

Course Title: CELLULAR AND MOLECULAR NEUROSCIENCE, PSB 6345 (3 credits)

Logistics: Fall Semester, 2019
Class will be given remotely online via Webex
Tues & Thurs 11:00 AM-12:20 PM

Course Coordinator/Instructor of Record (Office Hours via remotely)

Dr. Robert P. Vertes, Behavioral Science 521, 7-2362; rvertes@fau.edu (Tues & Thurs 9:30-10:30 AM)

Required Course Materials for distance learning:

- **Instructional Method: Online, live lecture via Canvas-Zoom. Attendance Required and Graded**

Requirements: computer, webcam with microphone, Respondus LockDown Browser and Respondus Monitor (for exam proctoring).

More on tools for online classes and proctoring: <https://www.fau.edu/keep-learning/proctoring/>

Course Description: This course is intended for Graduate Students and is the first of a two-part core sequence (6 credits total), which together provide in-depth coverage of the principles of neuroscience. Neuroscience 1 topics include neural cell and molecular biology, genetics of behavior, fundamentals of electrical and chemical signaling of neurons, post-synaptic mechanisms, neural development and synaptic plasticity. Interested undergraduates should consult instructors.

Course Objectives: This foundation course prepares the graduate student for courses that are more intensive and for training in brain science. Neuroscience is a vast discipline; the topics to be covered are extensive, and so we will not be able to cover them all in great depth in class. However, as a graduate student you are expected to complete all of the assigned readings provided as well as research additional material as necessary to achieve a mastery of the subject matter. We recommend reading textbook chapters before class. The course will follow a lecture format with in-class discussion of the topics presented. Questions and discussion are actively encouraged.

Required Text: Kandel, Schwartz, Jessell et al. (2013) *Principles of Neural Science*, 5th edition, McGraw-Hill Co, (KSJ)

Readings for In-class Discussions: Readings will also be assigned from the primary literature to reinforce topics covered in lecture. Each paper will be discussed in class on the respective date indicated on the schedule. You are expected to read each paper and then be prepared to discuss it in class. There will also be exam questions based on these readings.

Course Evaluation Method: Course grade will be based on (i) three equally weighted (30% each) exams; (ii) participation in class discussions of readings (5%); and (iii) attendance (5%). The exams will be comprised of multiple-choice and short essay style questions to test your understanding of course topics. **Exams will be based on material from lecture and assigned readings.** No extra credit will be given. As a graduate course, final grades fall on a scale of A – C, with a grade of C representing insufficient mastery of the material. An incomplete grade (I) will not be given in lieu of a grade of C.

Disability Policy: In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework, must register with Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three campuses – in Boca Raton, SU 113 (561-297-3880); in Davie, MOD (954-236-1222); and in Jupiter, SR 117 (561-799-8585); however, disability services are available for students on all campuses. For more information, please visit the SAS website at www.fau.edu/sas/

Code of Academic Integrity Policy: Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty 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 University Regulation 4.001. If your college has particular policies relating to

cheating and plagiarism, state so here or provide a link to the full policy—but be sure the college policy does not conflict with the University Regulation.

Reasonable Accommodation for Makeups: Reasonable accommodation will be made for students participating in a religious observance or in University-approved activities, including athletic or scholastics teams, musical and theatrical performances and debate activities. Unjustifiable reasons for missing an exam, or in-class paper discussion, will result in zero points for the exam missed, or zero points for the respective journal article discussion. Appropriate documentation must be presented for justifiable absence from an exam.

Counseling and Psychological Services (CAPS) Center: Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to <http://www.fau.edu/counseling/>

Credit Hour Definition: This course involves 50 minutes of in class instruction for each credit hour per week, and a minimum of two hours of out of class assignments each week for 15 weeks.

Course Schedule / Assigned Readings:

The following topics will be covered; however, we may spend more time on one than another.

08-25 (T):	Course Overview -- Varela
08-27 (R):	Historical perspective and neural basis of behavior (KSJ: 1) -- Varela
09-01 (T):	Cellular & molecular basis of the nervous system (KSJ: 2, 4) – Varela
09-03 (R):	Cellular & molecular basis of the nervous system (KSJ: 2, 4) -- Varela
09-08 (T):	Neurons and glia (KSJ: 4) – Quan
09-10 (R):	Neurons and glia (KSJ: 4) – Quan
09-15 (T):	Ion channel structure/function (KSJ: 5) – Varela
09-17 (R)	Membrane potential, passive properties (KSJ: 6) – Vertes
09-22 (T)	Membrane potential (KSJ: 6) -- Vertes
09-24 (T)	Exam 1
09-29 (T)	Action potential (KSJ: 7) – Vertes
10-01 (R)	Action potential (KSJ: 7) – Vertes
10-06 (T):	Action potential, conduction (KSJ: 6) – Vertes
10-08 (R):	Overview of synaptic transmission (KSJ: 8) – Zhang
10-13 (T)	Overview of synaptic transmission (KSJ: 8) – Zhang
10-15 (R)	Neuromuscular junction (KSJ: 9) – Vertes
10-20 (T)	Neuromuscular junction (KSJ: 9) – Vertes
10-22 (R)	Central synapses (KSJ: 10) – Vertes
10-27 (T)	Factors controlling transmitter release (KSJ -12) – Vertes
10-29 (R)	Exam 2
11/03 (T)	Neurotransmitters and neuromodulation (KSJ: 11, 13) – Toll
11-05 (R)	Neurotransmitters 2 (KSJ: 11, 13) – Toll
11-10 (T):	Receptors and molecular signaling cascades (KSJ: 11, 13) – Toll
11-12 (R)	Receptors and molecular signaling cascades (KSJ: 11, 13) – Toll
11-17 (T):	Neurotransmitter transporters – (KSJ: 11, 13) -- Blakely
11-19 (R):	Synaptic plasticity – short-term forms (Purves, Ch. 8) -- Varela

