

Biology 335 Genome Biology [M] – 3 credits Fall 2018

Time and Location: Aug 20 - Dec 14
Tuesday and Thursday 10:35-11:50 am
CUE 418

Prerequisites: Genetics, Biology 301

Instructor: Dr. Joanna Kelley and Mr. Shawn Trojahn
Heald 431A
Office hours: Tuesday 9:00-10:00 am
Email: joanna.l.kelley@wsu.edu; shawn.trojahn@wsu.edu
Phone: 509-335-0037

Text:

- **Required:** “Genomes” 4th edition by T.A. Brown
- Selected current articles on genome biology will be posted on the course website (learn.wsu.edu)

Course Website: You can access the syllabus, assignment directions, and pdfs of current articles on genome biology on the course page (learn.wsu.edu).

Overview: Biology 335 is an advanced course focused on genomes and genome analysis. This course will cover a range of topics in genome biology. Students will engage in projects exploring genome structure and function. Topics will include DNA sequencing technologies, genome structure, comparative genomics, functional genomics, personal genomics, genome-wide association studies, and population variation. Comparative analysis of genomes from bacteria to humans will include methods for sequencing, genotyping, annotation of genomes, population genetics and evolution.

Student Learning Outcomes:

1. Develop critical and scientific thinking skills to analyze and solve problems.
2. Synthesize information regarding key features of genome structure.
3. Understand and explain major biological concepts in evolution, ecology and organismal biology as it relates to genomes.
4. Use scientific literacy and knowledge of genomes to communicate to the scientific community.
5. Critically read popular press articles in genomics.

Student Learning Outcomes:	Assignments that advance outcome:	Evaluation of Outcome:
Develop critical and scientific thinking skills to analyze and solve problems	All discussions Evaluate scientific and popular media	Participation in discussions, written assignments
Synthesize information regarding key features of genome structure.	All topics	Midterm exams Final exam
Understand and explain major biological concepts in evolution, ecology and organismal biology as it relates to genomes sciences.	Participation in discussions and in oral presentation, written assignments and exams	Homework assignments
Use scientific literacy and knowledge of genomes to communicate to the scientific community.	Participation in discussions and in oral presentation, written assignments and exams	Written assignments Presentation
Critically read popular press articles in genomics	Written assignments and oral presentation	Written assignments Presentation

Class Mechanics (how it all works): Class attendance is *required*. This is an active classroom where participation, interaction and exploration are expected. All assigned work in this class is *required*: all homework, all quizzes and midterms, all presentations. Preparatory readings are required and should be completed prior to arriving to class each day. A *short assignment* will be given in class regularly, always *unannounced*. *On homework* you are *encouraged to work together*, almost anything is allowed, but *you may not directly copy*.

Grading: Grades are based on homework assignments, oral report and exams as shown below (Please note, there will be **no curve or extra credit** awarded). Working with genomic data in your homework assignments and term paper exploring a specific topic in genome biology are important to your grade and understanding of the material. If you feel an assignment was incorrectly graded, you may submit for a regrading within 1 week of receiving your assignment grade. The assignment will be completely regraded by the other instructor. This may result in a lower or higher grade on the assignment.

Homework assignments (5 X 25 pts each)	125
First midterm exam	110
Second midterm exam	110
Written assignment 1	50
Written assignment 2	120
Written assignment 3 (10 topic / 50 draft / 115 final)	175
In-class assignments / Participation	100 (max)
Final exam	110
<u>Final Presentation</u>	<u>100</u>
Grand total	1000

Grading Scale: %

A	90 +	C	70-73.99
A-	87-89.99	C-	67-69.99
B+	84-86.99	D+	64-66.99
B	80-83.99	D	60-63.99
B-	77-79.99	F	60 and below
C+	74-76.99		

Exams: Short answer, essay and problem solving.

Assignments: Detailed directions for homework will be posted on course website. I encourage you to work together on homework assignments, however the actual writing must be your own. Late assignments will not be accepted. Come to class with preparatory readings completed.

Weekly schedule: Subject to change based on the flow of the course.

