



**Course Title: SYSTEMS AND INTEGRATIVE NEUROSCIENCE, PSB 6346-001,002,003,004**

**CRNs: 10915 (section 001), 11430 (s. 002), 12012 (s. 3, Jupiter), 12532 (s. 4, Davie)**

**Number of credits: 3**

**Logistics: Term: Spring 2020**

**Computing Center (CM), Room 130 (Course will be broadcast to Jupiter, RF 119 & Davie, DW 108)  
Tuesday & Thursday 9:30-10:50 AM**

**Instructors (Office Hours):**

Dr. Carmen Varela, Office: BS-12 room 244 (Boca); MC-19 (Jupiter) room 106, after each lecture or by appointment

**Course Description:** This course is for graduate students that have successfully completed Neuroscience 1. The course follows from Neuroscience 1 (PSB 6345) with a discussion of neural development, functional neuroanatomy, sensory systems, motor systems, association and limbic systems, and the neural mechanisms of higher cognitive function. Interested graduate students, who have not completed Neuroscience 1, must consult the course director.

**Course Objectives:** This is a foundation course designed to prepare graduate students for more in depth material in the area of systems, cognitive and behavioral neuroscience. The topics to be covered are extensive, and so the course will give an overview of each topic; students are expected to actively participate, reading the materials provided and researching additional resources as necessary to complete your understanding and knowledge of the subject matter. Basic materials will be provided in class or on the course website on Canvas. The course will follow a lecture format with in-class discussion. Questions and comments are strongly encouraged. The lectures will largely be based on primary literature.

**Required Text:** Purves, Augustine, Fitzpatrick, Hall, LaMantia & White (2012) *Neuroscience*, 5<sup>th</sup> edition, Sinauer Associates, (PAF)

**Supplementary Text 1:** Kandel, Schwartz, Jessell et al. (2013) *Principles of Neural Science*, 5<sup>th</sup> ed., McGraw-Hill Co, (KSJ)

**Supplementary Text 2:** R.W. Rodieck (1998) *The First Steps in Seeing*, Sinauer Associates, (RWR)

**Supplementary Text 3:** Liqun Luo. (2016) *Principles of Neurobiology*, 1<sup>st</sup> ed., Garland Science. (LL)

**Required Papers for Literature Discussions (will be provided through canvas):**

*Discussion 1: Paper set 1: How is information encoded and transmitted in neural systems?*

*Hubel & Wiesel, 1963; Felleman & Van Essen, 1991; Guillery, 1995; Fuster, 2009*

*Discussion 2: Systems level conceptual frameworks to understanding brain function. Papers TBA*

The goal of these discussions is to reinforce learning through active engagement and to review a group of related papers in an informal setting. While students are encouraged to participate in all the lectures, the discussions will have a strong focus on student participation, providing an extended opportunity to raise questions, clarify concepts, sharpen critical reading skills and benefit from exploring topics in a group.

**Course Evaluation Method:** Course grade will be based on (i) three equally weighted (30% each) exams, for 90% of the final grade. The remaining 10% points are based on attendance and participation in lectures and discussions. 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.

**Reasonable Accommodation Statement 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.

**Disability policy statement:** 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 of FAU's campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses. For more information, please visit the SAS website at [www.fau.edu/sas/](http://www.fau.edu/sas/).

**Code of Academic Integrity policy statement:** 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 [http://www.fau.edu/regulations/chapter4/4.001\\_Code\\_of\\_Academic\\_Integrity.pdf](http://www.fau.edu/regulations/chapter4/4.001_Code_of_Academic_Integrity.pdf).

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.

**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. To master the material covered in this course it is expected that the student will spend a minimum of two hours per week per credit hour on the out of classroom assignments.

**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/>

**Lecture Schedule / Assigned Readings:**

The following topics will be covered. This schedule is subject to change. Exams will be based on material covered in class.

- 01-14(T): Introduction to Systems Neuroscience (KSJ: 1) – Varela  
 01-16(R): Overview of Experimental Approaches in Systems NS, part 1: Varela (LL: 13)  
 01-21(T): Neuroanatomy 1 – Somatic sensation, receptors, and organization of the spinal cord (PAF: 9) – Vertes  
 01-23(R): Neuroanatomy 2– Organization of brainstem and forebrain (PAF: Appendix, Survey of Human Neuroanatomy) – Vertes  
 01-28(T): Overview of Experimental Approaches in Systems NS, part 2: Zhang (LL: 13)  
 01-30(R): Neural development – Development of Nervous system: Part 1 (PAF: 24) – Guthrie  
 02-04(T): Neural development – Development of Nervous system: Part 2 (PAF: 22) – Guthrie  
 02-06(R): Neural development – Development of Nervous system: Part 3 (PAF: 23) – Guthrie
- 02-11(T): *Exam 1 (in Boca)***
- 02-13(R): Literature Discussion 1: Encoding and transmission of information (ensemble encoding, hierarchical organizations)– Varela  
 02-18(T): Sensory coding, circuits of the spinal cord and brainstem – Varela (**materials will be covered on 3/24**)  
 02-20(R): Retina, organization and phototransduction (PAF: 11; RWR: 3,5,8) – Hamer  
 02-25(T): Auditory system (PAF: 13) – Danesh  
 02-27(R): Vestibular system (PAF: 13) – Danesh  
 03-03(T): LGN and Primary visual cortex – neurons and networks (PAF: 12) – Hamer  
 03-05(R): Visual association cortices – dorsal & ventral stream (PAF: 26) – Hamer
- 03-07 through 13: *No classes - Spring Break: March 7-13th, 2019***
- 03-17(T): Motor cortex, planning and movement (PAF: 16,17) – Vertes  
 03-19(R): *Visit to the Anatomy Lab, School of Medicine (presentation by Dr. Rainald Schmidt-Kastner)*  
 03-24(T): Literature Discussion 2 - Conceptual Frameworks in Systems NS – Varela **First part of the class: Spinal cord and brainstem**
- 03-26(R): *Exam 2 (in Boca)***
- 03-31(T): Cerebellum – Vertes  
 04-02(R): Basal Ganglia (PAF: 17,18; KSJ: 42,43) – Vertes  
 04-07(T): Limbic & regulatory systems (septum, hypothalamus, sleep centers) (KSJ: 47,48,49; PAF: 27) –Vertes  
 04-09(R): Hippocampus: navigation (LL: 13) – Zhang  
 04-14(T): Hippocampus: episodic memory (KSJ: 67) – Varela  
 04-16(R): Learning: memory consolidation; value assignment. Hippocampus-neocortical interactions, amygdala (KSJ: 67) – Varela  
 04-21(T): Cognitive behavior – Prefrontal cortex; working memory, cognitive flexibility (KSJ: 67) – Alexander
- 04-30 (R): *Exam 3 – 7:45-10:15am (in Boca)***

**Subject: Neuroscience Certificate support memo**

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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 9<sup>th</sup>, 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. W. 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](mailto:mkantoro@fau.edu)



**Subject: Re: Course Name Updates in Biomedical Engineering Programs**

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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

