7S Lab Syllabus—Objectives
The goal of 7S lab is to introduce you to scientific method of doing experiments, to become familiar with common tools used in biology research labs, and to make you aware of a few of the diverse organisms out there, most of which are too small to be seen with the naked eye.

Timing and Rooms

**1:30-4:30 on Wednesdays.** Meets in T101 and T111 in Herrin Hall

Instructors:
Dr. Waheeda Khalfan
Nathan Barnett

Grading structure, Grading cycle, and other things to be aware of in 7S Lab

1. Your grade in the lab will be based on your performance on lab reports. Each lab will consist of two parts: PRE-LAB questions (worth 3 points) and the LAB REPORT (worth 12 points) for a total of 15 points. Since there are 8 labs, the maximum score you can achieve is 120 points (15 x 8). At the end of the quarter, your score out of 120 will be converted into a percent score. Letter grades will be awarded according to the following scale

   - 90-100% A
   - 80-89% B
   - 70-79% C
   - 60-69% D
   - Below 60 NP

2. Printouts of the lab will not be handed out (except for first lab). An electronic copy will be placed in the materials folder of Coursework by **Monday 4pm of each week.** You will need to make a printout of the entire lab and bring it to lab. We will not be providing printouts in lab.

3. Read the lab notes thoroughly, jotting down points in the margin. Then answer the pre-lab questions. Most of the questions can be answered by reading and understanding the introduction to the lab. Do not wait until 15 minutes before lab begins to answer the pre-lab questions.

4. Pre-lab questions have to be submitted at the beginning of lab, otherwise, it will be considered late. The pre-lab will be graded on the following basis. You will obtain only 1 point out of 3 if your performance on the pre-lab is poor to fair. You will get 2 points for satisfactory performance, and 3 points for outstanding performance. If you want to get the three points, you must get all (or almost all) pre-lab questions right! Note: One point will automatically be deducted for late pre-labs. For the first lab on Wed June 26th, pre-labs will be collected at the end of the first lab instead of the beginning (only applies to first lab).

5. During the lab, you should pay very close attention to the questions asked in the lab report. Fill out your observations/data in the lab report right away. If you fail to enter your observations, you will NOT be able to complete the lab. When you are working at 3 am in the morning at home and you do not know what you observed in the lab, you have a problem!

6. To be able to answer the questions in the lab report, you must also follow the procedures laid out in the lab notes. So therefore, you need to parallel process, reading the instructions in the lab notes and answering the questions in the lab report in parallel.

7. The lab report for the lab you did on Wednesday has to be turned in the same week by **Friday at 3:00pm.** A drop off box will be brought to lecture and to discussion section on Friday.
8. In the lab, you will be working in groups of 2. It is a violation of the honor code to copy your partner’s or someone else’s lab report or allow anyone to copy yours. It is fine to discuss the results and questions with others but, ultimately, you are responsible for coming up with appropriate responses to the questions. It is also your honor code responsibility to report to the instructor right away if you witness a case of academic dishonesty. Do not confront the person/s. Cases of academic dishonesty will be pursued vigorously.

9. A guide on answering questions in the lab report: The questions you will be asked in the lab report fall into three general categories.

a. The first type of question tries to ascertain if you understood the background information. For example, the question could be

“What are factors which affect chloroplast movement in cells?”

Your answer could be

“Temperature, pH, and light conditions.”

This type of question is trying to get background information to make sure you understand what is going on.

b. The second type of question asks you to make an observation, draw a figure, enter data in a table, or graph results. For this type of question, you should only include what you saw (qualitative observations) or what you measured (quantitative observations). You should not include what you wish you had seen or why you saw what you did. Present the data with any necessary units of measurement. So if the question being asked is

“What did you observe in the cells upon the addition of pH7 buffer? Give any measurements.”

The answer could be

“Observed rapid movement of chloroplasts upon addition of pH7 buffer. Speed of movement was 2 um/minute.”

Be aloof and write in a passive voice. When it comes to stating the results of an experiment and in scientific writing in general, you have to keep yourself out of the picture and not make guesses and suppositions. Stick with what you observed.

c. The third type of question asks you to determine why you observed what you observed. It is really asking you to interpret your results and to offer a reasonable explanation for it. For example, as a follow up to the previous question, you could be asked

“why did you notice this change when you added buffer of pH7?”

