



COURSE and TITLE: *Principles of Biology I (BIO 101)*

Instructor: Dr. Jessica Adams

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This course is being offered online asynchronously; however, I will be available via zoom for online “student” hours, help sessions, and individual appointments as needed (Please see Brightspace for more information). Email is the best way to communicate with me and I will respond within 24 hours (unless it’s the weekend – but even then, I’m usually quick to respond). I am here to help you – so please do not hesitate to reach out. Welcome aboard!

COURSE DESCRIPTION

Chemistry, structure, metabolism, and reproduction of cells. Principles of genetics. Structure, development, and physiology of animals. (Lecture 3 credits)

PREREQUISITES

Earned credit or concurrent enrollment in BIO 103 (Principles of Biology Laboratory).

COURSE LEARNING OBJECTIVES (CLO)

BIO 101 is the first of a two-course series on the principles of biology (BIO 101 & 102). The primary objective of this course is to teach basic biological concepts as they relate to the cell, the organism, and its application to your life. Consideration will be given to the cellular and chemical basis of life, genetics, evolution, animal form and function. Together these courses provide the biological fundamentals. To effectively do this, this course has the following broad learning goals:

- CLO1: Students will be able to recognize atomic structure in relation to chemical bonds, macromolecular structure, sub-cellular biochemical reactions, and the transfer of energy.
- CLO2: Students will be able to explain cellular division, transfer of genetic information, transmission of inherited characteristics, and how this contributes to the process of evolution.
- CLO3: Students will be able to identify the interrelationship between structure and function as it relates to animal systems.
- CLO4: Communicate clearly and in a way that reflects knowledge and understanding of biology and demonstrates the ability to adapt information to different applications.
- CLO5: Use both reflection and self-assessment to grow as a learner.
- Student Learning Objectives (SLO) for chapter specific learning outcomes are listed at the end of the syllabus and are available on Brightspace and within chapter lectures/PowerPoint.

DISCLAIMER: The contents of this syllabus are subject to change at the instructor’s discretion.

MAJOR STUDY UNITS

- Unit 1 “Intro – The Foundation”
 - Chapter 1: The Study of Life
 - Chapter 2: The Chemical Foundation of Life
 - Chapter 3: Biological Macromolecules
- Unit 2 “The Cell”
 - Chapter 4: Cell Structure
 - Chapter 5: Structure and Function of Plasma Membrane
 - Chapter 6: Metabolism
 - Chapter 7: Cellular Respiration
 - Chapter 10: Cell Reproduction
- Unit 3 “Genetics”
 - Chapter 11: Meiosis and Sexual Reproduction
 - Chapter 12: Mendel’s Experiment and Heredity
 - Chapter 14: DNA Structure and Function
 - Chapter 15: Genes and Proteins
- Unit 4 “Form & Function”
 - Chapter 33: Animal Form and Function
 - Chapter 35 Animal Nervous System
 - Chapter 43: Animal Reproduction

ESSENTIAL EQUIPMENT

To successfully complete this online course, you will need access to a computer with reliable, high-speed Internet access and appropriate system and software to support the Brightspace learning platform. Typical technical requirements for users are:

Windows 10 or higher 2 GB Ram 28.8 kbps modem (56k or higher recommended) SoundCard & Speakers External headphones with built-in microphone Mozilla Firefox 9.0 or higher	Mac OS 10.12 or higher 2 GB Ram 28.8 kbps modem (56k or higher recommended) SoundCard & Speakers External headphones with built-in microphone Mozilla Firefox 9.0 or higher; Safari 5.0 or higher
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Additional resources might also require Word 2007 (PC) 2011 (MAC) or newer, PowerPoint, Excel, and/or Adobe Acrobat Reader.

TECHNOLOGY REQUIREMENTS & RESOURCES

Computer access to the internet is required to successfully navigate this course. The course is delivered through the Brightspace Learning Management System (LMS), Zoom and Google Drive platform, which are a set of web applications designed to work with modern web browsers.

Recommended browsers (those with the most QA testing effort against them) are Google Chrome, Safari, and Mozilla Firefox. The mobile versions of these browsers also work well with most operations in Brightspace. Internet Explorer is not recommended.

To successfully complete this course, you will also need a working knowledge of Brightspace, Perusall, Zoom, and Google Drive. For help attaining these skills please refer to the tutorial links below.

