BIOL 111: Introduction to Cell and Molecular Biology
Gateway to Neuroscience LC/STEM-SCAMP LC

Faculty Instructor: Dr. Chris Korey
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Phone: 843-953-7178
Sections 06/10/12 - MW: 3:25 - 4:40; RITA 103

Peer Facilitators: Emma Chamberlain (Neuro), Nic Hayes (Neuro), Coralys Rios Santiago (SCAMP)
Supplemental Instructor: Annamaria Costanzo

Course Catalog Description: A foundation course for science majors emphasizing the concepts of structure and function in biological systems at the molecular and cellular levels. Topics include biochemistry, biochemical and molecular evolution, cell function, respiration, photosynthesis, genetics and molecular biology. Lectures three hours per week. Co-requisite(s) or Prerequisite(s): BIOL 111L

Much More Interesting Description: Why are some peppers hotter than others? What happens if you never feel pain? How do toxins effect neurons? How does the brain process pain and other stimuli from the environment. We'll answer these questions and others as we explore molecular and cellular biology through the lens of neuroscience. In addition to learning some basic neuroscience, we'll highlight some of the unanswered questions that are driving the field.

As a student in this course you will...

- Understand the basics of cellular and molecular biology with specific learning objectives in each content section
- Identify the primary research papers associated with popular science and news articles
- Understand the difference between a popular science article and a peer-reviewed science paper
- Understand the role of peer-reviewed primary research articles in the communication of new scientific findings
- Analyze figures and data from primary research articles

The discovery of a large family of receptors detecting odor solved the mystery of how our brains perceive smell.
What materials do I need to take this course?

**Readings:** We will be making extensive use of Freeman’s *Biological Sciences*. The seventh edition (newts on the front) is the newest version, but the sixth edition is perfectly fine (monkey on the front) and likely much cheaper to rent or buy. I would go with the cheapest option. Any other readings that we might have will be provided in OAKS.

**Computer Technology:** Reliable Internet Access, Computer, Access to OAKs

**Poll Everywhere:** We’ll be using the classroom polling app Poll Everywhere throughout the course. You can download the free app for iOS and Android or you can also just use texting to participate.

What are important dates I should make note of in my calendar?

I maintain a comprehensive course calendar with the course topics, readings, suggested problems, and due dates. In the case our schedule changes (due to weather, class cancellations, etc.), I will update the course calendar online as soon as I can.

- Wednesday, 8/21: First Day of Class
- Monday, 8/26: Quiz 1
- Monday, 9/2: Quiz 2/Summary
- Monday, 9/9: Quiz 3/Summary
- Wednesday, 9/11: Exam 1
- Monday, 9/23: Quiz 4/Summary
- Monday, 9/30: Quiz 5/Summary
- Wednesday, 10/2: Exam 2
- Monday, 10/14: Fall Break - No Class
- Wednesday, 10/16: Quiz 6/Summary
- Wednesday, 10/16: Midterm Grades Due
- Monday, 10/21: Quiz 7/Summary
- Friday, 10/25: Withdrawal Date
- Monday, 10/28: Quiz 8/Summary
- Wednesday, 10/30: Exam 3
- Monday, 11/11: Quiz 9/Summary
- Monday, 11/18: Quiz 10/Summary
- Wednesday, 11/20: Exam 4
- Saturday, 12/7: Final Exam


**Hurricane Season Note From the College:** If the College of Charleston closes and members of the community are evacuated due to inclement weather, students are responsible for taking course materials with them in order to continue with course assignments consistent with instructions provided by faculty. In cases of extended periods of institution-wide closure where students have relocated, instructors may articulate a plan that allows for supplemental academic engagement despite these circumstances.
Do I need to come to class on a regular basis?

The short answer is - yes! In my experience, students who do not attend class regularly often struggle to keep up with the pace of the material in our course. By coming to class regularly, focusing on the material during class time, and by asking questions when you are confused, your understanding of the material will be higher than if you worked on the same material at home.

It’s important that you come to class on time, ready to work; that you stay for the entire class period; and that you are working on biology while you are here. I will be taking attendance every day. If you arrive to class more than five minutes late, leave class more than five minutes early, or if you are found doing activities other than those related to our course, I reserve the right to mark you “absent” from class that day.

Any student who misses four class meetings, for any reason, will be reminded of our “WA” Policy via email. Any student who misses five class meetings, for any reason, will be subject to a “WA” Grade for the course. Note that this is computed in your GPA the same as as an “F” grade.

