PSYC3014 – Behavioural & Cognitive Neuroscience
Unit of Study Outline

Unit of Study Code: PSYC3014

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Consultation times: by appointment

Tutors: TBA- Your tutor will advise you of their consultation times in the first tutorial.

Format of Unit: 2 x 1 hour lectures/week x 13 weeks
1 x 2 hour tutorial/week x 10 weeks

Credit Point Value: 6 Credit Points

Prerequisite: 1. PSYC (2011 or 2911 or 2111) and at least one other Intermediate Psychology Unit from PSYC (2012 or 2112), PSYC (2013 or 2113), PSYC (2014 or 2114).
OR
2. (PSYC2011 or 2911 or 2111 or 2013) and ANAT2010 and PCOL2011.

Textbook: There is no set textbook for this course, but the following are recommended and are available in the library, as either 2 hour loans or e-books (search for PSYC3014 or PSYC3914 in library catalog):
- Nolte’s The Human Brain: An introduction to its functional anatomy (Authors: Vanderah, T.W. & Gould, D.J.), 7th edition, Elsevier, 2016. (available as e-book through the library; note also that there are earlier editions of this book, authored by Nolte).
- The Wickens textbook that some of you will have from PSYC2011 also has material covered in this course, albeit at a more introductory level.

<table>
<thead>
<tr>
<th>What?</th>
<th>PSYC3014 Assessment Information</th>
<th>% Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assignment (2000 word Report)</strong> Based on experiment discussed and run in weeks 3 and 4 tutorials</td>
<td><strong>Compulsory</strong>*</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>Online submission Tuesday 20 September (Week 9)</td>
<td>On-time submissions returned after Wednesday 26 October (Week 13) <em>This is the last possible date for submission of this assignment with or without extensions</em></td>
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<tr>
<td>Tutorial Quiz 1</td>
<td><strong>Non-compulsory</strong></td>
<td>5%</td>
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<tr>
<td></td>
<td>In your regular tutorial class in Week 6</td>
<td>Week 9</td>
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<tr>
<td>Tutorial Quiz 2</td>
<td><strong>Non-compulsory</strong></td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>In your regular tutorial class in Week 13</td>
<td>End of STUVAC</td>
</tr>
<tr>
<td>Class Participation</td>
<td><strong>Non-compulsory</strong></td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>Throughout semester</td>
<td>End of STUVAC</td>
</tr>
<tr>
<td>Exam</td>
<td><strong>Compulsory</strong>*</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>During exam period at the end of semester</td>
<td>University Final Results Release Date</td>
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</table>

*Completion of these components is compulsory to pass this unit. Students who fail to do so will receive an Absent Fail, regardless of their marks in other assessments.
Further information about assessments

**Report Assignment**: One 2000 word report (30% of total mark) due on Tuesday 20 September (Week 9). The report is based on an experiment we will run in tutorials in Week 4. The idea behind this experiment will be explained in the tutorials in Week 3 and you will need to do some preparation for running the experiment in Week 4. If you are unable to attend your regular tutorial in those weeks, please arrange to go to a different tutorial so you can participate in the experiment.

Students who do not complete the research report by the closing date must submit an alternative piece of written work to avoid automatically failing the course. If this is considered a serious effort, they will receive 0 marks for this. A serious effort consists of writing at least 1000 words, and answering the assigned question. Non-serious efforts won’t be accepted.

**Tutorial Quizzes (x2)**: Held in tutorials (Week 6 and Week 13) assessing the tutorial material not covered in the report. Quiz 1 covers neuroanatomy and neuroscience methods and is worth 5%; Quiz 2 covers the rest of the tutorial material and is worth 10%. If you are unable to attend your regular tutorial, make arrangements to attend a different tutorial in those weeks to sit the quiz.

**Participation**: Participation in class discussions throughout the semester. We will also have a bigger discussion forum in Week 13 on a topic to be advised, for an additional opportunity to pick up marks (5%).

**Examination** (50% of total mark): This will be a combination of multiple-choice questions and short answer questions. The exam assesses your knowledge of materials covered in lectures and readings set by the lecturing staff.

*Completion of these components is compulsory to pass this unit. Students who fail to do so will receive an Absent Fail, regardless of their marks in other assessments.

**Late penalties**

You will receive a penalty of 2% of the maximum value of the Report Assignment (e.g. 2 marks / 100) for each day (or part thereof) it is late, up to the closing date of the assignment, after which no more submissions will be accepted.

