

BIO 110: Integrative Biology 1
Fall 2021

Dr. Jennifer Larimore

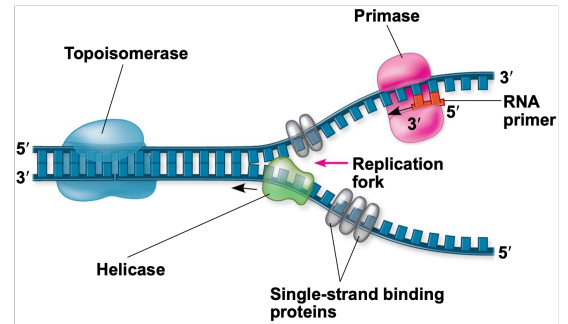
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SYLLABUS OUTLINE:

1. Course Description and Textbook
2. Success Plan
3. Course and Skill Objectives (what you gain from the course)
4. Grade Breakdown
5. Course Overview
 - a. Reading
 - b. Lectures
 - c. Study Guides
 - d. Tests
 - e. the Final Project and Outline
6. Academic Honesty
7. Class Management

1. COURSE DESCRIPTION:

In this course, we will explore a number of core topics in biology including biochemistry, cell biology, genetics, gene expression, evolution, and ecology. Because biologists are discovering new things every day, we have selected some of the most significant topics to cover in this course.

Tuesday/Thursday

8:20 AM – 9:35 AM

BSC 108 East

Essential course materials and Textbook:

- *Biology in Focus*, Second Edition, Person Publishing, by Lisa A. Urry, Michael L. Cain, Steven A. Wasserman, Peter V. Minorsky, Jane B. Reece. ISBN-13: 978-0321962751 | ISBN-10: 0321962753. This text is also used for Biology 111.
- PowerPoints as well as other important information will be posted to Canvas. MP3s for the lecture will be available through the Google Drive folder for this class. In order to access the Google drive folder, you must be using an Agnes Scott email address.

2. SUCCESS PLAN:

Purpose and Plan: Why are you taking this class? What purpose does this class serve for you? What are your personal goals for this class? What will it take to achieve these goals? You need to be able to answer these questions for each class you take – because the work will get hard and you will need to remind yourself what you are aiming for at the end of the semester. Set your goal and then make a plan to achieve that goal. Post that goal in your course text or notebook.

Good Habits: Learning throughout the semester: Preparing for tests and actually learning the material in Bio 110 and every other class you'll take, for that matter is made infinitely easier and more enjoyable if you establish an organized system for approaching the lecture and reading material early on in the semester.

SCHEDULE time and STICK to it: Based on assignments for both lecture and lab, you will spend 8-10 hours studying for this class outside of class time. Please come see your instructor early in the semester if you are struggling.

The lecture portion of Biology 110 is a 3 credit course. Additionally, you need to be co-enrolled in the 1 credit Biology 110 lab. BIO 110 and SUMMIT: BIO 110 Counts towards Leadership Skills Across the Liberal Arts.

3. COURSE OBJECTIVES:

The American Association for the Advancement of Science - with support from National Science Foundation - described the concepts and competencies that form the necessary foundation for science majors (Vision and Change in Undergraduate Biology Education: A call to Action. ISBN#: 978-0-87168-741-8)

Concepts 1. Evolution 2. Structure and Function 3. Information flow, exchange, and storage 4. Pathways & transformations of energy and matter and 5. Systems

Competencies 1. Apply the process of science 2. Use quantitative reasoning 3. Use modeling and simulation 4. Tap into the interdisciplinary nature of science 5. Communicate and collaborate with other disciplines and 6. Understand the relationship for science and society

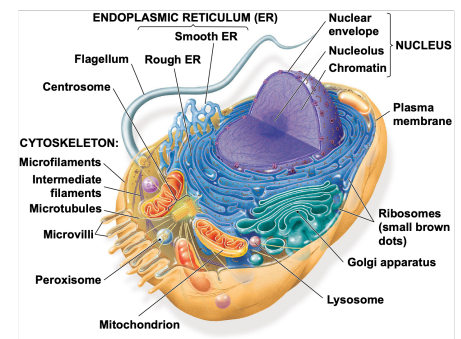
Skill Objectives Skills you will gain from this course that advance your development as a scientist (and you can put on your CV and personal statements).