Sometimes, life happens…

I also understand that you all have other courses, life responsibilities, jobs, and families. Sometimes, life takes an unexpected turn. However, that shouldn’t prevent you from being successful in this class. Please do not hesitate to talk to me about any personal issues (you do not have to provide specifics) that arise during the semester so that we can arrange for the assistance you may need and make reasonable accommodations for you to complete missed work.

Why kind of assignments can I expect?

**Weekly Quizzes:** We will have a quiz on most Mondays during the semester. This short quiz will cover the previous week’s material. You will take the quiz individually when you get to class and then work on the same quiz as a small group. Your score will be the average of the two scores.

**Weekly Summary Sheets:** On most Mondays a weekly summary sheet will be due at the beginning of class. In short, this weekly assignment has you create a concept map, mind map, or some other visual representation of the previous weeks material to help you consolidate and process the information we have covered.

**Course Exams:** There will be 4 exams during the semester. Each exam covers roughly two weeks of the semester. The exams will be mostly short answer and written questions.

**Neuroscience in the News Assignment:** We will have one writing assignment that is tied to our FYE librarian information literacy session. The due date for this will be in the second half of the semester.

**Final Course Experience:** At the end of the course we will not have a traditional final exam, but rather an end of course experience that captures our learning over the past semester together.
How can I get help with course material?

**Office Hours:** These are an ideal time to come and discuss material from the course. These will be open times where we can work on any standards that you are having difficulty with. My office hours are open work times with multiple students in the space working on course material - you can just walk in, no need to wait out side. If you want a more private conversation, we can schedule another time to meet one-on-one.

- **Tuesday:** 11:30-1:00, **Friday:** 9 - 10:30, and by appointment

**Discussion Board:** I have created an online discussion board on OAKS for you to post questions at anytime. Asking questions does not have to wait until office hours or after class. Post a question and I’ll respond within 12 hours.

**Our Classroom Community Strives to be Fully Inclusive**

**Veterans and Active Duty Military:** Veterans and active duty military personnel with special circumstances (e.g., upcoming deployments, drill requirements, disabilities) are welcome and encouraged to communicate these, in advance if possible, to the instructor.

**Preferred Name and Pronoun Information:** I will gladly honor your request to address you by the name and gender pronouns of your choice - mine are he/him/his. Please advise me of this early in the semester via your college-issued email account or during office hours so that I may make the appropriate notation on my class list.

**This course will provide equal access.**

- I am happy to work with all students to ensure that they have equal access to the educational experience of this class. Any student eligible for and needing accommodations because of a disability is requested to speak with the me during the first two weeks of class or as soon as you have been approved for services so that reasonable accommodations can be arranged.

- The College will make reasonable accommodations for persons with documented disabilities. Students should apply for services at the Center for Disability Services/SNAP located on the first floor of the Lightsey Center, Suite 104 (http://disabilityservices.cofc.edu/for-faculty/faqs.php). Students approved for accommodations are responsible for notifying me as soon as possible and for contacting me one week before accommodation is needed.

- This College abides by section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act. If you have a documented disability that may have some impact on your work in this class and for which you may require accommodations, please see an administrator at the Center of Disability Services/SNAP, 843-953-1431 or me so that such accommodation may be arranged.
How does the Honor Code apply to this course?

- Cases of suspected academic dishonesty will be reported directly by the instructor and/or others having knowledge of the incident to the Dean of Students.

- A student found responsible by the Honor Board for academic dishonesty will receive a XXF in the course, indicating failure of the course due to academic dishonesty. This grade will appear on the student’s transcript for two years after which the student may petition for the XX to be expunged. The F is permanent. The student may also be placed on disciplinary probation, suspended (temporary removal) or expelled (permanent removal) from the College by the Honor Board.

- Students should be aware that unauthorized collaboration--working together without permission-- is a form of cheating. Unless the instructor specifies that students can work together on an assignment, quiz and/or test, no collaboration during the completion of the assignment is permitted.

- Students can find the complete Honor Code and all related processes in the Student Handbook.

How does this course fulfill the FYE Learning Objectives?

By the completion of the First-Year Experience, a student will be able to...

- Identify and use the appropriate academic resources and student support services at College of Charleston. These would include the Addleston library, information technology, the Center for Student Learning, the Career Center, and other appropriate academic resources, student support services, and cultural resources.

By the completion of the First-Year Experience, a student will be able to...

