POTH 455 NEUROPHYSIOLOGY

Credits: 3

Prerequisites: PHGY209 Mammalian Physiology 1 – 3 credits and PHGY210 Mammalian Physiology 2 – 3 credits or an equivalent knowledge base as judged by the professors

Course Coordinators:
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Email: mh.boudrias@mcgill.ca

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Instructor:
Nahid Norouzi, instructor
Email: nahid.norouzi@mail.mcgill.ca

Teaching Assistant:
To be confirmed

Communication plan: Students should post content related questions on the discussion board of myCourses. For personal queries, course coordinators and instructors can be reached by email. In most circumstances, emails will be answered within 1 business day. Individual phone or Zoom meetings will be set when necessary.

The instructors and TA will be responsible for evaluating specific assignments. To avoid confusion, questions about the group poster project should be directed to the teaching assistant, while questions about the case studies should be directed to the course coordinators.

Course Description: This course aims to provide the student with neurophysiological principles, concepts and mechanisms useful for understanding the nervous system and its aberrations in pathologies that impact upon the functioning of the individual. These principles will be illustrated by reference to normal brain functions in animals and man as well as through illustrations of the effects of their disruption in diseases and other conditions that compromise the normal functioning of the nervous system. At the end of this course, the student will understand the function of major brain structures and will have learned signs and symptoms of some important neurological disease processes that illustrate principles of brain function.
**Course Structure:** The course will be offered remotely and will consist of pre-recorded lectures, and live virtual sessions in the format of clinical cases and question periods to link neurophysiological principles to neurological conditions.

**Student Learning Objectives:**
This course will cover essential competencies and milestones related to the domains of expertise, communication, collaboration and scholarship. Upon completion of this course, the student will be able to:

<table>
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<tr>
<th>Course Objectives and Related Assignments</th>
<th>Online evaluations</th>
<th>Preparatory quizzes</th>
<th>In-class participation</th>
<th>Poster project</th>
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<tbody>
<tr>
<td><strong>Expert</strong></td>
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<tr>
<td>1. <strong>Describe</strong> neurophysiological concepts, principles and mechanisms underlying normal functioning and <strong>explain</strong> their relationships to normal and pathological functioning of the individual.</td>
<td>✓ ✓ ✓</td>
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<td>✓ ✓ ✓</td>
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<td>2. <strong>Identify</strong> key components of the etiology, epidemiology and clinical characteristics of common neurological conditions associated with malfunctioning of brain structures and <strong>appreciate</strong> factors leading to a differential diagnosis.</td>
<td>✓ ✓ ✓</td>
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<td>✓ ✓ ✓</td>
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<td>3. <strong>Identify</strong> key components of the medical treatment, surgical interventions and rehabilitation associated with common neurological conditions and <strong>understand</strong> the impact of such treatment on the functional outcome of clients.</td>
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<td><strong>Communicator</strong></td>
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<td>4. <strong>Employ</strong> effective and appropriate verbal and nonverbal communication with lay public, peers and educators</td>
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<td>✓ ✓ ✓</td>
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<td><strong>Collaborator</strong></td>
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<td>5. <strong>Establish</strong> and <strong>maintain</strong> interprofessional and intraprofessional relationships while understanding the roles and responsibilities of team members.</td>
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<td>✓ ✓ ✓</td>
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<td><strong>Scholarly Practitioner</strong></td>
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<td>6. <strong>Organize</strong> available information about the neurological conditions presented and <strong>select</strong> information that is potentially important in regard to their needs as future rehabilitation specialists.</td>
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<td>✓ ✓ ✓</td>
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<td>7. <strong>Apply</strong> basic literature search and reporting principles.</td>
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<td>✓ ✓ ✓</td>
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Course Materials:

- **Required readings:** Readings for each week will be posted on myCourses
- **Lecture material:** All lecture material will be made available on myCourses before the time of the lecture as PowerPoint slides, recorded lectures, Word documents and/or web links.
- **Useful resources:** A list of resources that you may find useful is provided in Appendix B

Instructional Method:

- Zoom will be used for live session.
- During the online session, the clinician will provide a short overview of the case (5-10 min). The students will be then be split into groups of 6-8. Each group will be assigned one specific question related to the case. The questions are based on the self-learning tool (Appendix A) (also found on myCourses). The members of the group will be discussing that question within their small group for ~10 min (ZOOM break out room). The class will then reconvene as a large group, and small each group will give the answer to the question they were assigned. The invited clinician will provide opportunities for students to discuss and validate their answers.
- All course material can be found grouped by class period on myCourses.
- You can find information on these platforms by consulting the McGill Remote Learning Resources.
- Polling will be used in this course to enhance engagement and increase interactivity.
- During a class with polling questions, you will respond to questions from the instructor from a personal device (smartphone, tablet, or laptop).
- Students should come to class with their devices charged and connected to the Internet.
- Polling will be available through www.mcgill.ca/polling.
- To participate in Polling sessions, you must first register for an account by clicking on register your account at www.mcgill.ca/polling and logging in with your McGill username and password. Follow the prompts to agree to the terms of use and create your account. For more information, please visit the Getting Started for Students section at www.mcgill.ca/polling.
- For any technical problems with polling, please contact the IT Service Desk: http://www.mcgill.ca/it/get-started-it/need-help.
- If you do not have a phone, tablet, or laptop to use to respond to polling questions, please contact the instructor immediately in order for appropriate arrangements to be made.
- To maintain a safe and respectful classroom environment, please ensure that any polling responses you submit are appropriate and relevant to the question asked. Please note that unless the poll is labelled as anonymous, your responses are identifiable to the instructor. Please see the Code of Student Conduct and Disciplinary Procedures.

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### Student Assignment & Evaluation:

<table>
<thead>
<tr>
<th>Assignment Type</th>
<th>Format</th>
<th>Due Date</th>
<th>% of final grade</th>
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</thead>
<tbody>
<tr>
<td>1. Online evaluations</td>
<td>- 3 evaluations containing multiple choice and short answer questions that cover the all the course material.</td>
<td>Eval. 1: Oct 5th</td>
<td>15%</td>
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<td>Eval. 2: Nov 2nd</td>
<td>Eval. 3: Dec. 7th</td>
<td>15%</td>
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<td>2. Preparatory quizzes</td>
<td>- Weekly set of multiple-choice and fill-in the blank questions to prepare for the case presented a clinician.</td>
<td>Each week before</td>
<td>15%</td>
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<td>- Best 10/12 will count towards the final grade.</td>
<td>11:00 AM (ET) on</td>
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<td>the day of the</td>
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<td>presentation.</td>
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<td>3. In-class participation</td>
<td>- Following each case presentation, students must answer 2 questions in the quiz section on MyCourses.</td>
<td>Each week on the</td>
<td>10%</td>
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<td>- Each question will be graded as complete (1), incomplete (0.5), absent (0)</td>
<td>Friday following</td>
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<td>the case</td>
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<td>presentation.</td>
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<td>4. Poster project</td>
<td>- Design of a virtual scientific poster on a self-selected condition with assigned questions.</td>
<td>Choice of topic:</td>
<td>n/a</td>
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<td>- A virtual poster presentation will be organized with a prerecorded explanation of the poster and live Q &amp; A session with instructor.</td>
<td>Nov. 10th</td>
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<td>- A vote on best 3 posters with rationale by each student. Winners will be posted</td>
<td>Poster: Dec 7th</td>
<td>15%</td>
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<td>Presentation: Dec</td>
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<td>7th</td>
<td>10%</td>
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<td>Q &amp; A session:</td>
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<td>TBD (in the exam</td>
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<td>period)</td>
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<td>Vote: Dec 14th</td>
<td>5%</td>
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### Special Requirements for Course Completion and Program Continuation:

In order to pass the course, a grade of at least C+ (60%) must be obtained as a total course mark. A supplemental exam is permitted in this course. Please refer to the McGill University Health Sciences Calendar for information on University regulations regarding final examinations and supplemental examinations. The modalities used for remedial work will be determined by the instructors on a per case basis.

**Consent for recorded lectures:** Students must consent to being recorded if they are attending a lecture or participating in a component of a course that is being recorded. Students will be notified through a “pop-up” box in Zoom if a lecture or portion of a class is being recorded. If they are not comfortable being in a class that is recorded, students may decide to not take part by logging off Zoom. Instructors will make class recordings available in myCourses so that students who log off will be able to later watch the recording.
Plagiarism/Academic Integrity: [Amended by Senate on April 17, 2013]: McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures” (see McGill’s guide to academic honesty for more information).