- Critical thinking/Problem Solving – through weekly application of knowledge and analyzing papers, students will think critically about potential solutions to scientific questions.
- Written Communication – through the final project, and in class assignments, students will develop the ability to write scientifically.
- Teamwork/Collaboration – working with a team for in class assignments will enable the students to practice real-world teamwork and leadership competencies that are taught as a part of SUMMIT.
- Digital Technology – students will learn how to navigate various online resources to complete assignments and collaborate with peers. Students will actively use Canvas, PubMed, Google Drive and Power point.

4. GRADES:

Your grades will be posted to Canvas regularly so you are aware of your standing in the course. Your final grade will be calculated using the following point breakdown:

Study Guides	315 points (21 total x 15 points each)
Test Points	200 points (4 tests x 50 points)
Cum. Final Exam	100 points
Final Project	100 points
Outline/Draft of Final Project	20 points



The following grading scale will apply for converting numerical grades into final letter grades:

93 to 100: A, 90 to 92.9: A-, 87 to 89.9: B+, 83 to 86.9: B, 80 to 82.9: B-, 77 to 79.9: C+, 73 to 76.9: C, 70 to 72.9: C-, 67 to 69.9: D+, 63 to 66.9: D, 60 to 62.9: D-, Lower than 60: F

***your grade is not weighted. Your grade is calculated by total points earned divided by totals points possible, multiplied by 100. You can simply add the total points you earned so far and divide by the total points possible so far. Multiple that number by 100 to get your grade currently in the class. You can also use the same math to figure out what you need to get on a test in order to pull your grade up.*

5. COURSE OVERVIEW:

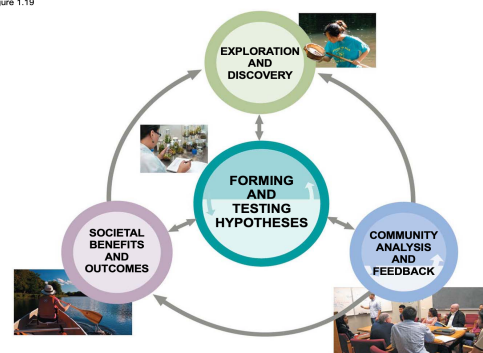
A. READ the assigned chapter and papers (see syllabus schedule). The chapter will contain material that is explained differently and supports the lecture. Read and take notes on the chapter (not just highlight). There is space in the Study guide for your notes. Hand-written notes will allow you to retain the information more than highlighting or simply reading. Bring those notes to class.

B. LECTURE Open the lecture PDF and create an outline for note taking on the study guide before listening. Listen/watch to the assigned lecture MP3 file for that topic (available through a link on Canvas) and minimize distractions so you can pay attention. While listening, take notes – putting information in your own words. If you have questions regarding the lecture or chapter, feel free to email your professor before class or talk with the learning assistants assigned to this class. You can also talk to your team about any questions you have. But you are responsible for the information in the lecture and the chapter for the quiz. Use the comprehension questions on the study Guide to quiz yourself on what knowledge you gained.

**Why did we record the lectures? Science education after college will require you to teach yourself the information. With a flipped classroom, you will begin to learn that skill. Medical schools and graduate schools will expect you to come to class knowing much of what was assigned in reading and your class time will take that information further.*

This allows you to take the lectures at your own pace - the person who has had AP Biology and the person who didn't have any biology in high school can listen at their own pace and get the same information out of the lectures..

Figure 1.19



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C. GROUP STUDY GUIDES are meant to practice and apply what was learned in the lecture. Study Guides have 3 parts: Comprehension Questions, Application Questions, and the Article Analysis. The material covered in the study guides include the lecture, the chapter reading, and any assigned articles. *It is recommended that you answer the comprehension questions before class, then work on the article questions and the application questions with your team.* Study guides from a given week are due by Friday at noon.

D. TESTS will consist of multiple choice and short-answer questions that evaluate your knowledge. They will be application questions. There are 4 tests for this course (one for each unit of study) and one final exam. The final exam will be cumulative. See schedule for test dates. About Bio 110 exams: **Format:** Tests are usually composed of multiple choice and a few essay. **Grading:** Don't get discouraged if you don't do well on your first test or quiz.

