

COURSE GUIDE

2024/25

Faculty231 - Faculty of Psychology

Cycle.

DegreeGLOGOP20 - Bachelor's Degree in Speech Therapy

YearFirst year

COURSE

25081 - Foundations of Behavioural Neuroscience

Credits, ECTS:6

COURSE DESCRIPTION

The Fundamentals of Behavioural Neuroscience subject has the fundamental objective of understanding the neurophysiological bases that underlie behaviour. It is thus a basic subject to be able to approach the study of the rest of the subjects that make up the training block or module "Biological Bases of Behaviour" which include: Evolution and Behaviour, Physiological Psychology and Fundamentals of Neuropsychology and Psychopharmacology. Through these subjects, which are distributed sequentially in the first three years, the aim is for students to understand the relationship between behaviour and the nervous system through the contributions of neuroscience to the understanding of human behaviour, and to know how to integrate this perspective in the explanation of behaviour and mental processes.

COMPETENCIES/LEARNING RESULTS FOR THE SUBJECT

- 1.- To know and identify the structural and functional organisation of the cells of the nervous system.
To understand and describe the neurophysiological and neurochemical mechanisms involved in communication between nerve cells, in order to be able to approach the study of the physiological basis of behaviour.
- 3.- Understand the organisation of the SN, as an initiation to the study of the neuroanatomical bases of behaviour.
- 4.- To be able to relate the function of hormones with the activity of the SN and to integrate the activity of both systems with behaviour.
- 5.- Differentiate the processes of integration and response of the SN, relating the physiological and neuroanatomical bases of sensory information with motor response, sensory perception and psychomotor activity.
- 6.- Be able to search for, analyse and synthesise specific information, solve exercises using audiovisual material and specific software and write reports.

Theoretical and Practical Contents

THEORETICAL PROGRAMME

- 1.- Cells of the Nervous System. Structure and function (Competence 1) [4h].
Introduction. Structural organization of the neuron and glial cells.
- 2.- Physiology of the neuron. Chemical communication (Competence 2) [7h].
Characteristics of the generation and propagation of the action potential or nerve impulse. Concept and physiology of synapses. Neurotransmitters.
- 3.- Anatomy of the nervous system (Competence 3) [12h]
General organisation and development of the nervous system. Anatomy of the CNS (spinal cord and brain) and PNS (somatic and autonomic).
- 4.- Neuroendocrine system (Competence 4) [5h]
Endocrine glands and hormones. Relations between the Nervous System and the Endocrine System (hypothalamic-pituitary-glandular axes).
- 5.- Sensory and Motor Systems (Competence 5) [12h].
Receptors, pathways and coding of sensory information. The neuromuscular junction. Movement control.

PRACTICAL PROGRAMME

- 1ST PL. The cell. Cell types. Nervous tissue (Competences 1 and 6) (2h)The aim of this practical is for the student to understand and recognise:
-The structure of the cell and its components.
-The mechanisms of cell reproduction (mitosis and meiosis).
-The different cell types, especially those that form part of the nervous system and muscle tissue.
-The structure of nervous tissue.
- 2ND PO. The neuron: structure and physiology I. (Competences 2 and 6) [1h].
The main objectives of this computer practical are: i) to know the role played by each of the parts of the neuron in synaptic transmission; ii) to differentiate the different roles played by the cells of the labyrinth in the central nervous system; iii) to understand the physiology of the neuron, studying the action potential and the mechanisms of synaptic transmission and integration; and, iv) to distinguish synaptic transmission based on the intervention of ionotropic and metabotropic receptors. A computer programme will be used to carry out this practice.
- 3RD PO. The neuron: structure and physiology II (Competences 2 and 6) [2h]Continuation of the 1st PO. With the same

software used in the 1st PO.

4TH AT. Neurotransmitters and psychopathologies I. Preparation. Preparation (Competences 2 and 6) [2h]
The aim of this practice is to learn about the most important neurotransmitters in brain communication, their general functions and the disorders associated with an imbalance in their activity. In this first session, group work will be carried out, which will mainly consist of collecting information and systematising the information, as requested in the pre-established script.

5TH PA. Neurotransmitters and psychopathologies II. Exhibition (Competences 2 and 6) [2h].
In this second session of the neurotransmitters workshop, the different working groups will make a public presentation using PowerPoint of the material prepared by each of them. This will be followed by a discussion and correction of the material presented.

6TH PO. Anatomy of the Nervous System II. Mute Maps. (Competences 3 and 6) [2h].

7TH PL. Anatomy of the Nervous System I. Mock-ups (Competences 3 and 6) [2h]
The aim of this practical is to recognise from a three-dimensional perspective the different structures of the Central Nervous System through the manipulation of models of the brain and spinal cord.

8TH AT. Hormones and behaviour I. Preparation. Preparation (Competences 4 and 6) [2h]
The aim of this practice is to know the main neuroendocrine hormones and their relationship with behaviour. For each of them, the chemical nature, the place of synthesis and activity, their fundamental functions and their involvement in behaviour will be studied. In this first session, group work will be carried out, which will mainly consist of collecting information and systematising the information, as requested in the pre-established script.

