**Advanced Techniques in Neuroscience Research**

**PSB 4112C; Section 001; CRN TBD**

**1 credit hour**

**Departments of Biological Sciences and Psychology, College of Science &**

**Harriet L. Wilkes Honors College**

**Florida Atlantic University**

**Semester:** Fall 2018

**Class meetings**: Wednesdays, 1:00 to 2:00 pm

**Location**: SR 283, Jupiter Campus

**Instructor**: Drs. Bolton and Dawson-Scully

 Office: MC 19/RE, Room 109

 Email: mclean.bolton@mpfi.org, ken.dawson-scully@fau.edu

 Phone: 516-799-8514

**Office Hours**: Tuesdays and Thursdays, 12:00 to 1:00 pm

**Course Description**: Students will receive hands-on training in application of current neuroscience research techniques using specialized instrumentation. Students will learn to both generate and analyze data.

**Prerequisite:** Permission of instructor

**Required Text**: There is no required text for this course. Handouts and selected articles will be posted on Canvas, and students will be expected to read all handouts and articles before the class period.

**Course Objectives**: The overall objective is for students to learn about exciting new research approaches in neuroscience. Specifically, students will be expected to learn 1) how to select suitable techniques for exploring specific neuroscience research questions; 2) how these techniques work and their historical origins; 3) how to perform these techniques to include operation of specialized instrumentation; and 4) how to analyze the data generated through the application of these techniques.

**Note of Honors Distinction**: This course is a Max Planck Honors Program (MPHP) course. Max Planck Honors Program courses have been designed as part of a unique collaborative effort between the Schmidt College of Science, the Wilkes Honors College, and the Max Planck Florida Institute for Neuroscience. They offer its students an exclusive and enriching opportunity to develop neuoroscientific knowledge, formulate questions, and communicate their research via oral and written deliveries while learning and engaging with a community of cutting-edge research scholars and Nobel laureates.

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| **FAU MPHP Journal Club - Schedule for Fall 2018** |
| **Week** | **Topic** | **Reading** |
| Week 1 | Organizational class to discuss general concepts and expectations | Handout and Syllabus |
|  Week 2 | An introduction to/overview of techniques and instrumentation used in neuroscience research | Handout |
| Week 3 | Experimental design | Handout & Selected article |
| Week 4 | Data collection and analysis | Handout & Selected article |
| Week 5 | Electrophysiology | Handout & Selected article |
| Week 6 | Patch clamp recording | Handout & Selected article |
| Week 7 | Intracellular recording | Handout & Selected article |
| Week 8 | Calcium imaging | Handout & Selected article |
| Week 9 | Optogenetics part 1 | Handout |
| Week 10 | Optogenetics part 2 | Handout & Selected article |
| Week 11 | High Speed Live Cell Imaging part 1 | Handout |
| Week 12 | High Speed Live Cell Imaging part 2 | Handout & Selected article |
| Week 13 | An introduction to computational approaches in neuroscience research | Handout & Selected article |
| Week 14 | Review of techniques | Handout & Selected article |
| Week 15 | Last day of class – Review and discussion | Handout |

**Participation**: Students will be expected to have completed assigned readings before class and come prepared to discuss them in depth. Articles and handouts will be posted on Canvas.

**Grading Policies**: This course is graded as Satisfactory (credit given for the course) or Unsatisfactory (no credit given for the course).

**The FAU Catalogue**: ***Satisfactory/Unsatisfactory Grading:*** *Certain courses are designated by the department offering them to be graded on a Satisfactory/Unsatisfactory (S/U) basis. Unlike P/F grading, S/U grading is not an option for the student but applies to all students in the course. In such courses, the grade of "S" indicates passing work and will be awarded credit for the course, but the course will not be included in the grade point average. The grade of "U" indicates failing work. The "U" is not awarded credit and is not included in the grade point average.*

**Grades**: A student’s course grade will be based on the student’s active participation in laboratory activities and class discussions of related handouts and articles.

**Incompletes**: As per University policy, grades of Incomplete (“I”) are reserved for students who are passing a course but have not completed all the required work because of exceptional circumstances. For this class, if a student is unable to complete the required coursework because of a serious illnesses, hospitalization, military service, or death of a family member, the student can request a grade of Incomplete. The awarding of an “I” (Incomplete) will be granted only in exceptional cases; the decision will be made either solely by the instructor or in consultation with the Associate Dean.

**Withdrawal from Class**: It is the responsibility of the student to withdraw from this class, should that status be desired.

**Attendance**: Students are expected to attend all classes and participate in discussions. If a student misses a class, the student is responsible for all material covered during that class and any changes to the course schedule. If a student must miss a class, it is suggested that the student arrange to obtain class notes and announcements from another student.

**FAU Attendance Policy**: Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. The effect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of non-attendance. Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations or participation in University-approved activities. Examples of University-approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances and debate activities. It is the student’s responsibility to give the instructor notice prior to any anticipated absences and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student’s final course grade as a direct result of such absence.

**Electronic Devices**: University policy states that “In order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular telephones and pagers, are to be disabled in class sessions.” In this class, any use of cell phones or other communication devices is not allowed during active class times. (A ringing or vibrating device is included in the definition of “use of an electronic device”, as is checking email or accessing the web.) If a student uses a communication device during active class time, the student will be required to leave for the remainder for the class period.

**Code of Academic Integrity**: 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: <https://www.fau.edu/ctl/4.001_Code_of_Academic_Integrity.pdf>.

**Accommodations for Disabilities:** 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) — in Boca Raton, SU 133 (561-297-3880); in Davie, LA 131 (954-236-1222); or in Jupiter, SR 111F (561-799-8585) — and follow all SAS procedures.

**Religious Accommodation:** In accordance with rules of the Florida Board of Education and Florida law, students have the right to reasonable accommodations from the University in order to observe religious practices and beliefs with regard to admissions, registration, class attendance, and the scheduling of examinations and work assignments.

Students who wish to be excused from course work, class activities, or examinations must notify the instructor in advance of their intention to participate in religious observation and request an excused absence. The instructor will provide a reasonable opportunity to make up such excused absences.