
- Master or flipped-classroom classes with ICT support and proposal of questions to discuss and debate through the active participation of students.
- Practical exercises and problem-solving tasks, both individually and in groups.
- Viewing and discussing short videos.

b) Workshops (5 sessions; 1,40h). Seminars/workshops to work, usually in groups, based on:
- Development of cooperative group work.
- Presentation and discussion of group work.
- Reading of texts and articles to achieve a better understanding of the teaching content.
- Practical exercises or self-assessment.
- Problem-solving tasks, reflections and debates on different issues of the teaching material.

b) Assessment activity (2 sessions; 1,40h).

Individual written tests (multiple-choice questions, open questions, and practical exercises) (EV1 and EV2).

Presentation, written scientific report and debate / defense of team work (EV3).

Participation and individual exercises (EV4).

SUPERVISED ACTIVITY (10%)

Tutorials. Follow-up, either face-to-face or virtual, with the teacher individually and/or in groups. Among others, aspects such as:

- Correction and supervision of the answers to key questions of the syllabus.
- Reflections on readings.
- Resolution of doubts.
- Guidance for team work.
- Individualized strategies for the study of the subject.

AUTONOMOUS ACTIVITY (60%)

 Search for information.

- Comprehensive reading of basic materials of the subject (recommended books, scientific journal articles, etc.).
- Consultation of complementary material (outreach articles, videos, websites, etc.).
- Study and memorization of basic concepts of the subject (creation of scripts, concept maps, synthesis, etc.).
- Preparation of group work on applied aspects related to the subject.
- Carrying out exercises and activities of continuous evaluation and self-evaluation.
- Regular participation in communication forums and other spaces on the virtual campus, coordinated by the lecturing staff.

Activities

Directed (45 hours):

Class sessions (practice)	33,3 hours
Class sessions (theory)	8,3 hours
Assessment	3,4 hours

Supervised (15 hours):

Project development	15 hours

Autonomous (90 hours):

Comprehensive study of materials	35 hours
Exercises and activities	30 hours
Team project	25 hours

Assessment

The continuous assessment of the course allows the students to know their academic progress and will be carried out through different tests in which the students must demonstrate that they have achieved the competencies, have achieved the objectives and passed the corresponding learning outcomes.

Assessment Activities

Title	weighting	hours	learning outcomes
Learning Evidence 1 (Test 1)	25%	1,7	1, 2, 3, 4, 7, 8
Learning Evidence 2 (Test 2)	30%	1,7	5, 6, 7, 8, 9
Learning Evidence 3 (Project)	25%	15	1, 2, 8, 9, 10, 11
Participation	20%	-	2, 8, 9, 10, 11

Bibliography

Bear, Mark F.; Connors Barry W.; Paradiso Michael A. (2020). *Neuroscience: Exploring the Brain* (Enhanced Edition). Jones & Barlett Learning.

Breedlove, S. M., Watson, N. V., & Rosenzweig, M. R. (2010). *Biological Psychology: An Introduction to Behavioral, Cognitive, and Clinical Neuroscience*. Sinauer Associates.

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Carlson Neil R.; Birkett, Melissa A. (2017). *Physiology of Behavior* (12th edition). Pearson (online): https://ebookcentral.proquest.com/lib/uab/reader.action?docID=5186462)

Garret, Bob; Hough, Gerald. (2022). *Brain and Behavior* (6th Edition). Sage Publications Inc.

Software