Neurosciences

COURSE DESCRIPTION
This course focuses on the physiology, morphology, and integrative function of neurons and their role in generating complex functions, such as behaviors and memories. Topics include: morphology and physiology of the neuron; genesis of resting and action potential; electrical and chemical transmission; brain development and neuroanatomy; sensory and motor systems; neural basis of leaning and memory; mental illness. Input from the students into the class is welcomed and encouraged. We all benefit when students contribute their personal and professional perspectives.

STUDENT LEARNING OUTCOMES
At the conclusion of this course, the student will have gained facility in synthesizing and describing:
- The morphological and anatomical structure of neurons;
- Genesis of the resting potential and action potential;
- Chemical and electrical transmission;
- Principle of neurodevelopment and neuroanatomy;
- Sensory systems;
- Motor systems;
- The neural bases of behavior and learning and memory

REQUIRED READINGS
1) Textbook: Bear, M.F., Connors, B.W., and Paradiso, M.A. (2007) “Neuroscience: Exploring the Brain”, third edition, Philadelphia, PA, Lippincott Williams & Wilkins. The lectures (titles and chapter numbers in parenthesis) listed in the tentative schedule correspond to the chapters of this book. Also, some of the material illustrated in the lectures and in the handouts is derived from the chapters of this book.

2) The electronic versions of the lecture handouts (PDF format) will be made available on Blackboard 9.1. Handouts will be posted on Blackboard 9.1 one week before class. Blackboard 9.1 can be accessed at: https://iol.tamucc.edu/ (the Island Online). For further information about the use of Blackboard 9.1, call (361-825-2825) or email the Help Desk (iol.support@tamucc.edu). If you need to contact the instructor about the course, please, do not use the Blackboard internal email system, but use the instructor’s regular email address instead (riccardo.mozzachiodi@tamucc.edu).

3) Additional material that will be provided by the instructor.

MAJOR COURSE REQUIREMENTS
Assessment = Exams + In-Class Learning Exercises + Review Paper

Exams: There will be 5 Exams (4 during the semester + final Exam). Each Exam is worth 100 points. Each Exam will focus on the material covered during lectures and is listed in bold in the
tentative schedule (see below). For example, Exam 2 will cover material from chapters 6-10, but it may also contain questions about the previous section (chapters 1-5). In addition to the handouts, students are responsible for all material, such as videos, guest lectures, websites etc. covered during class. Exams may contain questions in the following formats: multiple choice, matching, true/false, making/labeling drawings, short answer questions, and essay questions. **All the Exams are comprehensive. The lowest grade of the 5 Exams will be automatically dropped.** If the grade obtained at the end of the regular semester (i.e., after 4 Exams and 8 in-class learning exercises) cannot be improved with the final Exam, the student does not have to take the final Exam. Consequently, students will take the final Exam to replace the lowest Exam grade obtained during the semester and improve the cumulative grade. Exams are completed on a scantron answer sheet, which will be provided; you will need number two (# 2) pencils for the scantron sheet. Both Exams and scantron answer sheet must be completed and submitted at the end of the test. Grades are calculated based on the answers provided on the scantron sheet. Consequently, if an answer was bubbled wrong on the scantron, but was marked correctly on the Exam text, it will remain counted wrong. Therefore, students are strongly encouraged to carefully check their answers on the scantron before turning it in. An exam lasts as a regular class (approximately 90 min). There will be no lecture on exam days. During exams, students will be required to remove their caps, hats, etc.

- Different test forms may be prepared for an individual Exam. Follow instructions.
- If you leave an examination room for any reason you must hand in your test and you will not be allowed to resume the examination. Attend to personal matters (e.g., rest room visits) before the beginning of the exam.
- **Be on time!** Anyone arriving after someone has already completed and turned in an examination and left the room will not be allowed to take that examination.

