**Advanced Cell Imaging for Neuroscientists**

**PCB 4162C; 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:** Summer 2018

**Class meetings**: Monday, Tuesday, Wednesday, Thursday, 8:00 am to 5:00 pm

**Location**: SR 283, Jupiter Campus

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

With guest lectures from Dr. Serrano-Velez

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**Office Hours**: Mondays, 12:00 to 2:00 pm

**Course Description**: This is an intensive, four-day minimester in light microscopy as applied in cellular neuroscience for students participating in the FAU Max Planck Honors Program. The course will help students understand the theory of image formation and provide an introduction to different fluorescent and laser scanning techniques. Practical sessions will include demonstration of imaging systems available on Jupiter campus.

**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**: Upon completion of this course students will:

1. Have an understanding of the theory of image formation
2. Have a working knowledge of light microscopy
3. Have an understanding of different light microscopy techniques and their applications in cellular neuroscience
4. Have practiced the use of different fluorescent and laser scanning microscope systems
5. Have practical experience with digital image processing

**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.

**Advanced Light Microscopy – Schedule for Summer 2018**

*Classes meet from 9 AM to 12 PM and 1 PM to 5 PM*

Day Time Topic Assignments/Readings Instructor

1 9:00-10:30 Optics I Handouts & Selected Articles Boerner

10:30-12:00 Optics II Handouts Boerner

1:00-3:00 Ray Tracing Ray Tracing Boerner

3:00-5:00 Microscopy Koehler Illumination Boerner

2 9:00-10:30 Lasers & Scanners Handouts & Selected Articles Boerner

10:30-12:00 2-P & Super Res. Handouts & Selected Articles Boerner

1:00-3:00 Confocal Mic. I Laser scanning Boerner

3:00-5:00 Confocal Mic. II Laser scanning Boerner

3 9:00-10:30 Image Processing Handouts & Selected Articles Boerner

10:30-12:00 NIS Elements Handouts & Selected Articles Serrano-Velez

1:00-3:00 2-P Microscope Handouts & Selected Articles Serrano-Velez

3:00-5:00 Image Processing Process Images Boerner

4 9:00-10:30 Fluorescent Scope Data Acquisition Boerner

10:30-12:00 Confocal Mic. Data Acquisition Boerner

1:00-3:00 2-P Microscope Data Acquisition Boerner

3:00-5:00 Review session Discussion Boerner

**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 satisfactory or unsatisfactory grade will be given. To achieve a satisfactory grade, students have to attend all lectures, practical session, and demonstrations and engage in discussions.

**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 lectures and demonstrations and participate in all practical sessions.

**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.