Course Syllabus
NSCI 337-Neurotoxicology and Neurodegeneration
Instructor: Professor Gunnar Kwakye
Tues and Thurs 11:00-12:15 pm, Science Center A254

Contact Information:
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Tutors:
Marion Park (mrpark@oberlin.edu)
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Course Objectives:
Neurotoxicology is the science that deals with adverse effects of chemicals and injurious agents on the nervous system. The objective of this course is to introduce students to the pathophysiological link between neurotoxicology and neurodegeneration (progressive neuronal loss observed in many neurodegenerative diseases) due to aberrant cellular pathways.

By the end of the course students should have at minimum, a basic understanding of the following:
1. Principles of toxicology and neurotoxicology
2. Modes of action of chemicals and other injurious agents on the nervous system
3. Methods used to study neurotoxicology and neurodegeneration
4. Effects of toxins in neurodevelopment
5. Role of metals in neurodegeneration
6. Basic cellular mechanisms of neurodegeneration

Helpful reading books and Course Aids:
(i) ***Casarett & Doull's Essentials of Toxicology (2nd edition)*** by Curtis D. Klaassen & John B. Watkins III. The McGraw-Hill Companies, Inc. (ISBN 978-0-07-162240-0).
(ii) ***Principles of Neurotoxi****cology edited* by Louis W. Chang. Marcel Dekker, Inc. (ISBN 0-8247-8836-2).
(iii) ***Handbook of Developmental Neurotoxicology*** *edited* by William Slikker, Jr. and Louis W. Chang. Academic Press Limited. (ISBN 0-12-648860-6).
(iv) ***Toxicology: Principles and Applications*** *by Raymond J. M. Niesink, John de Vries, & Mannfred A. Hollinger.* CRC press, Inc. (ISBN 0-8493-9232-2).
(v) ***Neurotoxins and Neurodegenerative Disease*** *edited* by J. William Langston & Anne Young. Annals of the New York Academy of Sciences,Vol. 648. (ISBN 0-89766-696-8).
(vi) ***Metal-based Neurodegeneration*** by Robert R. Crichton and Roberta J. Ward. John Wiley & Don's, Ltd, Inc. (ISBN 13 978-0-470-02255-9).
(vi) ***Neurodegeneration (2nd edition)*** by Dennis W. Dickson and Roy O. Weller.
I have requested a copy of some of these books to be reserved in the Science Library.

Blackboard:
There is a Blackboard course website for this course on which I will post the syllabus, announcements, journal club discussion articles, helpful reading materials, and PDF versions

of lecture presentations. I will make every effort to have the lecture presentations posted the evening before class.

Lectures:
Attendance at lectures is critical for optimal performance in this class. We will be discussing several topics not described in detail in any single textbook and the material covered in lectures will be *emphasized* during all exams. If you are absent, it's your responsibility to obtain the material covered in class from a classmate.

Course Evaluation:		**Date**
Journal club (in class discussion) (**5%**)		March 7, April 4, and May 9, 2013
Journal club (written assignments) (**5%**)		March 7, April 4, and May 9, 2013
Exam I (**10%**):		Feb 19, 2013
Exam II (**15%**):		March 12, 2013
Exam III (**20%**):		April 9, 2013
Exam IV (**20%**):		April 30, 2013
Exam V (**25%**):	**by 4:00pm (EST)**	May 15, 2013

******NOTE:*** *In order to pass the course you must complete ALL exams, journal club written assignments and participate in journal club discussions***

Examinations (90%)
There will be five (5) exams for this course. The first four (4) exams will be **closed-book, closed-notes** and will be of a mixed format including (but not limited to) multiple choice, fill in the blank, true/false, short answer questions, short essay and case-study questions. The fifth exam (**Final**) will be **an open-book exam** and comprise of short and long essay as well as case-study questions. You may use your personal notes, class handouts, and other class reading materials. **YOU CANNOT DISCUSS THE TAKE HOME EXAM WITH ANYBODY BESIDES THE INSTRUCTOR.** The completed exam must be submitted via Blackboard as a word document saved with the following file name: your first-last names.doc. The document should have 0.5" margins (Top, Bottom, Left, and Right) and 11- Cambria font size by 4:00 PM (ET) on Wednesday, May 15th 2012.
If you miss an exam, a grade of zero will be given unless documentation for a College approved excuse is received within one week of the exam date.
The articles assigned for the Journal club discussions are testable.

Journal Club Discussion (5%):
Assigned journal club articles MUST be read before the class convenes for journal club discussion. Active class participation is also vital for the class and for your development as a neuroscientist; therefore, you are expected to enthusiastically participate in class discussions and debates.
***In class discussion*:** Students will break into small groups and discuss their answers to the journal club article questions with their classmates. At the end of class, we will come together to discuss the article as a class. For the class group discussion, students will break into two groups (Pro vs Con) and informally participate in a debate based on the written assignment questions below.

Journal Club Written Assignments (5%):
Briefly, you will be required to answer the following questions after reading the assigned article and before class with the aim of:

i) Identifying the key reasons why the authors investigated the scientific questions.

ii) Examining the hypothesis(es) being tested.
iii) Suggesting other alternative hypothesis/hypotheses that could possibly refute the authors' hypothesis(es) based on what you know in (i).
iv) Assessing the strengths and weakness of the methodology used to test the hypothesis(es).
v) Critically evaluating the results in the context of the hypothesis(es).
vi) Identifying the implications of the experimental findings in the field of neuroscience and neurotoxicology.
(vii) Proposing new future directions not addressed in the authors' discussion section of the article.

