Course Administration

About this Class
ESF 296 (Integrated General Chemistry and General Biology Laboratory) is an experimental, combined section of FCH 151 (General Chemistry I Laboratory) and EFB 102 (General Biology I Laboratory). This class is taught concurrently with FCH 150 (General Chemistry I Lecture, instructed by Dr. Kelley Donaghy) and EFB 101 (General Biology I Lecture, instructed by Dr. Melissa Fierke). Together, these classes serve as the first semester introductory chemistry and biology course sequence at ESF. This laboratory course is meant to complement the respective co-requisite lecture courses in content and sequence (see pages ix and x). However, in addition to providing hands-on learning of material taught in the lecture class, this laboratory course is also designed to develop student proficiency in scholarly scientific inquiry, laboratory and field techniques, and scientific writing. Therefore, we will frequently diverge from the lecture course content in order to devote time to laboratory experiments, data management and analysis, and writing skills.

The content and skills development of this integrated laboratory are identical to those of FCH 151 and EFB 102, except this course will presented in a fashion and sequence that promotes better integration of biological and chemical concepts, as well as the communication skills you will develop in EWP 190 (Writing and the Environment). While several laboratories will truly integrate biological and chemical concepts, other laboratories will present material in a unique sequence that provides for eventual integration, and some laboratories will need to stand alone in their biology or chemistry content.

Student Learning Objectives
By the end of this class, successful students will:

● recognize major taxonomic groups of organisms based upon distinguishing morphological features;
● demonstrate proficiency in a variety of microscopy and sterile laboratory techniques;
● conduct information searches using library resources;
● develop and test hypotheses through controlled laboratory experiments and observational studies; and
● effectively communicate experimental findings through appropriately formatted scientific reports.
Required Text and Materials

- A textbook in General Chemistry. Like FCH 150, there is no requirement for a specific textbook.
- Dissecting Kit. *These kits are available in the SU Bookstore. You will need to bring this kit to lab on several occasions. Plan to obtain one for yourself or share one with someone who is NOT in your lab section.*
- Carbonless copy laboratory notebook *available in the SU Bookstore* (Hayden-McNeil, publisher)
- Laboratory safety goggles *available in the SU Bookstore*
- 3-ring binder

Instructors

Dr. Neal Abrams  
Office: 422 Jahn Lab  
Mailbox: 121 Jahn Lab  
Phone: 470-4723  
E-mail: nmabrams@esf.edu  
Office Hours: Mondays, 3:00-4:00 pm, Wednesdays 9:30-10:30am or by appointment

Dr. Gregory G. McGee  
Office: 146 Illick  
Mailbox: 246 Illick  
Phone: 470-6792  
E-mail: ggmcgee@esf.edu  
Office Hours: Tuesday 3:30-5:00, Wednesdays, 11:00-12:30 or by appointment

Graduate and Undergraduate Teaching Assistants TBA
Meeting Locations and Times
This section will meet Tuesdays and Thursdays, 12:30-3:20.
• Tuesday meetings will be in 410 Illick unless directed otherwise.
• Thursday meetings will be in 130 Jahn unless directed otherwise.

Meet the bus below Lawrinson Hall at 12:30pm on Tuesday for field trips during weeks 1 and 2. DO NOT BE LATE - buses will depart on time at the start of the laboratory period.

Meeting Times
The integrated laboratory meets regularly on Tuesday and Thursday afternoons from 12:30-3:30pm. It is imperative that you attend your scheduled ESF296 laboratory section. However, we know that emergencies sometimes arise. So, understand that you may switch into an FCH151 or EFB102 lab sections ONLY IF you have received permission from both your instructor and the TA/Instructor of the section you are seeking to join. Laboratories for the standard sections of FCH 151 and EFB 102 will be running at every possible time of the week and, given the number of students enrolled in this class, most labs will be full to capacity. Therefore, there will likely be no room in those labs to accommodate additional students while maintaining safety and a quality instructional environment. You may seek permission to switch a lab section ONLY if you MUST miss your regularly scheduled class period (see attendance policy below). However, do not expect that permission to switch labs will be forthcoming.

