BISC 667 Confocal Microscopy I
Fall 2009 Monday 8:00 AM-9:55 AM + 2 hour lab TBD
Room 201 DBI (TBA)

1 credit course/5 week duration
Class dates September 28 and October 5, 12 19 and 26

Course Description

A basic introduction to operation and theory of light and confocal microscopes. Confocal microscopy is a powerful research tool for high-resolution, blur free, optical images. Topics will include image formation, 3-D rendering, multi-dimensional microscopy, transmitted, fluorescence and reflected light techniques, sample preparation and analysis.

Suggested textbook: Optimizing Light Microscopy for Biological and Clinical Laboratories, Barbara Foster and will be available as part of the course from instructor. Notes for the class and the papers to be discussed will be found on Sakai@UD.

Grading

50% 1 cumulative hourly exam (100 points)
25% weekly laboratory assignment (4 weekly lab assignments/12.5 points each lab)
25% Special project with PowerPoint Presentation using confocal microscopy (50 points)

Prerequisites: Prior class requirements, none. Requires permission of instructor Kirk Czymmek (LIMIT 6 students)

Professor:
Kirk Czymmek, Ph.D.
Department of Biological Sciences
Suite 117 Delaware Biotechnology Institute
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Course policies:

**Attendance:** Attendance will not be taken and is not figured into the final grade. However, students are responsible for all material covered in class (which may or may not be found in the materials posted on Sakai@UD).

**EXAMS:** One cumulative hourly exam will be given to test your retention and understanding of the material presented in lecture. All exam questions are either essay or short answer format, multiple choice questions will not be given. Make-up exams will only be given under the most unusual circumstances. You have a better chance of being granted a make-up exam if you contact Kirk Czymmek in writing at least two days ahead of the exam to be missed.

**Special Project:** A special project chosen by the student would demonstrate the capability of confocal microscopy for their sample in a PowerPoint presentation. The special project presentation should be fully annotated via text, images and/or movies and submitted on CD or DVD by due date. The presentation should be fully contained and self-explanatory.

**Disabilities:** Students suspected of having a learning disability must seek an accommodation from the office of academic enrichment [http://www.aec.udel.edu/LD_ADHD_students.html](http://www.aec.udel.edu/LD_ADHD_students.html).
Course Schedule
Reading assignments will be given at every class period

February 16- (1) First class, Basic principles in optical and confocal microscopy
LAB: Turning the system on, Setting up configurations, Image optimization

February 23- (2) Principles of fluorescence imaging
LAB: Multi-color, transmitted light and reflected light imaging.

March 2- (3) 3D microscopy
LAB: Z-series, X-Z scan and 3D Rendering

March 9- (4), Sample preparation
LAB: Time-series and live-cell imaging

March 16- (5) Last Class, Exam, Lecture- Controls and Imaging Ethics
LAB: Special Project

Special project DUE OCTOBER 30 by 5 pm.

JUSTIFICATION OF COURSE:

Currently students have no offerings in advanced biological microscopy techniques and theory at the University of Delaware. This is somewhat surprising as the Bio-Imaging Center has usage of ~7000 hours annually on confocal microscopes alone. Although training is provided as a fee-for-service through the Bio-Imaging Center, shear user volume prevents us from providing theoretical considerations in a structured lecture format to all users. This Confocal Microscopy I, 5 week 1 credit course would address this deficiency and allow students with more complex imaging needs to obtain an in-depth critical knowledge of advanced light microscopy that is not possible in the standard training. I believe that in this format, students with significant imaging requirements in their thesis research will develop improved imaging skills needed for more effective experimental design and implementation.

This course will serve as a pilot course for the possible addition of other advanced microscopy mini-courses such as Immunogold labeling for TEM, Atomic Force Microscopy, Deconvolution, Advanced Confocal (High-Speed and Spectral Imaging), etc…

All costs associated with the course will be covered by the DBI Bio-Imaging Center.