Syllabus

Course title: Cellular Neuroscience & Disease

Course number: PCB 6849

Pre-requisites: PCB 3063 Genetics

Co-requisites: PCB 4023 Molecular and Cellular Biology

Instructor: Tanja A Godenschwege

Office number: SC 209

Telephone: 561-297-1390

E-mail: godensch@fau.edu

Office hours: Monday-Friday 9:15am-10:30am, SC209


Supplementary texts: Recent research and review papers (see attached bibliography), which will be posted on blackboard or given as handouts.


Course description, purpose and objectives: Cellular neuroscience with a focus on human neurological diseases and is a course that can be taken by graduate and undergraduate students. We will analyze different signaling pathways and connect developmental malfunctions in them to neurological disorders such as Alzheimer's,
Parkinson's, Down syndrome, and Lou Gehrig's disease. We will examine molecular mechanisms involved in axon/dendrite growth and guidance, synapse formation, regeneration and degeneration. Finally, we will also cover electrical properties of neurons and muscles and their connections to ailments like Myasthenia Gravis and Cardiac Arrhythmias. Lectures will provide the students with the basic knowledge about cellular and molecular Neuroscience and will help them critically read and analyze original research papers. Discussions, presentations and proposal writing are aimed to stimulate independent thinking about neuroscience research topics and enhance skills in scientific communication.

**Method of instruction:** Lectures, classroom exercises, single and group assignments, discussion, proposal writing and presentations.

**Topics**

1.) Introduction & Outline  
2.) Neuron & Glia  
3.) Neuron doctrine  
4.) Ion channels and Action potential,  
5.) Potassium channels and Long QT syndrome,  
6.) Chemical Synaptic transmission,  
7.) Acetylcholine receptors and Myasthenia gravis  
8.) Motorneuron diseases  
9.) Guidance of Axons & Dendrites  
10.) Synapse formation & cell adhesion molecules  
11) L1-CAM & CRASH syndrome  
12) Review session  
13.) Midterm Exam  
14.) Test review  
15.) Oxidative and Thermal Stress Part 1  
16.) Oxidative and Thermal Stress Part 2  
17.) Amyloid precursor protein & Alzheimer  
18.) Alzheimer, Down syndrome and Patent  
19.) Amyloid precursor protein & endogenous function  
20.) Neurotransmitter & Dopamine
21.) Dopamine and Parkinson’s
22.) CNS & PNS Regeneration
23.) Scientific communication & Proposal outline
24.) Autism & Example of Proposal
25.) Discussion Proposals Part 1
26.) Discussion Proposals Part 2
27.) Intro to Neuroscience Seminar Intro
28.) Proposal submission
29.) Review of Proposals

**Assessment Procedures, Grading Criteria, Class Policies:**

Dependent on the topics covered, may include attendance, midterm exam (class 13), homework assignments, presentations, class participation, and final proposal paper (class29).

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94-100%=A, 90-94%=A-, 86-90%=B+, 82-86%=B, 78-82%=B-, 74-78%=C+, 70-74%=C, 66-70%=C-, 62-66%=D+, 58-62%=D, 54-58%=D-, <54%=F; grades may be curved to adjust to 100%

It is the responsibility of the student to withdraw from this class, should that status be desired - the instructor cannot withdraw students from the course. The instructor will not give the grade of "I" in lieu of a grade of "D" or "F". The grade of "I" will be considered only in exceptional cases (such as serious illness) for students who are presently performing at a "C" or higher level in the course.

**Attendance.** Students are expected to attend all scheduled classes. If you miss a class you are responsible for ALL the material covered during that class, including
lecture material and rules and regulations about the course (such as penalties for late assignments, etc.).

**Homework assignments and papers.** The papers and homework are due on the dates assigned. These will be accepted up to 1 week late, but they will be penalized. None will be accepted over 1 week late.

**Midterm Exam.** The material covered will include the material covered in class and the assigned readings. All students are expected to take the exams on the days they are scheduled. Makeup exams will be given only in exceptional circumstances and only if the student contacts the instructor BEFORE the exam. Some of the material covered in the lectures (and included on the exams) is NOT in the required texts.

**Final Exam.** The final exam will be a 5-page proposal paper excluding references and figures about a topic in cellular neurosciences. Due date will usually be first week of December or 2 weeks before the semester ends. Only in exceptional circumstances proposals after due dates will be accepted up to 3 days late, but they may be penalized.

**Accommodations for students with disabilities.** In compliance with the Americans with Disabilities Act (ADA), students who require special accommodations due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) located in Boca Raton - SU 133 (561-297-3880), in Davie - MOD I (954-236-1222), in Jupiter - SR 117 (561-799-8585), or at the Treasure Coast - CO 128 (772-873-3305), and follow all OSD procedures.

**Honor Code.** Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty, including cheating and plagiarism, is considered a serious breach of these ethical standards, because it interferes with the University mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the University community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see [http://www.fau.edu/regulations/chapter4/4.001_Honor_Code.pdf](http://www.fau.edu/regulations/chapter4/4.001_Honor_Code.pdf).
Bibliography:

Course book:

Chapters of other books used:
   Chapter 5: Axon Guidance and growth
   Chapter 6: Target Selection
   Chapter 9: Refinement of synaptic connections

   Chapter 2: Intracellular signaling.
   Chapter 6: Inherited and neurodegenerative diseases

Original and review papers used:


