



**SYLLABUS**  
**MCB 411: Molecular Biology**  
**Seven Week Summer II 2021: July 6<sup>th</sup> – August 20<sup>th</sup>**

**Instructor Information**

Lisa Rezende, Ph.D. Associate Professor of Practice Molecular & Cellular Biology	
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Phone: (520) 621-9729	Greeting: Dr. Rezende (she/her)

**Catalog Description**

**Course Description**

**Course Delivery**

This section is a 100% online course with no required Zoom meetings.

**Course Prerequisites**

MCB 181R or equivalent Introductory Biology course. Students who are concerned with the course pre-requisites are strongly encouraged to contact Dr. Rezende ([lrezende@email.arizona.edu](mailto:lrezende@email.arizona.edu)) to discuss your background in science courses and determine if it is adequate to support your success in MCB 411.

**Course Time Commitment and Online Attendance**

MCB 411 is an accelerated 3-unit semester-long course. The entire course is completed over 7 weeks. As University policy defines one unit of credit as at least 45 hours combined in-class and out of class work, you will be expected to put in at least 135 hours of work and study time or roughly **18-19 hours per week**. Students concerned with this time commitment should contact the instructor as soon as possible.

The course is organized into seven one-week modules. MCB 411 is what is known as a "guided" online course, and it provides structure so you will not get too far behind. **You**

**will not be working at your own pace.** Instead, every student enrolled in the course will be in the same unit at the same time. Discussion of the course material is a critical component of this online course, so we need to go through this together. Extended absences from the online course are not allowed except in cases where you have contacted the instructor **and** have a University- recognized excused absence. **Not checking into the course over a one-week period without first notifying the instructor will be considered an unexcused absence and any work due over that time cannot be made up.**

**Course Objectives and Expected Outcomes**

In this course, you will:

- Explore the molecular biology that underlies the storage and dissemination of genetic information.
- Apply concepts in molecular biology to novel problems
- Read annotated primary research papers in molecular biology

<b>Upon successful completion of the MCB411, you will be able to:</b>	<b>Which aligns with University of Arizona outcomes:</b>
Relate the structure of different nucleic acids to their biological functions.	Raise salient questions about the evidence, inferences, and conclusions of inquiries, including one’s own inquiries
Describe how gene expression is controlled in eukaryotes.	Raise salient questions about the evidence, inferences, and conclusions of inquiries, including one’s own inquiries
Discuss how the structure and composition macromolecular complexes relate to their biological functions.	Raise salient questions about the evidence, inferences, and conclusions of inquiries, including one’s own inquiries
Interpret data obtained using standard molecular biology techniques.	Exercise synthetic, analytic and/or computational/quantitative reasoning as needed to solve problems.
Evaluate evidence that underscores our understanding of molecular biology.	Infer and assess the ambiguities, assumptions, values, and purposes at issue in inquiries, including one’s own work.

Apply your understanding of DNA replication, repair, and gene expression to human disease.	Exercise synthetic, analytic and/or computational/quantitative reasoning as needed to solve problems.
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## Required Materials

### Inclusive Access Text and Online Support Materials

The course textbook and online activities are being delivered digitally via D2L through the Inclusive Access program. The textbook for the course is *Essential Cell Biology* with Smart works, by Bruce Alberts, and colleagues. The cost to students is \$74.38. **Note: You will be required to access weekly materials/exercises/activities on Smart works and completion of these assignments will count toward your grade for this course.**

Please access the material through D2L on the first day of class to make sure that there are no issues with delivery so any problems can be addressed quickly.

You automatically have access to the course materials FREE through **Tuesday, July 13th , 2021.**

You **must** take action (even if you have not accessed the materials) to opt-out if you do not wish to pay for the materials and choose to source the content independently. **The deadline to opt-out is July 13th. If you do not opt-out and choose to retain your access, the cost of the digital course materials will appear on your Bursars account.**

Please refer to the Inclusive Access FAQs at <https://shop.arizona.edu/textbooks/Inclusive.asp> for additional information.

### **Course Website and Electronic Communications Policies**

All course materials are available on the course website, <http://www.d2l.arizona.edu>. **To access the class website, you must be enrolled as a student in this section of the course.**

- **You should check the D2L site daily for announcements regarding the class, shown on the class home page.**
- D2L provides a convenient way for us to get in touch with you by email, and I will use email if I need to contact you. **D2L sends email to your “@email.arizona.edu” address. If you do not check this email account, please forward your UA email to the account you do check regularly.** I will not email you with routine course announcements, but only if there are significant, time-sensitive issues that need to be addressed.
- Please note that it is considered a violation of academic integrity for students to use the email function of D2L for their personal gain. For example, if you have

posted your class notes at a third-party site, you may not use D2L email as a way to advertise this to your fellow students. Furthermore, be advised that it is a violation of copyright to distribute course materials in this way.

