

# BIOL 141 – Cell Biology and Genetics with Lab

## [Fall 2018]

---

**Lecture:** MWF 1:00-1:50pm, OSB 115

**Lab:** Th 9:45am-12:45pm, OSB 325

**Lab TA:** Tanya Li

**Instructor:** Dr. Ariel VanLeuven

**SI:** Vivian Huang

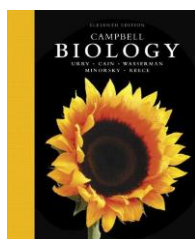
**E-mail:** [avanleu@emory.edu](mailto:avanleu@emory.edu)

**Office Location:** OSB 120

**Office Hours:** Thursdays 1:30-2:30pm OR by appointment

---

### Textbook, Lab Manual & Other Resources:



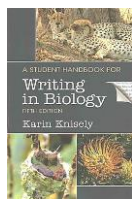
#### Required Lecture Text

Campbell Biology (11<sup>th</sup> ed.)  
Urry, Cain, Wasserman,  
Minorsky & Reece



#### Required Lab Text

BIO 141 Lab Manual  
Oxford-specific  
ONLY in bookstore  
MUST BUY NEW!



#### Optional Writing Book

Writing in Biology  
Karin Knisely  
5<sup>th</sup> Edition



#### Optional Workbook

Practicing Biology  
6<sup>th</sup> Edition

**Website:** Mastering Biology ([www.masteringbio.com](http://www.masteringbio.com)) has online study materials, practice exams, learning activities & strategies for success. Your textbook should include access to the site; if not, you can purchase access if desired.

---

### Course Overview & Objectives:

- This course is designed for students who 1) plan to major in biology or neuroscience and behavioral biology, 2) attend professional school in a health-related field, and/or 3) have a strong background in biology.
- This course is designed to serve as an introduction to the basic themes of biology and to begin your training as a scientist by introducing you to the basics of investigative science and science writing.
  - *This course fulfills the inquiry (INQ) & continuing Writing Requirement (WR)*
- The topics covered by the course will expose you to the basics of biology at the molecular, cellular, and organismal levels.
- You will learn:
  1. The basics of molecular biology.
  2. How biological molecules contribute to cell structure, function and survival.
  3. How cells control & regulate their functions (ex: transport, energy production).
  4. How genetics and inheritance underly the diversity of life on earth and are responsible for the evolution of populations.

- The Lab will involve investigations addressing these topics, in order to broaden your understanding and to help you begin to learn how to “think and act like a scientist.”
    - Labs are meant to supplement our material in lecture – to give you an opportunity to take part in the scientific process through inquiry and communicate your experience through scientific writing.
    - You will be working in teams.
    - Just as assignments are meant to be a dialogue, our entire lab period is also meant for interactions – between you and your student-colleagues and between you and me. Take time to observe and ask questions.
      1. You’ll practice observing living organisms, generating questions, and evaluating evidence.
      2. You’ll develop laboratory techniques and analyze real-world data.
- 

### **Tips for Success & Expectations:**

BIOL 141 is an intensive course (it will likely be one of the more difficult courses you’ll take) and requires time and commitment from you. To perform well, you must develop a proper plan for managing your time and your work, beginning from the first day of class.

#### **Helpful Tips:**

- ❖ Keep up with the assigned readings & ACTUALLY read the book before class
- ❖ Take good notes, review them regularly, and connect them to the readings
- ❖ Don’t try to get through this course simply via memorizing facts; this class is designed to make you think, so get in the habit of both learning terminology and then applying your knowledge in a critical and analytical way.
  - Activities both in and out of class will help you with this, so take those assignments seriously.
- ❖ Attend SI!
- ❖ Communicate!
  - Ask questions during class and lab
  - Contact me via email OR come to office hours with additional questions
- ❖ Engage in the lab; it’s equally important!

We will all take part in each other’s learning experience. I will work hard to provide opportunities for you all to interact with each other through team-based discussions, reflections, and activities. You will also be working on out-of-class assignments; these assignments should aid your progress in the class and your understanding of the course material. To that note, look at the grades, but also read my comments/feedback.