...bottom line...don’t miss your regularly scheduled lab section and don’t count on getting into another section.

Attendance Policy
Weekly participation in laboratory instruction is expected. If you do not attend laboratory, your absence will be duly noted and considered during calculation of final grades, and you will forgo the opportunity to turn in that week’s assignment. Accommodations will not be extended for unexcused absences.

Accommodations will be afforded to make up laboratory instruction only in cases of (1) a medical or family emergency; or (2) the observance of a religious holiday. If you are so sick that you cannot make it to class, then you should visit your family doctor or the SU Health Center. You may provide a note or receipt of such a visit as documentation to excuse your absence. In cases when a family emergency causes your absence from all of your classes, you should be in touch with the Office of Student Life to assist you in contacting all of your instructors. If you know you are going to miss a lab meeting or assignment deadline because of a religious holiday, you must contact your instructor at least 2 weeks ahead of time to reschedule your participation in another lab section, and to discuss any needed accommodations.

Your cumulative laboratory practical examinations will be given during your regularly scheduled lab section during the last full week of classes. Know your exam date and time and plan the end of your semester accordingly. Your laboratory competency exam will be by appointment with your instructor sometime during the last 3-4 weeks of class. Make-ups will not be granted for either of these exams except for documented medical or family emergencies. Once again, do not miss your final exam period or the appointment you make for your competency exam.
**Tips for Success**

It is our hope that every student in this class will be successful. There are a number of resources available to you that will help you be successful.

a. Drs. Abrams and McGee, along with graduate teaching assistants, will be supervising your work in laboratory. We all hold regular office hours. Stop by for a visit and get to know us, and otherwise don’t hesitate to regularly attend office hours for out-of-class assistance. Feel free to set up an appointment outside of our regular office hours if they conflict with your class schedule.

b. If you anticipate conflicts or academic difficulties please see one of us at your earliest convenience in order to avoid acute problems.

c. Read your textbook and lab manual often, regularly, and repeatedly. Ideally you should read assignments PRIOR to lab in order to prepare for the information we will be covering.

d. Find a study partner or group to discuss classroom and laboratory materials. Share and compare notes. Teach one another.

e. Come prepared to participate in laboratory. ASK QUESTIONS!

f. If you have a disability requiring accommodation, you should contact the Office of Student Life (110 Bray Hall). When accommodations have been approved please deliver a copy of your accommodation form to me, in person. Together we will discuss your accommodation as it applies to your lab activities. Accommodations will not be provided retroactively.

**Blackboard...sometimes**

Blackboard will be used in limited amounts to administer this course. Why? Because most things can be done via Blackboard can be done more efficiently by interacting with that carbon-based life form you will come to know as your laboratory instructor. The student/instructor ratios of this and all other General Biology and General Chemistry labs are purposefully kept low in order to facilitate interpersonal relationships between you and your instructor – take advantage of this. The class schedule/syllabus/policies will be posted to Blackboard, but only for convenience – they’re in your hands now. The only items that will be posted to Blackboard are media and related files needed to complete your prelab or lab report assignments. Class announcements will typically not be posted to Blackboard - you will receive them when you come to lab. If your instructors believe they need to make a general announcement to the laboratory section outside of the regular meeting time, this will be done via university e-mail. Make a habit of checking your syr.edu account regularly. Grades will not be posted on Blackboard - you are capable of calculating and knowing your grades as the semester progresses (see page viii). You might also consider beginning the habit of periodically checking with your instructor to make sure all your assignments have been received and an accounting has been made for all your grades.
Grading