- The D2L gradebook will be the official list of your scores for all work in the class.
- **It is your responsibility to check your grades frequently to ensure that the scores recorded in D2L are correct.**

### Contacting the Instructor

- **Course-related questions should be asked in the Virtual Office in D2L.** Examples of this type of question might include:
  - course logistics such as “When will week 3 open?”
  - issues with course components such as “The link to the video in week two isn't working,”
  - questions on course content such as “What happens if a mutation occurs at a splice acceptor site?”

By posting these questions to virtual office the entire class benefits from the question and answer (just as would occur in a face-to-face course).

- **If you have questions you wish to ask privately** (for example, something about your grade, or if you would like to schedule an office hour), the best way to contact me is email [lrezende@arizona.edu](mailto:lrezende@arizona.edu)
- **I make every effort to respond to all emails within 24 hours during the week, or 48 hours over the weekend.** Please understand that just like you, I have other responsibilities besides this class so my response may not be immediate. **If you have emailed me and haven't gotten a response within 24 hours on Monday-Friday, please contact me again!**

### Grading Scale and Grade Policies

In this course, I will give you two options to calculate your grade. The first is standard grading with homework, participation, and exams. The second is exams, discussions, and only.

**Option One:** Recommended for students who wish to lower the stakes of their exams and like to complete several practice assignments.

Gradable Item	Percent of Grade
Exams (4 total, drop lowest score)	45%
Weekly Smart works Assignments	20%
Discussions (8 total, drop lowest score)	25%
Playposit Participation (drop lowest 5 scores)	7%
Syllabus Quiz	1%
Final Course Reflection	2%
	100%

**Option Two:** Option for students who prefer to plan their own study and weight the exams more heavily in their grade.

Gradable Item	Percent of Grade
Exams (4 total, drop lowest score)	72%
Discussions (8 total, drop lowest score)	25%
Syllabus Quiz	1%
Final Course Reflection	2%
	100%

Your final grade will be based on the weighted percentage above, with minimum grade cutoffs as follows:

Grade	Points
A	90%-100%
B	80%-89.9%
C	70%-79.9%
D	60%-69.9%
E	59.9% or below

I will calculate grades using both option 1 and option 2 and give you the higher of the two grades. In general, grades in this course are not curved.

### **Incompletes and Withdrawals**

A grade of Incomplete (I) will only be given at the end of the term in the case of an emergency when a minor portion of the coursework cannot be completed. The student must contact the instructor before the end of the semester to agree on an incomplete grade contract using the Report of an Incomplete forms as described in the [University of Arizona Course Catalog](#).

Requests for withdrawals must be made in accordance with [university policies](#). The last day to drop the course without receiving a grade of W is **July 11<sup>th</sup>** after this date all students withdrawing from the course will receive a grade of W. The last day to withdraw through UAccess is **August 8<sup>th</sup>**. After that date, students will need to file a [Late Change Petition](#) to withdraw from the course. Dates are set by the [university calendar](#) and cannot be changed by the instructor

## Gradable Items

**Smart works Homework (10 points each, drop lowest scores):** Each week, I will assign a homework assignment from Smart works based on that week's reading and lecture. These questions will allow you to practice the types of questions that you will see on the exams.

**Class Participation through Playposit (5 points each, drop lowest 5 scores):** I do not tape long lectures on the material each week as research shows actively engaging with the material promotes learning more than passively listening to a lecture. I do know that some concepts in this course are challenging for students to understand, so rather than taping long lectures I have a series of short tutorials using Play posit, which allows me to explain complicated concepts then present questions and problems. You are required to participate by responding to these prompts within each Play posit. I will drop your lowest five scores. This will allow you to skip some without it adversely affecting your grade.

**Discussion (10 points each, drop lowest score):** Each week we will have at least one asynchronous discussion where you will work together on problems that are similar to what you will see on the exams. Both responses to the discussion prompt and responses to a peer are required to receive full credit. I will drop your lowest score.

**Exams (100 points, drop the lowest scores):** Exams will be cumulative up to and including material presented in the week that the exam is scheduled. I highly recommend you finish all activities and assignments for the week **before** taking the exam. I will drop the lowest **score** from your four exams from your final grade. If you are unable to take the exam for any reason, you will earn a score of 0 and that will be the score that I drop.

