A. COURSE INFORMATION

Course number/section: BIOLOGY 3410.001
Class meeting time: M, W, F 10:00-10:50 [Labs 103: M 2:00-4:50; 101: T2:00-4:50; 103: T 5:30-8:20]
Class location: IH 267 (Labs: EN 301)
Course Website: See BlackBoard (https://bb9.tamucc.edu/)

B. INSTRUCTOR INFORMATION

Instructor: Kirk Cammarata
Office location: EN 319 B (Research Lab: CS 127)
Office hours: W, R 2:00-3:30; T 8:00-10:00
Telephone: 361-825-2468
e-mail: kirk.cammarata@tamucc.edu
Appointments: Email/call to check on availability at other times or to make an appt.

C. COURSE DESCRIPTION

Course Description
A study of cellular structures and processes to explore strategies for cellular and organismal function. Emphasis will be placed on the biology and chemistry of basic cellular mechanisms. Topics include biomolecules, cellular architecture, gene regulation, catabolism, protein structure and function, enzymes, membrane structure and function, membrane transport, cellular trafficking, cytoskeleton, cell communication/signal transduction, regulation of cell proliferation and cancer. Laboratory will emphasize basic techniques and data analysis common to the overlapping fields of cell biology, biochemistry, and molecular biology. Hot topics include genomics approaches. Critical thinking and analytical skills are practiced.

D. PREREQUISITES AND COREQUISITES

Prerequisites
Genetics (BIOL 2416) and Organic Chem I (CHEM 3411)
Pre- or Corequisites
SMTE 0092

E. REQUIRED TEXTBOOK(S), READINGS, RESOURCES AND SUPPLIES
Required Textbook(s)

There are flexible purchasing options available for *Essential Cell Biology*, Fourth Edition, including hardback, loose-leaf, and e-books. Through the end of September GarlandScience.com offers a 25% discount and free standard shipping on print products from the website, and a $50 six-month e-book rental.

Print
Visit garlandscience.com/ecb4 and apply promo code DGL94 at checkout to take advantage of this special 25% off and free standard shipping promotion on print books:

<table>
<thead>
<tr>
<th>Format</th>
<th>ISBN</th>
<th>Original Price</th>
<th>Discounted Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardback</td>
<td>978-0-8153-4454-4</td>
<td>$155</td>
<td>$116.25</td>
</tr>
<tr>
<td>Loose-leaf</td>
<td>978-0-8153-4525-1</td>
<td>$110</td>
<td>$82.50</td>
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</table>

E-book
Essential Cell Biology is available in a variety of e-book formats, including lifetime purchase, rental, and individual chapters. There is a $50 six-month rental available through the end of September.

Students should visit garlandscience.com/ecb4-ebook to rent the $50 e-book for Essential Cell Biology, normally priced at $78.

Other Resources
*Text-Associated Website with student resources:* [www.garlandscience.com/ECB4-students](http://www.garlandscience.com/ECB4-students)

*BlackBoard:* Course-associated site for posting notes, supplemental readings, laboratory handouts, lab data, announcements, links to websites, etc. *[You MUST use this regularly!]*

*Course Listserv:* It is strongly suggested that you subscribe to the Opportunities Listserv. This service provides notification of scholarships, research and volunteer opportunities and
science-related job opportunities. To subscribe, send an e-mail to: “opportunities-list-request@Listserv.tamucc.edu” Make sure that your e-mail address appears in the “From:” heading, and that the word “subscribe” is typed in the subject line. You will receive a subscription acknowledgement confirming that you have done everything correctly. To post messages to the listserv, send to “opportunities-list@Listserv.tamucc.edu”. Because of security concerns, you should post messages from the official TAMUCC computer account (Islander) that is used to subscribe to the listserv. You can unsubscribe by sending an e-mail to “opportunities-list-request@Listserv.tamucc.edu” with “unsubscribe” in the subject heading.

List of Supplies
You will need a laboratory notebook, “sharpie”, calculator, laboratory coat, safety glasses and access to the internet.

Laboratory Instructors and Contact Info:
Section .103 Mon 2:00-4:50 K. Cammarata Office Hrs: See Above

Section .101 Tues 2:00-4:50 Hailey Boeck Office Hrs: EN 301 Mon 11-2
Section .102 Tues 5:30-8:20 Hailey Boeck Office Hrs: EN 301 Mon 11-2
Hboeck@islander.tamucc.edu

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT

Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

By the end of this course, students should be able to:
1. List the major macromolecules found in the cell and the monomers from which these polymers are constructed.
2. Explain the properties of each class of macromolecule and the roles that each plays in various cellular functions.
3. Describe the properties of water and the roles it plays in all cellular processes, eg. protein folding.
4. Describe the structure and differentiate the functions of the major parts of the cell, including: cell (plasma) membrane
nucleus
chromosomes
nucleolus
mitochondria
chloroplasts
endosomes
lysosomes
endoplasmic reticulum
peroxisomes
ribosomes
golgi complex
cytoskeleton
Clathrin-coated vesicles
extracellular matrix