L’université McGill attache une haute importance à l’honnêteté académique. Il incombe par conséquent à tous les étudiants de comprendre ce que l'on entend par tricherie, plagiat et autres infractions académiques, ainsi que les conséquences que peuvent avoir de telles actions, selon le Code de conduite de l’étudiant et des procédures disciplinaires.

IMPORTANT: The instructors may make use of text comparison software to compare the work submitted with that of previous years.

Right to submit in English or French written work that is to be graded: In accord with McGill University’s Charter of Students’ Rights, students in this course have the right to submit in English or in French any written work that is to be graded. This does not apply to courses in which acquiring proficiency in a language is one of the objectives.

Conformément à la Charte des droits de l’étudiant de l’Université McGill, chaque étudiant a le droit de soumettre en français ou en anglais tout travail écrit devant être noté (sauf dans le cas des cours dont l’un des objets est la maîtrise d’une langue).

Consequences of not completing assignments as requested: An individual who does not complete a required assignment and who does not have a university-recognized reason for deferral will receive a 0 in that portion of the course. Assignments submitted late will receive a deduction of 2% per day, including weekends.

Dress Code: Professionalism with respect to dressing is encouraged throughout the course of the semester. It is each student’s responsibility to have appropriate attire during all class assignments and learning activities.

Copyright of course materials: Instructor generated course materials (e.g., handouts, notes, summaries, exam questions, etc.) are protected by law and may not be copied or distributed in any form or in any medium without explicit permission of the instructor. Note that infringements of copyright can be subject to follow up by the University under the Code of Student Conduct and Disciplinary Procedures.

Disability: As the instructor of this course I endeavor to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with me and the Office for Students with Disabilities, 514-398-6009.

Course evaluations: End-of-course evaluations are one of the ways that McGill works towards maintaining and improving the quality of courses and the student’s learning experience. You will be notified by e-mail when the evaluations are available. Please note that a minimum number of responses must be received for results to be available to students. Additional policies governing academic issues which affect students can be found in the Academic Rights and Responsibilities.
Assignment Details

1. Online Evaluations (45%)
   - Three (3) online evaluations will be completed during the semester.
   - Online evaluations will consist of multiple choice, fill-in the blank and short answer questions that cover the material from previous weeks.
     - Evaluation 1: Weeks 1-4; clinical cases 1-3
     - Evaluation 2: Weeks 5-8; clinical cases 4-7
     - Evaluation 3: Weeks 9-13; clinical cases 8-12
   - Each quiz will be available for 72 hours in the Quiz section of myCourses.
   - When you start the exam, you will have 1 hour and 35 minutes to complete it. Each quiz is designed to be completed in 60 minutes. We added 15 minutes to account for technical difficulties and another 20 minutes to account for a personal situation that may require more time.

2. Preparatory quizzes (15%)
   - Every week, a clinician will present a neurological condition that they encounter in their practice during a live Zoom session.
   - Case studies and guiding questions related to the neurological condition under discussion will be posted via myCourses in the file for the corresponding lecture.
   - In order to optimize your learning experience and allow for an interactive session, you will be asked to complete an online quiz before each case presentation.
   - The questions are not designed to be tricky or difficult but are meant to assess your comprehension of the case and of the readings in order to prepare for the clinical case presentations. Cases are constructed to emphasize signs & symptoms, treatment options or topics relevant to the neurological condition discussed.
   - Each quiz will consist of 4-5 multiple choice or fill-in the blank questions based on the reading material, associated with the case history and the case-related readings.
   - The preparatory work quiz will be made available in the quiz section of myCourses one week prior to the corresponding case presentation and will have to be completed by 11:00 AM (ET) on the day of the presentation.
   - There will be a total of 12 preparatory quizzes, one for each case presentations 1 to 12. The 10 quizzes with the highest marks will count towards the final grade.

