



Course syllabus

Nämnden för grundnivå och avancerad nivå inom fakultetsnämnden för hälsa, socialt arbete och beteendevetenskap

Department of Psychology

1PS414 Biopsykologi och Neurokognition, 29 högskolepoäng

Biopsychology and Neurocognition, 29 credits

Main field of study

Psychology

Subject Group

Psychology

Level of classification

First Level

Progression

G1N

Date of Ratification

Approved by Faculty of Health and Life Sciences 2014-09-01

The course syllabus is valid from spring semester 2012

Prerequisites

A grade of pass in at least 10 credits from the first semester of the five-year psychology programme at Linnaeus University

Objectives

On completion of the course, students should be able to:

- account for the most important historical viewpoints and discoveries that led to modern comprehensions, especially about how biological and psychological processes are connected
- explain the basic mechanisms of biological evolution including how the importance of diversity, selection and individuality cooperate in phylogenetic development
- critically discuss and, through examples, illustrate the extent to which results from behavioural studies in animals is possible to generalize to human behaviour, including ethical considerations in such research
- explain how human behaviour and capacity develop as well as how they adapt to different environments on the basis of an epigenetic perspective
- briefly account for the development of the brain from embryonic level through the entire life-cycle as well as the consequences of the neural development level for cognitive and other psychological functions
- describe the structure and function of the nerve cell with emphasis on transmission within and between cells as well as their connection to psychological functions such as perception, learning and memory
- describe the general structure of the nervous system and which main function the various parts have for different psychological processes
- account for the meaning of the concept neural plasticity and, through examples,

- illustrate its importance for learning and adaptability
- explain how neurochemical occurrences are connected to feelings, addiction and other behavioural problems and through which mechanisms psychopharmacological drugs modify these occurrences
 - describe different brain imaging methods and in what ways they are used within neuropsychological research and diagnostics
 - in their own words, account for fundamental learning mechanisms such as classical conditioning instrumental learning as well as their neurobiological basis, and, through examples, be able to illustrate how functional and dysfunctional behaviour can be based in such mechanisms
 - differentiate between different types of memory and memory disorders as well as account for their neurobiological basis
 - in their own words, explain and exemplify how emotional and cognitive processes mutually influence each other with regards to existing psychological and biological models
 - critically compare different definitions of intelligence in a developmental perspective
 - explain how cognitive functions can be influenced by mental and physical trauma
 - account for different perspectives on the connection between psychopathology and cognition
 - account for the ways in which humans in psychological practice assess different cognitive abilities; how divergences from what is considered normal cognitive function is defined as well as for how the most common psychometric and neuropsychological test methods are used in psychological practice

On completion of the course, students are also expected to be able to demonstrate fundamental skills concerning analysis and interpretation of neuropsychological tests.

Content

Course content may be divided up in the following elements/sequences that are discussed in an integrated way:

- introduction of psychobiology and its scientific history
- theory of evolution with phylogenetic
- epigenetic with heritage-environment-interaction
- plasticity, adaptation and learning
- structure and function of the central nervous system, macro and micro perspectives
- information processing, intelligence, memory and decision making
- how cognition is influenced by feelings and ability
- irregular behaviour
- introduction to measurement of cognitive ability and neuropsychological investigatory methods

This means that the course begins with a scientific-historical psycho-biological background with emphasis on earlier and modern outlooks on the relationship between biological processes and psychological phenomena such as awareness, thought and experience. The phylogenetic perspective is also introduced in human behaviour as well as the development of the theory of evolution and modern modern scientific status.

Discussed after this, in relation to the earlier course in developmental psychology, is the development of the nervous system during the life-cycle, beginning with the foetal stage. For a deeper understanding of how genes and environment interact in order to create a certain individual with their own abilities, different epigenetic mechanisms will be illustrated and discussed. The meaning of the concepts neural plasticity and adaptation will be of central importance in this part of the course.