**In-Class Learning Exercises:** At random times during the semester, students will engage in in-class learning exercise. These exercises will require the students to answer questions about topics covered during class. **These in-class learning exercises will not be announced in advance.** During the in-class learning exercises students will be allowed to use textbook and handouts, but not electronic devices including portable computers and phones. There will be 8 in-class learning exercises, each worth 10 points. In class-learning exercises will last 10 min and will be presented at any time during class (i.e., at the beginning, at the end or during class). In-class learning exercises will not be scheduled on a day when an Exam is already scheduled. **All the 8 in-class learning exercises will count for the final grade.** During in-class-learning exercises, students will be required to remove their caps, hats, etc. Once the student has turned in an in-class learning exercise, **he/she is not allowed to turn on the cell phone or the computer until all the students have turned in their assignments.**

**Review Paper:** Graduate students are entering careers where they will be required to communicate ideas to others in research (manuscripts, grant proposals, reports, etc.) and/or in teaching (academic education or public outreach). In this course, each student will prepare a Review Paper on a topic chosen within the Neurosciences in consultation with the instructor. The Review Paper must be based on:

- At least four primary research articles published in peer-reviewed journals during the last ten years.
- At least one review article published in peer-reviewed journals during the last ten years.

Once a topic is identified, the student is encouraged to discuss with the instructor about the choice before proceeding with the review. The review should be 10-12 pages long and arranged using the following format:
Because this is a review-style paper that requires the student to synthesize data from several sources, the “Materials and Methods,” and “Results” sections should be combined into a single “Experimental Analysis” section. In this section, the student should paraphrase and reorganize the data from their sources into a coherent “story.” Students should discuss and evaluate the experimental data and conclusions of their sources in the “Discussion” or “Conclusions” section. All the cited references must be cited in the text and the full citations must be provided in the Reference List. Each student must provide the instructor with a hard copy of all reference sources. The student is allowed to use the illustrations published in the chosen articles. As regards for the other sections (i.e., Title, Abstract, Introduction, Experimental Analysis, Figure Legends, Discussion/Conclusions), the student is required to prepare these sections using his/her own words and not just copy or paraphrase portions of the chosen articles. References must be cited in the text. The Reference List must be prepared by using the format of a peer-reviewed journal chosen by the student.

The Review Paper is worth 100 points.
- Each student must select a topic of interest, discuss it with the instructor and have it approved by February 20, 2013.
- A first draft of the Review Paper is due at the beginning of class on March 27, 2013.
- The final draft of the Review Paper is due at the beginning of class on April 24, 2013.
- Both the initial and the final drafts of the Review Paper must be sent via email as electronic word files.
- Delayed submission dates are not permitted. If the student experiences difficulties with the preparation of the review paper, he/she is encouraged to inform the instructor in a timely manner.

The final grade is based on the sum of 4 Exams (400 points), 8 In-Class Learning Exercises (80 points) and the Review Paper (100 points), for a total of 580 points.

Grading Scale:
580 - 512 = A
511 - 454 = B
453 - 396 = C
395 - 338 = D
Below 337 = F

COURSE POLICIES

Attendance/tardiness
Students are expected to attend every class. If absent, it is the student’s responsibility to obtain missed information from a classmate. Missed information includes not only lecture notes, but also any possible information regarding changes to the agenda. The student is expected to arrive prepared to take notes and should bring textbook and handouts.
Communications with the instructor
All students are required to access and use their university Islander email accounts to communicate with the instructor. To find out more about your TAMU-CC email account go to: http://www.tamucc.edu/ise.html. The instructor will use these addresses to create a class email list to disseminate important course information. The instructor will not reply to personal email accounts (e.g., Gmail, yahoo, etc.) other than the student’s islander email.

Academic assistance
If a student experiences academic difficulty, the instructor is available for consultation and extra help. However, it is the responsibility of the student to seek help, preferably while the investment made by the student can still be salvaged. Please contact the instructor by phone or via email to arrange an appointment.

Late work and make-up exams
• In-class learning exercises. Regardless of the circumstances, students will not be allowed to make up the in-class learning exercise(s) that they have missed. This rule applies to every student and no exceptions will be made. In case a student cannot attend class because he/she will be officially representing TAMU-CC (e.g., meetings or sports events), see rule E below.
• Exams. This course does not include make-up Exams. If you are not able to attend one of the Exams, contact the instructor ASAP (see below). Points missed because of an unexcused absence (including tardiness and leaving early) cannot be recovered. An excused absence allows the instructor to make alternative arrangements for completing assignments. The documentation required for an absence to be excused must be:
  a) From an appropriate source (e.g., doctor, dentist, funeral director) who states the nature of the event that caused (or will cause) your absence.
  b) In writing, on official stationery, and signed (I do not return excuses to you). Telephone calls, FAXes, and e-mails are not acceptable.
  c) Presented prior to the absence for a scheduled event (e.g., university-sponsored activity, recognized religious holiday, military service).
  d) Presented no more than one week after the date of an unexpected absence.
  e) In case a student cannot attend class because he/she will be officially representing TAMU-CC (e.g., meetings or sports events), the documentation required for an absence to be excused must be from the Office of Dr. Eliot Chenaux, Vice President for Student Affairs. Refer to your student handbook on obtaining an excused absence from his office.