Week	Date	Preparatory Reading	Topic	Assignments due
1	Aug 21	Brown Ch 1, 15	Introduction/Genetics Review	
	Aug 23	Brown Ch 17	Genetics Review	
2	Aug 28	Brown Ch 2; Article	Genetics Review/Plagiarism Review	
	Aug 30	Article	Introduction to Genomics	
3	Sep 4	Brown Ch 3	Mapping Genomes	Homework #1
	Sep 6	Brown Ch 4	Sequencing Technologies	
4	Sep 11		Sequencing Technologies	
	Sep 13		Assembly – Using new technologies	
5	Sep 18	Brown Ch 5	Assembly/Annotation	Homework #2
	Sep 20		<i>Career Panel</i>	<i>Written assignment #1</i>
6	Sep 25		Midterm 1	
	Sep 27	Brown Ch 6	Comparative Genomics	
7	Oct 2	Brown 16, 18	Evolution	
	Oct 4	Brown Ch 8; Article	Prokaryotic genomes/Metagenomics	Homework #3
8	Oct 9	Brown Ch 7, 9	Eukaryotic genomes	
	Oct 11	Articles	Ancestry	<i>Written assignment #2</i>
9	Oct 16	Articles	Domestication	Homework #4
	Oct 18		Genomics Core Tour	Topic and summary written assignment #3
10	Oct 23	Articles	RNAseq	
	Oct 25	Brown Ch 12	Transcriptomics	
11	Oct 30	Brown Ch 10	Chromatin / Splicing	
	Nov 1	Articles	Epigenetics	Homework #5
12	Nov 6	Article	Systems Biology	
	Nov 8	Article	Guest Speaker	Draft written assignment #3
13	Nov 13	Brown Ch 13	Proteomics	

	Nov 15		Midterm 2	
14	Nov 20		THANKSGIVING	
	Nov 22		THANKSGIVING	
15	Nov 27		Class presentations	
	Nov 29		Class presentations	
16	Dec 4		Class presentations	
	Dec 6		Class presentations	Final written assignment #3
	Dec 11		Final Exam	10:10AM - 12:10PM

Written Assignments:

The first two written assignments will have the opportunity for revision based on feedback from the instructor. No revisions will be accepted for the rough draft or final draft of written assignment three. For the first two assignments, a draft for revision must be submitted at least two weeks before the due date. Assignments should be submitted to blackboard on the day indicated by the syllabus by 10:35am. Late assignments will not be accepted.

Written assignment 1:

Task: Write a formal summary of a popular press article (what was the article about). The summary should be one paragraph.

Goal: Make sure you understand what you are reading, practice consolidating information into a short summary.

Evaluation criteria: I will be evaluating on whether you stay true to the text, text is properly attributed, stays within the stipulated size.

Written assignment 2:

Task: Write an in-depth analysis of a popular press article. **Start with a less than one paragraph summary of the article.** Did the article fairly represent the science as we understand it? If so, why? If not, why not? Did the author leave out important findings or methods? Why did the author choose to do so? Does the article sufficiently describe the background that the reader needs to understand the scientific finding? Does any background need to be added, if so what? What is the science one needs to understand to read the popular press article? Etc. The analysis should be 2 pages single spaced.

Goal: Make sure you can critically read and evaluate popular press articles. Additionally, help you evaluate what background is relevant and necessary when presenting science to the general public and how to present findings in a way that the general public will understand.

Evaluation criteria: Draw on primary literature and popular press article to provide evidence for assertions. I will be looking for whether you have used evidence from 2 sources cited by the popular press article and an additional source outside of those referenced in the article (3 sources total). How well have you supported your assertions with evidence?

Written assignment 3:

Task: Write your own popular press article based on current (within the past 5 years) primary literature. This article cannot be one used for a previous writing assignment. Your role is scientific journalist, writing to readers of National Geographic. You will create an article with appropriate formatting and graphics. You will have embedded visuals. You must use at least 2

primary literature sources. Before formatting and graphics, the article should be approximately 4 single spaced pages.

Goal: Summarize scientific findings to a non-scientific audience.

Evaluation criteria: Rubric levels: great, okay and poor. At least 2 primary literature sources, no jargon, clear descriptions of technical processes, an image that supports their argument.

References should be cited in the format of a recognized scientific journal. You should plan to introduce the topic by putting it in a larger context within the field of genomics and address the following questions (among others): What is the history of the question being addressed? What approaches are being used to address it? What are the future prospects for research in this field? For this assignment, you will be turning in a brief summary of the proposed assignment, a rough draft, and a final draft (See above schedule for due dates).