- **Brightspace**
 - Account Access <https://brightspace.uri.edu>
 - Resource page <https://web.uri.edu/brightspace/>
 - Tutorials https://www.youtube.com/playlist?list=PLZz77ffBC33ltZ_XzSgohYHpzlo6T2xiE
 - Accessibility Information <https://www.d2l.com/accessibility/standards>
- **Perusall** (for Reading Annotations, as needed)
 - Account Access <https://www.perusall.com/>
 - Tutorials <https://www.youtube.com/watch?v=ODE6v4YOo0E>
 - Accessibility Information <https://support.perusall.com/hc/en-us/articles/360033993894-Accessibility-statement>
- **Zoom** (as needed)
 - Account Access <https://uri-edu.zoom.us/>
 - Tutorials https://youtube.com/playlist?list=PLZz77ffBC33kRvShf_m2hdmoelShm-Ewf
 - Accessibility Information <https://zoom.us/accessibility>
- **Google Drive** (as needed)
 - Account Access <https://drive.google.com/>
 - Tutorials <https://support.google.com/>
 - Accessibility Information https://support.google.com/drive/topic/2650510?hl=en&ref_topic=14940

REQUIRED TEXTS = FREE 😊!



Biology Textbook by OpenStax (2nd Edition) is licensed under Creative Commons Attribution License v4.0. Links on how to obtain the textbook for FREE can be found on Brightspace and accessed here: <https://openstax.org/details/books/biology-2e>

- Print copy (\$): ISBN-10:1-947172-51-4
- Digital copy (free): ISBN-10:1-947172-52-2
- iBooks (free): ISBN-10:1-947172-53-0

OpenStax Accessibility Statement: <https://openstax.org/accessibility-statement#:~:text=At%20OpenStax%2C%20we're%20committed,to%20the%20widest%20possible%20audience.>

INSTRUCTIONAL STRATEGIES – FULLY ONLINE ASYNCHRONOUS LEARNING

Much of the instruction for this course will be pre-recorded lectures. Chapter Power Points have been thoughtfully made to provide an effective framework to assist you in the lecture as well as with your studies. These Power Points, which include a list of student learning outcomes, made for each lecture, are available to you on Brightspace. For this online course, Brightspace is our “classroom.” Please refer to the [Brightspace YouTube video tutorials](#) before you get started and refer back to them as a resource as needed while you complete this course.

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GRADE POINT SYSTEM

A = 93%-100%	B = 83%-86%	C = 73%-76%	D = 60%-66%
A- = 90%-92%	B- = 80%-82%	C- = 70%-72%	F=59% and below
B+ = 87%-89%	C+ = 77%-79%	D+ = 67%-69%	

Performance accounts for 100% of your grade. Every member of the class can earn an “A” under this system. Percentage scores are not rounded up. **You must earn your grade.** There is no exception to this policy.

METHODS OF EVALUATION

Student Deliverables	Module	Points	CLO
Exam 1	Unit 1	75	CLO 1, SLOs for chapters 1, 2, 3
Exam 2 (two parts, one cumulative)	Unit 2	100	CLO 1-3, SLOs for chapters 4-7 & 10 plus cumulative from unit 1
Exam 3 (two parts, one cumulative)	Unit 3	125	CLO 1-3, SLOs for chapters 11,12,14, & 15 plus cumulative from units 1 & 2
Exam 4 (Final cumulative exam)	Unit 4	150	CLO 1-3, SLOs for chapters 33, 35, & 43 plus cumulative from units 1-3
Chapter Homework “quizzes” (lowest 2 dropped)	1 for each chapter	100	CLO 1-5, SLOs for each chapter
Discussion Forums (2 points each)	1 for each chapter + Introduction	30	CLO 4 & 5
Cultural Competency (1.5 extra credit points each)	1 per unit	6(EC)	CLO6
Total		580	

DESCRIPTION OF ASSESSMENTS

Exams: Four, unit exams will be administered throughout the semester on Brightspace. Exams are scheduled to be available according to the class schedule on Brightspace from 0800-2359. Please see the Brightspace calendar for exact dates. The exams will be timed (50 minutes) and consist of multiple choice and short answer questions based on the lecture material. Questions are completed one at a time without the option to return to previous questions. Exams are cumulative and increase in points through the semester.

Exam 1 Make Up Opportunity: If you earned less than a 70% on Exam 1, you have the option of completing a make-up exam to earn UP TO a 70%. To have access to the make-up exam, course modules on effective study strategies must be completed. More information will be announced on Brightspace after Exam 1.