9TH PA. Hormones and behaviour II. Exhibition (Competences 4 and 6) [2h]
In this second session of the Hormones Workshop (2nd AT), the different working groups will make a public presentation using PowerPoint of the material prepared by each of them.

10TH PO. Sensory Systems (Competences 5 and 6) [1h]
Using software, students will study how information is processed through the sensory systems, clearly identifying the receptors, pathways and processing areas for each of the senses.

11th PA. Video viewing and discussion. Synaesthesia (Competences 5 and 6) [2h]
Viewing of video and annotation of the most relevant aspects. After the viewing of the video, students will discuss and answer in groups a questionnaire that collects topics related to sensory and effector systems.

TEACHING METHODS

In order to achieve the objectives presented above, 60 hours of classroom teaching are offered. This face-to-face teaching is distributed in 40 hours of Master teaching (M), distributed in 4 didactic units, 6 hours of Classroom Practices (PA), 6 hours of Computer Practices (PO), 4 hours of Non-Industrial Workshops (TA), and 4 hours of Laboratory Practices (PL). It is also estimated that the student will need an additional 90 hours of non-classroom work, including exam preparation, tutorials, etc. (30 hours).

TYPES OF TEACHING

Types of teaching	M	S	GA	GL	GO	GCL	TA	TI	GCA
Hours of face-to-face teaching	40			4	6		10		
Horas de Actividad No Presencial del Alumno/a	60			6	9		15		

Legend: M: Lecture-based S: Seminar GA: Applied classroom-based groups
GL: Applied laboratory-based groups GO: Applied computer-based groups GCL: Applied clinical-based groups
TA: Workshop TI: Industrial workshop GCA: Applied fieldwork groups

Evaluation methods

- End-of-course evaluation

Evaluation tools and percentages of final mark

- Written test, open questions 10%
- Multiple choice test 60%
- Exercises, cases or problem sets 25%
- Oral presentation of assigned tasks, Reading 5%

ORDINARY EXAMINATION PERIOD: GUIDELINES AND OPTING OUT

The evaluation of this subject will be carried out by means of a Final Examination. All students will have the right to take the final exam (Theoretical-Practical) of the course, and to obtain 100% of the grade in it. The final exam will be



composed of multiple choice and open questions (7/10), as well as questions related to the practices of the course (2.5/10). In the practical section, the preparation and presentation of group work will also be assessed with a maximum of 0.5 points. If this work is not carried out during the course, the corresponding subject will be assessed in the exam.

PLAN FOR VIRTUAL ASSESSMENT OF THE COURSEIn exceptional circumstances such as those experienced recently with the state of alarm due to the Covid-19 pandemic, the criteria of the teaching guide presented above and those of the official guide published on the website may be modified or replaced, possibly establishing an ad hoc assessment plan by the teaching team of the subject, following the following general criteria: "The non-classroom assessment plan proposed in exceptional circumstances for the subject Fundamentals of Behavioural Neuroscience will try to be a reflection of the classroom assessment presented above, through different activities available on the virtual teaching platform eGela".

Explanatory notes:

- In this subject, failure to take the exam will be sufficient to waive the exam.

EXTRAORDINARY EXAMINATION PERIOD: GUIDELINES AND OPTING OUT

The evaluation in the extraordinary call will follow the same criteria and structure as in the ordinary call.

MANDATORY MATERIALS

BIBLIOGRAPHY

Basic bibliography

- Bear, M. F., Connors, B. W., Paradiso, M. A., & Lianas Massot, B. (2008). Neurociencia: explorando el cerebro (3 ed.). Barcelona: Wolters Kluwer.
- Corr, P. J. (2008). Psicología biológica. Mexico: McGraw hill.
- Crossman, A., & Neary, D. (2007). Neuroanatomía (3 ed.). Barcelona: Elsevier-Masson.
- Curtis, H., Barnes, N. S., Schneek, A., & Flores, G. (2007). Invitación a la biología (6 ed.). Madrid: Médica Panamericana.
- Del Abril Alonso, A., Ambrosio, E., De Blas, M. R., Caminero, A. A., Lecumberri, C., De Pablo, J. M., & Sandoval, E. (2005). Fundamentos biológicos de la conducta (2 ed.). Madrid: Sanz y Torres.
- Guyton, A. C., & Hall, J. E. (2011). Tratado de fisiología médica (12* ed.). Barcelona: Elsevier.
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- Pinel, J. P. J. (2007). Biopsicología (M. J. Ramos Platón, Trans. 6 ed.). Madrid: Pearson Educación.
- Purves, D. (2016). Neurociencia (5 ed.). Madrid: Médica Panamericana.
- Rubin, M., Safdieh, J. E., & Netter, F. H. (2008). Netter, Neuroanatomía esencial. Amsterdam: Elsevier.
- Silverthorn, D. U. (2008). Fisiología humana (4 ed.). Madrid: McGraw-Hill Interamericana.

