

**Biology 408 Contemporary Genetics – 3 credits  
Spring 2016**

**Time and Location:** Jan 12 – May 1  
Tuesday & Thursday 1:25-2:40 pm  
CUE 316

**Prerequisites:** General Genetics, Biology 301

**Instructor:** Joanna Kelley  
Heald 431A  
Office hours: by appointment  
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**Text:** Readings from the primary literature and news sources will be used for each week's readings. We will have folder on Blackboard with readings for each topic. If you have forgotten or are unfamiliar with a topic, it is essential that you review the background in your basic genetics text before the topic is covered. Every class will have associated readings that are required. There is a genetics textbook on reserve at Owen Library for your review.

**Course Website:** You can access the syllabus, readings and other resources on the course Blackboard page ([learn.wsu.edu](http://learn.wsu.edu)).

**Overview:** Biology 408 is a capstone course designed for students with background and interest in genetics (pre-requisite: General Genetics) to consider current topics in genetics. We will focus on topics of current interest including lecture, readings, essays by the student and discussions. You will present on a current genetics topic of interest in the last three weeks of the class. This is a course that requires extensive readings, participation in discussions, and written and oral presentations by the student.

**Student learning outcomes:**

	<b>At the end of this course, students should be able to:</b>	<b>Course assignment that advance the learning goal</b>	<b>This objective will be evaluated primarily by:</b>
<b>Critical and Creative Thinking</b>	critically evaluate information and data and from a range of sources	all discussions evaluate scientific and popular media	participation in discussions, written assignments
<b>Depth, Breadth and Integration of Learning</b>	integrate knowledge of genetics to current topics and apply their knowledge to contemporary issues related to genetics	participation in discussions and written assignments and exams	written assignments and exams
<b>Communication</b>	communicate current topics in genetics to both specialists and non-specialists	participation in discussions and in their oral presentation, written assignments and exams	written assignments and exams oral presentation
<b>Information Literacy</b>	find appropriate databases and scientific information to evaluate popular media coverage of genetic topics	research for written assignments and oral presentation	written assignments oral presentation

- Week 1:** Introduction and Orientation. Review of literature search procedures.
- Week 2:** Human Evolution: What does the newest DNA data tell us? What major questions remain to be answered?
- Week 3:** DNA and forensics: What is the state-of-the-art in genetic methods for forensic applications in humans? What concerns are associated with their use?
- Week 4:** Conservation Genetics: How can DNA typing be useful in conservation programs? What other genetic considerations are important for conservation?
- Week 5:** Evolutionary Genetics: What are some recent insights into the types of genetic changes, which have resulted in major evolutionary changes?
- Week 6:** Environmental Toxicology: What are some of the promising methods for detection of mutagens and teratogens? What are some examples of such chemicals or situations that are currently controversial?
- Week 7:** Plant and Animal GMOs: How successful are transgenic approaches (production of GMOs) in agriculture and what problems and controversies are associated with their use?
- Week 8:** Molecular breeding in plants and animals: How is DNA typing being utilized in breeding programs? How efficient and economically practical are these approaches?
- Week 9:** Genetics and human behavior: What do we know about the role of genetics in human behavior? What are some approaches being used to address these questions?
- Week 10:** Prediction of human phenotypes using genomic data: How well can we predict common disease conditions and other phenotypes using genome sequence data? What are some concerns related to the collection and dissemination of such data?
- Week 11:** Genetic screening for diseases in humans: What are the positives and problems associated with genetic screening in humans?
- Weeks 12-15:** Class presentations/ Oral reports. Students will give a 15-minute presentation on results of their literature research into a topic of their choice. These may include the above topics or other issues in contemporary genetics.