Your writing will be graded on the following criteria:

	Poor	Okay	Great
Introductory Paragraph	No introductory paragraph goes straight to the topic	Some introductory material but fails to provide enough information to put the topic in a larger context	Good introduction that puts the topic in a larger context with description of the topic and the essay focus in a clear and concise form
Provides balance or covers different aspects of the topic	Express similar viewpoints or use similar approaches by the author	Uses few articles on topic with different research methodologies or view points	Landmark articles with different research methodologies or approaches with different views on the topic
Proper evaluation of the articles	Superficial evaluation that does not consider methodology, analysis or basis for conclusions	Provides some supporting evidence for conclusion but still is overall lacking strong conclusive evidence	Critical evaluation that uses additional articles and provide supporting evidence for conclusion <i>or</i> alternative analysis for a different conclusion
Conclusion or Summary paragraph	Conclusion superficial or loosely related to the main discussion and topic	Conclusion pertains to the main discussion and topic but is underdeveloped	Conclusion well developed and coherent
Writing and mechanics	Unclear writing grammatical/spelling errors, poor organization	Some language errors, writing is slightly unclear	Language clear, errors minimal, organization clear/effective, proper citation

Oral Presentation Assignment and Grading Rubric

You will each give a short oral presentation (10 minutes + a few minutes for questions) on written assignment #3. There will be approximately five presentations on each of the class presentation days. I can work with you regarding possible formats for your presentation (e.g., short Powerpoint, overheads, oral plus writing on board or overhead, etc.). **The final exam will include material from the oral presentations.** Peer reviews of the presentation will make up a portion of your grade. **Your oral presentation will be graded on the following criteria:**

	Poor	Okay	Great
Introduction	Inadequate and leaves audience confused about topic.	Brief and clear but fails to put topic in broader context	Clear, interesting, explains why topic is important and what will be discussed.
Organization	Jumped between topics, lacked periodic summaries	Some jumping between topics, some summaries	Easy to follow, with smooth transitions and periodic summaries
Delivery	Presentation was read or seemed memorized. Speech was too slow, fast, or soft. Eye contact with audience lacking.	Some eye contact, speech was not smooth, difficult to understand and hear at times	Speech was smooth, articulate and easy to hear. Eye contact was appropriate. Delivery comfortable and well-prepared.
Media and Resources	Materials confusing, distracting or served as filler. Too much information per slide or overhead.	Some material was used as filler and slides lacked planning	Materials clear and with pertinent information. Not too much information per slide or overhead.
Conclusions/ Response to Questions	No or unclear conclusions presented. Misunderstands or give confusing answers to questions.	Some questions are answered well, does not admit lack of knowledge when appropriate	The main point(s) of the presentation are briefly summarized. Answers questions well or, if unable to do so, acknowledges lack of information.

Attendance Policy:

I will take attendance; I expect you to attend every class. Throughout the semester, we will be discussing the latest genetic technologies and their impact on society. Thus, attendance and participation in discussion will be noted and considered in the “In-class assignments / Participation” portion of the grade. Make-up quizzes and exams will be allowed for excused absences only.

Students with Disabilities: Reasonable accommodations are available for students with documented disabilities or chronic medical conditions. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center at Washington Building 217; Phone: 509-335-3417 to schedule an appointment with an Access Advisor. All accommodations **MUST** be approved through the Access Center. For more information contact a Disability Specialist on your home campus.

Pullman or WSU Online: 509-335-3417 <http://accesscenter.wsu.edu>, Access.Center@wsu.edu

Campus safety and Emergency Notification. Classroom and campus safety are of paramount importance at Washington State University, and are the shared responsibility of the entire campus population. WSU urges students

to follow the “Alert, Assess, Act,” protocol for all types of emergencies and the [“Run, Hide, Fight”](#) response for an active shooter incident. Remain ALERT (through direct observation or emergency notification), ASSESS your specific situation, and ACT in the most appropriate way to assure your own safety (and the safety of others if you are able).

Please sign up for emergency alerts on your account at MyWSU. For more information on this subject, campus safety, and related topics, please view the FBI’s [Run, Hide, Fight video](#) and visit the [WSU safety portal](#).

Academic integrity. Academic integrity is the cornerstone of higher education. As such, all members of the university community share responsibility for maintaining and promoting the principles of integrity in all activities, including academic integrity and honest scholarship. Academic integrity will be strongly enforced in this course. Students who violate WSU’s Academic Integrity Policy (identified in Washington Administrative Code (WAC) 504-26-010(3) and -404) will receive a failing grade on the assignment, will not have the option to withdraw from the course pending an appeal, and will be reported to the Office of Student Conduct.

Cheating includes, but is not limited to, plagiarism and unauthorized collaboration as defined in the Standards of Conduct for Students, WAC 504-26-010(3). You need to read and understand all of [the definitions of cheating](#). If you have any questions about what is and is not allowed in this course, you should ask course instructors before proceeding.