Test Tips: Developing good study strategies early on will save you lots of time and frustration over the next four years and beyond. You may find that the way you studied in high school doesn't work as well in college, where exams test whether you can apply and extend what you've learned rather than regurgitate minute details. A small amount of time every day is more effective than late-night marathon sessions. If a longer, intensive study session is needed, do it two nights before a test to guarantee a full night's rest. Form a study group, Prepare! **Use textbook/reading notes:** If you see anything surprising or particularly relevant to lecture material, or find a useful diagram, reference it in the margin of your lecture notes outline. **Flashcards:** Use flashcards with vocabulary from the lecture and the chapter as well as some basic questions to quiz yourself. Write your own test. If you had 20 (or 50, or 100) questions that you could ask about this information – what would you ask? Knowing what will be on a test is a difficult skill – but, with practice, you should be able to figure it out.

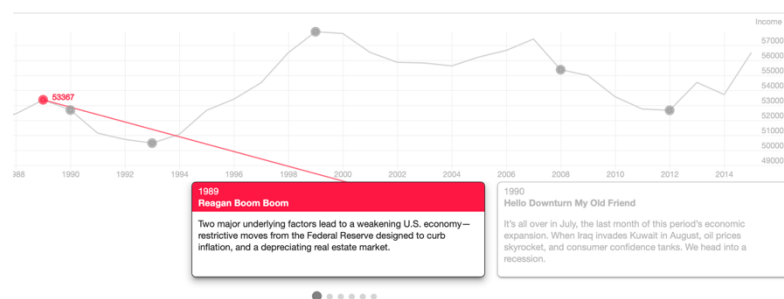
E. FINAL PROJECT (And the Outline)

Final Project Outline/ Rough Draft – the Google Sheet with data and story

Read up on your topic. Do some broad, initial internet searching to figure out what could fit this category in your species. Then use PubMed to find some scientific articles. Track the sources you find useful that you will want to use in your final paper.

Once you've decided what you will cover that fits your categorical topic, **do some focused background research.** You can use internet sources, but you are also encouraged to search the primary literature. <http://storyline.knightlab.com/>

For the final project, you will be using **Storyline to create a graph and describe 6 data points** along the graph. Storyline is an open-source tool that enables anyone to build an annotated, interactive line chart. To make Storyline as flexible as possible, we've just included the chart, axis labels, and cards. Headlines, context, more specifics on the data sources and credits--we expect you'll include what you want outside of Storyline.



Things to know

1. We're focused on time series line charts for now. The x-axis will accept only time/date formats.
2. Our mobile-first design requires you to keep it short. No more than 12 cards per story, titles limited to 54 characters, and paragraphs limited to 200 characters.
3. Storyline works best with fewer than 800 data points.

To create the final project

1. Put your data in a Google sheet. To make a storyline, you will need to put a spreadsheet with the data for your chart on Google Sheets. Your sheet needs to have a **date/time** column and a **data** column. (*If it has more than two columns, that's no problem.*) There needs to be a header row with titles for those columns.
2. Add your story. Your story is told through a series of cards explaining details about various points in your data. Each card has a **title**, **text**, and a **date**. The date comes from a column already in your data, but you'll need to add columns for the *title* and *text*. Go to your Google spreadsheet and columns for *title* and *text*. Find the rows for the data you want to explain, and add text and title information.

(These first 2 steps are the Final Project OUTLINE). Step #3 will be the final project assembled.

3. Configure the storyline and publish. Under the File menu, select "*Publish to the Web.*" In the next window, click the blue "*publish*" button. When asked, "*Are you sure...?*" click OK.

Along with your outline, you should **include 5 sources**. These can be websites or citations of papers. Primary literature might be helpful to you, and so will magazines and more popular science coverage. If you need help searching the literature, please refer to the Bio 110 lib guide on the McCain Library website, or set up an appointment with the instructional librarians (can be done directly on the library website!) to get some assistance.

Citation Style: Scientists use journal formats for their citation style so we will as well.

Visit: Journal of Molecular Biology (JMB). Then Click on Author Guidelines. Then click on references. Here is the website for JMB reference style: <https://www.elsevier.com/journals/journal-of-molecular-biology/0022-2836/guide-for-authors>

FINAL PROJECT

The rubric is on Canvas in the assignment and in the rubric section of Canvas. Upload the URL for the final StoryLine project.

