

## Genomes and Genome Evolution (BIOL 4301) - Spring 2017

<b>Recommended Co-requisite</b>	Co-registration in Biological Informatics BIOL 4301/6301
<b>Learning Objectives</b>	<p>After completing this course, students will be able to:</p> <ul style="list-style-type: none"> <li>- Describe the methods and principle of modern genome analysis</li> <li>- Describe the components and structure of viral, prokaryotic and eukaryotic genomes</li> <li>- Explain the basic techniques of genome sequencing and analysis</li> <li>- Describe the way genomes change over time</li> <li>- Apply principles of genomics to modern biological questions</li> <li>- Explain the objectives and outcomes of a variety of genome projects</li> </ul>
<b>Lectures</b>	MWF 10:00-10:50. Biology 106. You are expected to attend all lectures. Failure to attend will be detrimental to your grade.
<b>Professor</b>	Dr. David Ray, ESB 206, 806-834-1677, david.a.ray@ttu.edu Office Hrs: TTh (9:00-10:00)
<b>Textbook and Lecture Notes</b>	<p>Class lectures and supplementary information in the form of animations, FAQs, and extra reading will be available on the class website (<a href="http://www.davidraylab.com">http://www.davidraylab.com</a>).</p> <p>There is no official textbook for the class. However, I used two books as guides for designing my lectures: Introduction to Genomics 2<sup>nd</sup> Edition by Arthur M. Lesk and The Origins of Genome Architecture by Michael Lynch. Feel free to purchase them or not.</p>
<b>Exams and Other Assignments</b>	<p><b>EXAMS:</b> Three exams (variable formats) worth 100 points each (see schedule) including partially or wholly take-home and will be writing-intensive. Exam 3 will be partially cumulative. Graduate student exams will be more intensive than for undergraduates.</p> <p>Make-up exams will <b>ONLY</b> be given to those who present documentation explaining their absence immediately upon their return to class. Please inform me of absences in advance so that arrangements for a make-up exam can be made. Make-up exams will be of a different format and have different questions from the regularly scheduled exam. Students who miss an exam without a valid excuse will receive a <b>ZERO</b> for that exam.</p> <p><b>CURRENT EVENTS:</b> Genomics is increasingly having an impact on everyday life. As the semester proceeds, each student is required to bring to class at least four examples of news items or examples popular culture that are related to Genetics throughout the semester. Depending on the schedule for the day, these items may be discussed by the class. At least once during the semester, each student must present a basic summary of the topic and the reason it interested them to the class as a prelude to in-class discussion. Examples include news articles or reports, podcasts, references in popular television shows, etc.</p> <p><b>IN CLASS DISCUSSION:</b> At Friday class meetings, two graduate students will be selected at random to present the basic information on two recently published genome manuscript. All students should be prepared for exam questions that may be derived from the papers. The manuscripts will be assigned to the class in advance and each graduate student in the class should be prepared to give a brief (5-10 minutes) presentation to the class on that day. Information that should be included in that presentation should include the following:</p> <ol style="list-style-type: none"> <li>1. The species whose genome was sequenced</li> <li>2. The phylogenetic context of the species</li> <li>3. Rationale for sequencing that species</li> <li>4. Sequencing strategy (technology, assembly methods, etc.)</li> <li>5. Basic assembly statistics (genome size, N50 of the resulting assembly, etc.)</li> <li>6. Major results of the effort (What was discovered? What questions were answered? Etc.)</li> <li>7. Remaining questions you have about the genome/effort?</li> <li>8. Two questions for the class to discuss about the paper</li> </ol>

<b>Religious Holidays</b>	Students who intend to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. A student who is absent for the observance of a religious holy day shall be allowed to take an exam or complete an assignment scheduled for that day within a reasonable time after the absence.
<b>Evacuation Plan</b>	In the event of an emergency, leave the classroom in an orderly manner. Leave the building through the nearest outside door and quickly move as far away as possible. Do not gather near building or parking lots.
<b>Grading</b>	Final averages will be calculated as a percentage of the available points (Only a single letter grade will be issued). Letter grades will be determined as: <b>Point scale: Undergraduates: A (90-100%), B (80-89%), C (70-79%), D (60-69%), F (≤59%)</b> <b>Graduate Students: A (93-100%), B (83-92%), C (73-82%), D (65-72%), F (≤65%)</b> <b>Points available: Undergraduates: 3 x 100 pts (exams) + 50 pts (in-class discussion of genomics paper) + 50 pts (current events) = 400 pts</b> <b>Graduate students: 3 x 100 pts (exams) + 50 pts (in-class discussion of genomics paper) + 50 pts (current events) = 400 pts</b>
<b>Honor Statement</b>	Dishonesty on tests, quizzes, written work, or connected with your attendance in lab or lecture will have serious consequences. Students are expected to be aware of, and abide by, the University's Honor code. Plagiarism on written lab reports or essays (copying/paraphrasing from other students or from other sources without giving due credit) will result in the loss of all points for that exercise, at the very least.
<b>ADA Statement</b>	Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as possible to make necessary arrangements. Students must present appropriate verification from Student Disability Services during the instructor's office hours. Please note that instructors are not allowed to provide classroom accommodation to a student until appropriate verification from Student Disability Services has been provided. For additional information, please contact Student Disability Services office in 335 West Hall or call 806-742-2405.
<b>Topics</b>	Unit 1. Introduction & Biological Concepts Unit 2. Genomes as the Hub of Biology Unit 3. Maps, Sequencing, Assembly, etc. Unit 4. Transcriptomics and Gene Annotation Unit 5. Transposable Elements Unit 6. Genomic Medicine Unit 7. Organismal Genomes  Topics are issued for general information, and deviations from the schedule will likely occur. The Instructor reserves the right to make corrections and/or changes, and you will, of course, be informed about these.
<b>Important Dates</b>	August 28, 2017 – Classes begin September 4, 2017 – Labor Day holiday September 29 – Exam 1 November 1 – Exam 2 December 6 @ 10:00 am (or as arranged by the class) – Exam 3  The third exam will be partially cumulative. In other words, it will consist of about 2/3 new material (presented after the second exam). The remaining third will be older material.