Homework Assignments: Homework “quizzes” will be assigned on Brightspace for each chapter to ensure you are adequately meeting the course learning objectives.

Discussion Forums: will be available weekly on Brightspace. To create dialog with your classmates, I suggest completing your initial post by Wednesday and then respond to two of your group mates later in the week. These are graded on completion, not accuracy. The first discussion post “Introduce Yourself” will be your first interaction with the class. This will allow you to connect with me as well as your fellow classmates.

Cultural Competency: 4 extra credit opportunities, 1 per unit to gain knowledge, awareness, and skills related to cultural humility. There are several core competencies endorsed by the Association of American Medical Colleges (AAMC), Group on Student Affairs (GSA), and the Committee on Admission (COA) that are in demand for students applying to graduate programs or seeking employment. Cultural competence is one of them and the overall learning objectives desired are:

- demonstrate knowledge of socio-cultural factors that affect interactions and behaviors
- shows an appreciation and respect for multiple dimensions of diversity
- recognized and acts on the obligation to inform one's own judgement
- engages diverse and competing perspectives as a resource for learning, citizenship, and work
- recognizes and appropriately address bias in themselves and others
- interacts effectively with people from diverse backgrounds

ATTENDANCE AND OTHER CLASS POLICIES

- Monday of the first week is considered the first day of class for online instruction.
- In an online learning environment, “attendance” is measured by regular online participation and engagement—important components expected for student success. Online participation is evident through posting to a discussion board, completing quizzes, reading annotations, and other course-related assessments.
- This course is offered online asynchronously and therefore does not have set class meeting times. However, we will meet from time to time via zoom.
- Required first week meeting: Be on the lookout for a Brightspace announcement and sign-up sheet. This 15-minute meeting will be informal and allow us to connect so I may better support you on your educational journal.
- Any student who earns less than a 73% on an exam must meet with me. This will give us a chance to review the exam and discuss effective study strategies.
- Assessment due dates by 2359 (11:59pm for you non-military time folks 😊). Please refer to the Brightspace calendar for specific due dates.
- Late work is not accepted

COURSE NAVIGATION

The “Start here” module under the “content” tab in Brightspace will introduce you to the course and how it will operate. Within this module you will also make a discussion post, “Introduce Yourself”, where you will get your first opportunity to interact with your professor and fellow classmates. The course is then broken down by

chapter. Within each chapter module you will find the chapter learning objectives, reading materials, video lectures, chapter assessments, and additional resources.

EVOLUTION IN THE CURRICULUM

Evolution is the unifying theory of modern biology. In recognition of this fact, I make the inclusion of evolutionary themes in the biology curriculum a major priority. Where the course content is appropriate, processes and phenomena are presented from an evolutionary perspective.

"Nothing in Biology Makes Sense Except in the Light of Evolution" - Theodosius Dobzhansky, 1973

SELF DIRECTED LEARNING

I am an educator and I love my job. I believe in the power of education and desire to foster a love of learning in my students. To meet that end, I have designed this course (and its assignments) to teach you how to learn and provide you with the skills to become a self-regulated learner. (Ha – doesn't that sound like I am advocating a practice that will lead to my job becoming obsolete – Yikes! But it would be worth it :).)

Self-regulated learners are able to set goals for their learning (what do you want to learn?), use strategies to be successful in meeting those goals (we will cover many strategies this semester), and monitor and reflect on their learning progress in order to adjust their strategies as needed.

The bottom line is you are in the driver's seat, you control your learning – I am here to help you navigate.

ROAD TRIP!

MY COMMITMENT TO YOU

I am committed to quality teaching. This course is well organized, interactive, relevant, challenging, and the course objectives will be met. I need you to commit to the course as well. If there is anything I can do to make this course more relevant to you and your professional goals, please let me know. I encourage you to take advantage of my student "office" hours via zoom. I will help you in any way that I can.

Additionally, I am committed to reducing course material costs for my students as I strongly feel this is a social justice issue and I take it personally. As a student I worked year-round in order to pay for textbooks (booo!) and I do not want my students to have that burden. It's a bit of a challenge to provide high quality education without course material costs to students but I believe I have met that challenge (and rocked it if I do say so myself 😊). It is with great pride that this course is ZERO cost to students for course materials!! Thank you in advance for what I know is going to be a fantastic semester. I am glad you are a student in my class, and I am so excited to be on this biological exploration with you!