Assignment Criteria	10: Excellent	9-7: Good	6-4: Fair	3-1: Poor
1. Organization (10 points)	<ul style="list-style-type: none"> • Clear flow of topics • Easy to follow • Diagrams clearly labeled • Good balance of text and graphs or pictures 	<ul style="list-style-type: none"> • Generally easy to follow – may require rereading for clarity • Diagrams present • Fair balance of text and graphs or pictures 	<ul style="list-style-type: none"> • Sections unclear or inappropriate • Takes effort to follow thoughts and ideas • Diagrams absent or unclear • Mainly or all text 	<ul style="list-style-type: none"> • Sections unclear or absent • No flow of ideas • Cluttered, messy • Diagrams absent/ Majority is text
2. Science Content (10 points)	<ul style="list-style-type: none"> • All necessary information • Information well-explained • No excess information that is distracting • All abbreviations are defined 	<ul style="list-style-type: none"> • Most of the necessary information • Information mostly explained • Majority of the information is not distracting • Most abbreviations are defined 	<ul style="list-style-type: none"> • Some of the necessary information • Information partially explained • Excess information is mildly distracting • Some abbreviations are defined 	<ul style="list-style-type: none"> • Little to none of the necessary information • Information is not explained • Excess information is distracting • abbreviations are not defined
1. Sources – number and format (2 points)	<ul style="list-style-type: none"> • 2 points All 10 sources present and used 		<ul style="list-style-type: none"> • 1 point - 5-7 sources present and used 	<ul style="list-style-type: none"> • 0 points - Less than 5 sources used
2. CWS (2 points)	<ul style="list-style-type: none"> • 2 points if a CWS slip is added to end of the writing assignment file 			<ul style="list-style-type: none"> • 0 points if there is no CWS slip
3. Length Requirement met (1 point)	<ul style="list-style-type: none"> • 1 point if the length requirement is met 			<ul style="list-style-type: none"> • 0 points if the length requirement is not met.

When you go to the CWS, they should be reviewing your final draft. Take this instruction sheet with you and let them mark up the rubric to give you a general idea of your grade on the final draft. Incorporate any changes they suggest. Visit the CWS at least 2 weeks before the final project is due to give yourself plenty of time to make any changes. The CWS tutor should also sign a slip for you for the session. Take a picture of their rubric grading and the CWS slip for your tutoring session. Add that image to the last page of your assignment.

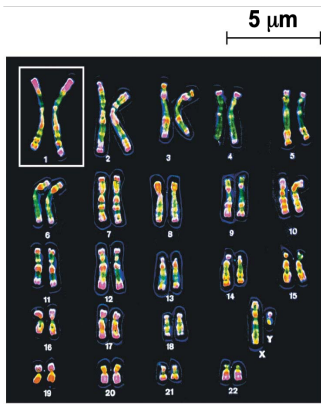
6. ACADEMIC HONESTY FOR YOUR WORK AS A SCIENTIST:

You are responsible. Review each course syllabus for the professor's expectations regarding course work and class attendance. Violations of the honor code will result from failure of the assignment, failure of the course, to expulsion from the college.

Do not cut and paste from the slide, your book, your neighbor, Wikipedia, or the internet. To further your science education, you need to be able re-word science in your own voice. If your answers are not your own, you will receive a 0 for the assignment. **All cases of academic dishonesty will be turned into Honor Court.** By placing your name on ANY assignment, you are stating that you completed that assignment with academic honesty.

Academic dishonesty is reported to medical schools and graduate schools as per their request. Anyone caught cheating relinquishes the privilege of asking for a letter of recommendation from the professor and will receive a 0 on the assignment.

Plagiarism: Plagiarism can include portraying another's work or ideas as your own, buying a paper online and turning it in as if it were your own work, or not citing or improperly citing references on a reference page or within the text of a paper. Passing off someone else's work as your own represents



intellectual fraud and theft, and violates the core values of our academic community. Putting a citation behind a statement gives ownership to that source, but, if you do not reword that information, it is plagiarism.

Intellectual Fraud: do not falsify or create data and resources or alter a graded work without the prior consent of your professor.

Cheating: do not allow another party to do your work/exam, or submit the same or similar work in more than one course without permission from the course instructors. Cheating also includes taking an exam for another person, looking on another person's exam for answers, using exams from previous classes without permission, or bringing and using unauthorized notes or resources (i.e., electronic, written, or otherwise) during an exam.