- Use appropriate tools and search strategies for identifying particular types of information specific to the discipline
- Evaluate the relevance, quality, and appropriateness of different sources of information
- Recognize and classify the information contained within a bibliographic citation
- Access and use information ethically and legally

Faculty will use writing, speech, or media in innovative ways to achieve integrative learning by students. By the completion on the first-year, a student will be able to...

- Use appropriate critical thinking skills and problem-solving techniques in appropriate disciplinary contexts
- Make connections across disciplines and/or relevant experiences
My job is to help you learn and develop a deep understanding of the course material. I want you to be successful in this course. Part of the goal of my class design is to promote habits of mind and practice that build on our understanding of how we learn.

By the end of the semester, I hope that you have built an approach to learning in Biology that will support your success in future Biology courses. My approach also provides continual opportunities to test yourself to see how your learning is progressing. Your daily approach is based on a learning/studying cycle that you will use in preparation for each class day. It also provides you and I several different checkpoints each day to see what you understand and what you need to work on.

Preparation before class is essential for success. If you do not prepare for class, you will not be able to participate in the in-class work and therefore you will not have the foundation for doing other work in the class. Stay on top of your readings before class. Work and take it seriously.

- Look at the Chapter Reading Guide on OAKS
- Read the assigned material with the questions on the Chapter Reading Guide in mind.
- Answer the Reading Guide questions after you have read the material

**First Checkpoint:** Were there things you didn’t find or understand on the reading guide? Make note of it so we can answer these questions in class.

Be Actively Engaged in Class. This is our opportunity to work on the material together in a variety of formats.

- Bring your reading guide notes. These are the essential pieces of our day’s work together.
- Participate fully in the quiz and problems you work on together in your small group. The problems will ask you to apply what you have read about as a second assessment of your learning of the concepts.
- Ask your questions in class

**Second Checkpoint:** Were there things that you did not understand in our daily work together? I’ll be walking around and will usually stop to help groups that are stuck. We’ll come together to discuss the answers and use online polling – these are great times to ask questions. Others likely have the same ones. At the end of the day, check to see if there are some things that still need clarification – these are great to bring to my office hours and SI.

Be engaged and active in your learning after class. Come to office hours, make appointments, go to supplemental instruction. Set aside 2-3 hours after each course meeting to review your notes, our in-class problems, and to do create your weekly visual summary. This is the time to identify your areas of difficulty.

Adopt a growth mindset. According to Carol Dweck those with a “fixed mindset” believe their basic qualities such as intelligence or mathematical skill are fixed quantities. On the other hand those with a “growth mindset” believe that these basic qualities can be improved through dedication and hard work, and when they fail at something, they take it as a learning opportunity and get better by learning from their mistakes.
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<tr>
<th>Day</th>
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<th>Topics</th>
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<tr>
<td>W</td>
<td>8-21</td>
<td>Introductions, Syllabus</td>
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**Week 1**
Read Before Monday: FBS Chapter 2.1/ 2.2/2.5 and Chapter 3
Start of Class on Monday: Quiz 1 on syllabus

| M   | 8-26 | Syllabus Questions
Neuropharmacology and Sodium Channels (Chapter 2)
*Structure Leads to Function: Atoms & Bonds, Carbon Skeletons, Functional Groups* |
| W   | 8-28 | Structure of Pain Sensing Sodium Channels (Chapter 5)
*Structure Leads to Function: Protein Structure and Function/Enzymes* |

**Week 2**
Supplemental Instruction Begins
Read Before Monday: FBS Chapter 2.3, Chapter 4, and Chapter 5
Due on Monday: Week 1 Summary Sheet
Start of Class on Monday: Quiz 2 on Week 1

| M   | 9-2  | Chemistry of Sodium Channel Function (Chapters 2.3 and 5)
*Structure Leads to Function: Thermodynamics and Energy
Structure Leads to Function: Carbohydrate Structure* |
| W   | 9-4  | Fire and Ice - Sodium Channel Mutations (Chapter 4)
*Structure Leads to Function: Nucleic Acids and Mutations* |