3. In-class participation (10%)
   - Following each case presentation, students must answer two (2) questions in the quiz section on MyCourses by the Friday following the case presentation.
     1. What is the most interesting fact that you learned about this condition? Justify your answer by for instance telling us how info can influence your clinical practice.
     2. What concept remains most unclear for you? Explain where you could look to get more information.
   - Each question will be graded as complete (1), incomplete (0.5), absent (0)
4. Poster project (30% of final mark, group project)

Format:
This project consists in designing a virtual scientific poster on a self-selected neurological condition that was not covered in the course, presenting it to the class, answering questions from the instructors and voting for the best poster. This project will be graded in 3 sections

- The electronic poster (15%)
- The virtual presentation and Q & A period (10%)
- Voting (5%)

Groups and topic selections:
- This project will be done in groups of 4-5 students that will be assigned on myCourses.
- Each group will need to select a condition based on the list below or submit another condition of their choice by email to Prof. Bolduc by November 10th, 2020.

Electronic poster (15%):
- The poster must address the following topics that are based on the self-learning tool (Appendix A):
  1) Epidemiology
  2) Causes
  3) Signs and symptoms
  4) Diagnostic process
  5) Treatment interventions
- A detailed grading rubric will be available on myCourses one (1) month before the paper is due.

Virtual presentation and Q & A period (10%)
- Posters need to be accompanied by a prerecorded 4-5 minutes presentation of the poster.
- Students will also have a 10 minutes Q & A session with instructor during the exam period.

Voting
- Students will be asked to review all posters and prerecorded presentations and fill the voting ballot in the Quiz section of myCourses.
- On the voting ballot you will be asked to vote for your top 3 posters. For each of your favorite poster you will be asked:
  a. What distinguishes this poster/presentation from the others?
  b. What could have been improved on that poster/presentation?
  c. How can the information presented on that poster influence your future practice?

Poster topics
The available topics will be:
  o Spina Bifida
  o Duchenne Muscular Dystrophy
  o Multiple Sclerosis
o Brachial Plexus Avulsion
o Left Temporal Stroke
o Occipital Stroke
o Frontal Stroke
o Amyotrophic Lateral Sclerosis
o Guillain-Barré Syndrome
o Peripheral Neuropathy secondary to type 2 diabetes
o Paranoid Schizophrenia
o Meningitis
o Autonomic Dysreflexia in a client with Spinal Cord Injury
o Huntington’s Disease
o Whiplash injury
o Spastic Cerebral Palsy
o Machado-Joseph Disease
o Lewi-body dementia

In the event of extraordinary circumstances beyond the University’s control, the content and/or evaluation scheme in this course is subject to change.
## Appendix A: Self-Learning Tool

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<tbody>
<tr>
<td><strong>Medical condition:</strong> _______________________________</td>
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</table>
| **1. Neurological aspects (Etiology)** | a. When someone is found to have this condition what part of the nervous system has been affected and what brain functions are affected, and how?  
(Ex: central versus peripheral nervous system, sensory versus motor cortex, dopamine versus serotonin) |
|  | b. For this condition, what are the probable causes of the alteration observed in the normal nervous system?  
(Ex: anoxia, atrophy, trauma, demyelination)  
The answers to question 1 and 2 often overlap. |
|  | **2. Epidemiological aspects** |
| a. What are the factors more often associated with an increased risk of developing this medical condition?  
(Ex: hypertension, diabetes, heredity) |
| b. Is this medical condition more commonly seen in a specific group of individuals?  
(Ex: male vs female, old vs young, caucasians vs hispanics) |
| **3. Clinical aspects (Signs & symptoms)** | a. What are distinctive clinical signs and symptoms associated with this medical condition? What are the principal factors needed for a differential diagnosis?  
(Ex: hemiplegia, ataxia, tremor, loss of short-term memory) |
| b. Are other impairments associated with this condition?  
(Ex: hydrocephalus and cognitive impairments are often associated with spina bifida) |
| **4. Psychosocial aspects** | a. What are the functional implications of this medical condition? i.e. What are the activity restrictions and participation limitations to be encountered in an individual’s daily activities?  
(Ex: Is there an increased probability of falls? What are the limitations for the person?) |
| **5. Treatments** | a. What are the most common medical treatments currently in use for this condition?  
(Ex: rTPA, Ritalin, surgery, rehabilitation, diet restrictions, etc.) |

For each of these medical treatments consider:  
- The clinical signs and symptoms alleviated by this treatment.  
- How the treatment acts on the clinical signs and symptoms.  
- The positive and negative impacts of the medical, surgical and/or rehabilitation treatment on functional outcomes of the individual.

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Appendix B: Useful References

Texts:


Websites:

- Canadian Stroke Network: http://www.canadianstrokenetwork.ca/