You are responsible for your own work. All laboratory assignments are to be completed by the individual student -- you have the responsibility of maintaining academic honesty and integrity in your work. There will be NO tolerance for plagiarism on any assignments or for collaborations on exams. The URL for the Academic Integrity handbook at ESF can be found here: http://www.esf.edu/students/handbook/integrity.pdf

Your final course evaluation will be based upon regular laboratory assignments and two laboratory practical exams. These evaluation activities will be weighted in the following manner:

- Lab practical (held on your last regularly scheduled lab meeting): 15%
- Laboratory competency exam (see page vi; to be scheduled w/ TA): 5%
- Lab assignments: 80%

All written lab assignments will have an associated due date. Materials turned in late will be assessed a penalty of 15% per day.

- Laboratory assignments will typically be due at the end of your lab period or the following week in lab.
- Pre-lab assignments are due at the beginning of your assigned lab period. You may on occasion have a pre-lab quiz prior to beginning a lab activity.

Civility

Please be respectful at all times towards your classmates and instructors. We’re sure you know that this means to treat others as you wish to be treated, and to behave as you would have others around you behave. There are a couple corollaries to this general rule:

- Cell phones: We guarantee you will not need a cell phone in the lab – shut yours off please.
- E-mails: Write courteous and grammatically correct messages. You can well imagine that a courteous e-mail inquiry will most likely elicit a prompt reply. Your instructors will reserve the right to request a rewrite before writing a reply.
Sample Grading Guide for Integrated Laboratory Competency Exam

1. Basic Microscopy
Student demonstrated command of microscope, including:
- adjustment of inter-ocular distance and ocular lens focus / 1
- proper loading and unloading of slide onto the deck / 2
- proper technique for increasing magnification while maintaining position and focus of object (scanning objective, focus, center) / 1
- use of oil emersion objective / 1
- clean-up / 2

2. Micrometer Calibration
Student demonstrated command for methods and calculations associated with micrometer calibration and use in determining size of unknown object:
- properly align deck micrometer with ocular micrometer / 1
- show work for calibrating the micrometer; / 3
- properly produce a wet mount / 2
- measure and properly report size of object / 2

3. Sterile Techniques
Student should work through sterilization of work space and proper sterile transfer of suspension onto agar plate.
- properly prepare the work station by sterilizing work space with bleach; / 1
- light and properly adjust flame on Bunsen burner; / 2
- transfer a sample (of water) from container to agar plate by
  - flame-sterilizing the loop / 1
  - retrieving sample from container / 1
  - streaking the sample onto agar / 1
  - repeating the flaming and spreading of sample onto quadrants of the plate
  - proper rotation and spreading of loop across plate / 1
  - retaining lid on plate / 1
  - flaming between streaks / 1

4. Counting Chamber
Demonstrate command for use of counting chamber.
- find the grid, get the scope focused and centered onto a 1x1mm grid; / 1
- place cover slip on chamber / 1
- properly load the chamber with algae culture / 1
- count and tally the cells within the 1 x 1 x 0.1 mm³ volume / 1
- convert count to #cells/requested volume / 2

5. Volumetric Pipettes
Have student pipette a volume of water from one beaker to another.
- Does student have command of the bulb? / 1
- Does student measure the volume properly? / 1
6. **Balance**
Demonstrate command for techniques associated with using a balance:
- properly turn on and tare the balance / 1
- use of a weigh boat to hold solids / 1
- use of draft doors in making the measurement / 1
- prompt recording of data / 1

7. **Micropipette**
Student should demonstrate proper use of a micropipette for transferring liquids:
- place a tip on the micropipette / 1
- properly adjust volume / 1
- push plunger and withdraw liquid properly / 2
- dispense liquid properly / 2
- dispose of tip / 1

8. **Spectrometer**
Student should demonstrate proper use of a spectrometer and associated software/materials:
- fill a cuvette and place in spectrometer properly / 1
- measure a blank spectrum / 1
- measure a sample spectrum / 1
- obtain maximum absorbance wavelength / 1

/43
Use this page to keep track of your grades and to calculate your final grade point average.