**An important note on exams and academic integrity:** As this is an online course, I am allowing you to schedule the exam over a 2-day period rather than all taking it at one time. **Discussing any aspects of the exam** including but not limited to topics on the exam, exam format, specific questions, or any other aspect **will be considered a violation of the code of academic conduct for all parties involved in the discussion** (including the person who has already completed the exam), will be reported to the Dean of Students Office and will receive a sanction, such as a failing grade on the assignment, exam, and/or in the course. **You may not take screenshots of questions or post questions on the Internet. Any posting of exam questions on sites including but not limited to Chegg or CourseHero will be reported.** 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>

## **Exam Schedule**

All exams are open for 48 hours. Once you open the exam, you will have 60 minutes to complete it. If you have exam accommodations through the DRC, please be sure to place a request for this course so the information is released to me.

<b>Exam</b>	<b>Points</b>	<b>Time to Complete</b>	<b>Dates Exam is open (Note: All in Arizona time)</b>
Week Exam 1	100 points	60 minutes	Sunday, July 18 <sup>th</sup> at 7 AM – Wednesday, July 21 <sup>st</sup> at 7 AM
Week Exam 2	100 points	60 minutes	Sunday, August 1 <sup>st</sup> - Wednesday, August 4 <sup>th</sup>
Week Exam 3	100 points	60 minutes	Sunday, August 15 <sup>th</sup> – Wednesday, August 18 <sup>th</sup>
Week Exam 4	100 points	60 minutes	Friday, August 20 <sup>th</sup> – Sunday, August 22 <sup>nd</sup>

**Exams must be completed by the last day it is officially opened, or a score of 0 will be recorded unless the exam has been officially rescheduled BEFORE the exam date.**

**As a course policy, exams will not be rescheduled except as follows:** Absences pre-approved by the UA Dean of Students (or Dean's designee) will be honored, and students will be allowed to reschedule exams if they have a Dean-approved absence. Exams that fall on holidays or special events observed by organized religions will be rescheduled for students who show affiliation with that particular religion.

### **Grade Appeals**

If you believe that an error has been made in grading, you must contact Dr. Rezende **within one week** after the scores are posted. Turning in a re-grade request does not guarantee that you will receive more points, and your entire assignment or exam will be graded again.

### **Extra Credit**

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. You may earn up to 1% of your grade in extra credit. ***Please do not contact Dr. Rezende requesting an extra credit assignment.***

### **Late Work**

Late work will be accepted provided you contact Dr. Rezende as soon as possible and preferably **before** the due date. Assignments that are more than 2 days late will receive a score of 0 **unless previous arrangements have been made with Dr. Rezende.** For each class of gradable item, the lowest score will be dropped.

**Late exams will not be accepted without prior arrangements with Dr. Rezende.**

**Syllabus, Schedule, and Assignment Changes**

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

**Tentative Course Schedule**

<b>Week</b>	<b>Topics and Reading</b>
Week 1: July 6 <sup>th</sup> - July 12 <sup>th</sup>	DNA and Chromosomes <ul style="list-style-type: none"> <li>• Review: Chapters 1 (Cells), Chapter 2 (Chemical Composition of Cells) and Chapter 4 (Protein Structure and Function) sections “The Shape and Structure of Proteins,” “All Proteins Bind Other Molecules,” and “How Proteins are Studied.”</li> <li>• Read: Chapter 5 (DNA and Chromosomes)</li> <li>• Read: “The Structure of DNA” by Ron Vale on Xbio</li> <li>• Read: Ron Vale’s annotated version of Watson, J.D. and Crick, F.H.C. Genetic implications of the structure of deoxyribonucleic acid. Nature 1953;171:964–967.</li> </ul>
<b>Sunday, July 11<sup>th</sup> is the last day to drop <u>without</u> a grade of W and to opt-out of Inclusive access textbook.</b>	
Week 2: July 13 <sup>th</sup> – July 19 <sup>th</sup>	DNA Replication, Repair, and Recombination <ul style="list-style-type: none"> <li>• Read Chapter 6 (DNA Replication and Repair)</li> <li>• Read “How DNA Replicates” by Matthew Meselson and Franklin Stahl on Xbio</li> <li>• Read “Meiosis and Fertilization, and Genetics as an Experimental Tool from Chapter 19 (Sexual Reproduction and Genetics)</li> </ul>
Week 3: July 20 <sup>th</sup> – July 26 <sup>th</sup>	Accessing Genetic Information <ul style="list-style-type: none"> <li>• Read Chapter 7 (From DNA to Protein: How Cells Read the Genome)</li> <li>• Read: “Lighting up Biology- Expression of Green Fluorescence Protein” by Martin Chalfie and Ghia Euskirchen on Xbio</li> <li>• Read: Annotated version of M. Chalfie, Y. Tu, G. Euskirchen, W.W. Ward, and D.C. Prasher. Green fluorescent protein as a marker for gene expression. - Science 1994;263:802–80</li> </ul>