**Disruptions to your study**

The university does not permit informal special consideration. If you experience any disruption to your study due to illness, misadventure, or other unavoidable factors, you must apply for formal Special Consideration online at [www.sydney.edu.au/science/cstudent/ug/forms.shtml#special_consideration](http://www.sydney.edu.au/science/cstudent/ug/forms.shtml#special_consideration). All Special Consideration requests are processed centrally and you will be required to provide supporting information which will be checked with the professional practitioner’s office. Keep copies of all paperwork. If you have, or develop, an ongoing medical issue, you can register with Disabilities Services [www.sydney.edu.au/disability](http://www.sydney.edu.au/disability).

Students who miss or cannot complete the final exam through illness or misadventure will be offered a different supplementary exam as a replacement. Note that students who apply for and are granted either special arrangements or special consideration for examinations in units offered by the Faculty of Science will be expected to sit any replacement assessments in the two weeks immediately following the end of the formal examination period. Later dates for replacement assessments may be considered where the application is supported by appropriate documentation and provided that adequate resources are available to accommodate any later date. We reserve the right to offer supplementary examinations in
different formats to the original examination.

Assuring the Academic Integrity of PSYC3014

All written assignments will be submitted to Turnitin similarity detecting software in this unit. If we suspect your assignment has been written by someone else, we reserve the right to ask you to explain and defend the work you have submitted as your own, in person. If you are a commencing student at the University of Sydney you are required to complete the Academic Honesty Education Module. Please do this before you submit any written work to any unit of study.

Where to get more information?

This Unit of Study Outline should be read in conjunction with the Undergraduate Student Guide which contains general administrative guidelines – available on the e-Learning site as well as on the School of Psychology website under Current Students > 2nd and 3rd Year:
It is your responsibility to ensure that you are familiar with and adhere to the Student Guide.
You should also check the e-Learning site for this course regularly for any announcements and resources related to lectures and tutorials. Academic and administrative staff will not answer questions where the answer is readily available in these sources, so please make sure you read these first before contacting them with questions.

Unit of study general description

This unit of study will focus on approaches to studying neurosciences incorporating molecular, preclinical and clinical models of brain function. These biological models of brain function will be linked with behavioural, affective and cognitive function and dysfunction. The implications of focal cognitive deficits in neurological patients for models of normal cognitive function will also be explored. Specific topics to be covered will include: the biological basis of feeding and appetite, glial cell function, the neural basis of learning and memory, sensorimotor integration, neurodegenerative disease, language, visual cognition and praxis. In addition to lectures, a practical component will cover basic neuroanatomy and neuroscience methods and introduce students to experimental and case-study approaches to studying neurosciences.

Graduate Attributes in Behavioural and Cognitive Neuroscience

This course is structured around the graduate attributes associated with the scientist-practitioner model, the basis for the training of psychologists in Australia and internationally. Graduate Attributes are the generic skills, abilities and qualities that students should acquire during their university experience and the School of Psychology is committed to providing an environment to promote these skills. In addition, this unit of study will provide students with generalised and transferable skills that will also be useful in careers outside psychology.

The following graduate attributes and student learning outcomes will be developed through lectures, practical classes and assessment activities. They will be assessed in the laboratory report, tutorial quiz, class participation and final exam.

1: Knowledge and Understanding of behavioural neuroscience and cognitive neuroscience
Display basic knowledge and understanding of major concepts, theoretical perspectives, empirical findings, and historical trends in behavioural and cognitive neuroscience

Student learning outcomes:
(i) An interest in and appreciation of the historical and current contribution of learning theorists, neuroscientists, psychopharmacologists, cognitive and sensory scientists to the understanding of the brain and behaviour and to the treatment of mental illness and neurological disorders.
(ii) Understanding basic neural processes and anatomical systems underlying different types of learning and memory.
(iii) Understanding the neural control of movement and its disorders
(iv) Understanding the clinical presentation and biological bases of dementia
(v) Understanding the neural systems underlying object perception and its disorders
(vi) Understanding neural systems underlying speech and language and its disorders
(vii) Understanding neural systems underlying attention and its disorders
(viii) Understanding of concepts of neural computation
(ix) Understanding neural correlates of sleep and wakefulness
(x) Ability to describe, explain and evaluate research studies in these fields.
(xi) Skill in reporting experimental work using standard conventions.

