Course description: Molecular and cellular aspects of neural development, structure and function.

Prerequisites: BIOL 315 Cell Biology

This course satisfies Core Objective 9: Science, technology, and society.

“Students will be able to connect science and technology to real-world problems by explaining how science relates to problems of societal concern; be able to distinguish between sound and unsound interpretations of scientific information; employ cogent reasoning methods in their own examinations of problems and issues; and understand the applications of science and technology in societal context.”

Student learning outcomes

Upon successful completion of this course, students will be able to:

- demonstrate understanding of fundamental concepts of cellular and molecular neuroscience by definition, explanation, and use of these concepts in examinations.
- describe and interpret the structure, molecular players, and function of key neuron types within multiple levels of nervous system organization, ranging from genes, proteins, organelles, neurotransmitters, synapses, circuits, and systems.
- integrate previous knowledge about cell and molecular biology to explain the cellular and molecular basis of sensory, motor, and other major neural systems.
- Analyze and discuss technological applications and ethical concerns of cellular and molecular neuroscience for health- and society-related topics, such as genetic disease, autism, drug abuse, mental illness, neurodegeneration, regeneration, and stem cells (CO9).
- demonstrate the ability to critically analyze scientific research articles in cellular and molecular neuroscience, through assignments in writing, speaking, and/or website design, with further demonstration of understanding the profound impacts of neuroscience on society (CO9).

How to succeed in the Neurobiology course: Grading Policies

Attendance: Required. Come to class prepared: quizzes and/or assignments will be given at unannounced times.
Classroom Activities: Class meetings will primarily be lectures, but will also involve a mix of activities, including quizzes and short writing assignments. It is important that you prepare by reading the assigned chapters before coming to class to benefit fully from the class activities.

Review daily. Research has shown that most people soon forget almost all of what they hear in a lecture. However, retention is much better for people who review the information within 24 hours. Thus, the single most beneficial way to help your grade is to review your notes after every class. Be proactive and schedule time for review.

Required Textbook: Neuroscience: exploring the brain. 3rd Ed., Bear, LWW.

Assignments and Grading:

Exams: There will be three "mid-term" exams during the semester. Each exam will have problems to be solved along with some multiple choice and short answer. Each exam will be 100 pts. The exam schedule can be changed without notice by the instructor. (Late, early, or make-up exams require approval from the instructor prior to the exam date. At the discretion of the instructor, the format of the exam may be a verbal exam.)

Poster Project: This project is a series of written assignments and presentations to analyze a specific area of cellular and molecular neuroscience research. The total points for the poster project assignments will be 75 points. Students will choose a major recent primary research article in cellular and molecular neuroscience. The project will center on analyzing this article and related articles, submitting written assignments, and presenting the article to the class as either a poster or website. Written assignments and presentations will include analyzing the advances in science and technology of the study, and discussing impacts of neuroscience on societal issues.

Please carefully review the detailed instructions for each of the assignments. These assignments must be submitted by their due date, by the beginning of class period. You are encouraged to submit your assignments early for feedback to help you improve your final submission. Late assignments may be accepted, at the discretion of the instructor, for partial credit.

Final Exam: The final exam will be held during finals week. The final exam will be cumulative, as you will be expected to use your knowledge and skills accumulated during the entire course. 100 points.

Quizzes and homework: Counting for 30-50 points in total will be quizzes, other small assignments, as well as periodic checks for attendance and class participation/contribution.

Final Grade: Based on percentage of the total points for the course. Check your progress in "My Grades".
The tentative grading scale will be A (92%+), A- (90-91%), B+ (88-89%), B (82-87%), B- (80-81%), C+ (78-79%), C (70-77%), D (60-69%), F (<60%). The instructor reserves the right to change the final grading scale.

Undergraduate grading will be considered separately from grading of the graduate section (BIOL 675).

**Grading Philosophy:**

As an instructor, my goal is much the same as yours as a student: to have a highly stimulating, challenging, and interesting experience; and to be rewarded for taking on these challenges. My goal is for every student to master the concepts in this course, and obtain a good grade.

Academic Success Services: Your student fees cover usage of the Math Center (784-4433 or www.unr.edu/mathcenter/), Tutoring Center (784-6801 or www.unr.edu/tutoring/), and University Writing Center (784-6030 or http://www.unr.edu/writing_center/). These centers support your classroom learning; it is your responsibility to take advantage of their services. Keep in mind that seeking help outside of class is the sign of a responsible and successful student.

Statement on Audio and Video Recording: “Surreptitious or covert video-taping of class or unauthorized audio recording of class is prohibited by law and by Board of Regents policy. This class may be videotaped or audio recorded only with the written permission of the instructor. In order to accommodate students with disabilities, some students may be given permission to record class lectures and discussions. Therefore, students should understand that their comments during class may be recorded.”

**Academic Dishonesty:**

Cheating, plagiarism or otherwise obtaining grades under false pretenses constitute academic dishonesty according to the code of this university. Academic dishonesty will not be tolerated and penalties can include canceling a student's enrollment without a grade, giving an F for the course or for the assignment. For more details, see the University of Nevada, Reno General Catalog.

Cases of academic dishonesty are viewed as a serious violation of the student code of conduct. Examples of academic dishonesty include, but are not limited to:

- Copying homework assignments.
- Cheating on quizzes or exams including sharing answers with students in other sections of the
course.
· Including information in written assignments without proper citations.