7. CLASS MANAGEMENT:

Email/Canvas: Instructors will make announcements regularly via email. **It is your responsibility to check your Agnes Scott email account daily.** When responding to a professor via email, take care that your email is professional. You can access the calendar in Canvas. And that calendar can be shared with your Google Calendar. There is a discussion board where you can use the class to answer questions or get in touch with the professor. The modules contain each of the pieces of the course. The syllabus item lets you see this syllabus and the schedule.

Technology: Cell phones should be in the silence mode prior to entering the classroom or lab.

Course Accessibility and Academic Accommodations. Agnes Scott College views disabilities as an integral part of the rich diversity of our community and strives to make all learning experiences as accessible as possible. If you are a student who receives academic accommodations through the Office of Accessible Education, please schedule a meeting with your instructor within the first two weeks of classes to discuss how your accommodations will be implemented for this course. During this meeting, you are not expected to disclose any details concerning your disability, though you may discuss these details at your discretion.

Title IX: Agnes Scott is here to help you if you have experienced any form of sexual harassment or violence, dating or domestic violence, or stalking. Please talk to any faculty or staff member with whom you feel comfortable. Faculty and staff members want to support you and have been trained to help. They will also inform the Title IX office so that you learn about options available to you. If you do not want college administrators to know what you have experienced, you may talk to the chaplain, as well as nurses or counselors in the Wellness Center with complete confidentiality. They will not tell anyone what you share with them unless you give your express permission. You may contact the Title IX Coordinator directly at T9Coordinator@agnesscott.edu.

Inclusion: Please include this statement or a version of it in your syllabus. Agnes Scott is a diverse and inclusive community. "As one of the most diverse colleges in the nation, ASC is ideally positioned to be the model of a diverse and inclusive community that society can aspire to be. Such diversity raises the intellectual quality of the classroom experience, creating a unique environment for learning to understand and navigate the challenges of our times. By studying, living, and playing together, Agnes Scott College's remarkably diverse student body hones the habits of mind, skills, and knowledge essential to ethical and innovative leadership in our increasingly heterogeneous and global society. As such, this course adheres to the principles of diversity and inclusion as integral to the Agnes Scott community and respects people from all backgrounds. As a first step, this course affirms people's decisions about gender expression and identity and will use each other's preferred names and gender pronouns at all times.

Content warning: This course will explore cell biology, genetics, ecology and evolution, which might raise issues of racism, sexism, classism, heterosexism, cissexism, ableism, and other kinds of privilege. I invite you to come see me if want more information. If you feel you will be unable to fully participate in the course requirements, set up a meeting with the course instructor to determine appropriate accommodations.

Date	Class Topic and Lecture (listen to lecture BEFORE class)	Reading assignment (To Read BEFORE class)
T 8/24	0. Syllabus - in class group work on the study guide #0 on group agreements and plagiarism article	Syllabus Kumar et al 2019 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4212376/
UNIT 1: BIOLOGY BASICS (L1- L3)		
TR 8/26	1. Biological Themes -lecture review -lecture Q and A - in class group work on the study guide #1	Campbell Chapter 1 RV Subramanyam 2013 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3687192/
T 8/31	2. Chemistry of Biology -lecture review -lecture Q and A - in class group work on the study guide #2	Campbell Chapter 2 Kareklas et.al 2012 https://royalsocietypublishing.org/doi/full/10.1098/rsbl.2012.0999
TH 9/2	3. Biological Molecules -lecture review -lecture Q and A - in class group work on the study guide #3	Campbell Chapter 2 Kareklas et.al 2012 https://royalsocietypublishing.org/doi/full/10.1098/rsbl.2012.0999
UNIT 2: ECOLOGY AND EVOLUTION (L4 - L8)		
T 9/7	4. Population Ecology -lecture review -lecture Q and A - in class group work on the study guide #4	Campbell Chapter 40 Dantzer et. al 2013
TH 9/9	5. Species Interactions -lecture review -lecture Q and A - in class group work on the study guide #5	Campbell Chapter 41 Philips & Shine 2006
T 9/14	Test #1 L 1 -3 & assigned readings	Test #1 L 1 -3 & assigned readings
TH 9/16	6. Ecosystems and Energy -lecture review -lecture Q and A - in class group work on the study guide #6	Campbell Chapter 42 Teal 1962
T 9/21	7. Descent with modification -lecture review -lecture Q and A - in class group work on the study guide #7	Campbell Chapter 19 Vignieri et. al 2010
TH 9/23	8. Population evolution -lecture review -lecture Q and A - in class group work on the study guide #8	Campbell Chapter 21
UNIT 3: CELLULAR REGULATION (L9 - L12)		
T 9/28	9. The cell -lecture review -lecture Q and A - in class group work on the study guide #9	Campbell Chapter 4 Bentivoglio 1999 https://www.tandfonline.com/doi/abs/10.1076/jhin.8.2.202.1833
TH 9/30	10. Cell cycle -lecture review -lecture Q and A - in class group work on the study guide #10	Campbell Chapter 9 Marquis et al 2021 https://pubmed.ncbi.nlm.nih.gov/33619254/