In addition to mastering course content, I’d like you to finish the course having gained critical thinking practice and honed your ability to ask & answer questions like a scientist.

---

### **Supplemental Instruction (SI):**

SI is provided for all students in BIOL 141; this program provides assistance for all students who wish to improve their performance in biology. It is an incredibly helpful resource for practicing and applying what we do in class.

---

## Class Policies:

- Attendance is mandatory and is the only way you'll get the most out of this course. BIOL 141 follows the attendance policy laid out by the Biology Department, which is detailed on the attached handout.
- Canvas is the primary way we share announcements, course content, and assignments.
- Laptops are more often a distraction than a learning aid – if you feel your learning is best accomplished with a laptop, please do not let it become a problem.
- Cell phones should *not* be visible or audible in class.
- Academic dishonesty will not be tolerated and is handled according to the Oxford College Honor Code (<http://oxford.emory.edu/catalog/regulations/honor-code.html>).
- Be interactive; this class will involve participation in discussions, activities, labs, etc., which will help you connect and integrate the material.
- **NEVER** hesitate to ask a question in or out of class.

---

## Additional Sessions:

We have two additional instruction sessions in this course for library and information technology. These sessions are held outside of class time and are critical for your laboratory assignments, as well as for your future as a science student.

---

## Accommodations:

If you have Academic Accommodations, please let me know as soon as possible so we can communicate with the Office of Accessibility Services.

(<https://inside.oxford.emory.edu/life-at-oxford/accessibility-services/>).

---

## Evaluation Criteria & Grading:

\*Exams will consist of multiple choice, short answer, and short essay questions. Exams will cover all material in lecture plus assigned textbook readings & supplemental material.

\*Laboratory Exams will cover the material from the lab exercises and will include a practical and a written portion.

|                                    |                   |                             |   |
|------------------------------------|-------------------|-----------------------------|---|
| Exam 1                             | 100               | Final Grade Determination   |   |
| Exam 2                             | 100               | 90-100%                     | A |
| Exam 3                             | 100               | 80-89%                      | B |
| Comprehensive Final Exam           | 175               | 70-79%                      | C |
|                                    |                   | 60-69%                      | D |
| Scientific Writing (4 assignments) | 25                | <60%                        | F |
| Lab Research Project               | 75                | plus and minus grades given |   |
| *Proposal, Presentation, and Paper |                   |                             |   |
| Lab Exam 1                         | 50                |                             |   |
| Lab Exam 2                         | 35                |                             |   |
| Lab Exam 3                         | <u>50</u>         |                             |   |
| <b>TOTAL:</b>                      | <b>710 points</b> |                             |   |