### Pre-lab Assignments/Quizzes

<table>
<thead>
<tr>
<th>Topic</th>
<th>Points Earned</th>
<th>Total Possible Points</th>
</tr>
</thead>
</table>

Sum of Total Points Earned for all pre-labs, quizzes, assignments and reports: (i) ______

### Laboratory Assignments / Reports

<table>
<thead>
<tr>
<th>Topic</th>
<th>Points Earned</th>
<th>Total Possible Points</th>
</tr>
</thead>
</table>

Sum of Total Possible Points for all pre-labs, quizzes, assignments and reports: (ii) ______ Assignment Average (AA) = i / ii * 100 = ______

### Lab Practical Exam Grades

<table>
<thead>
<tr>
<th>Practical</th>
<th>Competency</th>
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<tbody>
<tr>
<td>Points Earned</td>
<td>Total Points</td>
</tr>
</tbody>
</table>

Practical Exam Points Earned: (iii) ______ Exam Average (EA) = iii / iv * 100 = ______

Practical Exam Total Points: (iv) ______

Competency Exam Points Earned: (v) ______ Competency Avg (CA) = v / vi * 100 = ___

Competency Exam Total Points: (vi) ______

Final Weighted Average = (AA * .80) + (EA * .15) + (CA * .05) = __________

### Grade Scale

<table>
<thead>
<tr>
<th>100-93</th>
<th>92-90</th>
<th>89-87</th>
<th>86-83</th>
<th>82-80</th>
<th>79-77</th>
<th>76-73</th>
<th>72-70</th>
<th>69-60</th>
<th>&lt;60</th>
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<tbody>
<tr>
<td>A</td>
<td>A-</td>
<td>B+</td>
<td>B</td>
<td>B-</td>
<td>C+</td>
<td>C</td>
<td>C-</td>
<td>D</td>
<td>F</td>
</tr>
</tbody>
</table>

viii
Combined schedules for Organismal Biology & Ecology Lecture (EFB 101) and Laboratory (ESF 296/EFB 102).