My advice: Learning is social! One of the best ways to become an active learner is to TALK about what you are learning. In all Adams-style classes, you are expected to communicate with your classmates. The more you engage with each other, the more you engage with the content. In an online class like this, the more people you are connect to, the more opportunities you will have to really cement the material into your new neural networks! There will be plenty of opportunities to engage with your peers - so please don't be shy! Form study groups and find people to work with. You'll be happy you did!

NETIQUETTE FOR ONLINE COURSE

- Be polite and respectful of one another.
- Avoid personal attacks. Keep dialogue friendly and supportive, even when you disagree or wish to present a controversial idea or response.

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- Be careful with the use of humor and sarcasm. Emotion is difficult to sense through text.
- Be helpful and share your expertise. Foster community communication and collaboration.
- Contribute constructively and completely to each discussion. Avoid short repetitive “I agree” responses and don’t make everyone else do the work.
- Consider carefully what you write. Re-read all e-mail and discussion before sending or posting.
- Remember that e-mail is considered a permanent record that may be forwarded to others.
- Be brief and succinct. Don’t use up other people’s time or bandwidth.
- Use descriptive subject headings for each e-mail message.
- Respect privacy. Don’t forward a personal message without permission.
- Cite references. Include web addresses, authors, names of articles, date of publication, etc.
- Keep responses professional and educational. Do not advertise or send chain letters.
- Do not send large attachments unless you have been requested to do so or have permission from all parties.
- 2-word postings (e.g.: I agree, Oh yeah, No way, Me too) do not “count” as postings.

DOCUMENTATION

Any material not original to the student must be cited in APA documentation format. Deliberate use of information or material from outside sources without proper citation is considered plagiarism and can be grounds for disciplinary action. See the explanation of Academic Integrity below.

ACADEMIC INTEGRITY

As a learning community of scholars, URI emphasizes the ethical responsibility of all its members to seek knowledge honestly and in good faith. Students are responsible for doing their own work, and academic dishonesty of any kind will not be tolerated. "Violations of academic integrity include, but are not limited to, cheating, plagiarism, or misrepresentation of information in oral or written form. Such violations will be dealt with severely by the instructor, the dean/center director, and the standards committee. Plagiarism means presenting someone else's idea or writing as if it were your own. If you use someone else's idea or writing, be sure the source is clearly documented." Other guidelines for acceptable student behavior are specified in the university catalog.

1. Plagiarism: Plagiarism consists of using another author's words without proper identification and documentation of that author. Plagiarism takes the form of direct quotation without the use of quotation marks and/or documentation or paraphrasing without proper identification and documentation. The fabrication of sources, or the act, deliberately or unconsciously, of passing another author's work off as your own are also considered to be plagiarism.
2. Falsification: Falsification consists of deliberately changing results, statistics, or any other kind of factual information to make it suit your needs. It also consists of deliberately changing a source's intent by misquoting or taking out of context.
3. Multiple submission: If you wish to turn in the same work or use the same research, in whole or in part, for more than one course, you must obtain permission to do so from all professors involved. Failure to obtain this permission constitutes academic dishonesty. “Recycled work” must contain significant work as related to the current course topic, meeting the standards for the current assignment.

All submitted work must be your own. If you consult other sources (class readings, articles or books from the library, articles available through internet databases, or websites) these MUST be properly documented, or you

will be charged with plagiarism and will receive an F for the submitted work. In some cases, this may result in a failure of the course as well. In addition, the charge of academic dishonesty will go on your record in the Office of Student Life.

Cheating will not be tolerated. URI's regulations regarding cheating will upheld.

Students are expected to be honest in all academic work. A student's name on any written work, quiz or exam shall be regarded as assurance that the work is the result of the student's own independent thought and study. Work should be stated in the student's own words, properly attributed to its source. Students have an obligation to know how to quote, paraphrase, summarize, cite, and reference the work of others with integrity. The following are some examples of academic dishonesty:

- Using material, directly or paraphrasing, from published sources (print or electronic) without appropriate citation
- Claiming disproportionate credit for work not done independently
- Unauthorized possession or access to exams
- Unauthorized communication during exams
- Taking an exam for another student
- The use of notes or electronic devices to gain an unauthorized advantage during exams
- Unauthorized use of another's work or preparing work for another student
- Facilitating or aiding another's academic dishonesty
- Altering or attempting to alter grades
- Fabricating or falsifying facts, data or references
- Submitting the same paper for more than one course without prior approval from the instructors.