If you wish to appeal a faculty member's decision relating to academic integrity, please use the form available at [conduct.wsu.edu](#).

Cheating on an exam or a writing assignment (including plagiarism) can result in a final grade of F for the entire course, will be reported to the Office of Student Affairs, and will result in additional disciplinary action by the University.

Additional information on plagiarism from the School of Biological Sciences website

Plagiarism: Plagiarism is the inclusion of any material, into any class assignment, that is not your own without adequate reference to its author. Other than the fraudulent manufacture of data, it is the most serious professional breach of ethics that a scientist can commit.

Consistent with the broad authority the university gives faculty in the management of the classroom [<http://academicintegrity.wsu.edu/Resources-for-Faculty/Sample-WSUSyllabus-Statements/>], SBS views plagiarism in any student assignment as cheating and a serious breach of academic integrity. Students in all our courses (100-700 level) must clearly and unequivocally understand the meaning of this term because the penalties for plagiarism in the sciences can be career ending.

A common dictionary definition of **plagiarism** is

“to steal and pass off (the ideas or words of another) as one's own : use (another's production) without crediting the source”

(<http://www.merriam-webster.com/dictionary/plagiarize>) (Accessed 28 October 2013).

As with many terms, plagiarism may have alternative meanings and interpretations in other fields. However, SBS is responsible only for training students under its instruction and training to understand the meaning of plagiarism in the Life Sciences as described herein.

This multi-component view is supported under WAC 504-26-010 definitions.
<http://apps.leg.wa.gov/wac/default.aspx?cite=504-26-010>

“(i) Plagiarism. Presenting the information, ideas, or phrasing of another person as the student's own work without proper acknowledgment of the source. This includes submitting a commercially prepared paper or research project or submitting for academic credit any work done by someone else. The term "plagiarism" includes, but is not limited

to, the use, by paraphrase or direct quotation, of the published or unpublished work of another person without full and clear acknowledgment.”

In accordance with universal practice in the Life Sciences, SBS interprets this definition of plagiarism to include several forms, each of which is explained below.

First, this definition includes incorporation of another author’s verbatim phrase(s) and sentence(s) into text purportedly written by the plagiarist without quotation marks and without citation of the true author.

Second, the definition also includes incorporation of another author’s verbatim phrase(s) and sentence(s) without quotation marks even if the true author is cited, e.g. at the end of a paragraph within which is the plagiarized text.

Third, the definition includes superficial paraphrasing, i.e., the substitution of a few words or modification/re-arranging/re-writing of another author’s phrases, such that the text is still largely verbatim. Note plagiarism in this form includes copying the flow of logic or ideas in the text such that it follows the order in the original work. This practice is not permitted with or without citing the true author(s) because the original text was altered to give the impression that the plagiarist is the author of the novel idea/hypothesis/proposal (“to steal the idea as one’s own”...).

Fourth, this definition includes use of the ideas and writings of classmates and students from prior semesters as described in points one through three above.

Access to papers and other texts on the internet has opened new opportunities for those who would plagiarize, and the School of Biological Sciences (SBS) has in the past year encountered such cases in its courses. Thus, SBS now has access to software that can detect text plagiarized from the internet, and the faculty and the TAs have been instructed to employ these tools.

In the School of Biological Sciences, a confirmed case of plagiarism can result in a final course grade of F being immediately assigned and can result in the offense being immediately forwarded to the Office of Student Conduct, which will likely take further more serious action.

If you have any doubt at all about what constitutes plagiarism, you need to discuss immediately this matter with your instructor or T.A.

In short, make sure all elements of your paper, including text and figures, are your own work.

IMPORTANT: Per WSU policy effective August 24, 2015, I will ONLY be able to respond to emails sent from your WSU email address. I will NOT be able to respond to emails sent from your personal email address.

Copyright (2018) Joanna L. Kelley and Shawn Trojahn. This syllabus and all course-related materials, presentations, lectures, etc. are my intellectual property and may be protected by copyright. Selling class notes through commercial note taking services, without my written advance permission, could be viewed as copyright infringement and/or an academic integrity violation, WAC 504-26-010 (3)(a,b,c,i). Further, the use of University electronic resources (e.g., learn.wsu.edu) for commercial purposes, including advertising to other students to buy notes, is a violation of WSU’s computer abuses and theft policy (WAC 504-26-218), a violation of WSU’s Electronic Communication policy (EP 4), and also violates the terms of use for the learn software program.