T 10/5	11. Cell Cycle Regulation -lecture review -lecture Q and A - in class group work on the study guide #11	Campbell Chapter 9 Marquis et al 2021 https://pubmed.ncbi.nlm.nih.gov/33619254/
TH 10/7	Alumnae Panel - Science Career Discovery -attend career discovery session - work on Career Management Study Guide	Read Through Study Guide #20
TH 10/7	Test #2 L 4-8 & assigned readings	Test #2 L 4-8 & assigned readings
10/11 - 10/17	Fall Break - No Classes	Fall Break - No Classes
T 10/19	Final Project Work Day	Final Project Work Day
T 10/19	Resume Workshop (1st Option) -attend one of the 2 resume workshops - work on Career Management Study Guide	Read Through Study Guide #20
TH 10/21	12. DNA replication and structure -lecture review -lecture Q and A - in class group work on the study guide #12	Campbell Chapter 13 Meselson and Stahl 1958. https://www.pnas.org/content/44/7/671
F 10/ 22	Resume Workshop (2nd Option) -attend one of the 2 resume workshops - work on Career Management Study Guide	Read Through Study Guide #20
T 10/26	Test #3 L 9 -12 & assigned readings	Test #3 L 9 -12 & assigned readings
	UNIT 4: GENETICS (L13 - L19)	
TH 10/28	13. Mendelian Genetics -lecture review -lecture Q and A - in class group work on the study guide #13	Campbell Chapter 11 Rees 2003 https://pubmed.ncbi.nlm.nih.gov/14616056/
T 11/2	14. Extensions of Mendelian Genetics -lecture review -lecture Q and A - in class group work on the study guide #14	Campbell Chapter 11 Rees 2003 https://pubmed.ncbi.nlm.nih.gov/14616056/
TH 11/4	15. Meiosis -lecture review -lecture Q and A - in class group work on the study guide #15	Campbell Chapter 10 and Gely-Pernot 2017 https://www.nature.com/articles/s41598-017-03738-1
T 11/9	16. Chromosomal Basis of Inheritance -lecture review -lecture Q and A - in class group work on the study guide #16	Campbell Chapter 12 and Cepeda et.al. 2020 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7024798/
TH 11/11	17. Gene Linkage and abnormalities -lecture review -lecture Q and A - in class group work on the study guide #17	Campbell Chapter 12 and Cepeda et.al. 2020 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7024798/
T 11/16	18. Transcription -lecture review -lecture Q and A - in class group work on the study guide #18	Chapter 14, Nikolay et. al. 2016 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4929433/
TH 11/18	19. Translation -lecture review -lecture Q and A - in class group work on the study guide	Chapter 14, Nikolay et. al. 2016 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4929433/
T 11/23	Test #4 L 13 - 19 & assigned readings	
11/24-11/26	No Class - Thanksgiving Break	No Class - Thanksgiving Break
T 11/30	Final Project Work Day	Final Project Work Day

	Career Management - Final Project Due before Class - Resume/ Personal Statement Day upload Final drafts that include corrections before class as part of the Career Management Study Guide	
TH 12/2		
T 12/7	<i>Reading Day</i>	<i>Reading Day</i>
12/8 - 12/13	<i>Final Exam Days</i>	<i>Final Exam Days</i>
	<i>**self scheduled final exam L1 - L19 & assigned reading</i>	