2: Research Methods in behavioural and cognitive neuroscience
Understand, apply and evaluate basic research methods in behavioural and cognitive neuroscience, including design of laboratory and clinical research, data collection, analysis and interpretation, literature searches and review. Demonstrate understanding of technologies used to study brain function and activity.

Student learning outcomes:
(i) To develop a critical understanding of the major methods of research in these areas.
(ii) To critically assess the major theories and research findings in these areas.
(iii) To interpret statistical analyses.
(iv) Use basic web-search, word-processing, database, spreadsheet, and data analysis programs.
(v) Design and conduct basic studies to address psychological questions: frame research questions; undertake literature searches; critically analyse theoretical and empirical studies; formulate testable hypotheses; operationalise variables; choose an appropriate methodology; make valid and reliable measurements; analyse data and interpret results; and write research reports.

3: Critical Thinking Skills in behavioural and cognitive neuroscience
Respect and use critical and creative thinking, skeptical inquiry, and the scientific approach to solve problems related to the neuroscientific bases of behaviour. Develop ability to identify and evaluate the purposes, research questions, data, perspectives, inferences, concepts, implications and assumptions associated with research presented during the course.

Student learning outcomes:
(i) Demonstrate an attitude of critical thinking that includes persistence, open-mindedness, and intellectual engagement.
(ii) Evaluate the quality of information, including differentiating empirical evidence from speculation.
(iii) Evaluate issues and behaviour using different theoretical and methodological approaches.
(iv) Use reasoning and evidence to recognise, develop, defend, and criticise arguments and persuasive appeals.

4: Values in behavioural and cognitive neuroscience

Student learning outcomes:
(i) Value empirical evidence; tolerate ambiguity during the search for greater understanding of behaviour and knowledge structures
(ii) Use information in an ethical manner (e.g., acknowledge and respect the work and intellectual
property rights of others through appropriate citations in oral and written communication)
(iii) Be able to recognise and promote ethical practice in research.
(iv) Promote evidence-based approaches and rigour in the understanding of behaviour.
(v) Be aware of ethical issues pertaining to clinical interventions.
(iv) Respect diversity associated with cognitive and neurological disorders.

5: Communication Skills in behavioural and cognitive neuroscience

Student learning outcomes:
(i) Write a standard research report using American Psychological Association (APA) structure and formatting conventions.
(ii) Write effectively in a variety of other formats (e.g., essays, research proposals, reports) and for a variety of purposes (e.g., informing, arguing).
(iii) Demonstrate effective oral communication skills in various formats (e.g., debate, group discussion, presentation) and for various purposes.
(iv) Collaborate effectively, demonstrating an ability to: work with groups to complete projects within reasonable timeframes; manage conflicts appropriately and ethically.

6: Learning and the application of behavioural and cognitive neuroscience

Student learning outcomes:
(i) To develop an awareness of the applications of the theories and research findings in learning, control of movement, memory, language, visual processing, computational modeling and sleep.
(ii) Apply psychological concepts, theories, and research findings to solve problems in everyday life and in society.
(iii) Understand major areas of applied psychology and neuroscience.
(iv) Understand how basic research in psychopharmacology and neuroscience gives rise to treatments for addictions, movement and memory disorders and other neurological disorders.
(v) Develop a capacity for independent learning that will sustain personal and professional development in the rapidly changing field of neuroscience.
(vi) self-assess performance accurately; incorporate feedback for improved performance; purposefully evaluate the quality of one’s thinking (metacognition, part of critical thinking).
### LECTURE AND TUTORIAL TIMETABLE

Lectures are held on:
- Mondays 11-12 in Physics Lecture Theatre 1 (Rm 405)
- Thursdays 11-12 in Quadrangle Building, General Lecture Theatre K2.05

