**Prerequisites:** BIOL/BIMS 2200 & BIOL 3410  
**Semester hours credit:** 3

**Office:** HRI 118  
**Office hours:** T 3-5 pm, OTBA

**Phone:** 361-825-3489  
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**Website:** [http://lsci.tamucc.edu/RThomas/BIOL3345Home](http://lsci.tamucc.edu/RThomas/BIOL3345Home)

**Required materials:** All readings and assignments can be found on the course website listed above.

**Course description:** Cell Physiology is a course that intensely focuses on the cellular basis for physiological processes that are more typically analyzed at the level of tissues, organs, organ systems, and the whole organism. Particular emphasis will be placed on transport across membranes, membrane potential and excitability, cell volume, organelle functions, intracellular membranes, and cell metabolism.

**Student learning outcomes:** Students will learn and use the vocabulary of cell physiology; students will learn mathematical concepts that relate to diffusion, osmosis, and membrane potential; students will learn the functions of: molecules, organelles, energy, temperature, oxygen, carbon dioxide, water, and salts; students will learn the integrative nature of physiology by studying the role of cells in producing/maintaining homeostasis; students will learn to read and critically evaluate high-level articles written about relevant topics; students will learn to apply problem solving skills to clinical scenarios.

**Evaluation:** Final course grades will be determined by the following

- Midterm examination: 30%
- Article summaries: 24%
- Problems: 16%
- Final examination: 30%

The following grading scale will be used to determine final letter grades: 90-100% = A, 80-89.9% = B, 70-79.9% = C, 60-69.9% = D, and < 60% = F. The exam schedule is as follows: Midterm Exam, 3/6, and Final Exam, 5/8, 7:15 – 9:45 pm. Absolutely no make-up exams will be given. Any student who knows in advance that they will miss an exam due to official University business must notify Dr. Thomas at least fourteen (14) days in advance with official documentation of the absence to make arrangements to take the exam early. It is the student’s responsibility to obtain official documentation in a timely fashion. The date and time for the final exam are non-negotiable for any reason. The final exam will be comprehensive. The format for all exams may vary and may include multiple choice, short answer, essay, matching and definitions. Exams given outside regularly scheduled times may vary in format and content at the discretion of the faculty member. Students will also be required to complete article summaries on each article assigned (the 10 highest grades will be counted) and 5 physiological problems. Available on the website is the article summary form that gives students an idea of what is expected for the article summaries. Students
can do more than what is expected for better grades, but more does not assure higher scores. Quality is the most important element. Likewise, just doing the minimum required with minimum effort does not guarantee a satisfactory grade. Problems to be solved will be mostly done in small groups in class and will be posted on the course website the day before the class for which a problem is assigned. Article summaries and problem solutions must be turned in when they are due. **No assignment may be turned in late for any reason!** Assignments will be accepted as hard copy only, no electronic copies will be allowed. If you email me an assignment, the email will be permanently deleted and a 0 will be the grade earned. Plagiarism is a serious offense and students are not allowed to work with others on their article summaries. Plagiarism will result in a 0 on an assignment (even if you were the one being plagiarized), and if it happens a second time an F will be the grade earned in the course. As for the problems, similar answers are expected among same group members, but identical answers are unacceptable (numerical, yes/no, and +/- answers, for example, are an exception). I need clear evidence that each student understands the material and is able to explain the material in his/her own words. In addition, class participation in the discussion of all assigned readings and in problem solving will factor in to the grade earned in those portions of the course.

**Students with Disabilities**
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. If you believe you have a disability requiring an accommodation, please contact the Disability Services Office at (361) 825-5816 or visit the office in Driftwood 101.

**Classroom Etiquette:**
All students are expected to attend class each week and to be respectful. This requires that students listen when others are speaking, and that students refrain from participating in text messaging, taking phone calls, instant messaging, surfing the web, checking email, sending email, listening to MP3 players or iPods, talking with others, and other such behaviors that are distracting to other students and/or the Professor. A student who is participating in such activities will be asked to leave the classroom, and chronic offenders will be asked to not attend class. While I realize that you are paying for the class and that this should entitle you to do what you want, you must understand that others are paying for the class as well and they have the right to a distraction-free atmosphere. In this situation, the benefit of the majority of students must outweigh any individual benefit.
**Tentative Course, Reading, and Assignment Schedule:**

1/17: Introduction and background information; Q & A

1/24: Ion Channel Development, Ion Channels and Toxins*

1/31: TRP Cation Channels in Disease, Ion Channels and Disease*

2/7: Ion Channels and Drugs, Carrier-Mediated Transport*

2/14: Osmosis and Cell Volume, Cellular Hyperosmotic Stress*

2/21: Protein Folding, HSPs and the Cardiovascular System; Problem 1*

2/28: Free Radicals and Cell Function; Problem 1 due

3/6: MIDTERM EXAM

3/13 Mitochondrial Membranes and Cell Death, Life and Death; Problem 2*

3/20: SPRING BREAK

3/27: The Nuclear Envelope; Problem 2 due

4/3: Transcriptional Regulation of Metabolism, Cellular Cholesterol Transport; Problem 3*

4/10: Metabolic Sensor Cells; Problem 3 due

4/17: Mammalian Hibernation; Problem 4

4/24: Membrane Transport and Malaria; Problem 4 due

5/1: Bioluminescence; Problem 5

5/8: FINAL EXAMINATION, 7:15 – 9:45 pm; Problem 5 due

*On days where two articles are assigned for reading, only one article summary is due. However, both articles will be discussed and each student is expected to participate in the discussion of each article. The student may choose which article they wish to turn in an article summary on those days. Article summaries are due each class day beginning January 24th except for midterm exam day.