**Week 3**
Review Weeks 1 and 2 Before Monday
Due on Monday: Week 2 Summary Sheet
Start of Class on Monday: Quiz 3 on Week 2

| M   | 9-9  | *Unit Review Activity* |
| W   | 9-11 | *Exam 1* |

**Week 4**
Read Before Monday: FBS Chapters 2.2, 6.1-6.2, 7.1-7.3, 7.5-7.6

| M   | 9-16 | The Dynamic Neuron (Chapters 2.2, 6.1-6.2, 7.6)
*Structure Leads to Function: Lipid Structure/Membranes; Water Chemistry/pH
Structure Leads to Function and Information Flow: Cytoskeleton Dynamics* |
| W   | 9-18 | The Dynamic Neuron (Chapter 7.1-7.3, 7.5)
*Structure Leads to Function and Information Flow: Prokaryotic and Eukaryotic Cell Structures* |
### Week 5
Read Before Monday: Chapters 6.3-6.4 and 11.3  
Due on Monday: Week 4 Summary Sheet  
Start of Class on Monday: Quiz 4 on Week 4

| M  | 9-23   | Neurotransmission and Sodium Channels (Chapter 6.3-6.4)  
|    |        | *Structure Leads to Function: Membranes, Diffusion/Osmosis, Transport* |
| W  | 9-25   | Neuropathic Pain and Transmitting Pain Signals (Chapter 11.3)  
|    |        | *Information Flow: Cellular Communication, Signal Transduction* |

### Week 6
Review Weeks 4 and 5 Before Monday  
Due on Monday: Week 5 Summary Sheet  
Start of Class on Monday: Quiz 5 on Week 5

| M  | 9-30   | Unit Review Activity |
| W  | 10-2   | Exam 2 |

### Week 7
Read Before Monday: Chapters 8 and 9

| M  | 10-7   | Why Does the Brain Use So Much Energy? (Chapter 8)  
|    |        | *Cellular Pathways and Energy Transformation: Metabolic Pathways, Energy Transfer, ATP, Enzymes* |
| W  | 10-9   | Cellular Respiration and Fermentation (Chapter 9)  
|    |        | *Cellular Pathways and Energy Transformation* |

### Week 8
Read Before Wednesday: Chapter 10.1-10.3  
Due on Wednesday: Week 7 Summary Sheet  
Start of Class on Wednesday: Quiz 6 on Week 7

| M  | 10-14  | Fall Break |
| W  | 10-16  | Photosynthesis, Light Reactions (Chapter 10.1-10.3)  
|    |        | *Cellular Pathways and Energy Transformation* |

### Week 9
Read Before Monday: Chapters 10.4 and 12.1-12.4  
Due on Monday: Week 8 Summary Sheet  
Start of Class: Quiz 7 on Week 8

| M  | 10-21  | Calvin Cycle (Chapter 10.4) and Review of Energy Transformation  
|    |        | *Cellular Pathways and Energy Transformation* |
| W  | 10-23  | Mitosis and the Cell Cycle (Chapter 12.1-12.4)  
|    |        | *Information Flow: Cell Cycle Control* |
## Week 10
Review Weeks 7, 8 and 9 Before Monday
Due on Monday: Week 9 Summary Sheet
Start of Class: Quiz 8 on Week 9

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<th>Day</th>
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<tbody>
<tr>
<td>M</td>
<td>10-28</td>
<td>Unit Review Activity/Neuroscience Opportunities at the CofC</td>
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<td>W</td>
<td>10-30</td>
<td>Exam 3</td>
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## Week 11

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| M   | 11-4 | Online in OAKS (Dr. Korey Away From Campus)  
Mutations and Human Disease (Chapter 16)  
Structure Leads to Function and Information Flow: Genes, Mutation, and Multiple Alleles |
| W   | 11-6 | Online in OAKS (Dr. Korey Away From Campus)  
Connecting Inheritance to Meiosis (Monohybrid Crosses) (Chapter 13.1/2,14.1/2 )  
Information Flow: Basic Inheritance, Meiosis, Probability |

## Week 12
Read Before Monday: FBS Chapters 14.4-14.5 and 17.1-17.5
Due on Monday: Week 11 Summary Sheet
Start of Class: Quiz 9 on Week 11

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<th>Day</th>
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<th>Event</th>
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| M   | 11-11 | Connecting Inheritance to Meiosis (Dihybrids and Linkage)  
Information Flow: Basic Inheritance, Meiosis, Probability |
| W   | 11-13 | Transcription/Translation  
Structure Leads to Function and Information Flow: Protein Structure, Nucleic Acid Structure, Transcription and RNA Polymerase, Translation and Ribosomes |