URI ACADEMIC WRITING STANDARDS

Specific writing standards differ from discipline to discipline and learning to write persuasively in any genre is a complex process, both individual and social, that takes place over time with continued practice and guidance. Nonetheless, URI has identified some common assumptions and practices that apply to most academic writing done at the university level. These generally understood elements are articulated here to help students see how they can best express their ideas effectively, regardless of their discipline or any writing assignment.

Venues for writing include the widespread use of e-mail, electronic chat spaces and interactive blackboards. URI is committed to guaranteeing that students can expect all electronic communication to meet Federal and State regulations concerning harassment or other "hate" speech. Individual integrity and social decency require common courtesies and a mutual understanding that writing--in all its educational configurations--is an attempt to share information, knowledge, opinions and insights in fruitful ways.

Academic writing (as commonly understood in the university) always aims at correct Standard English grammar, punctuation, and spelling. The following details are meant to give students accurate, useful, and practical assistance for writing across the curriculum of URI.

Students can assume that successful collegiate writing will generally:

- Delineate the relationships among writer, purpose, and audience by means of a clear focus (thesis statements, hypotheses or instructor-posed questions are examples of such focusing methods but are by no means the only ones) and a topic that's managed and developed appropriately for the specific task.
- Display a familiarity with and understanding of the discourse styles of the discipline and/or particular assignment.
- Demonstrate the analytical skills of the writer rather than just repeating what others have said by summarizing or paraphrasing
- Substantiate abstractions, judgments, and assertions with evidence specifically applicable for the occasion whether illustrations, quotations, or relevant data.
- Draw upon contextualized research whenever necessary, properly acknowledging the explicit work or intellectual property of others.
- Require more than one carefully proofread and documented draft, typed or computer printed unless otherwise specified.

STUDENT SUPPORT SERVICES

The following student support services are provided by the university and available to all URI students:

- Student support services such as counseling center: <https://web.uri.edu/counseling>
- Food assistance: <https://web.uri.edu/rhody-outpost>
- Bias resource team: <https://web.uri.edu/brt>

We are a community of learners, and I am here to support you in any way that I can. Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. As always, if you are comfortable in doing so, please let me know and I'll provide any resources that I can.

ANTI-BIAS SYLLABUS STATEMENT

We respect the rights and dignity of each individual and group. We reject prejudice and intolerance, and we work to understand differences. We believe that equity and inclusion are critical components for campus community members to thrive. If you are a target or a witness of a bias incident, you are encouraged to submit a report to the URI Bias Response Team at www.uri.edu/brt. There you will also find people and resources to help.

ACADEMIC SUPPORT SERVICES

DISABILITY ACCOMMODATIONS AND INCLUSION

Your access in this course is important. Please send me your Disability, Access, and Inclusion (DAI) accommodation letter early in the semester so that we have adequate time to discuss and arrange your approved academic accommodations. If you have not yet established services through DAI, please contact them to engage in a confidential conversation about the process for requesting reasonable accommodations in the classroom. DAI can be reached by calling: 401-874-2098, visiting: web.uri.edu/disability, or emailing: dai@etal.uri.edu. They are available to meet with students enrolled in Kingston as well as Providence courses.

Office of Disability Services

Americans With Disabilities Act Statement

Any personal learning accommodations that may be needed by a student covered by the "Americans with Disabilities Act" must be made known to the university as soon as possible. This is the student's responsibility.

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Information about services, academic modifications and documentation requirements can be obtained from The Office of Affirmative Action, Equal Opportunity, and Diversity (AAEOD). <https://web.uri.edu/affirmativeaction/>

Any student with a documented disability is welcome to contact me early in the semester so that we may work out reasonable accommodations to support your success in this course. Students should also contact Disability Access, and Inclusion Office, Office of Student Life, 302 Memorial Union, 401-874-2098. They offer online drop-in hours for student support: <https://web.uri.edu/disability/>

From the University Manual: 6.40.10 and 6.40.11 Accommodations for Qualified Students with Disabilities.

Students are expected to notify faculty at the onset of the semester if any special considerations are required in the classroom. If any special considerations are required for examinations, it is expected the student will notify the faculty a week before the examination with the appropriate paperwork.