5. Explain the properties of biological membranes and transport of molecules and signals across them.
6. Describe the roles of ATP and NADH (NADPH) in metabolism and explain how electron transport is linked to ATP generation.
7. Describe how proteins and membrane lipids are trafficked through cells.
8. Explain how information flow embodied by the Central Dogma can be used to study cells and manipulate gene expression.
9. List components of the cytoskeleton and describe how they maintain or modify cell structure.
10. Describe techniques for characterizing proteins.
11. Provide examples of signaling mechanisms in cells and organisms, and interpret signal transmission based upon ythe state of the signaling components.
12. Describe regulation and control of the cell cycle
13. Describe the nature of mutations and alterations to cell regulation which accompany cancer

**Students should have appropriate skills to be able to:**

1. Propose practical experimental procedures to:
   a. fractionate, label or visualize specific cellular compartments or components.
   b. identify, quantify, and characterize proteins.

2. Use the following equipment in a safe and professional manner:
   a. high power light and phase-contrast microscopes
   b. centrifuge
c. spectrophotometer
d. thermal cycler & gel imager
e. electrophoresis equipment
f. micropipetting devices

3. Calculate, graph and interpret the results of cell biology experiments.
4. Communicate experimental procedures, results and outcomes in a professional manner.
5. **Perform basic laboratory mathematics including concentration and dilution calculations.**

**G. INSTRUCTIONAL METHODS AND ACTIVITIES**

This course will utilize traditional lecture, discussions, in-class demonstrations/animations,
and coordinated laboratory learning experiences to: 1) integrate conceptual learning and skills development; 2) explore the relationships between cellular structure and function; and 3) experience how cell biologists study cells. Each topic builds upon the previous one in a progressive manner, and is made relevant to organismal function. The course is capped off by studying the alterations associated with cancer.

H. MAJOR COURSE REQUIREMENTS AND GRADING

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
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<tbody>
<tr>
<td>LECTURE</td>
<td>75%</td>
</tr>
<tr>
<td>3 Hourly Exams</td>
<td>60%</td>
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<tr>
<td>Final Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Assignments, Participation</td>
<td>20%</td>
</tr>
<tr>
<td>LABORATORY</td>
<td>25%</td>
</tr>
<tr>
<td>Lab Reports/Assignments</td>
<td>60%</td>
</tr>
<tr>
<td>Lab Quizzes</td>
<td>40%</td>
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</tbody>
</table>

Tentative Evaluation: Your final grade will be based on the percentage you earn out of the total possible points, weighted as specified below. Individual extra credit is not possible, but bonus points may be built into exams or other assignments. Statistical manipulations, if used (at the Instructor’s discretion), will be performed only once, at the end of the semester. A 10-point grading scale will be used:

- A = 90 - 100 %
- B = 80 - 89.9 %
- C = 70 - 79.9 %
- D = 60 - 69.9 %
- F = 0 - 59.9 %

Components of Course Grade (Tentative)

I. Lecture (75 %)
- 3 Exams @ 100 pts = 300
- Final Exam = 100
- Quizzes; Other Assignments (Tentative) = 100

II. Laboratory (25 %)
- Lab Reports/Assignments = 150
- Lab Quizzes = 100

The time and grading schedule may require adjustment. Should this be the case, the assignments and weighting may change slightly. Additional assignments may or may not be provided at the Instructor’s discretion. Such assignments might include homeworks, group projects, reading assignments,
quizzes, seminar attendance, etc. **Regardless of any such changes, the lecture and laboratory weighting of your grade shall remain at 75% and 25%, respectively.** For example, if you make 90% of total points available for the lecture and 80% of total points available for the laboratory portion, then your grade would be calculated as:

\[(0.9 \times 75) + (0.8 \times 25) = (67.5) + (20) = 87.5/100\text{ possible} = B\]

*An assignment will likely be due during the last week of class.*

Every attempt will be made to follow the time and evaluation schedules shown here. It is the student’s duty to **attend each class session, read messages from Blackboard and to be aware of all assignments, deadlines, changes.**

**Exams** will be a mixture of multiple choice, matching, fill-in the blank, short answer, labeling, calculations and essay questions. Questions are often relatively long and detailed compared to what you may have seen in some introductory courses. Some will require analysis and interpretation of data or experimental design to assess critical thinking skills. Some questions will be derived from laboratory activities. The **Final Exam (Wednesday, Dec. 13 from 8:00 - 10:30 AM)** will contain new material from the end of the semester.