Unacceptable excuses: Only unavoidable absences are excused, so you should schedule routine personal events (e.g., vacations, weddings, reunions, non-emergency medical or dental visits, parent-teacher conferences, household or auto repairs) to avoid conflicts with your classes. Oversleeping is never an acceptable excuse. Employment conflicts are not acceptable excuses for absences, tardiness, or leaving class early. Once enrolled in a class, it is the student’s responsibility to arrange his or her work schedule so that no regularly scheduled class, laboratory, or examination time is missed. Texas waives jury duty for students, so jury duty is not an acceptable excuse.

Cell phone/electronic device usage
• During lectures, cell phones and any other portable devices must be turned off and removed from the table. Cell/smart phones must be turned off at the beginning of class and remain so until the class is dismissed. Computers and notebooks can be used to take notes.
• During exams or learning exercises, any portable device, including phones, computers and notebooks must be turned off and removed from the table.
**Academic integrity**

University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism (plagiarism is the presentation of the work of another as one’s own work). For this class, acts of academic misconduct, including plagiarism, cheating and complicity conducted during a learning exercise or an exam will result in a grade of zero (0) points for that given assignment. Furthermore, an Academic Misconduct Incident will be filed and reported to the University Academic Standard Grievance Committee.

**Dropping a class**

I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. Please, consult with the instructor before you decide to drop to be sure it is the best thing to do. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation **WILL NOT** automatically result in your being dropped from the class. November 4, 2011 is the last day to drop a class with an automatic grade of “W” in the fall semester.

**Grade appeal process**

As stated in University Rule 13.02.99.C2, Student Grade Appeals, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Rule 13.02.99.C2, Student Grade Appeals, and University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules Web site at http://www.tamucc.edu/provost/university_rules/index.html. For assistance and/or guidance in the grade appeal process, students may contact the Office of Student Affairs.

**About the final exam**

1) Students are not required to take more than two final examinations in any one day. The students who have three or more final examinations scheduled on the same day may request to take the final exam for this course on another day during the final examination period. The process is described below:
   2) The student should first try to resolve the matter with the appropriate instructor(s). If this is the case, students are strongly encouraged to contact Dr. Mozzachiodi in a timely manner.
   3) If the matter remains unresolved, the student should submit a request for an alternative final exam time in writing to the Office of Student Affairs. This request must be submitted by the drop date (the last day to drop a course for the semester with an automatic grade of W as stated in the semester class schedule).
   4) The Office of Student Affairs will select which of the exams should be taken at an alternative time and formally contact the faculty member at least 15 working days before the final examination period. Preference for selection of which course would have an alternative final exam time must be based on the course with the smaller class size and, then, courses with final exam times in between other exams.
   5) The faculty member will then arrange an alternative time for the student to take the final exam for that course that does not conflict with the student’s final exam schedule or require the student to take more than two final exams in one day. If students have difficulties in rescheduling the examination, they should consult with the Office of Student Affairs. Final
exams given outside the regularly scheduled time may vary in content and format at the discretion of the faculty member.

**Opportunities listserv**

Students are strongly encouraged to subscribe to the opportunities listserv, which announces scholarships, fellowships, internships, seminars, jobs, etc. Some SPAM filters will not accept mass mailings, but you can adjust your settings to accept messages from this listserv. To subscribe:

1) Send an email message to: opportunities-list-request@sci.tamucc.edu

2) Make sure that your e-mail address appears in the “From:” heading, and that the word “subscribe” is typed in the subject line.

3) You will receive a subscription acknowledgement from the listserv letting you know that you have subscribed successfully.

4) To post a message to all members of the listserv, send the message to: opportunities-list@sci.tamucc.edu

You must be subscribed to the listserv to send messages.

