PSYC 3204 – Behavioural Neuroscience

Unit of Study Code: PSYC3204

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Format of Unit: 2 x 1 hour lectures/week x 13 weeks
1 x 1 hour tutorial/week x 12 weeks
Tutorial sizes: maximum of 15 students per group

Credit Point Value: 4 Credit Points

Qualifying: 12 credit points of Intermediate Psychology including PSYC 2111 and PSYC 2112

Assessment: The marks will be allocated as follows:
• Exam (multiple choice) 65%
• Classwork 35%

Classwork will be comprised of:
• Tutorial quiz 25%
  22 October–25 October (week 13)
• Poster presentation 10%
  all through the semester

Evaluation of teaching and learning:
Date: week 13
Type: standard CTL evaluation
Unit of study general description:

This unit of study carries on from the Psychology component of PSYCH 2111, providing some more specialised coverage in the areas of psychopharmacology, molecular neuroscience, sensorimotor integration, human brain imaging and cognitive neuroscience. Topics to be covered include: Psychopharmacology (basic actions of drugs on the brain, mechanism of action of antidepressant, antipsychotic and anxiolytic drugs, effects of recreational drugs (cannabis, MDMA, alcohol, opiates) on brain, behaviour and cognition); Molecular Neuroscience (effects of drugs on gene expression, the use of knockout mice and antisense techniques); Sensorimotor Integration (functions of the vestibular system, the role of the hippocampus in spatial learning); Brain Imaging Technologies (findings in psychiatry and neurology, what we can learn about the fundamentals of brain function from brain imaging) and Cognitive Neuroscience (neural basis of cognitive abnormalities in schizophrenia and other disorders). In the first few weeks of the course, tutorials consist of demonstrations covering basic neuroanatomy, histology and neuropharmacology. In the latter part of the course, tutorials involve groups of students giving poster presentations of recent "hot" papers in the neuroscience field.

Teaching outcomes:

- Knowledge of fundamental functional neurophysiology including aural and synaptic transmission.
- Knowledge of the methods in behavioural neuroscience; recording, lesions, histology and immunohistochemistry; behavioural measures.
- Knowledge of psychopharmacology - for example the psychopharmacology of depression and the psychopharmacology of drugs of abuse such as MDMA and cannabis.
- Knowledge of sensorimotor integration and the functions and mechanisms of the vestibular system.
- Knowledge of neuropsychology - understanding brain structure and brain impairment due to strokes etc. Neuronal mechanisms of recovery after loss or damage.
- Knowledge of cognitive neuroscience; relating recent functional imaging results to behaviour and psychological function.

Tutorials

For the first six weeks, tutorials will consist of demonstrations and practicals on such topics as sheep brain dissection, histology, immunohistochemistry, single cell recording and animal models. These practicals, while not at all "gory", are not recommended for people who have a strong ethical objection to animal experimentation. In weeks 8-12, tutorials will involve poster presentations by groups of students in which they discuss a recent paper in the neuroscience field. The final tutorial (in week 13) will involve a quiz on all tutorial material.

Poster presentations

In the first tutorial (week 2) you will be required to form groups of 3 people. A poster topic will be allocated (at random - literally by drawing the topic out of a hat) to each group and you will be required to present a poster on that topic later in the semester. You will work with others in your team to prepare this poster. You will also be responsible for preparing a handout in association with each poster for the rest of the tutorial. Your poster presentation will last around 20 minutes and you must be ready to encourage and handle questions about the material.
PROVISIONAL SYLLABUS

Dr Iain McGregor will give lectures on the following topics:
• Revision of basic neuroanatomy, neurophysiology and neurochemistry
• Molecular neuroscience - the new revolution in neuroscience.
• The origins and history of psychopharmacology.
• Psychosis - neural basis, animal models, prevalence and drug treatments.
• Depression - neural basis, animal models, prevalence and drug treatments.
• MDMA ("Ecstasy") - who takes it, what it does. Does it have neurotoxic effects in humans?
• Cannabis - effects on the brain. Is it addictive? Is it a gateway drug? Does it cause schizophrenia?
• Alcohol - effects on the brain and behaviour. Anti-craving medications for treatment of alcoholism.
• Olfaction - how the brain codes odours, olfactory learning and memory.

Dr Lea Williams will give lectures on the following:
• Cognitive neuroscience models of brain function
• Models of whole brain function and brain dynamics.
• Brain Imaging Technologies in neuroscience - including PET, MRI, SPECT and functional MRI.
• Brain Imaging and Psychophysiological techniques
• Face and facial emotion processing.
• Application of above to clinical disorders, such as schizophrenia, ADHD, phobias (psychophysiology, fMRI research).

Professor Ian Curthoys will give lectures on the following:
• The role of the vestibular system in stabilizing the perceptual world.
• Vestibular compensation. Clinical implications.
• Spatial information and the hippocampus.

TEXT

This will be supplemented by references to many recent papers in the areas. Copies of these papers should be available from Special Reserve.

Supplementary Text