Detailed bibliography

- Afifi, A. K., Bergman, R. A., Orizaga Samperio, J., & Sandoval Romero, A. (2006). Neuroanatomía funcional: texto y atlas (2 ed.). Mexico: McGraw-Hill Interamericana.
- Alberts, B., Wilson, J., Hunt, T., Roberts, K., Lewis, J., Raff, M., Walter, P. (2008). Molecular biology of the cell (5 ed.). New York: Garland.
- Audesirk, T., Audesirk, G., & Byers, B. E. (2008). Biología: la vida en el Tierra (8 ed.). México: Pearson Educación.
- Becker, J. B. (2002). Behavioral endocrinology (2 ed.). Cambridge: MIT Press.
- Cardinali, D. P. (2007). Neurociencia aplicada: sus fundamentos. Buenos Aires: Editorial Médica Panamericana.
- Carlson, N. R., Ramos Platón, M. J., Muñoz Tedo, M. d. C., & Rodríguez de Fonseca, F. (2007). Fisiología de la conducta (8 ed.). Madrid: Pearson-Addison Wesley.
- Clark, D. L., Boutros, N. N., & Mendez, M. F. (2010). El Cerebro y la conducta: neuroanatomía para psicólogos (2 ed.). México, D.F.: Manual Moderno.
- Delgado, J. M., Teruel, F. M., Vila, F. J. R., & Gamero, A. F. (1998). Manual de neurociencia: Editorial Síntesis.
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- Mora, F. (2009). Cómo funciona el cerebro. Madrid: Alianza.
- Morgado Bernal, I. (2012). Cómo percibimos el mundo: una exploración de la mente y los sentidos. Barcelona: Ariel.
- Nieuwenhuys, R., Voogd, J., & Huijzen, C. V. (2009). El sistema nervioso humano (4 ed.). Madrid: Panamericana.
- Rodríguez, F. (2006). Fundamentos de neurociencia : manual de laboratorio. Madrid, etc.: McGraw-Hill.
- Snyder, S. H. (1992). Drogas y cerebro. Barcelona: Prensa científica.
- Sobotta, J., Putz, R., & Pabst, R. (2004). Atlas de Anatomía Humana (21 ed.). Madrid: Editorial Médica Panamericana.
- Young, P. A., & Young, P. H. (2004). Neuroanatomía clínica funcional. Barcelona: Masson.

Journals

Mente y Cerebro. Investigación y Ciencia. Prensa Científica, S.A. Barcelona (España)

Web sites of interest

<http://www.loni.ucla.edu/SVG/Animations/Anatomy.html>

Algunos videos del Sistema Nervioso.

<http://www.psicoactiva.com/atlas/cerebro.htm>
Atlas anatómico del cerebro con imágenes en 3D y explicaciones de sus principales componentes.

<http://biologia.fciencias.unam.mx/bioanim3/09neumes/>
Página sobre el desarrollo ontogenético del Sistema Nervioso.

<http://www.iqb.es/>
Un completo atlas de Anatomía y una enciclopedia médica bastante completa.

<http://hon.nucleusinc.com/categories.php?CatID=064&A=&I=2>
Interesantes imágenes anatómicas.

<http://escuela.med.puc.cl/paginas/cursos/primero/NEUROANATOMIA/Cursoenlinea/inca.html>
Curso de Neuroanatomía.

<http://www9.biostr.washington.edu/da.html>
Atlas interactivo digital.

http://www.uc.cl/sw_educ/biologia/bio100/html/portadaMIval5.0.html
Texto e imágenes sobre el Sistema Nervioso y la comunicación celular.

<http://www.med.harvard.edu/AANLIB/home.html>
Magnífico atlas de la Universidad de Harvard.

<http://200.121.71.62/diccionario/index.php?dic=pedagogico>
Buscador de términos médicos.

<http://www.netterimages.com/image/search.htm>
Buscador de imágenes de Netter.

<http://www.radnet.ucla.edu/sections/DINR/index.htm>
Increíble Web de vascularización.

<http://www.bartleby.com/107/>
Anatomía de Gray “on line”.

http://www.institutodelcomportamiento.com/neuroanatomia_psicologos/
Pequeño atlas y texto de Neuroanatomía.

<http://www.bartleby.com/65/>
La enciclopedia Columbia.

http://www.puc.cl/sw_educ/neurociencias/html/frameMapa.html
Web sobre estructura, desarrollo y funciones del Sistema Nervioso.

<http://www.pbs.org/wnet/closetohome/science/html/animations.html>
Animaciones de la acción neuroquímica cerebral de distintas drogas

<http://synapses.clm.utexas.edu/>
Página de anatomía e histología de la neurona y de la sinapsis

<http://es.brainexplorer.org/>
Página muy pedagógica para el estudio de la anatomía

OBSERVATIONS