

**MCB 330 Critical Reasoning and Problem Solving in Biomedicine
Fall 2020**

**MCB 330 Critical Reasoning and Problem Solving in Biomedicine
Fall 2020 Thursday 11-11:50 AM via Zoom or (when possible) in Manuel Pacheco ILC, Rm 140
1 unit**

Instructor Information Lisa Rezende, PhD Associate Professor of Practice Department of Molecular and Cellular Biology University of Arizona	Contact Information Please contact me by email (lrezende@arizona.edu). I generally respond within 24 hours on weekdays; 48 hours on weekends. Instructor Availability <ul style="list-style-type: none">• Open Zoom Drop-in Hours: Wednesdays 12 PM – 1 PM (link on D2L)• Available by appointment for students who wish to chat privately
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Course Description

Students will read and analyze primary scientific literature on a variety of topics in molecular and cellular biology that apply to biomedicine. Students will practice solving problems based on authentic experimental data.

Course Delivery

This class is scheduled to be taught in the **IN-PERSON modality**.

Meeting times for remote teaching: MCB 330 is a phase 3 course. We will be meeting remotely until the University notifies us that in-person meetings of phase 3 courses may commence. During remote learning, we will meet on Thursdays at 11 AM via Zoom to work on group activities.

Meeting times and patterns for in-person teaching: When the COVID-19 situation permits your instructor teaching on campus, students may elect to attend in person in **Manuel Pacheco ILC, Rm 140** or via Zoom. I will be present in the classroom and I will have a learning assistant helping me run the Zoom meeting simultaneously .

Remain flexible: If pandemic conditions warrant, the University may require that we return to remote operations. If that is the case, we will notify you by D2L Announcement and email that we are moving to remote operations.

Remote / online only after Thanksgiving: After the Thanksgiving holiday, we are scheduled to move back to remote teaching.

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Course prerequisites

The course is open only to declared MCB majors who have completed MCB 181R.

Required Course Materials

- All course readings will be posted to the course D2L site.
- Templates for in-class literature analysis will be available on D2L. Please print copies or copy onto paper for use in class.
- Students attending in-person sessions should bring their own paper and writing implement or a computer to complete in-class assignments.
- Students attending remotely should be prepared to work on in-class assignments at the same time they are in the Zoom session (either on paper or on their computer).

Course Objectives and Expected Learning Outcomes:

In this course, students will:

- Read and critique primary research articles in biomedical research
- Participate in small group discussions of biomedical literature
- Solve problems using authentic data
- Write critical analysis of biomedical research

Upon successful completion of MCB 330, students will be able to:

Course Outcome	Aligns with MCB Program Outcome
Read and critique biomedical literature	Read and interpret primary scientific literature in cell and molecular biology, linking the results to prior understanding of biological processes.
Analyze authentic data from biomedical research	Apply analytical thinking to biological problems.
Develop testable hypotheses, predictions, and models from biomedical data.	Apply analytical thinking to biological problems.
Write short paper analyzing biomedical research	Communicate effectively about scientific ideas and methods.

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Tentative Schedule of Topics and Activities

Date	Discussion Topic	What you need to do <u>before</u> class
August 27th	Introduction to course- Reading primary literature	<ul style="list-style-type: none"> • Read: Course syllabus • Optional Reading: Scientific Papers from Scitable by Nature Education
September 3rd	Viral growth and inhibition	<ul style="list-style-type: none"> • Read: Salgado-Venvindo, C et al., "Suramin Inhibits SARS-CoV-2 Infection in Cell Culture by Interfering with Early Steps of the Replication Cycle," <i>Antimicrobial Agents and Chemotherapy</i>, 64 (8): e0090020, (August 2020). • Complete: Reading quiz by Wednesday, September 2nd at 9 PM Arizona time.
Sunday, September 6th: Last day to drop <u>without</u> a grade of W		
September 10 th	Enzyme Inhibition	<ul style="list-style-type: none"> • Read: Gordon, CJ, "The antiviral compound remdesivir potently inhibits RNA-dependent RNA polymerase from Middle East respiratory syndrome coronavirus," <i>Journal of Biological Chemistry</i>, 2020, 295: 4773-4779. • Complete: Reading quiz by Wednesday, September 9nd at 9 PM Arizona time.
September 17 th	Interaction with cell surface proteins	<ul style="list-style-type: none"> • Read: Hoffman, M, et al., "SARS-CoV-2 cell entry depends on ACE2 and TMPRSS2 and is blocked by clinically proven protease inhibitor," <i>Cell</i>, 181: 271-280 (April 2020). • Complete: Reading quiz by Wednesday, September 16th at 9 PM Arizona time.
Problem Set #1 Due Wednesday, September 23rd at 9 PM Arizona time		
September 24 th	Problem Solving Day #1	<ul style="list-style-type: none"> • Complete: Problem Set #1 by Wednesday, September 23rd at 9 PM Arizona time.
October 1 st	RNA interference	<ul style="list-style-type: none"> • Read: Fire, A, et al., "Potent and specific genetic interference by double-stranded RNA I