Specific advice on plagiarism is also included with the poster project instructions, which specify that all writing must be in your own words. Further, quotes are almost never used for science writing, and instead the points should be explained in your own words.

Statement of Non-discrimination and Accommodation of disabilities:

Any student with a disability needing academic adjustments or accommodations is requested to speak with the Disability Resource Center (Thompson Building, Suite 101) as soon as possible to arrange for appropriate accommodations.

Student Absences: By NSHE policy in Title 4 Chapter 20 A, Section 3, paragraph 1, http://system.nevada.edu/tasks/sites/Nshe/assets/File/BoardOfRegents/Handbook/T4-CH20-%20General%20Policies%20Regulating%20Students%20and%20Student%20Government.pdf, there are no official absences from any university class. It is the personal responsibility of the student to consult with the instructor regarding absence from class. In the event that a student misses a class because of an official university function or event or because of serious personal issues, the Office of the Vice President for Student Services may, at its discretion, send an explanation to affected faculty. The instructor shall make the final determination on whether the missed work can be done at a time other than during the regularly scheduled class period.

Religious Holy Days: It is the policy of NSHE (Title 4 Chapter 20 A, Section 3, paragraph 2, http://system.nevada.edu/tasks/sites/Nshe/assets/File/BoardOfRegents/Handbook/T4-CH20-%20General%20Policies%20Regulating%20Students%20and%20Student%20Government.pdf) to be sensitive to the religious obligations of its students. Any student missing classes, quizzes, examinations, or any other class or lab work because of observance of religious holy days should, whenever possible, be given an opportunity during that semester to make up the missed work. The make-up will apply to the religious holy day absence only. It shall be the responsibility of the student to notify the instructor in advance in writing, if the student intends to participate in a religious holy day which does not fall on state holidays or periods of class recess. This policy shall not apply in the event that administering the assignment at an alternate time would impose an undue hardship on the instructor or the institution which could not reasonably have been avoided.
### Schedule Fall 2014  BIOL 475/675 Neurobiology

**Dr. Grant Mastick, Biology Department**

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Text chapter</th>
<th>Poster project</th>
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<tbody>
<tr>
<td>8/26</td>
<td>Introduction to Neuroscience</td>
<td>1</td>
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<tr>
<td>8/28</td>
<td>Neurons and Glia</td>
<td>2</td>
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<tr>
<td>9/2</td>
<td>Neuronal membrane: The action potential</td>
<td>3</td>
<td>1. Topic due</td>
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<tr>
<td>9/4</td>
<td>Neuronal membrane: The action potential</td>
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<tr>
<td>9/9</td>
<td>Synaptic transmission</td>
<td>5</td>
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<tr>
<td>9/11</td>
<td>Computer lab (DMS 106)</td>
<td>3, 4, handout</td>
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<tr>
<td>9/16</td>
<td>No class</td>
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<tr>
<td>9/18</td>
<td>Neurotransmitter systems</td>
<td>6</td>
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<tr>
<td>9/23</td>
<td>Exam 1</td>
<td>7</td>
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<tr>
<td>9/25</td>
<td>Neuroanatomy</td>
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<td>9/30</td>
<td>Chemical senses</td>
<td>8</td>
<td>2. Review notes</td>
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<tr>
<td>10/2</td>
<td>Vision: the retina</td>
<td>9</td>
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<tr>
<td>10/7</td>
<td>Vision: the retina</td>
<td>9</td>
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<tr>
<td>10/9</td>
<td>Central visual system</td>
<td>10</td>
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<td>10/14</td>
<td>Hearing</td>
<td>11</td>
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<td>10/16</td>
<td>Exam 2</td>
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<tr>
<td>10/21</td>
<td>Motor: spinal cord</td>
<td>13</td>
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<tr>
<td>10/23</td>
<td>Motor: central pathways</td>
<td>14</td>
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<td>10/28</td>
<td>Tom Gould, Physiology, SOM: Neuron death</td>
<td>15</td>
<td>3. Research article: written summary due</td>
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<td>10/30</td>
<td>Dennis Mathew, Biology: Olfactory systems</td>
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<td>11/4</td>
<td>Autism</td>
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<td>11/6</td>
<td>Learning and memory</td>
<td>24, 25</td>
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<td>11/11</td>
<td>Veterans Day, no class</td>
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<tr>
<td>11/13</td>
<td>Exam 3</td>
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<td>11/18</td>
<td>Poster 1</td>
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<td>11/20</td>
<td>Poster 2</td>
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<td>11/25</td>
<td>Poster 3; Websites due</td>
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<td>11/27</td>
<td>No class: Thanksgiving</td>
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<td>12/2</td>
<td>Development: Eye</td>
<td>23</td>
<td>5. Essay: Medical, societal, and ethical issue</td>
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<tr>
<td>12/4</td>
<td>Development: axon guidance</td>
<td>23</td>
<td>6. Website discussion due</td>
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<tr>
<td>12/9</td>
<td>Development: neuron migration, stem cells</td>
<td>23</td>
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<td>12/10</td>
<td>Prep day: review session for final exam</td>
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<td>12/16</td>
<td>Comprehensive Final, Exam 4: 5:00-7:00 pm</td>
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