PSYCHOLOGY OF THINKING – Code 800155
Academic Year 2018-19

COURSE INFORMATION

Undergraduate Studies: 0812 – Degree in Psychology (Studies Plan 2009-10)

Type: Compulsory

ECTS: 6.0

Module: Compulsory psychological training

Area: Psychological processes

Year: Second

Semester: 2

INSTRUCTOR INFORMATION

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SYNOPSIS

COMPETENCIES

General competencies

GC1: Know and understand the functions, characteristics and limitations of the different theoretical models in psychology.

GC2: Know and understand the basic laws of the different psychological processes.

GC6: Know and understand research methods and data analysis techniques.

Transversal competencies

TC1: Analysis and synthesis.

TC2: Preparation and defence of properly reasoned arguments.

TC5: Looking for information and data interpretation on social, scientific and ethical topics related to the field of Psychology.

TC6: Team work.

TC7: Critical thinking and self- analysis.

TC8: Learning how to learn, skills for life-long learning.

Specific competencies

SC1: Identify needs and demands of the recipients of work performed by the psychologist in the different areas of application.

SC2: Be able to establish goals of basic psychological action in different contexts, proposing and negotiating goals with recipients and interested parties.

SC3: Be able to plan and carry out interviews.

SC4: Be able to describe and measure variables (personality, intelligence and other aptitudes, attitudes, etc.) and cognitive, emotional, psychobiological and behavioural processes).

TEACHING ACTIVITIES

Theoretical classes

This class will consider computational models of some of the core structures of human cognition: nature of concepts and categories, representation of knowledge, causal relationships and inference, problem-solving and decision-taking theories. We will emphasize questions of inductive learning and the representation of knowledge. Class meetings will mix lectures and discussion, covering both the necessary cognitive science and computational background and confronting state-of-the-art research questions. We will cover human experimental cognitive psychology, the adaptive nature of thinking, the nature and use of representations, reasoning, problem-solving and decision-taking. Emphasis is placed on experimental methods, evidence and simulation of elementary phenomena using neural networks. Students are encouraged to learn a programming language by themselves, particularly c++, java or python.

COURSE PARTICIPATION

The course will be available at the virtual campus. After entering the campus you should identify yourself by writing on the appropriate place your user id and your password. The modules become active on specific dates. Each module includes information about a topic, optional readings, and includes a main glossary and a secondary glossary. The secondary glossary is given to include concepts entered by the student on a voluntary basis. The entries are revised and scored, and, in such case, selected for the main glossary. The entries count as a merit for the final grades. Each module presents a topic for discussion, resources and, eventually, tests. The readings are provided to support discussions and contributions by writing questions and answers to be upload to the class discussion forum. The course follows the strategy "learning by doing" by combining information on theoretical topics, developing formal skills, carrying out an experiment, and by performing practical exercises to be delivered in specific dates according to the schedule. Except for personal contributions to the discussion in course forums, every student should participate in a team to deliver two practical exercises and a course project. To this end, every student should eventually collect information the topic, elaborate hypotheses and strategies and develop some formal skills to contribute to exercises and projects to be delivered by his/her own team.

PRACTICAL CLASSES

Students will experiment by themselves how thought processes can be assessed with some GNU software, just to implement experiments that allow us to evaluate categorizing, reasoning and decision processes. Students will get some insight about knowledge representation by using standard tools.

Students should participate in small groups aimed at developing two sets of exercises and a common project, a project that might allow them to implement an experimental design, or develop a well-founded discussion on the current topic. No oral presentation will be requerid.

ECTS BREAK-DOWN

TEACHING ACTIVITIES	Hours	% of total credits	Attendance
Class sessions	45	30%	100%
Tutorials	15	10	50%
Students' work (class assignments and time of study)	100	66'7	0%
Assessment activities	5	3,3	100%

BRIEF DESCRIPTION:

The central assumption of a computational approach to COGNITION is that the brain computes. What does that mean? Generally speaking, a computer is a dynamical system whose state variables encode information about the external world. In short, computation equals coding plus dynamics, both expressing the way brain functions. Mind is described as what the brain does in interaction with the environment, the environment supplying the information which behaviour is based on. The mind is conceived as a specific-purpose system, a by-product of the way the brain, conceived as a general-purpose system, learns and behaves. A realistic approach requires that for each part of a theory a corresponding piece of neural evidence emerges, thus contributing to the construction of a psychological theory entirely compatible with what we know about the brain. Psychological modelling and neural simulation should ideally go hand-in-hand. The study of mind can be subdivided into three separate strands. The first strand focuses on the way experience in being represented. The second focuses on the way representations allow us to draw inferences based on the information encoded. The third focuses on the way information is being exploited and used in problem-solving and risk-based decision-taking processes in everyday experience with some uncertainty.