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		<p><i>Caenorhabditis elegans</i>," <i>Nature</i>, 391: 806-811 (1998).</p> <ul style="list-style-type: none"> • Reading quiz due by Wednesday, September 30th at 9 PM Arizona time.
October 8 th	Gene Editing	<ul style="list-style-type: none"> • Read: Jinek, M. et al., "A programmable dual-RNA-guided DNA endonuclease in adaptive bacterial immunity," <i>Science</i> 337: 816-821 (2012). • Complete: Reading quiz due by Wednesday, October 7th at 9 PM Arizona time.
October 15 th	TBD	<ul style="list-style-type: none"> • Read: TBD • Complete: Reading quiz
Problem Set #2 due by Wednesday, October 21st at 9 PM Arizona time		
October 22 nd	Problem Solving #2	<ul style="list-style-type: none"> • Complete: Submit Problem Set #2 by Wednesday, October 21st at 9 PM.
October 29 th	Hormone Action	<ul style="list-style-type: none"> • Read: Liu, P, et al., "Blocking FSH induces thermogenic adipose tissue and reduces body fat," <i>Nature</i>, 546: 107-112 (2017). • Complete: Reading quiz by Wednesday, October 28th at 9 PM Arizona time.
Sunday, November 1st: Last day to drop with a grade of W (also Daylight Savings Time ends for most of the country, be sure to adjust your schedule if you are attending remotely from another state)		
Paper Selection for Final Project due Monday, November 2nd at 7 AM Arizona time		
November 5 th	Meiosis	<ul style="list-style-type: none"> • Read: Holubcova, et al., "Error-prone chromosome-mediated spindle assembly favors chromosome segregation defects in human oocytes," <i>Science</i>, 2015, 345: 1143-1147. • Complete: Reading quiz by Wednesday, November 4th at 9 PM Arizona time.
November 12 th	Chromatin Remodeling	<ul style="list-style-type: none"> • Read: Chakraborty, AA et al., "Histone demethylase KDM6A directly senses oxygen to control

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		<p>chromatin and cell fate," <i>Science</i>, 363: 1217-1222 (2019).</p> <ul style="list-style-type: none"> • Complete: Reading quiz by Wednesday, November 11 at 9 PM Arizona time.
Problem Set #3 due by Wednesday, November 11th at 9 PM Arizona time		
November 19 th	Problem Solving #3	<ul style="list-style-type: none"> • Complete: Submit Problem Set #2 by Wednesday, November 11th at 9 PM.
Thursday, November 26 th Thanksgiving (no class)		
Rough analysis of final project paper due by Wednesday, December 2nd at 7 AM Arizona time		
December 3 rd	Final Paper: Partner Discussion	<ul style="list-style-type: none"> • Read: Partner's article • Complete: Reading Quiz by Wednesday, December 2nd at 9 PM Arizona time.
Final Exam December 15th: Turn in final project by 12:30 PM Arizona time		

Class attendance and participation

Participating is vital to the learning process. As such, participating in the course activities during the week they are assigned is critical. **You may opt to attend via Zoom rather than in-person at any time.**

- If you feel sick or may have been in contact with someone who is infectious, stay home. Except for seeking medical care, avoid contact with others and do not travel.
- Notify your me (lrezende@arizona.edu) if you will be missing an in-person or Zoom session of the course.
- Campus Health is testing for COVID-19. Please call (520) 621-9202 before you visit in person.
- Visit the University of Arizona's COVID-19 page for regular updates.

The UA's policy concerning Class Attendance and Administrative Drops is available at: <https://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop>

The UA policy regarding absences on and accommodation of religious holidays is available at <http://deanofstudents.arizona.edu/religiousobservanceandpractice>

Absences pre-approved by the UA Dean of Students (or Dean designee) will be honored. Available at: <https://deanofstudents.arizona.edu/faqs> See "Absences" section.

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Required Course Activities

Reading Quiz: Students will complete a quiz on D2L on that week's assigned paper to check their understanding and help them prepare for class. Quizzes are due before class. Each quiz may be taken twice with the highest score counting towards the student's grade. The lowest quiz score will be dropped. If a student misses a quiz for any reason, that will be the score which is dropped.