## BIOL 141 Lecture Schedule

| Date                 | Lecture   | Reading            |
|----------------------|---|--------------------|
| 29 – Aug (W)         | Science as a Way of Knowing   | --                 |
| 31 – Aug (F)         | Major Themes in Biology   | 1                  |
| <b>3 – Sep (M)</b>   | <b>Labor Day – Holiday</b>  |                    |
| 5 – Sep (W)          | Hierarchies: Beginning with Living Chemistry and Water                      | 2, 3               |
| 6 – Sep (Th)         | <i>Scientific Literature and Research (OSB115/101) 8-8:45am or 9-9:45am</i> |                    |
| 7 – Sep (F)          | Building Biological Macromolecules: Carbohydrates and Lipids                | 4,5                |
| 10 – Sep (M)         | Proteins and Nucleic Acids  | 5                  |
| 12 – Sep (W)         | Structure and Function Revealed in Cells                                    | 6                  |
| 14 – Sep (F)         | Cell Biology - Problems/Case Study and <i>Strategies for Success</i>        | 6                  |
| 17 – Sep (M)         | Membrane Structure & Cellular Transport                                     | 7                  |
| 19 – Sep (W)         | Transport Problems  | 7                  |
| 21 – Sep (F)         | Fundamentals of Energy Transformations: Enzymes, ATP, Electron Carriers     | 8                  |
| 24 – Sep (M)         | Cellular Respiration I - Glycolysis   | 9                  |
| 26 – Sep (W)         | Cellular Respiration II – Glycolysis & Transition                           | 9                  |
| <b>27 – Sep (Th)</b> | <b>EXAM I – 8:00-9:30am (through membrane transport)</b>                    |                    |
| 28 – Sep (F)         | Cellular Respiration III – Krebs Cycle                                      | 9                  |
| 1 – Oct (M)          | Cellular Respiration IV – Chemiosmosis and The Electron Transport System    | 9                  |
| 3 – Oct (W)          | Review and Recapitulation: Accounting Day                                   | --                 |
| 5 – Oct (F)          | Homage to Photosynthesis  | 10                 |
| <b>8 – Oct (M)</b>   | <b>Fall Break – Holiday</b>   |                    |
| 10 – Oct (W)         | Photosynthesis I: Light Dependent Reactions                                 | 10                 |
| 12 – Oct (F)         | Photosynthesis II: Light Independent Reactions and Variations (C4 and CAM)  | 10                 |
| 15 – Oct (M)         | <i>Team Research Proposal Development Part I</i> (class held in OSB 325)    | --                 |
| 17 – Oct (W)         | <i>Team Research Proposal Development Part II</i> (class held in OSB 325)   | --                 |
| <b>18 – Oct (Th)</b> | <b>TEAM RESEARCH PROPOSALS DUE ON CANVAS BY 9:00AM</b>                      |                    |
| 19 – Oct (F)         | Cell Reproduction: Cell Cycle, Mitosis                                      | 12                 |
| 22 – Oct (M)         | Sexual Life Cycles and Meiosis  | 13                 |
| 24 – Oct (W)         | Mendelian Principles; Genes and Chromosomes                                 | 14, 15, pp 294-297 |
| <b>25 – Oct (Th)</b> | <b>EXAM II – 8:00-9:30am (through photosynthesis)</b>                       |                    |
| 26 – Oct (F)         | Patterns of Inheritance   | 14, pp 278-283     |
| 29 – Oct (M)         | Chromosomal Theory and Linkage  | 15                 |
| 31 – Oct (W)         | Genetics Problems and Review  | 14, 15             |
| 2 – Nov (F)          | DNA Structure   | 16                 |
| 5 – Nov (M)          | DNA Replication   | 16                 |
| 7 – Nov (W)          | Gene to Protein I: Transcription and the Genetic Code                       | 17                 |
| 9 – Nov (F)          | Gene to Protein II: Translation and Genetic Mutations                       | 17                 |
| 12 – Nov (M)         | Molecular Genetics Workshop   | --                 |
| 14 – Nov (W)         | Charles Darwin and Development of Evolutionary Concepts                     | 22                 |

|               |  |                    |
|---------------|--|--------------------|
| 15 – Nov (Th) | <b>EXAM III – 8:00-9:30am (through genetics)</b>                           |                    |
| 16 – Nov (F)  | Evidence for Evolution   | 22, 25, pp 523-535 |
| 19 – Nov (M)  | Genetic Variation, Population Genetics and Hardy-Weinberg                  | 23                 |
| 21 – Nov (W)  | <b>Thanksgiving Break – Holiday</b>  |                    |
| 23 – Nov (F)  | <b>Thanksgiving Break – Holiday</b>  |                    |
| 26 – Nov (M)  | <i>Scientific Papers – “Ask the Editors”</i>                               |                    |
| 28 – Nov (W)  | Microevolution: Genetic Drift, Gene Flow and Mutation                      | 22                 |
| 30 – Nov (F)  | Evolution of Land Plants<br><i>RESEARCH PAPERS DUE ON CANVAS BY 1:00PM</i> | 29                 |
| 3 – Dec (M)   | Bryophytes and Seedless Vascular Plants                                    | 29                 |
| 5 – Dec (W)   | Seed Plants: Gymnosperms and Angiosperms                                   | 30, 38, pp 826-830 |
| 7 – Dec (F)   | Sexual Encounters of the floral kind                                       | 38, pp 821-829     |
| 10 – Dec (M)  | Evolutionary Trends in Land Plants & Big Themes Revisited                  | --                 |
| 17 – Dec (M)  | <b>FINAL EXAM – 9:00AM – 12:00PM</b>                                       |                    |

