UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Applied Neuroscience

2627-2-F5109P015

Learning area

Applied Experimental Psychological Sciences

Learning objectives

Knowledge and understanding

- The application of knowledge from Cognitive Neurosciences to production systems and technological development
- The use of methodologies and techniques from Cognitive neurosciences to the analysis of responses obtained from human consumers/users

Applying knowledge and understanding

- Ability of transferring the course contents to the planning and development of strategies and research plan in the field of applied cognitive neurosciences.

Making judgements

-Development of the ability to critically analyze, evaluate and synthesize new and complex scientific ideas (also in relation to issues of international strategic relevance) through group discussions and possible seminar-type activities

Communication skills

-Development of the ability to communicate information, ideas, problems and solutions clearly and consciously to specialist and non-specialist interlocutors and in different training and work contexts.

Development of a solid ability to listen actively, to interact and to work in groups, including interdisciplinary ones, as well as to understand and critically analyze different points of view.

Learning skills

-Development of the ability to continue one's study/work path independently, strengthened by greater critical awareness and a renewed theoretical-conceptual and methodological sensitivity.

Contents

The field study of applied cognitive neurosciences and of its most recent developments will be analysed. In particular, the course will discuss how the knowledge regarding the nervous bases of behaviour can be used in different practical applications such as: product design, Virtual Reality, engineering, movie making, gastronomy, marketing, technological development, human-machine interfaces, improvement of services.

The course will start with an overview of the most important cerebral structures and of their functions, seen from an applied perspective. The role of the human sensory systems in the interactions with products, services and technologies will be examined. Special attention will be dedicated to the theme of human-machine interactions and presence in Virtual Reality environments. Finally, the course will discuss the use of the neuroscientific methodologies for the study of explicit and implicit (behavioural and physiological) reactions to ecologically valid situations (e.g., shopping, human computer interactions, virtual reality simulations, etc.)

Detailed program

- Cerebral anatomy applied to consumer behavior and object design
- Marketing and design inspired to neural functioning
- The human senses and their role in applied contests
- Physiological functions, hormone and homeostasis in the design of services and in consumer behavior
- Brain-machine interfaces
- Multisensory processing and product development
- Neuroscientific techniques and methodologies for the study of consumer behavior and human interactions with technologies
- Overcoming the limitations of Virtual reality technologies by means of neuroscientific principles

Prerequisites

Good English knowledge

Teaching methods

The course will be held in presence (100%). Teaching will consist of lecture-based lessons, and also interactive classwork that will take place through the following:
Presentation and analysis of themes through visual material.

Class discussion with experts in the field of engineering, neuroscience and marketing.
Group work and assignments: Students will be given the opportunity to deepen a topic of the course through group activities consisting of the development and presentation (10 minutes using ppt slides) of a project study in the field of cognitive neuroscience.

Assessment methods

The exam includes a written test with multiple choices questions and an open question that requires a large and critical discussion on one topic of the course. The questions are aimed at ascertaining the effective acquisition of both theoretical knowledge and the ability to connect different aspects of applied neuroscience. The answers to the open question will be evaluated in terms of correctness of the answers, argumentative capacity, and analytic discussion of the topics of the course. For students who request it and that have passed the written test, an oral interview will be also made available, on all the topics of the course.
Participation in optional activities (see teaching methods) contributes to the final evaluation.

Textbooks and Reading Materials

-Gallace, A., & Spence, C. (2014). In touch with the future: The sense of touch from cognitive neuroscience to virtual reality. Oxford: Oxford University Press. (ch. 9-10-11)

-Spence, C. & Gallace, A. (2011). Multisensory design: Reaching out to touch the consumer. Psychology & Marketing, 28, 267-308.

- Gallace, A., Ngo, M. K., Sulaitis, J., & Spence, C. (2011). Multisensory Presence in Virtual Reality: Possibilities & Limitations. In: G. Ghinea, F. Andres, & S. Gulliver (Eds.), Multiple Sensorial Media Advances and Applications: New Developments in MulSeMedia. IGI Global.

- Nazir, S., Gallace, A., Bordegoni, M., Colombo, S., & Manca, D. (2012). Performance comparison of different training methods for industrial operators. In: De Waard, D., Brookhuis, K., Dehais, F., Weikert, C., Röttger, S., Manzey, D., Biede, S., Reuzeau, F., & Terrier, P. (Eds.), Human Factors of Systems and Technology (pp. 1-8). Available as open source download.

- Spence, C., Hobkinson, C., Gallace, A., & Piqueras Fiszman (2013). A touch of gastronomy. Flavour, 2:14.

-Additional reading material will be specified during the course

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | INDUSTRY, INNOVATION AND INFRASTRUCTURE