Macro and micro perspectives on the structure and function of the nervous system, from the components of the individual nerve cells to the brain's general organisation, are taken up in such a way that biological and psychological processes are regularly discussed in a parallel and integrated way. A main focus in the course is to observe and understand man as an information-treating and acting creature. This means that the course, to a large extent, deals with biological and psychological prerequisites for intelligence, attention, perception, memory, learning, understanding, decision-making and action, as well as motivation's, feelings' and general cognitive ability's importance for the result of these processes. The ways in which cognitive functions are influenced by stress, trauma and crises are one of many examples of how the connection between cognitive and emotional processes are highlighted in the course.

Problems that can occur for individuals and their surroundings when cognitive processes do not work in an optimal way are illustrated on the basis of different case reports. Elements surrounding irregular behaviour is connected to the ways in which psychologists work with assessing functional levels in practical situations and in cooperation with other professionals. In this course, such methods are especially taken up as in psychological practice where they are used for helping individuals with functional problems where neuropsychological and cognitive elements are especially obvious. Here, students will also familiarise themselves with different measuring devices as a means of preparing them for their placement semester. In connection with this, computer assignments, study visits and conversations with mentors will be important. Those elements that concern testing and investigation will, for the most part, be dealt with during the final 4 credits of the course, which are given during the sixth semester. The concerned literature of circa 500 pages for this element will be further specified beforehand.

Type of Instruction

Classroom teaching is integrated with different learning activities via a web-based learning platform. In addition to lectures, group work, seminars, computer assignments,

case studies, study visits and exercises will also be included. The learning platform is partly used to distribute different types of material, including external lectures, partly for different learning activities, primarily comparative discussions and assignments.

Examination

The course is assessed with the grades Fail (U) or Pass (G).

Examinations are carried out in the form of active seminar participation, participation in discussions and other activities via the learning platform, presentation of personal work as well as participation in group work, exercises, computer assignments and through written tests. Closer specification of examination forms will be communicated in the study guide, which is distributed via the learning platform.

Course Evaluation

Course evaluation on a continuous basis verbally and/or in writing throughout the course. When the course has finished, an evaluation is compiled. The results are reported to the students and then archived according to the rules of the school.

Other

Possible additional costs in connection with assignments and such must be paid for by the students themselves.

Required Reading and Additional Study Material

Berg, Lasse (2011). *Skymningsång i Kalahari. Hur människan bytte tillvaro*. Sverige: Ordfront förlag. 312 pages.

Gazzaniga, Michael S., Ivry, Richard B. & Mangun, George R. (2009): *Cognitive Neuroscience: The Biology of the Mind. International Student Edition*. London: Norton, 666 pages.

Groome, David (2010). *Kognitiv psykologi : processer och störning*. Studentlitteratur. 528 pages.

Passer, Michael, Smith, Ronald, Holt, Nigel, Bremner, Andy and Vliek, Michael (2009): *Psychology The Science of Mind and behavior*. London: McGrawHill. Chap 3-10, 390 pages. ISBN 13978-0-07-711836-5

Along with this are articles and other texts of circa 700 pages, whereof circa 500 concern the applied elements in testing and investigation that are taken up in semester 6, as well as filmed material according to the teachers instruction.

Reference literature

Hansen, Stefan (2009). *Från neuron till neuros: En introduktion till modern biologisk psykologi*. Stockholm: Natur och Kultur.

Horstman, Judith (2010). *The Scientific American Brave New Brain: How Neuroscience, Brain-machine Interfaces, Neuroimaging, Psychopharmacology, Epigenetics, the Internet, and Our Own Minds are Stimulating and Enhancing the Future of Mental Power*. Chichester (USA): Jossey-Bass, 208 pages.

Nyberg, Lars (2009). *Kognitiv neurovetenskap : studier av sambandet mellan hjärnaktivitet och mentala processer*. Lund: Studentlitteratur. 214 pages.

Sacks, Oliver (1998). *The Man Who Mistook His Wife for a Hat And Other Clinical Tales*. London: Touchstone Books. 256 pages.