The answer might be

“movement of chloroplasts occurs at pH7 because cytoplasmic streaming, which is what
causes the chloroplasts to move, occurs at pH 7.”

What you have done here is given a reason why chloroplast movement in the cell is pH sensitive. This involves thinking and analysis. For this type of question, it is very easy to simply restate the results again and talk about how you saw chloroplasts moving at pH 7. If you are unsure about what is expected, ask the instructor for guidance. Usually there will be plenty of hints in the lab instructions itself to enable you to interpret your results and draw conclusions.

If you are not sure why you missed points in the lab report even though you think you knew what was going on…

When you hand your report in on Friday, it will be returned to you by the following Wednesday. If you did not do well (turn your score into a percentage and look at the grade scale above), take a look at the answer key, which will be posted on coursework. See where you made errors. Hopefully, by studying the answer key and comparing it to your report, you will begin to understand what we expect and where you went wrong.

If you are having conceptual difficulties with understanding the experiments in lab…

The Teaching Assistant for 7S, Nathan, will be happy to meet with you (his office hours are on Thursdays from 2-4pm in Falconer library). When you meet with him, you can talk about difficulties you are having but do not expect him to do your lab report for you!

Checklist Before you come to the first lab:

• Read the Lab Safety Sheet and jot down any questions you have. When in lab, seek your instructor for guidance on safety precautions. If you have any allergies we should be aware of, please notify your instructor during the first lab. Also note that safety concerns do not end after the first lab so remain vigilant throughout the quarter.

• Read lab number 1 and complete all the pre-lab questions

• Bring a calculator, a pencil, and an eraser to lab

• Please come to lab on time. It is very inconsiderate to be late, as you will be delaying everyone. Please come to lab a little before 1:30 so we can begin at 1:30pm. It is not O.K to come at 1:35 pm!