11-24 (T)	Synaptic plasticity – long-term forms (Purves, Ch. 8 -- Varela
11-26 (R):	No class, <i>Thanksgiving Day</i>
12-01 (T):	Synaptic plasticity -- relevance to behavior -- Varela
12-03 (R)	<i>Discussion paper:</i> Hasegawa et al., 2020 – Varela
12-08 (T)	Reading day
12-10 (R)	Exam 3

Subject: Neuroscience Certificate support memo

From: William Kalies - To: cbeetle@fau.edu - Cc: - Date: February 7, 2021 at 11:13 PM



Charles E. Schmidt College of Science
Department of Biological Sciences
777 Glades Road
Boca Raton, FL 33431
tel: 561.297-3320
fax: 561.297-2749

MEMORANDUM

To: William Kalies, Associate Dean for Graduate Studies, Charles E. Schmidt College of Science
Christopher Beetle, Chair, College Graduate Programs Committee, Charles E. Schmidt College of Science

From: Sarah L. Milton, Chair, Department of Biological Sciences

Cc: Teresa Wilcox, Interim Dean, Charles E. Schmidt College of Science
Randy Blakely, Executive Director, FAU Brain Institute
Robin Vallacher, Interim Chair, Department of Psychology
Gary Perry, Director, Center for Complex Systems

Date: March 5, 2021

Re: Course Title Changes for Neuroscience 1 & 2

Dear Bill and Chris,

The Department of Biological Sciences has reviewed and endorse the changes to Neuroscience 1 (PSB 6345, now Cellular and Molecular Neuroscience) and Neuroscience 2 (PSB 6346, now Systems and Integrative Neuroscience). We have prepared and attach requests to update the catalog program description accordingly.

Sincerely,

A handwritten signature in black ink that reads 'SL Milton'.

Sarah L. Milton
Professor and Chair
Department of Biological Sciences



Center for Complex Systems and Brain Sciences
& Department of Psychology
Charles E. Schmidt College of Science
777 Glades Road
Boca Raton, FL 33431-0991

Gary W. Perry, PhD
Behavioral Science (BS 12); Room 309
Email: perryg@fau.edu

MEMORANDUM

To: William Kalies, Associate Dean for Graduate Studies, Charles E. Schmidt College of Science
Christopher Beetle, Chair, College Graduate Programs Committee, Charles E. Schmidt College of Science

From: Gary W. Perry, Director, Center for Complex Systems and Brain Sciences

Cc: Teresa Wilcox, Interim Dean, Charles E. Schmidt College of Science
Randy Blakely, Executive Director, FAU Brain Institute
Robin Vallacher, Interim Chair, Department of Psychology
Sarah Milton, Chair, Department of Biological Sciences

Date: February 9th, 2021

Re: Course Title Changes for Neuroscience 1 & 2

Dear Bill and Chris,

The faculty in Complex Systems and Brain Sciences have reviewed and endorse the changes to Neuroscience 1 (PSB 6345, now Cellular and Molecular Neuroscience) and Neuroscience 2 (PSB 6346, now Systems and Integrative Neuroscience). We have prepared and attach requests to update the catalog program description accordingly.

Sincerely,

A handwritten signature in black ink, appearing to read 'G. Perry', with a long, sweeping underline.

Gary W. Perry, PhD
Professor of Neuroscience & Director



Charles E. Schmidt College of Medicine
777 Glades Road
Boca Raton, FL 33431
(561) 297-2910
Fax: (561) 297-2221

To: Dr. Bill Kalies
Re: Changes to Neuroscience 1 (PSB 6345, now Cellular and Molecular Neuroscience) and Neuroscience 2 (PSB 6346, now Systems and Integrative Neuroscience).

February 6, 2021

Hi Bill,

The name changes to Neuroscience 1 (PSB 6345, now Cellular and Molecular Neuroscience) and Neuroscience 2 (PSB 6346, now Systems and Integrative Neuroscience) have been reviewed and endorsed.

Sincerely,

A handwritten signature in black ink that reads 'Marc Kantorow'.

Marc Kantorow, Ph.D.
Associate Dean for Graduate Programs
Professor of Biomedical Science
Charles E. Schmidt College of Medicine
Florida Atlantic University
Room 207, Biomed Building
777 Glades Rd.
Boca Raton FL 33431
561-297-2910
mkantoro@fau.edu

Subject: Re: Course Name Updates in Biomedical Engineering Programs

From: Hanqi Zhuang - To: cbeetle@fau.edu - Cc: Mihaela Cardei, Randy Blakely, William Kalies, Carmen Varela, Robert Vertes, Robin Vallacher - Date: February 7, 2021 at 11:31 AM