PRE-REQUISITES

No special prerequisites are required. The following requisites will be applied.

Regular attendance (not more than 10% of non-attendance rate regardless any reason).

Participation on glossaries and discussion forums on a voluntary basis.

Compulsory participation in online multiple choice tests, with open and closed questions.

Two problem sets by a T.E.A.M. (Together Everyone Achieves More).

Course project by a T.E.A.M. (Together Everyone Achieves More).

OBJECTIVES

1. To know and understand the functions, features and limitations of the different theoretical models within the Psychology of Thought, in most regular programs also called as Cognitive Psychology.
2. To know and understand the basic laws governing the different psychological processes of thought.
3. To be able to distinguish between the different models of thought processes.
4. To be able to critically evaluate such models both from a theoretical and experimental viewpoint.
5. To know and understand the different research methods and data analysis techniques employed in the Psychology of Thought.

TOPICS

Topic 1. The Adaptive Nature of Thought
Topic 2. What's Knowledge? Pattern Recognition & Causality.
Topic 3. Concepts and Categories. Categorization Effects. Categorizing Models.
Topic 4. Neural Modelling.
Topic 5. Reasoning. Knowledge representation.
Topic 6. Problem Solving. Searching Processes.
Topic 7. Decision Making.

ASSESSMENT

The general formula to evaluate choice tests (# hits - #fails / (# alternatives - 1) will be applied.
Compulsory online multiple choice tests and free class participation.
60% - Final exam covering all lectures and required reading material.
10% - First problem set on formal grammars and computational theory.
10% - Second problem set on neural networks and cognitive simulation.
20% - Course Project, Presentation, Problem Sets and/or Paper Submission.

On-site theory lectures: They will be assessed and graded independently via tests. The scores in online tests provides the student information about his/her progress in the subject, and serve as criteria to select the most discriminant questions for the finals.

Practical sessions and seminars through the exercises and the project will be assessed and graded independently. A positive grade for all items, problem sets and course project above are expected to pass the course. Individual participation in glossaries and discussion will count as a merit. They will be graded independently.

The course will have a comprehensive final exam on the scheduled date, which includes theory and practice. Only those students under the condition of a regular attendance program can take a regular final evaluation. Any other, not under this program, o having lost his/her condition as a regular student should follow directions given in the General Norms of this subject for the class 2018-2019.

RESOURCES

Recommended Textbooks

Dayan, P., & Abbott, L. F. (2001) *Theoretical Neuroscience: Computational and Mathematical Modeling of Neural Systems*. Cambridge, MA: MIT Press. ISBN: 9780262041997. Gobet, F., Chassy, Ph., & Bilalic, M. (2011). Foundations of Cognitive Psychology. McGraw-Hill Education. ISBN-10: 0077119088, ISBN-13: 978-0077119089.

Hertz, J., Krogh, A., & Palmer, R.G. (1991) *Introduction to the Theory of Neural Computation.* Redwood City, CA: Addison-Wesley Pub. ISBN: 9780201515602.

Medin D., Ross, B.H., & Markman, A.B. (2005). *Cognitive Psychology.* 4th ed. Hoboken: NJ: Wiley & Sons. ISBN 0-471-45820-1.

Reisberg, D. (2010). *Cognition: Exploring the Science of The Mind.* 4nd ed. New York: Norton. ISBN: 039397622X.

Sternberg, R.J., & Sternberg, K. (2012). Cognitive Psychology, Sixth Edition. Wadsworth, Cengage Learning. ISBN-13: 978-1-111-34476-4. ISBN-10: 1-111-34476-0

Course Textbook

McBride, D.M., & Cooper Cutting, J. (2018). Cognitive Psychology: Theory, Process, and Methodology. 2nd Edition. Publisher SAGE Publications, Inc. ISBN 978-1-5443-2495-1. ISBN: 9781506383842, 150638384X. https://vsaccess.vitalsource.com/#/user/signin. Available as printed and electronic book after being registered.