Principles of Neuropsychology: 2N03

LEARNING OBJECTIVES

Location: BSB/B103; Tue and Thu 1:30 pm-4:30 pm.

Course Instructor: Dr. Ullal, G.

Contact: Department of Psychology, Neuroscience and Behaviour.

Tel. 21331; email: ullalg@mcmaster.ca Room # 108 Psych. Bldg.

Office Hours No allotted, “Office Hours”. Mutually convenient meetings could be scheduled. Please email me with the subject of your email using your McMaster email to schedule an appointment. Emails sent without a subject or using other email accounts will not get a response.

Outline of the Course:

Neuropsychology is a branch of psychology that deals with normal and abnormal behaviour as determined by the neural substrates. The traditional and most popular approach would be to gain insights with the help of unfortunate “experiments of nature” in the form of disorders or syndromes. On many occasions, classical case reports have been the “textbooks” for neuropsychology. Owing to the recent advancement in the non-invasive tools of investigations such as functional neuroimaging and electrophysiology, it has become possible to study the healthy individuals or animals while they are performing various tasks. In this course we will use syndromic approach, case-study approach and on several occasions study the healthy subjects.

1. **Course website**: A scheme of every forthcoming lecture along with important slides will be posted on the “avenue to learn” (available at avenue.mcmaster.ca). Students are encouraged to visit the site regularly to look for any important announcements, test marks etc. that would appear periodically.

2. **Text**: The lectures will cover material from the textbook as well as from outside sources. Skeleton slides pertaining to the lecture in the form of PowerPoint and PDF will be posted prior to every class. Students are advised to make their own notes in class.

   **PLEASE NOTE** About 10% of the material in the textbook that may not be taught in class will appear on each of the three examinations. The exact page numbers from the textbook pertaining to this, “ASSIGNED READINGS” will be posted with every lecture along with the slides prior to every lecture.

3. **Evaluations**

   1. **First midterm examination**: The midterm examinations will be worth 25% of the final grade. About 90% of the material covered in class prior to 1st midterm examination and 10% from assigned readings in the text will be on 1st midterm examination. Page numbers of the assigned readings will be posted prior to every lecture. Besides **multiple choice questions** there will be a few **short answer** type questions comprising of definitions and some important concepts discussed in class.

   2. **Second midterm examination**: The midterm examinations will be worth 25% of the final grade. About 90% of the material covered in class after the 1st midterm examination and prior to 2nd midterm examination and 10% from assigned readings in the text will be on 1st midterm examination. Page numbers of the assigned readings will be posted prior to every lecture. Besides **multiple choice questions** there will be a few **short answer** type questions comprising of definitions and some important concepts discussed in class.
3. **Final examination:** It will be worth 50% of final grade. It will test 90% of the material covered in the entire course and 10% from the entire assigned readings. There will be greater emphasis on what is covered after the 2nd midterm examination. Besides **multiple choice questions** there will be a few **short answer** type questions comprising of definitions and some important concepts discussed in class. The final exam will take place in class. Please look up the dates below.

**MISSED EXAMINATIONS:** There will NOT be a re-examination for missing any of the midterm examinations. However, if a student misses any examination owing to an illness or any other legitimate reason, the final examination will be rated proportionately higher provided an official permission is routed through the University Administration/ McMaster Student Absence Form (MSAF) applications. No examination will be re-scheduled unless there is cancellation of the class by the University.

**PLEASE NOTE:** Students that miss both the midterm examinations for whatever reasons will have to make up for the 2nd examination in the form of an assessment that may be in the form of an examination that may be of a different format or a oral/viva voce with the instructor. The instructor will determine the format of the examination, date, location and time for such an assessment. However, there should be an official permission or a MSAF filled up to support that. Further, such students should get in touch with the instructor within 24-hours after the missed 2nd examination. In absence of such an arrangement, the mark on the second missed examination will be a “ZERO”.

**CONFLICT OF EXAMINATIONS:** Both the midterm examinations and the final examination are conducted during the regular class-hour. If any other examination conflicts with this examination, please contact the authorities conducting the other examination.

**“IMPORTANT ANNOUNCEMENTS”:** Important announcements regarding the course will be periodically posted in the Announcement Box of the course. Please remain updated.
<table>
<thead>
<tr>
<th>Grade</th>
<th>Equivalent Grade Point</th>
<th>Equivalent Percentages</th>
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<tbody>
<tr>
<td>A+</td>
<td>12</td>
<td>90-100</td>
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<td>A</td>
<td>11</td>
<td>85-89</td>
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<td>A-</td>
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<td>80-84</td>
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<td>73-76</td>
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<td>B-</td>
<td>7</td>
<td>70-72</td>
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<td>C+</td>
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Schedule of Lectures

PLEASE NOTE:

1. The topics listed for the lectures below will follow the dates against them approximately.
2. About 90% of the material covered in class and 10% from assigned readings in the text will be on each of the examinations. Page numbers of the assigned readings from the textbook will be posted prior to every lecture.