**Quizzes** may be given at any time in class. There will be no makeups. **Homeworks and other assignments** may be given in class. The other assignments may include data interpretation, experimental design, calculations, opinion papers, research article summaries, etc. They will generally be due at the start of lecture class the following week, **but some assignments will be in-class only and makeups are not possible.** You are encouraged to get together and work on them as a group. However, unless specified otherwise, the assignments must be turned in individually and be written *in your own words, NOT COPIED.* An assignment grade of ZERO will be given if the work is not in your own words.

All assignments and examination answers must be legible to the Instructor. Illegible answers will receive a “0”.

I. **COURSE CONTENT/SCHEDULE**

**Important Dates:**
- Classes Begin: Aug 28
- Labor Day: Sept 4
- Last day to register: Sept 5
- Last Day to Drop: Nov 15
- Reading Day-No Class: Nov 22
- Thanksgiving Holiday: Nov 23-24
- Last Day to withdrawal: Dec 5
- Last Class Day: Dec 6
- Reading Day: Dec 7
- **FINAL EXAM**: Wed December 13 (8:00 – 10:30 AM)

<table>
<thead>
<tr>
<th>DATE (BY DAY OR WEEK)</th>
<th>TOPIC</th>
<th>ACTIVITIES</th>
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<tbody>
<tr>
<td></td>
<td></td>
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<tr>
<td>Week</td>
<td>Dates</td>
<td>Topic Description</td>
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</tr>
<tr>
<td>Wk 1</td>
<td>Aug 28, 30; Sept 1</td>
<td>Cells, Organelles, Genomes, Microscopy (Ch 1); SI Presentation</td>
</tr>
<tr>
<td>Wk 2</td>
<td>Sept 6, 8</td>
<td>Sept 4 Labor Day Holiday—NO LABS; Water, Chemical bonds, Macromolecules (Ch 2)</td>
</tr>
<tr>
<td>Wk 3</td>
<td>Sep 11, 13, 15</td>
<td>Macromolecular interactions, Energetics, Enzymes, Prot Str &amp; Catalysis (Ch 3)</td>
</tr>
<tr>
<td>Wk 4</td>
<td>Sep 18, 20, 22</td>
<td>Protein conformation &amp; energy, Protein functions &amp; motions (Ch 4)</td>
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<tr>
<td>Wk 5</td>
<td>Sep 25, 27, 29</td>
<td>Catalysis; Antibodies &amp; Regulation (Ch 4); Membrane structure (Ch 11)</td>
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<tr>
<td>Wk 6</td>
<td>Oct 2, 4, 6</td>
<td>Membrane structure (Ch 11) Membrane transport (Ch 12) EXAM I (Fri Oct 6; Chapt 1-4)</td>
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<tr>
<td>Wk 7</td>
<td>Oct 9, 11, 13</td>
<td>Membrane transport, membrane potential (Ch 12)</td>
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<tr>
<td>Wk 8</td>
<td>Oct 16, 18, 20</td>
<td>Catabolism Overview (Ch 13) Mitochondrial structure &amp; function (Ch 14)</td>
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<tr>
<td>Wk 9</td>
<td>Oct 23, 25, 27</td>
<td>Mitochondria: Ox Phos, E.T., Proton pumping, ATP synthesis (Ch 14; Media); Intracellular compartmentation/transport (Ch 15)</td>
</tr>
<tr>
<td>Wk 10</td>
<td>Oct 30; Nov 1, 3</td>
<td>Protein Sorting: translocations, vesicular, secretory &amp; endocytic paths (Ch 15) EXAM II (Fri Nov 3; Chapt 11-14)</td>
</tr>
<tr>
<td>Wk 11</td>
<td>Nov 6, 8, 10</td>
<td>Cell communication: Types &amp; principles, G-proteins (Ch 16)</td>
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<tr>
<td>Wk 12</td>
<td>Nov 13, 15, 17</td>
<td>Cell communication: G-prot- &amp; enzyme-linked receptors (Ch 16)</td>
</tr>
<tr>
<td>Wk 13</td>
<td>Nov 20</td>
<td>EXAM III on Mon Nov 20 (Chapts 15-16) NO LABS Nov 22 = Reading Day – No Class! Thanksgiving Holiday Nov 23-24</td>
</tr>
<tr>
<td>Wk 14</td>
<td>Nov 27, 29; Dec 1</td>
<td>Cytoskeleton: Intermediate filament, microtubules, Actin (Ch 17); Cell cycle (Ch 18) Assignment: Cell cycle, division and control (Ch 18);</td>
</tr>
<tr>
<td>Wk 15</td>
<td>Dec 4, 6</td>
<td>Cell cycle, division and control; Cell death (Ch 18);</td>
</tr>
</tbody>
</table>
Tissues/matrix/junctions; Cancer (Ch 20)  localization II  OR QPCR II

Wk 16: Dec 13  FINAL EXAM; 8:00 – 10:30 AM  FINAL EXAM

The time and point schedule may require adjustment. Additional assignments may or may not be provided at the Instructor’s discretion. Such assignments might include homeworks, group projects, reading assignments, quizzes, etc. Every attempt will be made to follow the time and evaluation schedules shown here. It is the student’s duty to attend each class session, subscribe to the listserv, and regularly visit BlackBoard to be aware of all assignments, deadlines, and changes to such.