**DISABLING CONDITIONS**

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. The Biology and Biomedical Sciences Programs comply with the ADA in making reasonable accommodation for qualified students with disabilities. Any student who suspects that a disabling condition (physical impairment, learning disability, psychiatric disability, etc.) may necessitate special arrangements to meet course requirements, should first obtain appropriate verification from A&M-Corpus Christi Services for Students with Disabilities Office (located in 116 and 119 Corpus Christi Hall, phone #: 825-5816). If the student is a returning veteran and is experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance. It is important to contact the Disability Services office in a timely fashion as it may take several days to review requests and prepare accommodations and accommodation letters. Upon receipt of accommodation letters, a student should take them to appropriate instructors as soon as possible. Please note that instructors are not required to make accommodations prior to receipt of an official accommodation letter. Should you have mobility problems, please notify the lecture and laboratory instructors so that they may seek assistance for you in the case of fire drills or emergencies. Also, any student having a medical condition that may fulminate (i.e., “flare-up” without warning such as diabetes, epilepsy, etc.) should notify your instructors.

**ACADEMIC ADVISING**

The College of Science and Technology requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. The College’s Academic Advising Center is located in the Center for Instruction, room CI-350.

**RELIGIOUS HOLIDAYS**

Any student who will miss class and/or test days because of recognized religious holidays should notify me as soon as possible so we can make alternative arrangements. Prior notification is required for such absences to be excused.
**GENERAL DISCLAIMER:**
The Instructor reserves the right to modify the schedules and policies in this syllabus if and when necessary. Such changes will be announced during regularly scheduled lecture periods, but no attempt will be made to contact students who were absent when an announcement was made. Nevertheless, all students are responsible for abiding by all announced changes, and it is a student’s responsibility to obtain this information. Changes will be announced in a timely manner, but be aware that some modifications may be implemented without prior warning.

**TENTATIVE SCHEDULE**
This schedule may change depending on unforeseen events. Numbers in parenthesis refer to specific chapters of the textbook:

**January**
- 23 Review of the syllabus and course introduction (chapter 1)
- 28 Neurons and glia (chapter 2)
- 30 The neuronal membrane at rest (chapter 3)

**February**
- 4 The action potential (chapter 4)
- 6 Synaptic transmission (chapter 5)
- 11 Synaptic transmission (chapter 5, continued)
- 13 Neurotransmitter systems (chapter 6)
- 18 **Exam 1: material covered in chapters 1 – 5 (introduction, neurons and glia; the neuronal membrane at rest; the action potential; synaptic transmission).**
- 20 The structure of the nervous system (chapter 7 + Appendix) *(topic of the Review Paper discussed with the instructor and approved by today)*
- 25 The structure of the nervous system (chapter 7 + Appendix, continued)
- 27 The structure of the nervous system (chapter 7 + Appendix, continued)

**March**
- 4 The chemical senses (chapter 8)
- 6 The eye (chapter 9)
- 11 No class, Spring break
- 13 No class, Spring break
- 18 The central visual system (chapter 10)
- 20 The auditory and vestibular systems (chapter 11)
Exam 2: material covered in chapters 6 – 10 (neurotransmitter systems; the structure of the nervous system; the chemical senses; the eye; the central visual system).

The auditory and vestibular systems (chapter 11, continued) (first draft of the Review Paper due today)

April
1 The somatic sensory system (chapter 12)
3 Spinal control of movements (chapter 13)
8 Brain control of movements (chapter 14)
10 Chemical control of the brain and behavior (chapter 15)
15 Exam 3: material covered in chapters 11 – 14 (the auditory and vestibular systems; the somatic sensory system; spinal control of movements; brain control of movements).
17 Brain mechanisms of emotion (chapter 18)
22 Memory systems (chapter 24)
24 Molecular mechanisms of learning and memory (chapter 25) (final draft of the Review Paper due today)
29 Mental illness (chapter 22)

May
1 Exam 4: material covered in chapters 15, 18, 24 and 25 (chemical control of the brain and behavior; brain mechanisms of emotion; memory systems; molecular mechanisms of learning and memory).
6 General review of the course material and questions in preparation to the final exam
15 Final Exam: 7:15 – 9:45 pm. Final Exam will be comprehensive and will also include questions on chapter 22 (mental illness).