Problem Set: Students will complete three problem sets where students will analyze experimental data. The class period after the problem set are due, students will discuss the problem sets in class. The lowest problem set score will be dropped. If a student misses a problem set for any reason, that will be the score which is dropped.

In-class Paper Analysis: Students will work in groups of 3-4 each class period to analyze that week's paper. The group will turn in an analysis of the paper. All members of the group who are in class that day will earn the same score. The lowest score of the semester will be dropped. If a student is absent for any reason, they may complete the paper analysis on their own and turn it in by the following Monday for credit.

Reflections: Students will complete periodic reflections on their learning. These reflections will be graded on completion only.

Final Project: The final exam for this course will be a critical analysis of a paper of your choosing. There are three deliverables for this project: 1) paper choice, 2) rough analysis, 3) final analysis. The analysis will be due on the date of the final exam. Grading rubric will be available in class.

Grading Scale and Grade Policies

Grades will be based on

Item	Weight
In-class paper analysis (lowest score dropped)	25% of final grade
Reading quizzes (lowest score dropped)	30% of final grade
Problem Sets (3 total, lowest score dropped)	20% of final grade
Reflections	5% of final grade
Final Project milestones and paper	20% of final grade

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Grades will be awarded as follows:

<i>Grade</i>	<i>Points</i>
A	90-100% of possible points
B	80-89.9% of possible points
C	70-79.9% of possible points
D	60-69.9% of possible points
E	59.9% or fewer of possible points

Requests for incomplete (I) or withdrawal (W) must be made in accordance with University policies, which are available at <http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete> and <http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal> respectively.

Late Assignments Policy

If you are unable to turn in an assignment or complete a quiz on time, please contact Dr. Rezende (lrezende@arizona.edu) as soon as possible so we can discuss the situation and develop a plan to help you complete the course successfully.

Extra credit policy: From time-to-time small number of extra-credit points may be available to students for work that goes beyond the normal requirements of the class. Dr. Rezende will announce when these are available, and at all times the opportunity will be available to the entire class. ***Please do not contact Dr. Rezende requesting an extra credit assignment.***

Syllabus, Schedule, and Assignment Changes

Information contained in the course syllabus, other than the grade and absence policies, may be subject to change.

Course Policies

Face coverings are required in our classroom

Per the University of Arizona's Administrative Directive, face coverings that cover the nose, mouth, and chin are required to be worn in all learning spaces at the University of Arizona (e.g., in classrooms, laboratories and studios). Any student who violates this directive will be asked to immediately leave the learning space and will be allowed to return only when they are wearing a face covering. Subsequent episodes of noncompliance will result in a Student Code of Conduct complaint being filed with the Dean of Students Office, which may result in sanctions being applied. The student will not be able to return to the learning space until the matter is resolved.

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The Disability Resource Center is available to explore face coverings and accessibility considerations if you believe that your disability or medical condition precludes you from utilizing any face covering or mask option. DRC will explore the range of potential options as well as remote course offerings. Should DRC determine an accommodation to this directive is reasonable, DRC will communicate this accommodation with your instructor.

Physical distancing is required in our classroom: During our in-person class meetings, we will respect CDC guidelines, including restricted seating to increase physical distancing and appropriately-worn face coverings. Per University of Arizona's Administrative Directive, face coverings that cover the nose, mouth, and chin are required to be worn in all learning spaces at the University of Arizona (e.g., in classrooms, laboratories and studios). Any student who violates this directive will be asked to immediately leave the learning space and will be allowed to return only when they are wearing a face covering. Subsequent episodes of noncompliance will result in a Student Code of Conduct complaint being filed with the Dean of Students Office, which may result in sanctions being applied. The student will not be able to return to the learning space until the matter is resolved.

Class Recordings

For lecture recordings, which are used at the discretion of the instructor, students must access content in D2L only. Students may not modify content or re-use content for any purpose other than personal educational reasons. All recordings are subject to government and university regulations. Therefore, students accessing unauthorized recordings or using them in a manner inconsistent with the University of Arizona's values and educational policies are subject to suspension or civil action.

Academic advising

If you have questions about your academic progress this semester, or your chosen degree program, please note that advisors at the Advising Resource Center can guide you toward university resources to help you succeed.

Life challenges

If you are experiencing unexpected barriers to your success in your courses, please note the Dean of Students Office is a central support resource for all students and may be helpful. The Dean of Students Office can be reached at 520-621-2057 or DOS-deanofstudents@email.arizona.edu.