<table>
<thead>
<tr>
<th>Week of</th>
<th>Laboratory Schedule</th>
<th>Lecture Schedule (101)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/27-8/31</td>
<td>*Field Trip 1: Forest Herbs I - Hypothesis Development</td>
<td>Introduction</td>
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<td></td>
<td>Science of Life</td>
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<td></td>
<td></td>
<td>Animal Behavior</td>
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<tr>
<td>9/3-9/7</td>
<td>§ Field Trip 2: Forest Herbs II - Hypothesis Testing</td>
<td>Ecology and the Biosphere</td>
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<td>Labor Day</td>
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<td></td>
<td>Population Ecology</td>
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<tr>
<td>9/10-9/14</td>
<td>Forest Herbs III - Literature Review</td>
<td>Community Ecology</td>
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<tr>
<td></td>
<td>Intro to Microscopy</td>
<td>Ecosystems &amp; Restoration</td>
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<td></td>
<td></td>
<td>Conservation &amp; Global Change</td>
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<tr>
<td>9/17-9/21</td>
<td>Forest Herbs IV - Data Analysis &amp; Report Writing</td>
<td>Synthesis</td>
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<td>Exam 1</td>
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<td></td>
<td>Tree of Life</td>
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<tr>
<td>9/24-9/28</td>
<td>Bacteria, Protists</td>
<td>Bacteria and Archaea</td>
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<td>Protists</td>
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<td></td>
<td></td>
<td>Fungi</td>
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<tr>
<td>10/1-10/5</td>
<td>Peer Review Opisthokonta - Fungi</td>
<td>Overview of Animals</td>
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<td></td>
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<td>Invertebrates I</td>
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<td>Invertebrates II</td>
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<tr>
<td>10/8-10/12</td>
<td>Opisthokonta - Animalia</td>
<td>Synthesis</td>
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<td>Exam 2</td>
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<tr>
<td>10/15-10/19</td>
<td>Viridiplantae I: Non-seed Plants</td>
<td>Plant Diversity I</td>
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<td>Plant Diversity II</td>
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<td></td>
<td>Plant Structure, Growth, Development</td>
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<tr>
<td>10/22-10/26</td>
<td>Viridiplantae II: Seed Plants</td>
<td>Plant Transport &amp; Nutrition</td>
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<td>Reproduction &amp; Biotechnology</td>
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<td></td>
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<td>Plant Responses</td>
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<td>10/29-11/2</td>
<td>Initiate Bacteria Experiment</td>
<td>Synthesis Lecture</td>
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<td>Exam 3</td>
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<td></td>
<td>Animal Form &amp; Function</td>
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<tr>
<td>11/5-11/9</td>
<td>Terminate Bacteria Experiment Data Analysis</td>
<td>Animal Nutrition</td>
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<td>Circulation &amp; Gas Exchange</td>
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<td>Immune System</td>
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<tr>
<td>11/12-11/16</td>
<td>Comparison of Animal Organ Systems I</td>
<td>Osmoregulation &amp; Excretion</td>
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<td>Hormones &amp; Endocrine Systems</td>
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<tr>
<td>11/19-11/23</td>
<td>Thanksgiving - no labs</td>
<td>Thanksgiving</td>
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<td>Thanksgiving</td>
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<td>Thanksgiving</td>
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<td></td>
<td>Nervous System</td>
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<td>Sensory &amp; Motor Mechanisms</td>
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<tr>
<td>12/3-12/7</td>
<td>Lab Practical</td>
<td>Synthesis Lecture</td>
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<td>Exam 4</td>
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<td></td>
<td></td>
<td>Synthesis Lecture</td>
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<td>Final Exam TBA</td>
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</tbody>
</table>

*Field trips run rain or shine – dress appropriately.
§ Chance of poison ivy during field trip 2 – wear long pants, long sleeves, no open-toed shoes.
Combined schedules for General Chemistry Lecture (FCH 150) and Integrated Laboratory (ESF 296/FCH151).

