

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, Shoemaker Hall 208

Class: TTh: 2:30-3:45pm,

- Lectures and discussions will occur online via zoom at this link - <https://olemiss.zoom.us/j/99232444941?pwd=ei9zTEV2OUFQeHRlbG9BcDE2V1JyZz09>
- Labs and independent projects will occur in Shoemaker 203 or in the confocal room – Shoemaker 114

Outline of course: This course is a hybrid course separated into two overlapping parts:

1. A conceptual component consisting of discussions and presentations, which will occur online via [zoom](#), and
2. A laboratory component consisting of three projects, which will be conducted in Shoemaker Hall either in Room 203 or in the Confocal room (Room 114). Laboratories are conducted alone or in conjunction with Dr. Bloomekatz.
 - a. You must reserve a time-slot to conduct a laboratory on the courses [google calendar](#) for room 203 or on the booked scheduler for the confocal (to get access to the booked scheduler you must email Lance Sullivan at sully7@olemiss.edu).
 - b. Access to the confocal room is restricted via a key card system. To get access to the confocal room email Matt Ward at jmward1@olemiss.edu and tell him you are in the microscopy course, you need access to the

confocal room. Don't forget to tell him your school ID number. And he will activate your card so you can use it to get into the room.

- i. The door knob doesn't work, just push hard once the lock is deactivated (green light).

Due dates: Found on the schedule of classes

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

Course website: [google drive](https://drive.google.com/drive/u/1/folders/1YHl5SxE9q3zAxrAGijUoQrLOUg2Ab90Q)

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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

5% Optics lab 1

5% Optics lab 2

10% Project 1

10% Project 2

20% Project 3

50% Conceptual Presentations

20% Confocal Presentation

20% Specialized Microscope Presentation

10% Participation

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

- Standard rounding rules apply.

Health and Safety protocols –

While you conduct research in Shoemaker Hall, you must adhere to strict health and safety protocols. These are both COVID-19 related and related-to general laboratory research. These protocols are for your safety and safety of others They include –

1. Completing a [daily symptom checker](https://uofmississippi.qualtrics.com/jfe/form/SV_eKH25jxIIHAr8A5) before coming to campus. https://uofmississippi.qualtrics.com/jfe/form/SV_eKH25jxIIHAr8A5 . If you pass the symptom checker you may come to lab. See below if you don't pass the daily symptom checker.
2. In Shoemaker Hall, at all times, you are required to wear a face mask. This is a Course, University, City and State requirement.
 - a. (Students who have a diagnosed health concern which interferes with the wearing of face coverings or face masks may contact the Student Disability Services (SDS) Office to seek a University-approved accommodation. Please [contact SDS](https://sds.olemiss.edu/) at <https://sds.olemiss.edu/> for more information.)
 - b.
3. In Shoemaker Hall, you should practice social distancing – staying at least 6 feet away from other individuals. All activities you will perform in this course will allow for social distancing.
4. Before you begin lab/research, you should wash your hands for at least 20 seconds with soap.
5. While working in lab, you should follow general laboratory safety protocols, these include but are not limited to wearing long pants, not wearing open toe shoes, tying hair back, using appropriate PPE when necessary, never eating or drinking in a laboratory setting, etc.
6. Before you begin lab/research, you should wipe down your work space as well as any knobs or handles commonly touched with 70% Ethanol, which will be provided.
 - a. Oculars and knobs on microscopes can be wiped down by spraying 70% Ethanol on to a Kim wipe and using that kim wipe on the oculars and knobs. Be gentle. A Kim wipe should NEVER be used on an objective.
7. After you finish will lab/research, wipe down your work surface and handles/knobs commonly touched with 70% Ethanol. AND wash your hands with soap.

If you:

- Don't pass the symptom checker,
- Feel ill (with COVID-19 related symptoms or otherwise).
- Have been in contact with a person who is COVID-19 positive within the last 2 weeks.
- Are being tested for COVID-19 (ie. waiting for test results or going to be tested).

You should contact me (Dr. Bloomekatz, 858-380-7449, josh@olemiss.edu) AND stay home. If in doubt just contact me.

- I will (and I am obligated by law) to protect your privacy. I am only authorized to tell others that they have been possibly exposed to infection. I can give no details which would reveal the individual's identity either directly or indirectly. But this way I can support you and I can make sure proper measures are taken to prevent further transmission.
- I will also work out ways in which you will be able to complete the activities you missed.
- If you are ill or you have to stay home – contact the student health center.
- Please also contact me if other issues arise, like you need to take care of a sick family member.

We (The University and myself) are here to help you. And that is our plan.

Failure to adhere to health requirements during the COVID-19 emergency will be deemed as disruptive to the classroom and will be enforced following the Academic Conduct and Discipline procedures. The University of Mississippi has adopted a tiered disciplinary protocol for nonadherence to COVID-19 health Office of Conflict Resolution and Student requirements. This disciplinary protocol is maintained by the Office of Conflict Resolution and Student Conduct (<https://conflictresolution.olemiss.edu/>).

- Students are encouraged to visit the [University's Keep Learning site](https://olemiss.edu/keeplearning/) (<https://olemiss.edu/keeplearning/>) to access information and resources related to COVID-19 support. The site provides links to University student services to facilitate and support learning.
- Students with diagnosed health concerns that may affect their compliance with COVID-19 health requirements should contact [UM's Student Disability Services \(SDS\) Office](https://sds.olemiss.edu) (<https://sds.olemiss.edu>) to see if they are eligible for an SDS accommodation as soon as possible.

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) is an excellent resource or the Ombuds office (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: Monday, August 10, 2020