<table>
<thead>
<tr>
<th>Session 1</th>
<th>Learning Objectives</th>
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<tbody>
<tr>
<td>21st June.</td>
<td>1. Course Objectives</td>
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<tr>
<td><strong>a. Course Outlines</strong></td>
<td>2. Evaluation Strategies</td>
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<td><strong>b. Realms of neuropsychology</strong></td>
<td>3. Heart versus Brain: Cause for the confusion:</td>
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<td>What Drives? The Capilano-Bridge Experiment</td>
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<td>4. Mind-Body Problem; Dualism and Monism</td>
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<td>5. Epilepsy-Madness-Witchcraft</td>
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<td>6. Realms of Neuropsychology: Syndrome-Single Case-Normal Function</td>
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<td>7. Phrenology: Are we after all glorified Phrenologists?</td>
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<td>8. Cranioscopy and Trephining</td>
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<th>Session 2</th>
<th>Learning Objectives</th>
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<tr>
<td>23rd June</td>
<td>1. What/</td>
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<tr>
<td><strong>Lateralization of</strong></td>
<td>2. Localization of Brain Functions: Types Epilepsies</td>
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<td>3. “Two Minds in one Brain”: The Split Brain Syndrome</td>
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<td>4. Acallosal Syndrome</td>
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| brain functions | 5. What/ Who is to blame? The Whitman Case  
6. Lateralization of Brain Functions  
7. Transcranial magnetic stimulation (TMS), Wada’s test. |
|-----------------|-------------------------------------------------|
| **Session 3**   | 1. Gross Anatomy of Cerebral Cortex, Blood Supply,  
                   Meninges and Cerebrospinal fluid  
2. Meningitis and Hydrocephalus  
3. Case: Phineas Gage and the Frontal-Lobe Syndrome  
4. The Limbic System  
5. Kluver-Bucy’s Syndrome  
6. Hypothalamic and Amygdala-Rage  
7. The Case of “HM” and Hippocampus |
| **28th June**   | Applied  
**Neuroanatomy-I** |
| **Session 4**   | 1. Meninges, CSF, Blood brain barrier  
2. Cerebral blood flow |
| **30th June**   | Applied  
**Neuroanatomy-II** |
| Session 5                 | 1st midterm examination-In class.  
|                          | During the class hour (in the same class room)  
|                          | All material covered including Session 4 and the assigned readings from the textbook will be tested. |
| Session 6                | Neurons, Glia and Axon Transport.  
|                          | Tauopathies and Alzheimer’s disease |
| Session 7                | 1. Single-cell recording  
|                          | 2. Principles of Voltage-Clamp and Patch-Clamp techniques  
|                          | 3. Resting Membrane Potential, Graded potential and Action Potential  
|                          | 4. Rate-coding in neurons  
|                          | 5. “Signatures” of an Epileptic Neuron  
|                          | 6. Channelopathies  
|                          | 7. Axon-transport  
|                          | 8. Nerve conduction  
|                          | Myelin and Multiple Sclerosis |
| Session 8                | 1. Synapse  
|                          | 2. Synaptic mechanism  
|                          | 3. Neurotransmitter systems  
|                          | 4. Long-term Potentiation and Long-term Depression |
| Session 9  
19\(^{th}\) July | 2\(^{nd}\) midterm examination-In class. 
During the class hour (in the same class room) 
All material covered including Session 4 and the assigned readings from the textbook will be tested |
|---|---|
| Session 10  
21\(^{st}\) July  
Investigating the Nervous system | 1. Imaging the Brain: Structural and Functional Imaging CT, MRI, fMRI-PET, MRI spectroscopy, Diffusion Tensor Imaging/Tractography (DTI), SPECT. 
2. Electrophysiological tools: EEG, ECoG, stereo-EEG, MEG, voltage and patch clamp, photon caging, 
3. Tools in molecular biology; PCR, in situ hybridization, microarray, transgenics 
4. Neural network modeling 
5. Neuropsychiatric tests including the MOCA. |
| Session 11  
26\(^{th}\) July  
Lobe functions I | Occipital and temporal lobes. 
1. Blind sight 
2. Neglects 
3. Ballint’s syndrome |
<table>
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<tr>
<th>Session 12</th>
<th>Lobe functions II</th>
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<tbody>
<tr>
<td>28th July</td>
<td>Parietal and frontal lobes.</td>
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<tr>
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<td>1. Levels of consciousness, Glasgow coma scale</td>
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<td>2. Locked-in-syndrome</td>
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<td>3. Parietal lobes beyond touch sensation</td>
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<td>4. Gerstmann’s syndrome</td>
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<td>5. Balint’s syndrome</td>
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<td>6. Spatial neglects</td>
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<td>7. Somatosensory agnosias</td>
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<td>8. Place cells, Grid cells and Spatial maps, topographic disorientations</td>
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<td>9. ‘Ded Reckoning’</td>
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<td>10. Motor tracts; Upper and Lower Motor Neurons</td>
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<td>11. Muscle Tone</td>
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<td>12. Stretch Reflex</td>
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<td>13. Voluntary Movements</td>
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<td>14. Upper and Lower Motor Neuron Paralysis</td>
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<td>15. Mirror Neurons</td>
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<td>16. The 'Booba-Kiki” effect</td>
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<td>Session 13</td>
<td>Basal ganglia and cerebellum</td>
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<tr>
<td>2\textsuperscript{nd} Aug</td>
<td>1. Basal ganglia; Motor and Cognitive Functions</td>
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<td>2. Parkinson’s disease</td>
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<td>3. Huntington’s dementia</td>
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<td>4. Ataxias</td>
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<td>5. Cognitive-Affective-Syndrome</td>
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<tr>
<th>Session 14</th>
<th>In class 2-hour examination. Will test all material taught in the course and the corresponding readings that were assigned from the textbook.</th>
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<tr>
<td>4\textsuperscript{th} Aug</td>
<td>Final Examination</td>
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DISCLAIMER

The instructor and University reserve the right to modify elements of the course during the term. The University may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

A Note on Academic Dishonesty

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at http://www.mcmaster.ca/academicintegrity

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one’s own or for which other credit has been obtained.
2. Improper collaboration in group-work.
3. Copying or using unauthorized aids in tests and examinations.

Message from the Chair of Psychology

The Instructor cannot be responsible for returning long distance calls from students. Any student wishing to reach an Instructor is invited to e-mail the instructor.