## Week 13
Review Weeks 11 and 12 Before Monday
Due on Monday: Week 12 Summary Sheet
Start of Class: Quiz 10 on Week 12

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<th>Day</th>
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<tr>
<td>M</td>
<td>11-18</td>
<td>Unit Review Activity</td>
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<td>W</td>
<td>11-20</td>
<td>Exam 4</td>
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## Week 14

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<tr>
<td>M</td>
<td>11-25</td>
<td>Neurophysiology and Neuroanatomy Lab Activity</td>
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<td>W</td>
<td>11-27</td>
<td>Thanksgiving Break</td>
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## Week 15 and Finals Week

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<tr>
<td>M</td>
<td>12-2</td>
<td>Last Day of Class</td>
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<tr>
<td>T</td>
<td>12-3</td>
<td>Reading Day</td>
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<tr>
<td>Sat</td>
<td>12-7</td>
<td>Final Course Experience, 4-7 pm in our regular classroom</td>
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You will earn a course grade of “B” if you meet all of the following conditions

- **Attendance and Participation:** You actively participate in class and have no more than 4 absences from class. 5 absences from class will trigger a WA grade. This will withdraw you from the course with a failing grade.

- **Exams:** You complete 3 of the 4 in-class exams with a score of 85% or higher

- **Quizzes:** You complete 8 of the 10 in class quizzes with a score of 70% or higher

- **Summary Sheets:** You complete 10 of 12 weekly summary sheets. See below for more information on what makes an assignment complete or incomplete.

- **End of Course Experience:** You complete the end of course experience that will take place during our Final Exam period.

There are two ways to earn a grade higher than a B in this course

- You will earn an **A** if you complete 4 of the 4 exams, 9 of 10 quizzes, and 11 of 12 weekly summary sheets.

  OR

- You will earn an **A** if you meet all the specifications for a B and complete the Neuroscience in the News Assignment

**An assignment is considered complete** if it is **submitted on time** and **meets all the assignment’s specifications**. The specifications for particular assignments are listed in their description.

**A quiz or assignment is considered incomplete if:**

- It is submitted on time but fails to meet all the quiz or assignment’s specifications.  
  OR
- If it meets all the assignment’s specifications but is submitted late.  
  OR
- If it is not submitted.
Each student automatically receives 3 Ethos Points, which they can use to make up incomplete assignments in the following ways:

- In the case of an exam that is incomplete due to not reaching the 85% threshold, a student may cash in one Ethos Point and re-submit the corrected exam using the format provided by the specified due date. If the resubmitted exam is considered complete, the grade will be changed to “Complete.” **Only 2 Ethos Points can be used in this way**

- In the case of a quiz that is incomplete, a student may cash in one Ethos Point and re-submit the a new version of the quiz using the format provided. If the re-submitted quiz is considered complete, the grade will be changed to “Complete.”

- In the case of an assignment that is incomplete due to it not being submitted or not meeting all the specifications, a student may cash in one Ethos Point and submit the assignment on or before the last day of class. If the assignment is otherwise complete, the grade will be changed to “Complete.”

**Summary**

Your course grade is determined by the amount of work you put into the course and the degree to which your work in the class completes key learning outcomes for the course. The table below describes the breakdown of each grade option. You must meet all the specifications in the row to qualify for that particular letter grade. “Plus and minus” grades (like C- or B+) will be based on proximity to the full letter grade.

An example of how this table works: You complete 2 of 4 exams, complete 7 of 10 B-level quizzes, complete 10 of 12 Weekly Summary Sheets, complete the Neuroscience in the News Assignment, and complete the Final Course Experience. You have met the specifications for a B, except in the quiz category. This would earn you a B-.

<table>
<thead>
<tr>
<th>Grade</th>
<th># of Complete B-Level Exams</th>
<th># of Complete B-Level Quizzes</th>
<th># of Complete Weekly Summary Sheets</th>
<th>Complete Neuroscience in the News Assignment</th>
<th>Final Course Experience</th>
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<td>A</td>
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<td>9 of 10</td>
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**Synthesis Seminar Completion**: Your PF will send me the final seminar completion information for the synthesis seminar which is based on attendance/participation and completion of the Synthesis Seminar assignments/modules. This will be used to adjust your final grade in the course.

<table>
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<tr>
<th>% from the seminar</th>
<th>Course grade stays the same</th>
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<tr>
<td>80-100%</td>
<td>Grade goes down 1/3 of a letter grade</td>
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<td>70-79%</td>
<td>Grade goes down 2/3 of a letter grade</td>
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<td>60-69%</td>
<td>Grade goes down a full letter grade</td>
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