Course schedule by week and date

<b>Week</b>	<b>Date</b>	<b>Activity</b>	<b>Assignment Due</b>
<b>1</b>	12-Jan	Introduction/ Orientation	
<b>1</b>	14-Jan	Review	<i>Review</i>
<b>2</b>	19-Jan	Human evolution	
<b>2</b>	21-Jan	Human evolution discussion	
<b>3</b>	26-Jan	DNA and forensics	
<b>3</b>	28-Jan	DNA and forensics discussion	
<b>4</b>	2-Feb	Conservation genetics	
<b>4</b>	4-Feb	Conservation genetics discussion	
<b>5</b>	9-Feb	Evolutionary genetics	<i>Take-home essay exam I handed out</i>
<b>5</b>	11-Feb	Evolutionary genetics discussion	
<b>6</b>	16-Feb	Plant and Animal GMOs	<i>Take-home essay exam I due</i>
<b>6</b>	18-Feb	Plant and Animal GMOs discussion	
<b>7</b>	23-Feb	Mutagens & Teratogens	
<b>7</b>	25-Feb	Mutagens & Teratogens discussion	
<b>8</b>	1-Mar	Molecular Breeding	
<b>8</b>	3-Mar	Molecular Breeding discussion	
<b>9</b>	8-Mar	Genetics & Human Behavior	
<b>9</b>	10-Mar	Genetics & Human Behavior discussion	
	14-Mar	Spring break	
	18-Mar	Spring break	
<b>10</b>	22-Mar	Genetics & Human Phenotypes	<i>Take-home essay exam II handed out</i>
<b>10</b>	24-Mar	Genetics & Human Phenotypes discussion	
<b>11</b>	29-Mar	Genetic Screening	<i>Take-home essay exam II due</i>
<b>11</b>	31-Mar	Genetic Screening discussion	
<b>12</b>	5-Apr	Oral reports	
<b>12</b>	7-Apr	Oral reports	
<b>13</b>	12-Apr	Oral reports	
<b>13</b>	14-Apr	Oral reports	
<b>14</b>	19-Apr	Oral reports	<i>Written assignment due</i>
<b>14</b>	21-Apr	Oral reports	
<b>15</b>	26-Apr	Oral reports	
<b>15</b>	28-Apr	Concluding discussion	
<b>Final</b>	3-May	1-3pm	

Final Exam: May 3<sup>rd</sup>, 1-3pm. Comprehensive - will cover lectures, readings, discussions and student presentations

**Written assignment:**

*Task:* Write a comparison and synthesis of primary literature on a specific topic as it relates to the course and integrates information from other fields. Pick one of the topics in the class or another topic relevant to contemporary genetics for the subject of your essay. Please consult with the instructor about your choice of topic and articles to evaluate. Find at least two articles from the scientific literature with different authors to evaluate for each essay. Select the articles carefully; they ideally should be complementary and have differing viewpoints or address the problem using different approaches. They should not have been one of the assigned class readings. Ideally, at least two of the articles you select for each essay should have been published within the last four years.

*Goal:* Make sure you can critically read and evaluate scientific articles.

*Evaluation criteria:* At least 2 primary literature sources, no jargon, clear descriptions of technical processes. The essay should be at least four double-spaced pages, excluding references. 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?

<b>Content</b>	<b>Poor (1)</b>	<b>Fair (2)</b>	<b>Competent (3)</b>	<b>Good (4)</b>	<b>Excellent (5)</b>
Introduction that puts the topic in a larger context with description of the topic and the essay focus in a clear and concise form					
Demonstrates an understanding of historical work (i.e. context) regarding the biological problem(s)					
Formulates cogent explanation and/or explains corresponding experiment(s)					
Clearly describes tests and results of conceptual ideas described					
Relates the specific research outcomes to broader scientific goals					
Defends research methodology/ interpretation(s) and considers alternative interpretation(s)					
Conclusion well developed and coherent, synthesizes research in a way that communicates general importance					
Language clear, errors minimal, organization clear/effective					
Proper citation					

**Oral Presentation:**

*Task:* Prepare a short oral presentation (15 minutes, plus time for a few questions) on your written assignment topic. Please consult with the instructor regarding possible topics and formats for your presentation (e.g., short Powerpoint, overheads, oral plus writing on board or overhead, etc.). Find at least two articles from the scientific literature to evaluate for your presentation and include relevant background information. The final exam will include material from the oral presentations.