Physical and mental-health challenges

If you are facing physical or mental health challenges this semester, please note that Campus Health provides quality medical and mental health care. For medical appointments, call (520-621-9202. For After Hours care, call (520) 570-7898. For the Counseling & Psych Services (CAPS) 24/7 hotline, call (520) 621-3334.

Code of Conduct

Please review the University's Code of Conduct information, which can be found at:
<https://deanofstudents.arizona.edu/policies-codes>

Classroom Behavior

The Arizona Board of Regents' Student Code of Conduct, ABOR Policy 5-308, prohibits threats of physical harm to any member of the University community, including to one's self.

Disruptive Student Behavior

Students are expected to be familiar with the UA Policy on Disruptive Student Behavior in an Instructional Setting found at:

<http://policy.arizona.edu/education-and-student-affairs/disruptive-behavior-instructional-setting>

Threatening Student Behavior

The University of Arizona seeks to promote a safe environment where students and employees may participate in the educational process without compromising their health, safety or welfare. The Arizona Board of Regents' Student Code of Conduct, ABOR Policy 5-308, prohibits threats of physical harm to any member of the university community, including to one's self. Threatening behavior can harm and disrupt the University, its community and its families.

Threatening behavior means any statement, communication, conduct or gesture, including those in written form directed towards any member of the university community that causes a reasonable apprehension of physical harm to a person or property. A student can be guilty of threatening behavior even if the person who is the object of the threat does not observe or receive it, so long as a reasonable person would interpret the maker's statement, communication, conduct or gesture as a serious expression of intent to physically harm. You are encouraged to read more on this at:

<http://deanofstudents.arizona.edu/accountability/disruptive-student-behavior>

The Policy on Threatening Behavior by Students found at:

<http://policy.web.arizona.edu/education-and-student-affairs/threatening-behavior-students>

Student Code of Academic Integrity

Academic Integrity at the University of Arizona is the principle that stands for honesty and ethical behavior in all homework, tests and assignments. All students should act with personal integrity and help to create an environment in which all can succeed.

Dishonesty will not be tolerated in this course. This includes, but is not limited to, cheating, plagiarizing, fabricating information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students. Students who are found to be dishonest will be reported to the Dean of Students Office and receive a sanction, such as a failing grade on the assignment, exam, and/or in the course. Students with questions on this policy should refer to the UA Code of Academic Integrity, available at: <http://deanofstudents.arizona.edu/policies-and-codes/code-academic-integrity>

Plagiarism

This course will be using Turnitin, a plagiarism detection software, for some assignments.

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

Discrimination and Harassment

Policies against discrimination and harassment, along with offices for reporting concerns related to discrimination or harassment, <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

Communication

You are responsible for reading emails sent to your UA account from your professor's UA account and the announcements that are placed on the course D2L site. Information about readings, news events, your grades, assignments and other course related topics will be communicated to you with these electronic methods. The official policy can be found at: <http://www.registrar.arizona.edu/emailpolicy.htm>

Accessibility and Accommodations

At the University of Arizona, we strive to make learning experiences as accessible as possible. If you anticipate or experience barriers based on disability or pregnancy, please contact the Disability Resource Center (520-621-3268, <https://drc.arizona.edu/>) to establish reasonable accommodations.

Grievance Policy

Should a student feel he or she has been treated unfairly there are a number of resources available. With few exceptions, students should first attempt to resolve difficulties informally by bringing those concerns directly to the person responsible for the action, or with the student's graduate advisor, Assistant Dean for Student and Alumni Affairs, department head, or the immediate supervisor of the person responsible for the action. If the problem cannot be resolved informally, the student may file a formal grievance. Information can be found at: <http://deanofstudents.arizona.edu/policies-and-codes/code-academic-integrity>

University Final Grade Appeal Policy

<http://catalog.arizona.edu/2015-16/policies/gradappeal.htm>

Notice of Potentially Objectionable Materials

As this is a biology course, we will be discussing biological evolution in a scientific manner.

Confidentiality of Student Records

Family Educational Rights and Privacy Act of 1974 (FERPA) is the federal law that governs the rights of students and institutional responsibilities with respect to student records. FERPA is a federal law designed to protect the privacy of a student's educational record. More details on what FERPA is about and specifics of what constitutes an Education Record can be accessed at: <http://www.registrar.arizona.edu/ferpa/default.htm> . If you have any questions regarding any of the information provided on this site, please contact the University of Arizona Office of the Registrar via email: reghelp@email.arizona.edu.