## BIOL 141 Lab Schedule

| Date          | Lab Topic  | Writing Assignment <sup>1</sup>         |
|---------------|--|---|
| 6 – Sep (Th)  | Scientific Investigation   | Introduction; References                |
| 13 – Sep (Th) | Microscope and Cells   | Review Table <sup>2</sup>               |
| 20 – Sep (Th) | Diffusion and Osmosis  | Materials and Methods; Title Page       |
| 27 – Sep (Th) | Enzymes  | Table; Figure                           |
| 28 – Sep (F)  | <i>FERMENTATION PROPOSALS DUE ON CANVAS BY 2:30PM</i>  |   |
| 4 – Oct (Th)  | Cellular Respiration and Fermentation  | Figure; Results; Discussion; References |
| 4 – Oct (Th)  | <b>*LAB EXAM I (through Enzymes) – Thursday PM</b>   |   |
| 11 – Oct (Th) | <b>NO LAB – Fall Break</b>   |   |
| 18 – Oct (Th) | <i>TEAM RESEARCH PROPOSALS DUE ON CANVAS BY 9:00AM</i>   |   |
| 18 – Oct (Th) | Mitosis and Meiosis  | Comparison Table <sup>2</sup>           |
| 25 – Oct (Th) | Field Research: Ecology and Evolution on the Outcrops  | --                                      |
| 1 – Nov (Th)  | Microbial Diversity (Bacteriology)   | --                                      |
| 1 – Nov (Th)  | <b>*LAB EXAM II (Mitosis and Meiosis) – Thursday PM</b>  |   |
| 8 – Nov (Th)  | Research Symposium/Presentations<br><i>Technology Rehearsal – Upload &amp; Check Your Slides by 9:00am</i> | --                                      |
| 15 – Nov (Th) | Molecular Biology  | --                                      |
| 22 – Nov (Th) | <b>NO LAB – Thanksgiving Break</b>   | --                                      |
| 29 – Nov (Th) | Plant Diversity I and II   | --                                      |
| 30 – Nov (F)  | <i>RESEARCH PAPERS DUE IN CLASS &amp; ON CANVAS BY 1:00PM</i>  |   |
| 6 – Dec (Th)  | <b>*LAB EXAM III (Bacteriology, Molecular Biology and Plant Diversity I and II) – Thursday PM</b>          |   |

\*Lab Exams are scheduled in several sessions on the Thursday afternoons and evenings noted above. Sign up in class for a time.

<sup>1</sup>Writing Assignments are due one week later at the beginning of the lab period unless otherwise noted.

<sup>2</sup>These assignments are NOT turned in for a grade.

---

**BIOL 141 Important Dates\_Fall 2018**  
**(Includes lecture & lab exams, lab assignments, & additional sessions)**

| Date     | Assessment  |
|----------|---|
| 6 – Sep  | Scientific Literature and Research Workshop                       |
| 13 – Sep | Introduction; References due on Canvas by 9:45am                  |
| 27 – Sep | Materials and Methods; Title Page due on Canvas by 9:45am         |
| 27 – Sep | EXAM I  |
| 28 – Sep | <i>FERMENTATION PROPOSALS DUE ON CANVAS BY 2:30PM</i>             |
| 4 – Oct  | Table; Figure due on Canvas by 9:45am                             |
| 4 – Oct  | LAB EXAM I  |
| 18 – Oct | Figure; Results; Discussion; References due on Canvas by 9:45am   |
| 18 – Oct | <i>TEAM RESEARCH PROPOSALS DUE ON CANVAS BY 9:00AM</i>            |
| 25 – Oct | EXAM II   |
| 1 – Nov  | LAB EXAM II   |
| 8 – Nov  | Research Symposium/Presentations (Technology Rehearsal at 9:00am) |
| 15 – Nov | EXAM III  |
| 26 – Nov | “Ask the Editors” session in class                                |
| 30 – Nov | <i>RESEARCH PAPERS DUE ON CANVAS BY 1:00PM</i>                    |
| 6 – Dec  | LAB EXAM III  |
| 17 – Dec | FINAL EXAM  |

**The instructor reserves the right to modify any part of the syllabus at any point in the semester if deemed necessary.**