Molecular Basis of Life

MCB 301

Spring 2018

Instructor:

Carol Dieckmann, Professor of Molecular and Cellular Biology

dieckman@u.arizona.edu or dieckman@email.arizona.edu

Life Sciences South 427

520-621-3569

Office hours by appointment

Teaching Assistants:

Ryan Wallace, PhD program MCB

ryanwallace@email.arizona.edu

Office hours by appointment

Emma Holland, PhD program Genetics GIDP

ehollan3@email.arizona.edu

Office hours by appointment

Preceptors:

Bobby Betterton, Amy Giang, Austin Lipinski, Jacob Lovorn, Josh McKinney, Carson McKelvey, Mackenzie Roman, Chelsea Villela, Nate Yang. All of these students/graduates took the class in Spring 2017 and are receiving credit to help with learning in MCB 301 during the MWF 10 AM class periods.

Time: MWF 10 AM **and** F 2 PM or 3 PM

Locations: Pacheco ILC 141 for MWF 10 AM classes.

Life Sciences South (LSS) 240 or 340 for Friday Discussions 2 PM. LSS 240 at 3 PM.

Units: 3 units class + 1 unit discussion = 4 total units

5 units if enrolled in Honors. **Extra** Honors 50 minutes class is 2 PM Weds LSS 240.

Overall course objectives:

The course encompasses foundational material for the study of Molecular and Cellular Biology. It will be one of three core courses required for the MCB major. The focus will be on the fundamental concepts governing the interaction of biological macromolecules required for the central dogma of molecular biology: DNA > RNA > protein. Topics to be covered: DNA structure, replication, RNA transcription, structure, modification, processing and turnover, protein translation and modification. Protein-protein and protein-nucleic acid interactions required for these processes will be explored in-depth.

In addition to lectures, small group in-class activities will: 1) introduce concepts that are the basis of interaction in large molecular assemblies, 2) introduce molecular and cell biology concepts that put macromolecular assemblies in a biological context.

Learning outcomes:

1. Students will demonstrate understanding of the ways that chemical principles govern the ability of biological molecules to form cellular complexes. They will be able to describe and apply concepts governing the assembly and function of macromolecular assemblies, such as nucleosomes, polymerases, ribosomes and spliceosomes.

2. Students will be able to describe accurately the cellular context within which macromolecules operate, and how evolution drives diversity at the molecular and macromolecular assembly level.

3. Students will be able to readily identify, retrieve, display and manipulate atomic-level representations of macromolecules and macromolecular assemblies.

Required text:

Molecular Biology: Principles and Practice, Cox, Doudna, O'Donnell, W.H.Freeman 2nd edition 2015.

Special materials:

All students will need a laptop they can bring to Discussion section.

Course Prerequisites or Co-requisites:

Prior completion of MCB 181R and 181L; Prior completion of first-semester Organic Chemistry, CHEM 241A and 243A.

Grading scheme:

There are four grading components to this course: quizzes (pre-class online AND in-class on paper), in-class clicker questions, discussion participation, and exams.

Pre-class quizzes: Due prior to most Monday and Wednesday 10 AM class periods, except the days before exams, 10 pts x 22 classes. Scores from top-scoring 18 quizzes will be totaled. Max score = 180.

Before every 10 AM class, there will be assigned reading from the text and/or an online lecture. A short set of questions based on the reading and lecture will be available online in D2L. Acceptance of quiz answers will close in D2L when class begins.

In-class quizzes: On most Friday 10 AM class periods, there will be an in-class quiz. These quizzes will cover the reading and lecture for the day (3 questions) and one repeat question from the Monday and Wednesday quizzes from the same week. 10 pts x 11 classes. Scores from top-scoring 9 quizzes will be totaled. Max score = 90.

