

## **Illuminating the Invisible: Microscopes**

**Course objectives:** How do light microscopes work? What is the big microscope in the corner of the room and how do I use it to get awesome images? What type of light microscopes are there? And how can you break the diffraction limit and get SUPER resolution! This is a hand-on course for learning how to use a confocal microscope and learning the theory and concepts behind different types of light microscopes.

### **Learning goals:**

- Use the confocal microscope to image fluorescent samples, creating individual slices and stacks.
- Use the confocal microscope to perform advanced imaging techniques such as time-lapse, resonance scanner, mark and find, tiling, FRAP, FRET, photo-activation.
- Process confocal images-
- Explain core concepts behind light microscopy- such as magnification, resolution
- Identify and explain the advances behind different types of light microscopes, focusing on the confocal microscope.
- Explain the different aspects of the confocal microscope
- **What are your goals:** \_\_\_\_\_

**Instructor:** Dr. Joshua Bloomekatz, [josh@olemiss.edu](mailto:josh@olemiss.edu), Shoemaker Hall 208

**Class: TTh:** 2:30-3:45pm, Shoemaker Room 219

**Outline of course:** This course is separated into two overlapping parts:

1. A conceptual component consisting of discussions and presentations, and
2. A laboratory component consisting of three projects.

**Due dates:** Found on the schedule of classes

**Prerequisites:** BISC 160, 161, 162, 163: Minimum grade C

**Course website:** [google drive](#)

### **Attendance and engagement policy:**

- You must attend class. Engaging with the material during class as part of active learning is essential for mastering the material.
- You must engage with the material outside of class, routinely. This is a graduate-type of class, you will get out of it what you put in it.

**Grading:**

- 50% Laboratory**
  - 15% Project 1**
  - 15% Project 2**
  - 20% Project 3**
- 45% Conceptual Presentations**
  - 10% Confocal Presentation**
  - 25% Specialized Microscope Presentation**
  - 10% Participation**
- 5% Contribution to UM Confocal User Manual**

<b>92.5 – 100%</b>	<b>A</b>	<b>79.5 – 82.4%</b>	<b>B-</b>
<b>89.5 – 92.4%</b>	<b>A-</b>	<b>77.5 – 79.4%</b>	<b>C+</b>
<b>87.5 – 89.4%</b>	<b>B+</b>	<b>69.5 – 77.4%</b>	<b>C</b>
<b>82.5 – 87.4%</b>	<b>B</b>	<b>59.5 – 69.4%</b>	<b>D</b>
		<b>&lt;59.5%</b>	<b>F</b>

- Standard rounding rules apply.

**Diversity and inclusion:** The ideal scientist strives to keep an open mind and to look at questions from all different perspectives. That is why integrating a diverse set of experiences is important for a truly comprehensive understanding and study of biology. However, science is conducted by humans and thus has not always met this ideal, especially historically where formal science and science education has often been restricted to a subset of perspectives. This is true for science teaching as well. As principal investigators and science educators we try to create an environment that supports a diversity of thought, perspective and experience. Since this is a continually evolving process we welcome your feedback (you can either contact us electronically, in person or anonymously). If you prefer to speak with someone outside of the course, Katrina Caldwell, the Vice Chancellor for Diversity and Community Engagement ([kmcaldw1@OleMiss.edu](mailto:kmcaldw1@OleMiss.edu)) is an excellent resource or the Ombuds office ([ombuds@olemiss.edu](mailto:ombuds@olemiss.edu)). Finally, as a participant in the course and in course discussions, it is also your responsibility to honor and integrate a diverse set of perspectives and identities.

**Students with Disabilities:** Students requesting accommodations and services due to a disability for this course need to contact the Office of Student Disability Services (662-915-7128). SDS will then provide the student with an Instructor Notification of Classroom Accommodations form. Please contact the instructor in advance, with this form, so they can arrange reasonable accommodations. Advance contact is necessary for the appropriate planning of reasonable accommodations

It is University policy to provide, on a flexible and individual basis, reasonable accommodations to students who have disabilities that may affect their ability to participate in course activities or meet course requirements.

**Academic Integrity:** Academic dishonesty will not be tolerated in this course. According to UM policy, academic dishonesty includes:

- taking an exam for another student
- allowing another student to take an exam for you
- copying another student's work on an exam
- allowing another student to copy your work on an exam
- altering a graded exam and submitting it for a regrade.
- Rearranging the sequence of words or replacement of words is still plagiarism just as improperly citing (or lack thereof) a source or direct usage of information without citation. Whether done maliciously or "innocently," plagiarism is considered a form of cheating and will not be tolerated.

Any student caught cheating or suspected of cheating will be reported to the Dean of the student college. And Strict procedure will be followed. These can be found here <https://secure.olemiss.edu/umpolicyopen/index.jsp>

### **Plagiarism & Cheating**

There is a **zero tolerance policy** for plagiarism and cheating. Rearranging the sequence of words or replacement of words is considered plagiarism just as improperly citing (or lack thereof) a source or direct usage of information without citation. Whether done maliciously or "innocently," plagiarism is considered a form of cheating and will not be tolerated. All parties involved will receive a 0 for that assignment. If a presentation is found to commit plagiarism, every group member will receive a zero for the presentation.

*Registering for BISC 578 translates to full recognition and acknowledgement of the expectations, policies, guidelines, and information stated above.*

This syllabus is subject to change at the discretion of the instructor to accommodate instructional, and/or student needs.

Last modified: Tuesday, August 20, 2019