<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture #</th>
<th>Topic</th>
<th>Lecturer</th>
<th>Tutorial (2 hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 July</td>
<td>1</td>
<td>Introduction and History of Neuroscience</td>
<td>IH</td>
<td>No tutorial</td>
</tr>
<tr>
<td>Week 1</td>
<td>2</td>
<td>Long term potentiation</td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>1 Aug</td>
<td>3</td>
<td>Neural bases of Pavlovian conditioning</td>
<td>LC</td>
<td>Animal models of mental disorders</td>
</tr>
<tr>
<td>Week 2</td>
<td>4</td>
<td>Neural bases of extinction</td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>8 Aug</td>
<td>5</td>
<td>Consolidation, reconsolidation and erasure</td>
<td>LC</td>
<td>Neuroscience Methods</td>
</tr>
<tr>
<td>Week 3</td>
<td>6</td>
<td>Motivation</td>
<td>LC</td>
<td>+ Introduction to the experiment for the major assignment</td>
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<tr>
<td>15 Aug</td>
<td>7</td>
<td>Instrumental learning</td>
<td>LC</td>
<td>Neuroanatomy I</td>
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<tr>
<td>Week 4</td>
<td>8</td>
<td>Sleep I</td>
<td>LC</td>
<td>+ Run the experiment for assignment</td>
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<tr>
<td>22 Aug</td>
<td>9</td>
<td>Sleep II</td>
<td>LC</td>
<td>Neuroanatomy II</td>
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<tr>
<td>Week 5</td>
<td>10</td>
<td>Biological Rythms</td>
<td>LC</td>
<td>(in the Anatomy lab)</td>
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<tr>
<td>29 Aug</td>
<td>11</td>
<td>Movement and motor control I</td>
<td>JH</td>
<td>Quiz 1 on Methods and</td>
</tr>
<tr>
<td>Week 6</td>
<td>12</td>
<td>Movement and motor control II</td>
<td>JH</td>
<td>Neuroanatomy</td>
</tr>
<tr>
<td>5 Sept</td>
<td>13</td>
<td>Biological Bases of Dementias</td>
<td>JH</td>
<td>+ Discuss data from Exp</td>
</tr>
<tr>
<td>Week 7</td>
<td>14</td>
<td>Dementia: Clinical Syndromes</td>
<td>IH</td>
<td>Neurodegenerative Diseases</td>
</tr>
<tr>
<td>12 Sep</td>
<td>15</td>
<td>High Level Visual Processing I</td>
<td>IH</td>
<td>No tutorials, work on your reports</td>
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<tr>
<td>Week 8</td>
<td>16</td>
<td>High Level Visual Processing II</td>
<td>IH</td>
<td></td>
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Report due Tuesday of Week 9

<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture #</th>
<th>Topic</th>
<th>Lecturer</th>
<th>Tutorial (2 hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>19 Sept</td>
<td>17</td>
<td>Episodic Memory I</td>
<td>IH</td>
<td>Agnosia</td>
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<tr>
<td>Week 9</td>
<td>18</td>
<td>Episodic Memory II</td>
<td>IH</td>
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<tr>
<td>26 Sep</td>
<td></td>
<td>Study Break</td>
<td></td>
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<tr>
<td>3 Oct</td>
<td>19</td>
<td>Semantic Memory</td>
<td>IH</td>
<td>No tutorials</td>
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<tr>
<td>Week 10</td>
<td>20</td>
<td>Brains vs. Computers I</td>
<td>AH</td>
<td>Human neuropathologies</td>
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<tr>
<td>10 Oct</td>
<td>21</td>
<td>Brains vs. Computers II</td>
<td>AH</td>
<td></td>
</tr>
<tr>
<td>Week 11</td>
<td>22</td>
<td>Attention and the parietal lobe I</td>
<td>AH</td>
<td>Simulating 'lil Brains</td>
</tr>
<tr>
<td>17 Oct</td>
<td>23</td>
<td>Attention and the parietal lobe II</td>
<td>AH</td>
<td></td>
</tr>
<tr>
<td>Week 12</td>
<td>24</td>
<td>Language I</td>
<td>IH</td>
<td>Quiz 2 on remainder of tutorial work, class discussion, course evaluation.</td>
</tr>
<tr>
<td>24 Oct</td>
<td>25</td>
<td>Language II, Revision, Exam Prep</td>
<td>IH</td>
<td></td>
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<tr>
<td>Week 13</td>
<td></td>
<td>Study Break</td>
<td></td>
<td>No classes</td>
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<tr>
<td>31 Oct</td>
<td></td>
<td>Exam Period</td>
<td></td>
<td>No classes</td>
</tr>
<tr>
<td>Week 14</td>
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<td>Exam Period</td>
<td></td>
<td>No classes</td>
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<tr>
<td>7 Nov</td>
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<td>Week 15</td>
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<tr>
<td>14 Nov</td>
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<tr>
<td>Week 16</td>
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IH = Irina Harris, LC = Laura Corbit, JH = Justin Harris, AH = Alex Holcombe