EXAM RULES: No calculators, phones, iwatches, cameras, music or bluetooth or other digital devices are allowed anywhere in sight, including desktop, chair or floor! Put them away before entering the classroom! All Exams are the property of the Instructor as they will be saved for course records. Taking, copying, photographing or scanning of exams is forbidden and violation of this policy will result in a failing grade for the course. No one may enter an exam room once the first person has finished.
Other Course Requirements:

1. All Exams are the property of the Instructor as they will be saved for course records. Taking, copying, photographing or scanning of exams is forbidden and violation of this policy will result in a failing grade for the course.

2. All students must access BlackBoard on a regular basis to watch for class announcements, changes, and for laboratory materials, readings, etc.

For help with access to BlackBoard, email or internet, please contact the IT Helpdesk by phone (825-2692) or electronically (computer.helpline@tamucc.edu; http://it.tamucc.edu/selfservice/index.html)

3. Attendance at lecture and lab, preparedness and participation in all learning activities is required and counts towards your participation points. Assignments cannot be made up later if absent without a recognized excuse (see below).

J. COURSEPOLICIES

Attendance/Tardiness

Attendance is the student’s responsibility. You are responsible for the material covered in every lecture or online activity, regardless of your (lack of) attendance or participation. Nothing missed during an unexcused absence can be made up. An excused absence allows us to make alternative arrangements to complete an assignment. Only unavoidable absences are excused. Routine events (non-emergency medical visits, parent-teacher conferences, household or auto repairs) should be scheduled to avoid conflicts with class. Plane tickets booked to conflict with class do NOT constitute an excusable absence. An acceptable excuse must be:

• from an appropriate source (doctor, dentist, funeral director) who states the nature and dates of the event
• In writing, on official letterhead, and signed (it will not be returned)
• presented prior to, or within 3 days of, the absence

Late Work and Make-up Exams

Nothing missed during an unexcused absence can be made up. An excused absence allows us to make alternative arrangements to complete an assignment. Only unavoidable absences are excused. Routine events (non-emergency medical visits, parent-teacher conferences, household or auto repairs) should be scheduled to avoid conflicts with class. Plane tickets booked to conflict with class do NOT constitute an excusable absence. An acceptable excuse must be:

• from an appropriate source (doctor, dentist, funeral director) who states the nature and dates of the event
• In writing, on official letterhead, and signed (it will not be returned)
• presented prior to, or within 3 days of, the absence
There are No make-up examinations: For some scheduled events, you may arrange to take a lecture exam before, but not after, its scheduled time.

Cell Phone Use
As adult university students, you are expected to act with courtesy and common sense. Disruptive, disrespectful, or abusive language/behavior towards anyone in class (student, staff, faculty) will not be tolerated and could result in permanent removal from class. This includes tardiness to class, talking in class, insubordination, and electronic disturbances (cell phones, ipods, etc). Turn it off unless specifically being used for class.

Missed Exam
See Above.

Participation
All students are expected to attend the full class and lab periods, complete all learning assignments, complete reading assignments fully and carefully, and to participate in class discussions. A portion of your grade is earned by participation.

Expectations:
You are responsible for your own education. Take notes in class, during lab discussions, and when completing assignments. Ask questions when you have them and seek help when you need it. The instructor is here to help you. Be aware of university-imposed deadlines (ie drop dates).

K. COLLEGE AND UNIVERSITY POLICIES

• Academic Integrity (University)
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.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

• Classroom/Professional Behavior
Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This
prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

- **Statement of Civility**
  Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

- **Deadline for Dropping a Course with a Grade of W (University)**
  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 your academic advisor, the Financial Aid Office, and me, before you decide to drop this course. 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. Please consult the Academic Calendar [here](http://www.tamucc.edu/academics/calendar/) for the last day to drop a course.

- **Grade Appeals (College of Science and Engineering)**
  As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, 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 Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at [here](http://www.tamucc.edu/provost/university_rules/index.html), and the College of Science and Engineering Grade Appeals webpage at [here](http://sci.tamucc.edu/students/GradeAppeal.html). For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**
  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 call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

http://disabilityservices.tamucc.edu/

- **Statement of Academic Continuity**
  In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

L. **OTHER INFORMATION**

- **Academic Advising**
  The College of Science & Engineering 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. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

**GENERAL DISCLAIMER**

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes during lecture.