*Goal:* Make sure you can present and distill important information from scientific articles to an audience with a similar background.

*Evaluation criteria:* Your oral presentation will be graded on the following rubric criteria. This should also serve as a guide in planning your presentation.

<b>Content</b>	<b>Poor (1)</b>	<b>Fair (2)</b>	<b>Competent (3)</b>	<b>Good (4)</b>	<b>Excellent (5)</b>
Identifies problem(s) of significant standing in biology					
Demonstrates an understanding of historical work (i.e. context) regarding the biological problem(s)					
Formulates cogent explanation and/or explains corresponding experiment(s)					
Clearly describes tests and results of conceptual ideas described					
Relates the specific research outcomes to broader scientific goals					
Defends research methodology/ interpretation(s) and considers alternative interpretation(s)					
Synthesizes research in a way that communicates general importance					
Response to questions					

<b>Presentation Style</b>	<b>Poor (1)</b>	<b>Fair (2)</b>	<b>Competent (3)</b>	<b>Good (4)</b>	<b>Excellent (5)</b>
Uses clear and intelligible language (avoids jargon)					
Makes appropriate eye contact with audience					
Engages audience					
Effectively use of slides / visual aids (text is large enough, figures are well-explained)					
Clear flow of overall presentation					
Projects voice					
Well-paced and well-spoken presentation					

**Grading:** Grades are based on participation in discussions, written assignment, oral report and essay exams as shown below. Students write a four page (double-spaced) written essay on a topic in contemporary genetics, with the essay evaluating at least two articles from the scientific literature. Homework assignments and term papers are important both to your grade and understanding of the material. Your written assignments may be used by university evaluators for assessment of success of this capstone course.

Participation in Discussions (5 pts each X 10 sessions)	50
Written assignment (due in week 14) (see rubric on page 5)	100
Oral report (during weeks 12-15) (see rubric on page 7)	100
Take-home essay exams (2 X 50 pts each) (due in weeks 5 and 11)	100
Final in-class exam (during final exam week)	<u>50</u>
<b>Grand total</b>	<b>400</b>

**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	Below 60
C+	74-76.99%		

**Exams:** There will be two take-home essay exams and a final in-class exam.

**Attendance and Participation:** I will not take attendance, but I expect you to attend every class. Throughout the semester, we will be discussing the latest genetic technologies and their impact on society including ethical, economic and environmental concerns. Thus, attendance and participation in discussion will be noted and considered in the “participation in discussion” portion of the grade.

**Disabilities:** Students with Disabilities: Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center.

**Academic dishonesty:** The WSU handbook defines Academic Dishonesty as follows: Academic dishonesty includes cheating, falsification, fabrication, multiple submission, plagiarism, abuse of academic materials, complicity, or misconduct in research. Plagiarism is the inclusion of any material that is not your own, without adequate reference to its author. In its simplest form, plagiarism is the direct copying or duplication of another person’s words without quotation marks or citation (or both). Including ideas in your paper that are not your own, without adequate citation is plagiarism. Paraphrasing can also be a form of plagiarism, if the paraphrased text is too similar to the original. Cheating on an exam or copying homework assignment will result in a final grade of F for the entire course. Definitions of academic dishonesty and the University Academic Integrity Policy can be read at the following web site: [www.conduct.wsu.edu/AI](http://www.conduct.wsu.edu/AI).

**Campus Safety and Emergencies.** Washington State University is committed to enhancing the safety of the students, faculty, staff, and visitors to the Pullman campus. As part of this commitment, the university has prepared a Campus Safety Plan that can be found at <http://safetyplan.wsu.edu/>, and contains a listing of university policies, procedures, statistics and information relating to campus safety, emergency management and the health and welfare of the campus community. Campus emergency and travel alerts can be found at <http://alert.wsu.edu/>. Please register your contact and emergency information at your <http://my.wsu.edu/> website. Further information on emergencies can be found at <http://oem.wsu.edu/emergencies>.