BIO3356/5456: “ORGANIZATION AND DEVELOPMENT OF THE NERVOUS SYSTEM”

SUMMER 2017

Instructor
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Class
Tuesday/Thursday 13:30-4:25 pm, 342 BioSciences Building

Office Hours
Tuesday/Thursday 4:30-6:00 pm or by appointment

Prerequisites
BIO3096 “Cell Structure and Function” or permission of instructor

Textbook
“Development of the Nervous System”
ISBN: 978-0-12-374539-2

The textbook is on reserve in the Paley Library.

Powerpoint slides with notes of each lecture and additional material (journal articles, reports, videos etc.) will be posted on Blackboard.

Course Description
The course is designed for upper division undergraduate and graduate students who have a background in Biology/Neuroscience. It introduces students to the fundamentals of how embryos construct their nervous systems and how the human brain has evolved. The course explores how a single cell, the fertilized egg, divides to form the neural tube and generate progressively a network of cells during development, and ultimately the complex nervous system (developmental origin). In addition, the ancestry of our brains back to simpler organisms will be examined (evolutionary origin). Finally, the brain wiring constructed by regulation of gene expression, will be discussed in order to understand at the molecular level the organization and development of the brain, as well as its tuning in response to environmental cues.

The following topics will be covered: general organization of the nervous system, neural induction, patterning, neurogenesis, axonal growth and target selection, neuron death, synaptogenesis, neuronal network maturation, neural crest, glial cells, adult neurogenesis and neural stem cells, etc.
Course Objectives
Students taking this course will learn the cellular and molecular mechanisms that underlie the development of the nervous system, the cellular processes involved, such as cell division and cell migration, and the function of molecules and signaling pathways in each process. Moreover, developmental pathologies in humans will be studied to understand normal developmental processes.

Learning outcomes
By the end of this course students should be able to recognize that:
- Development of the nervous system is an essential aspect of animal development.
- Common principles and mechanisms govern the establishment of the nervous system in several species serving as experimental models.
- Understanding the developmental and evolutionary history of the brain constitutes an important element for deciphering its physiology and pathology.

Course Requirements
This is a lecture course that requires active engagement of students in class through discussion sessions to organize acquired knowledge. Readings of assigned chapters should be done before class meetings. Graduate students will present in class primary scientific literature on current research in topics, such as molecular basis of neuronal cell fate determination, experience-based refinement of connections, etc.

Students are expected to attend all lectures and exams. If circumstances prevent a student from attending a lecture or taking an exam, please notify the instructor in advance, if possible. Class meetings will be held June 27- August 8, 2017.

Quizzes and Exams
Quizzes and exams consist of a combination of short answers, multiple choice, true-false, and fill-in-the-blank questions. Tests for graduate students will include 20% additional questions. Grades for the course will be posted on the Blackboard.

Final grade (letter) will be based on:
- Quizzes weekly (7/6, 7/13, 7/27) 30 points
- Midterm exam (7/20) 30 points
- Final exam (8/8) 30 points
- In-class participation 10 points
Course Policies

Academic Honesty and Plagiarism
Any form of academic dishonesty—plagiarism and cheating—is as unacceptable in this course as it is across the University and throughout higher education. Plagiarism is defined in the Bulletin as “the unacknowledged use of another person's labor, another person's ideas, another person's words, and another person's assistance.”

Disability Disclosure Statement
Any student who has a need for accommodation based on the impact of a documented disability, including special accommodations for access to technology resources and electronic instructional materials required for the course, should contact the instructor privately to discuss the specific situation as soon as possible. You may also contact Disability Resources and Services (DRS) at 215-204-1280 in 100 Ritter Annex to learn more about the resources available to you. Reasonable accommodations for all students with documented disabilities will be provided by the DRS in coordination with the instructor.

Technology Usage Policy
Read Temple University’s Technology Usage policy which includes information on unauthorized access, disclosure of passwords, and sharing of accounts. The Temple University Technology Usage Policy can be accessed at http://policies.temple.edu/PDF/84.pdf

Resources
Access your course materials at Blackboard (https://blackboard.temple.edu); Databases, journal articles, and more at Temple University Libraries (http://library.temple.edu/); Obtain 24/7 technology assistance at Computer Services Helpdesk (http://www.temple.edu/helpdesk)
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