Students will have to submit their answers to the instructor via blackboard by **9:00 pm (EST) the day of the journal club**. Your written assignment should be **no more than 1 page** in length for the assigned article. It should be a word document with 0.5" margins (Top, Bottom, Left, and Right) and 11- Cambria font size.

Before turning in your answers to the journal club questions, you will be required to write the honor pledge and sign it on your assignment. The honor pledge is: "I affirm that I have adhered to the Honor Code in this exam".

Students with Disabilities
If you have physical, psychiatric or learning disabilities that require accommodations (e.g., a note taker or special testing arrangements), please let me know as soon as possible so that your learning needs can be met. You will also need to provide me with proper documentation. To obtain this documentation you'll have to contact Ms. Jane Boomer at the Office of Disability Services, Peters Hall G-27/G-28 (phone: 775-5588).

The Oberlin College Honor Code
The Oberlin College Honor Code applies to all exams for this course. To access the complete Honor Code via Blackboard, please go to the tab Lookup/Directories > Honor Code. Before turning in your final exam, you will be required to write the honor pledge and sign it. The honor pledge is: "I affirm that I have adhered to the Honor Code in this exam".

A few comments on course etiquette
Policy on tardiness*:* Please arrive to class on time. In the event that you are late, please enter as quietly as possible.
Technology etiquette*:* Please refrain from engaging in any personal internet/communication activities while in the classroom. Also, please ensure that your cell phones, tablets, etc., are turned off during class time. If there is a compelling reason why you need to have these devices on, please talk to me about it in advance.
Email etiquette**:** You are encouraged to contact me via email for questions that do not require expansive answers. If questions require more than a few lines, I will direct you to visit me during office hours or to schedule an appointment.

NSCI337 Spring 2013 Lecture/Exam Schedule

(Please note that this is a tentative lecture schedule; topics may vary at my discretion)

Date	Description	Helpful reading
Feb 5 (T)	Introduction: Principles of Toxicology/Neurotoxicology-Part I	Casarett & Doull's: chapters 1, 2, 3, 5, 6
Feb 7 (Th)	Introduction: Principles of Toxicology/Neurotoxicology-Part II	Casarett & Doull's: Chapters 2, 3, 4
Feb 12 (T)	Neurotoxicology of the central and peripheral nervous systems	Chang: parts I and II
Feb 14 (Th)	Modes of action of neurotoxins on the nervous system (mitochondrial mechanisms, calcium homeostasis, and cell death mechanisms)	Langston: Part II Dickson: Part 1
Feb 19 (T)	**EXAM I *(Feb 5- Feb 14 lectures)***	
Feb 21 (Th)	Oxidative stress and redox-active metal ions	Chang: chapter 20; Dickson: Part 1
Feb 26 (T)	Excitotoxins	Langston: part VI
Feb 28 (Th)	Role of ion channels in neurotoxicology	Chang: parts 17, 19, and 22
Mar 5 (T)	Behavioral and non-behavioral assessments in Neurotoxicology	Slikker, Jr: chapter 22
Mar 7 (Th)	*Journal club discussion I*	To be assigned
Mar 12 (T)	**EXAM II *(Feb 21- March 5 lectures and JC I article)***	
Mar 14 (Th)	Placental transfer and pharmacokinetics of neurotoxins	Chang: part 23
Mar 19 (T)	Developmental Neurotoxicity of Nicotine	
Mar 21 (Th)	Neurotoxic Syndromes - **Part I**: (i) Fetal Minimata disease: congenital methylmercury poisoning (ii) Developmental neurotoxicity of cadmium	Slikker, Jr: chapters 29 and 30
Mar 26 and 28 (T&Th)	***SPRING BREAK***	
Apr 2 (T)	Neurotoxic Syndromes - **Part II**: Developmental neurotoxicity of lead	Slikker, Jr: chapter 31
Apr 4 (Th)	*Journal club (JC) discussion II*	To be assigned
Apr 9 (T)	**EXAM III *(March 14 - April 2 lectures and JC II article)***	
Apr 11 (Th)	Alzheimer's Disease and Aging	Chrichton: chapter 4, 9, 10,11 Dickson: Part 2
Apr 16 (T)	Tauopathies	Dickson: Part 3
Apr 18 (Th)	Synucleinopathies and Parkinson's Disease	Dickson: Part 4 Chrichton: chapter 3, 9, 10,11
Apr 23 (T)	Trinucleotide Repeat Disorders	Chrichton: chapter 5, 9, 10,11 Dickson: Part 5
Apr 25 (Th)	Prion Disorders	Dickson: Part 6
Apr 30(T)	**EXAM IV *(April 11 - April 25 lectures)***	
May 2 (Th)	Amyotrophic Lateral Sclerosis (ALS) and Primary Lateral Sclerosis	Dickson: Part 8
May 7 (T)	Frontotemporal Lobar Degeneration and Other Neurodegenerative Disorders	Dickson: Parts 7 and 8
May 9 (Th)	*Journal club (JC) discussion III and CLASS WRAP UP*	
May 15 (W)	**TAKE HOME FINAL EXAM (due by 4:00pm)**	