

## BASIC INFO AND SYLLABUS

- LECTURERS:** Tim S. Baker, Lilly B402A, 4-5645, [tsb@bilbo.bio.purdue.edu](mailto:tsb@bilbo.bio.purdue.edu)  
John Turek, Lynn Hall G193C, 4-5854; [turekj@purdue.edu](mailto:turekj@purdue.edu)
- Instructors:** Valorie Bowman, Lilly B402B; 4-5643; [vdb@bilbo.bio.purdue.edu](mailto:vdb@bilbo.bio.purdue.edu)  
Deb Sherman, Whistler Hall S-052; 4-6666; [dsherman@purdue.edu](mailto:dsherman@purdue.edu)  
Misha Sherman, Lilly B140; 6-7716; [msherman@bilbo.bio.purdue.edu](mailto:msherman@bilbo.bio.purdue.edu)
- SECRETARIES:** Baker: Joyce Bell, Lilly B226, 4-8518, [joyce@purdue.edu](mailto:joyce@purdue.edu)  
Turek: Rose Killian, Lynn Hall, 4-7881, [rmk@vet.purdue.edu](mailto:rmk@vet.purdue.edu)
- WHERE & WHEN:** Lilly G424; Tue & Thu 12:00-1:15PM-->? (demos)

### GOALS:

Develop a basic understanding of the principles of transmission electron microscopy (TEM) as applied to the study of molecules, thin crystals and tissues. Knowledge of these principles will form a foundation for gaining practical experience and training in TEM through courses such as BIO 595S (*Microscopy of Macromolecules*) and BIO 595T (*Microscopy of Cells and Tissues*) and in image processing through course BIO 595W (*3D Reconstruction of Macromolecules*). This year BIO 595S and BIO 595T (each a 2-credit course) will begin during weeks 4 and 5 of the semester, and hence will overlap with BIO595R. BIO595W (1-credit) is taught during the last 7-weeks of the semester.

### COURSE FORMAT:

1. 75 minute lectures and demos on Tuesdays and Thursdays (12:00-1:15PM); from Jan 13 – Mar 2.
2. Some lab demonstrations *might* extend class periods beyond the nominal 75 minutes, thus, it will be necessary at times to conduct open-ended classes. If your schedule has specific time constraints during the period 1:15-2:00PM on Tuesdays and Thursdays, please be sure to indicate any constraints on the Class Roster Sheet.
3. Grading is based on two mid-term exams, scheduled for Jan 29 and Mar 4. Help sessions will be offered on Jan 28 and Mar 3 at times and locations to be determined later.

### CLASS HANDOUTS AND OTHER MATERIALS:

Lecture notes are posted on a Web site (<http://bilbo.bio.purdue.edu/~baker/courses/bio595r.htm>) from which you can view or download the material to your favorite printer (required password provided 1<sup>st</sup> class session). The class lecture notes include most of the illustrations that will be shown as powerpoint presentations during lectures. This should minimize the need for frantic note taking and thus allow you to listen carefully during lectures and concentrate on understanding the principles being presented. The lecture notes and other supplementary materials are available to solidify your understanding of the topics being discussed. The lecture notes are required reading because it is all but impossible to cover the necessary depth in lectures alone!

**SYLLABUS:**

Date(s)	Topic(s)	Lecturer	Notes
Jan 13,15	Course introduction Analogy between light and transmission electron microscopy Electrons/waves/interference/resolution Optics and Electromagnetic lenses	TB	1-4 5-12 12-28
Jan 20,22	Design of the TEM and lens aberrations Top to bottom description of instrument	TB	29-57
Jan 27	Contrast and image formation (electron scattering)	TB	58-64
Jan 28	Optional help session preparation for midterm I (TBA)	TB	
<b>Jan 29</b>	<b>Midterm I</b>		
Feb 3	Basics of TEM alignment Basics of TEM performance	JT	65-70 70-73
Feb 5	<b>DEMO (TEM top to bottom; focusing; astigmatism correction)</b>	DS/MS	
Feb 10	Basics of TEM operation	JT	74-86
Feb 12	<b>DEMO (TEM alignment)</b>	DS/MS	
Feb 17	Photography (Film and CCD recording of images)	JT	86-93
Feb 19	<b>No BIO595R</b> (BIO595S and BIO595T meets)	DS/MS	
Feb 24	Other modes of TEM (e.g. electron diffraction; dark field; EELS; etc.)	JT	94-114
Feb 26	<b>No BIO595R</b> (BIO595S and BIO595T meets)	DS/MS	
Mar 2	Support films, grids, and carbon evaporation and <b>DEMO</b>	VB	115-121
Mar 3	Optional help session preparation for midterm II (TBA)	JT	
<b>Mar 4</b>	<b>Midterm II</b>		

Key: TB=Tim Baker; JT=John Turek; VB=Valorie Bowman; MS=Misha Sherman; DS=Deb Sherman  
TBA=To be announced

**OFFICE HOURS:**

Baker: No specific hours, but mornings are generally not free. Call or email me or my secretary (Joyce Bell) for an appointment.

Turek: No specific hours. Call my office or email me to make an appointment.

Note: The additional instructors (V. Bowman, D. Sherman, and M. Sherman) are also very knowledgeable and willing to help answer your questions.

**FINAL NOTES:**

Please heed a few simple but **important** requests:

1. Lectures begin **promptly** at noon. If you are seated and ready to proceed at noon, this will greatly minimize disruptions and will be appreciated by all. There is a significant amount of material and new concepts to be covered in a rather limited period of time.
2. Please come to class prepared (e.g. caught up with reading assignments). This will help assure a learning experience that will be beneficial to everyone. Come armed with questions, especially if something from a previous lecture or class demonstration needs clarification.