• Best of luck! We are super excited about seeing you all on Wednesday!
<table>
<thead>
<tr>
<th>Lecture#</th>
<th>Date</th>
<th>Major Area</th>
<th>Lecture Topic</th>
<th>Readings from Johnson’s living world 7th ed.</th>
<th>Lab Topic</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Mon June 24</td>
<td>Science of Biology</td>
<td>Hand out Pset1 on Lectures 1-6</td>
<td>Chapter 1: 1.1, 1.2, 1.3, 1.4, 1.7, 1.9</td>
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<tr>
<td>2</td>
<td>Wed June 26</td>
<td>Biochemistry</td>
<td>Chemistry of Life</td>
<td>Chapter 2: 2.1, 2.2 (read isotopes and dating fossils for later use in evolution), 2.3, 2.4, 2.5</td>
<td>Lab 1: Microscopy</td>
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<td>3</td>
<td>Fri June 28</td>
<td>Molecules of Life</td>
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<td>Chapter 3: 3.1, 3.2, 3.4 3.5</td>
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<td>4</td>
<td>Mon July 1</td>
<td>Cell Biology</td>
<td>Cells</td>
<td>Chapter 4: 4.1 (do not worry about antibodies to visualize cells), 4.2, 4.3 (will be relevant later) 4.4, 4.5, 4.6, 4.7, 4.8, (4.9: do not worry about ECM), 4.10, 4.11 4.12, 4.14</td>
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<td>5</td>
<td>Wed July 3</td>
<td>Energy and Life</td>
<td></td>
<td>Chapter 5: 5.1, 5.2, 5.3, 5.4, 5.5, 5.6 (i.e., read entire chapter)</td>
<td>Lab 2: Testing for Biological macromolecules</td>
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<td>6</td>
<td>Fri July 5</td>
<td>Photosynthesis</td>
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<td>Chapter 6: 6.1, 6.2, 6.3, 6.4, 6.5 (Skip 6.6)</td>
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<td><strong>Mon July 8</strong> Problem Set 1 on lectures 1-6 due in class</td>
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<td>7</td>
<td>Mon July 8</td>
<td>Respiration and DNA Replication</td>
<td>Hand out Pset2 on Lectures 7-12</td>
<td>Chapter 7: 7.1, 7.2, 7.3, 7.4, 7.5 (skip 7.6), Chapter 11: 11.3, 11.4, Chapter 3: 3.3 (structure of DNA)</td>
<td>Lab 3: Enzyme Lab</td>
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<td>8</td>
<td>Wed July 10</td>
<td>Cell cycle/Mitosis and Cancer</td>
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<td>Chapter 8: 8.1, 8.2, 8.3, 8.4, 8.5 (skip aging and the cell cycle), 8.6, 8.7 (entire chapter)</td>
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<td>9</td>
<td>Fri July 12</td>
<td>Genetics</td>
<td>Meiosis and sexual reproduction</td>
<td>Chapter 9: 9.1, 9.2, 9.3, 9.4, 9.5 (entire chapter)</td>
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<td><strong>Fri July 12</strong> Midterm 1 exam from 1:15-3:05 covering lectures 1-7</td>
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<td>10</td>
<td>Mon July 15</td>
<td>Mendelian Genetics</td>
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<td>Chapter 10: 10.1, 10.2, 10.3, 10.4, 10.5, 10.6 (read 10.7-10.11 for your own interest)</td>
<td>Lab 4: Meiosis Mitosis, Corn Genetics</td>
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<td>11</td>
<td>Wed July 17</td>
<td>Mendelian Genetics Cont.</td>
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<td>Chapter 10: 10.1, 10.2, 10.3, 10.4, 10.5, 10.6 (read 10.7-10.11 for your own interest)</td>
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<td>12</td>
<td>Fri July 19</td>
<td>Molecular Biology</td>
<td>Transcription, Translation, (Flow of information)</td>
<td>Chapter 12: 12.1, 12.2, 12.3</td>
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| 13      | Mon July 22 | **Biotechnology** | Mutations, Gene Regulation and Biotechnology  
*Handout Pset3 on Lectures 13-18*  
Chapter 11: 11.5, Chapter 12: 12.4, 12.5 (skip discussion of activators and CAP), Chapter 13: 13.3 |
| 14      | Wed July 24 | **Genomics and Cell Technology** | Chapter 13: 13.1, 13.2 (for 13.2, focus more on the presentation in the powerpoint slides than the book), 13.3 (skip DNA fingerprinting), 13.4 (skip piggyback vaccine), 13.5, 13.6, 13.7, 13.8 |
| 15      | Fri July 26 | **Evolution** | History of Evolutionary thought,  
Chapter 14: 14.1, 14.2, 14.3, 14.4, 14.5, 14.6, 14.8,  
**Lab 5: pGLO bacterial transformation + practice micropipetting** |
| 16      | Mon July 29 | Forces of Evolution               | Chapter 14: 14.9, 14.11, 14.12, 14.13, 14.14                     |
| 17      | Wed July 31 | Phylogenetics + origin of life | Chapter 15: 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8, 15.9, 16.1, 16.2  
**Lab 6: pGLO protein gel + start PCR** |
| 18      | Fri Aug 2 | **Biodiversity** | Bacteria, Archaea, and Viruses  
Chapter 16: 16.3 (Skip bacterial conjugation), 16.4, 16.5, 16.6, 16.7, 16.8, 16.9 |
| 19      | Mon Aug 5 | Protists  
*Handout Pset4 on Lectures 18-21* | Chapter 17: 17.1, 17.2, 17.3, 17.4, 17.5, 17.6, 17.7, 17.8, 17.9 (in 17.9, read only about Amoebas) |
| 20      | Wed Aug 7 | **Fungi** | Chapter 18: 18.1, 18.2, 18.3, 18.4, 18.5, 18.6, 18.7, 18.8, 18.9  
**Lab 7: PCR genotyping** |
| 21      | Fri Aug 9 | **Plants** | Chapter 32.1, 32.2, 32.3, 32.4, 32.5, 32.6, 32.7, 32.8, 32.9, 32.10, 32.11 |
| 22      | Mon Aug 12 | **Ecology** | Community Ecology  
Chapter 35: 35.1, 35.2, 35.3, 35.4, 35.8, 35.9, 35.10, 35.11, 35.12  
**Lab 8: Mystery lab** |
| **Sat Aug 17** | **Final Exam Comprehensive; 8:30-11:30am weighted towards lectures 15-22** |