Week 4: July 27 <sup>th</sup> – August 2 <sup>nd</sup>	Regulating Gene Expression <ul style="list-style-type: none"> <li>• Read Chapter 8 (Control of Gene Expression)</li> </ul>
Week 5: August 3 <sup>rd</sup> – August 9 <sup>th</sup>	Molecular Biology Techniques <ul style="list-style-type: none"> <li>• Read: Chapter 10 (Analyzing the Structure and Function of Genes)</li> <li>• Read: “CRISPR-Cas: From Bacterial Adaptive Immunity to a Genome Editing Revolution,” by Rodolphe Barrangou</li> <li>• Read: Annotated version of Amoasli, L. Gene editing restores dystrophin expression in a canine model of Duchenne muscular dystrophy. <i>Science</i> 2018;362:86–91</li> </ul>
<b>Sunday, August 8<sup>th</sup> is the last day to withdraw through UAccess with a grade of W.</b>	
Week 6: August 10 <sup>th</sup> – August 16 <sup>th</sup>	Genetic Changes, Evolution, and Disease <ul style="list-style-type: none"> <li>• Read: Chapter 9 (How Genes and Genomes Evolve)</li> <li>• Read: Exploring Human Genetics in Chapter 19 (Sexual Reproduction and Genetics)</li> <li>• Read: Cancer in Chapter 20 (Cell Communities: Tissues, Stem Cells, and Cancer)</li> <li>• Read: The Genetic Basis of Cancer by J. Michael Bishop in XBio</li> <li>• Read: Annotated Version of Stehelin, D., Varmus, H.E., Bishop, J.M., and Vogt, P.K. (1976). DNA related to the transforming virus gene(s) of avian sarcoma viruses is present in normal avian DNA. <i>Nature</i>, 260: 170–173</li> </ul>
Week 7: August 17 <sup>th</sup> – August	Molecular Biology and You <ul style="list-style-type: none"> <li>•</li> </ul>

### Online Course Resources

The University of Arizona provides a wide variety of resources to help online students succeed, including:

**Online Tutoring:** UA THINK TANK provides free academic assistance for writing and math, and various other related subjects, at multiple locations and fully online. Students can access free tutoring in-person at the UA Think as well as fully online from the UA Think Tank. To find online tutoring hours, please see <http://thinktank.arizona.edu/tutoring/online>

**24/7 Technical Assistance:** Technical assistance is available 24 hours a day, with the exception of University observed holidays. 24/7 can help you with troubleshooting hardware, software, and any special course technology you are using. Available by phone, chat, or help ticket.

- Phone: (520) 626-TECH (8324)
- [24/7 Website](#)

**University Libraries:** The University Libraries provide resources, services, and expertise to the University and the local community. They support online students in particular with access to scholarly articles and journals, free ebooks, interactive tutorials and helpful research guides. Learn more about these resources and more on their site featuring tools for online students.

#### University Libraries for Online and Distance Students

#### **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.

#### **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](mailto: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.

#### **Course Policies**

#### **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 oneself.

### **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 oneself. 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>

### **Online Class Etiquette**

What is Netiquette? Simply stated, it's network etiquette -- that is, the etiquette of cyberspace. And "etiquette" means "the forms required by good breeding or prescribed by authority to be required in social or official life." In other words, Netiquette is a set of rules for behaving properly online. Please refer to this website to further your understanding of online class etiquette:

<http://www.albion.com/netiquette/introduction.html>

### **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>

### **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>

### **Absence and Class Participation Policies**

Participating is vital to the learning process. As such, it is critical that students participate in the course activities during the week they are assigned. If you anticipate being absent or are unexpectedly absent, please contact me as soon as possible.

*To request a disability-related accommodation to this attendance policy, please contact the Disability Resource Center at (520) 621-3268 or [drc-info@email.arizona.edu](mailto:drc-info@email.arizona.edu).*

If you are experiencing unexpected barriers to your success in your courses, the Dean of Students Office is a central support resource for all students and may be helpful. The Dean of Students Office is located in the Robert L. Nugent Building, room 100, or call 520-621-7057.

### **Accessibility and Accommodations**

It is the University's goal 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. For additional information on Disability Resources and reasonable accommodations, please visit <http://drc.arizona.edu>

### **Grievance Policy**

Should a student feel he or she has been treated unfairly there are some 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**

The University Final Grade Appeal Policy can be found here:  
<http://advising.arizona.edu/content/policies-procedures/petitions-grade-appeals>

### **Notice of Potentially Objectionable Materials**

As this is a biology course, we will be discussing biological evolution and sexual reproduction 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 <https://www.registrar.arizona.edu/personal-information/family-educational-rights-and-privacy-act-1974-ferpa>

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 at: [REG-reghelp@email.arizona.edu](mailto:REG-reghelp@email.arizona.edu).