In-class clicker questions: There will be 1-3 clicker questions/10 AM during class periods focused on the major concept(s) of the lesson and distributed throughout the 50 minute period. You will receive 5 participation points/period if you answer all of the questions asked that day; correct answers not required for receiving points. No clicker Q's on in-class quiz days. 5 pts x 30 classes. Top-scoring 24 sessions will be totaled. Max score = 120.

Discussion sections: Fridays at 2 or 3 PM. Points will be given by the instructors for attendance and **ACTIVE**participation. 15 pts x 15 classes. Top-scoring 12 sessions will be totaled. Max score = 180.

Exams: There will be a total of three 100-point exams: an exam given at the end of each multi-week module. A Final exam will be given during the assigned Final exam time at 10:30 AM Friday May 5 in ILC 141. The Final exam will cover the last module (100 points) and include a comprehensive section covering all course material (100 points). Max score = 500. There are **NO** make-up exams.

Course grades: Total possible points: 1070. Grades will be assigned as follows based on total points: A = 90% of total points or higher, B = 80%, C = 70%, D = 60%, E = less than 60%. Points required for each grade may be adjusted at the end of the semester by the professor, but only to a lower value. These values will be posted.

Assessments and bonus points: There will be two approximately half-hour assessments given to measure acquisition of core course concepts. These assessments are required by MCB and the UA. One assessment will be given just after the second exam and one the Friday before the last week of class. 5 pts extra will be awarded for scoring 50-69%, 10 pts for scoring 70-79%, 15 pts for scoring 80% or better. These possible total **30 bonus points** can be used to enhance your course point total **AFTER grade cutoffs are assigned**, i.e. move grade level up if the total is just below the cutoff. The bonus points are offered as an incentive to try as hard as you can on the assessments.

Policies:

Attendance:

Attendance is required. Attending class is vital to the learning process. As such, attendance is required at all morning classes and afternoon discussion section meetings. Students who miss class due to illness or emergency are required to bring documentation from their healthcare provider or other

relevant, professional third parties. Failure to submit third-party documentation will result in unexcused absences.

All holidays or special events observed by organized religions will be honored for those students who show affiliation with that particular religion. Absences pre-approved by the UA Dean of Students (or Dean's designee) will be honored.

See: http://uhap.web.arizona.edu/policy/appointed-personnel/7.04.02

Tardiness and leaving early is enthusiastically discouraged. If you must arrive late or leave early occasionally, please join your group as quickly and unobtrusively as possible, and join in the day's lesson without disrupting the process.

Behavior:

Civil interaction is encouraged at all times between all course students, TA's, and preceptors. Phone/laptop use will be allowed for course-related activity only.

Grading:

All exams will be copied before they are returned to students with a grade. There will be no re-grading of homework. If you want to have your exam re-graded, return it within one week of receiving the graded exam with a written explanation of what you want re-graded and why. I will grade the entire exam again.

Student Code of Academic Integrity

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog.
See: http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity.

The University Libraries have some excellent tips for avoiding plagiarism available
at: http://www.library.arizona.edu/help/tutorials/plagiarism/index.html.

Threatening behavior will not be tolerated as outlined:

http://policy.web.arizona.edu/threatening-behavior-students

Disabled students:

It is a goal of the University that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcome to contact Disability Resources (520-621-3268) to establish reasonable accommodations.

Confidentiality of Student Records:

Student records are held confidentially. To see the University's confidentiality policy, see http://www.registrar.arizona.edu/ferpa/default.htm

Additional Resources for Students:

UA Non-discrimination and Anti-harassment
policy: http://policy.arizona.edu/sites/default/files/Nondiscrimination.pdf

UA Academic policies and procedures are available at:
http://catalog.arizona.edu/2015-16/policies/aaindex.html

Student Assistance and Advocacy information is available at:

http://deanofstudents.arizona.edu/student-assistance/students/student-assistance

Change to syllabus:

The information contained in the course syllabus, other than the grade and absence policies, may be subject to change with reasonable advance notice, as deemed appropriate by the instructor.