<table>
<thead>
<tr>
<th>Week of</th>
<th>Laboratory Schedule</th>
<th>Lecture Schedule (FCH 150)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug 27 - 30</td>
<td>Hypothesis development and Lab Safety introduction</td>
<td>Atomic Theory Light Quantum Chemistry Periodic Trends</td>
</tr>
<tr>
<td>Sept 3 - 6</td>
<td>Data and sample collection and analysis</td>
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<tr>
<td>Sept 10 - 13</td>
<td>Method validation</td>
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<tr>
<td>Sept 17 - 20</td>
<td>Data analysis Microscopy</td>
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<tr>
<td>Sept 24 – 27</td>
<td>Separation of mixtures Solar Cells</td>
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<tr>
<td>Oct 1 – 4</td>
<td>Separation of Mixtures Solar cells</td>
<td>Bonding VSEPR Valence Bond Theory</td>
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<tr>
<td>Oct 8 – 11</td>
<td>Atomic structure</td>
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<td>Oct 15 – 18</td>
<td>States of matter</td>
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<tr>
<td>Oct 22 – 25</td>
<td>Ion chemistry</td>
<td>The Mole and Stoichiometry Reactions Solution Stoichiometry Gases Solids</td>
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<tr>
<td>Oct 29 – Nov 1</td>
<td>Solution stoichiometry</td>
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<tr>
<td>Nov 5 – 8</td>
<td>Nutrient limited growth</td>
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<tr>
<td>Nov 12 – 15</td>
<td>Gas laws</td>
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<tr>
<td>Nov 19 – 22</td>
<td>Thanksgiving – no labs</td>
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<tr>
<td>Nov 26 – 30</td>
<td>The Solid State</td>
<td>Liquids/IMFs Colligative properties</td>
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<tr>
<td>Dec 3 – 6</td>
<td>Lab practical</td>
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<tr>
<td>Week</td>
<td>Week of</td>
<td>Tuesday</td>
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</tbody>
</table>
| 1    | Aug 27 - 30   | Forest Herbs I: Hypothesis Development (field trip) | - Critical and close reading practices  
- Introduction to Academic Inquiry and Discourse  
- Observation & Description  
- Concrete vs. Abstract Diction | Lab safety  
- Note taking and observation |
|      |               | - Introduction and organization              |                                                                                  |                               |
| 2    | Sept 3 - 6    | Forest Herbs II: Hypothesis Testing          | - Introduction to Source Integration  
- Putting sources into conversation | Soil sample analysis |
|      |               | - Field Data Collection (field trip)         |                                                                                  |                               |
| 3    | Sept 10 - 13  | Microscopy I                                 | - Introduction to the Library Resources  
- Reading Scientific Papers  
- Evaluating Sources  
- Introduction to APA Citation Procedures | Sample Analysis II  
Method validation |
|      |               | Literature Review                            |                                                                                  |                               |
| 4    | Sept 17 - 20  | Microscopy II                                | - Making and Refining Claims  
- Gathering and Analyzing Evidence | Data Analysis and Report Writing (computer labs) |
|      |               | - Resolution & diffraction  
- Electron microscopy |                                                                                  |                               |
| 5    | Sept 24 – 27  | Bacteria, Protists                           | - Revision Strategies  
- Peer Review  
- Continued Work with APA Citation Procedures | Separation of mixtures  
Solar cells I |
- Introduction to Rhetorical Analysis  
- Class-wide Review of Sample Lab Report  
- Writing Abstracts | Solar Cells II |
| 7    | Oct 8 – 11    | Animalia                                     | - Selecting a Site of Analysis  
- Recognizing Significant Details, Patterns, Binaries, and Anomalies  
Interpreting Data  
- Gathering and Interpreting Evidence | Atomic Structure and Emission |
|      |               | Forest Herb Report Due                       |                                                                                  |                               |
|   | Oct 15 – 18 | Archaeplastida - Non-Seed Plants | · Formulating Meaningful Questions and Working Theses  
· Using Evidence to Complicate and Refine a Thesis | States of Matter: Liquids Colloids Gels |
|---|---|---|---|---|
| 8 | Oct 22 – 25 | Archaeplastida - Seed Plants | · Composing Your Analysis (developing claim-driven, focused paragraphs with supporting evidence)  
· Drafting | Ion chemistry |
| 9 | Oct 29 – Nov 1 | Microbial Communities I | · Peer Review  
· Editing Practices  
· Introduction to Academic Argument | Solution stoichiometry |
| 10 | Nov 5 – 8 | Microbial Communities II | · Locating and Complicating Debates  
· Continued Emphasis on Rhetorical Appeals and Rhetorical Context  
· Identifying Claims, Warrants, Assumptions and Data | Nutrient-limited growth Water quality analysis |
| 11 | Nov 12 – 15 | Animal Organ Systems I | · Locating Appropriate Sources  
· Selecting Effective Evidence  
· Structuring an Argument (classical, Rogerian, and alternative structures) | Gas laws |
| 12 | Nov 19 – 22 | No lab Thanksgiving | No class Thanksgiving  
· Drafting | No Lab Thanksgiving |
| 13 | Nov 26 – 30 | Animal Organ Systems II | · Presenting Information Orally  
· Designing Visuals for Presentations | The Solid State Nutrient-Limited Growth Lab Report Due |
| 14 | Dec 3 – 6 | Lab practical I | · Take-home Peer Review  
· Revision  
· Oral Presentations | Lab Practical II Lab checkout |