Academic Enhancement Center

Please note we cover a large amount of material in this course, and as such, a significant amount of work will be expected. This is a challenging course. Success requires that you keep pace with the work, understand course concepts, and study effectively. The Academic Enhancement Center (<http://www.uri.edu/aec/>) is a great place to do this and they offer online services.

The Academic Enhancement Center helps URI students succeed through three services: Academic Coaching, Subject-Based Tutoring, and The Writing Center. To learn more about any of the services below, please visit uri.edu/aec or call 401-874-2367 to speak with reception staff. AEC is located 4th floor of Roosevelt Hall.

Subject Tutoring To view more information about our offerings and schedules, please visit uri.edu/aec/tutoring.

Academic Skills Development resources helps students plan work, manage time, and study more effectively. All Academic Skills and Strategies programming are offered both online and in-person. **UCS160: Success in Higher Education** is a one-credit course on developing a more effective approach to studying. **Academic Consultations** are 30-minute, 1 to 1 appointment that students can schedule on Starfish with Dr. David Hayes to address individual academic issues. **Study Your Way to Success** is a self-guided web portal connecting students to tips and strategies on studying and time management related topics. For more information on these programs, visit uri.edu/aec/academic-skills or contact Dr. Hayes directly at davidhayes@uri.edu.

The Writing Center, located in Roosevelt Hall 009, provides free writing support to students in any class, at any stage of the writing process: from understanding an assignment and brainstorming ideas, to developing, organizing, and revising a draft. Fall 2020 services are offered through two online options: 1) real-time **synchronous appointments** with a peer consultant (25- and 50-minute slots, available Sunday - Friday), and 2) written **asynchronous consultations** with a 24-hour turn-around response time (available Monday - Friday). Synchronous appointments are video-based, with audio, chat, document-sharing, and live captioning capabilities, to meet a range of accessibility needs. View the synchronous and asynchronous schedules and book online, visit uri.mywconline.com.

Like AEC on Facebook (Seriously? Who uses FB anymore?) <https://www.facebook.com/URIAEC>

BRIGHTSPACE SUPPORT SERVICES

The ITS Service Desk, located in the URI Library, is prepared to help students should they encounter problems with Brightspace. Please read through the following information:

1. For login problems, call the Service Desk at 874-4357.
2. The Service Desk Website, <https://web.uri.edu/itservicesdesk/> opens in new window, posts the semester operating schedule as well as a link on the right index to the self- help technical wiki. That site contains Brightspace help and instructions for both students and faculty.
3. Recommended browsers (those with the most QA testing effort against them) are Google Chrome, Safari, and Mozilla Firefox. The mobile versions of these browsers also work well with the majority of operations in Brightspace. Internet Explorer is not recommended.

URI ONLINE LIBRARY RESOURCES

<https://web.uri.edu/library/>

BIOLOGICAL SCIENCES BEREAVEMENT STATEMENT

If you are grieving or have experienced the death of a loved one, the Biological Sciences Faculty, Staff, and Teaching Assistants understand and want to support you during this difficult time.

- If you have questions about missing class or your assignments, we encourage you to reach out to your Dean so they can notify all your instructors about your circumstances. If you are in University College, call 401-874-5903 and ask to speak to the UC Dean about a private matter; if you are in CELS, contact Dean Kim Anderson (kand@uri.edu; 401-874-5026) in the CELS Office of Student Affairs.
- Next, please reach out to me and together, we can make a plan that will allow you to be as successful as possible in this class during this tough time. Your mental health is so much more important than your grade in this class.

The University Counseling Center can offer further support 24/7 (call 401-874-2288, <https://web.uri.edu/counseling/crisis>).

SUMMER SESSION COURSE ALIGNMENT

Week	Chapters	Learning Objectives	Assessments*
1	1: Introduction 2: Chemistry 3: Macromolecules	See chapter learning objectives below	<ul style="list-style-type: none"> Each chapter has a homework "quiz", and discussion topic
2	<u>Exam 1*</u> 4: The Cell 5: Plasma Membrane 6: Metabolism	See chapter learning objectives below	<ul style="list-style-type: none"> Each chapter has a homework "quiz", and discussion topic EXAM 1 Cultural Competency 1
3	7: Cellular Respiration 10: Mitosis <u>Exam 2*</u> 11: Meiosis	See chapter learning objectives below	<ul style="list-style-type: none"> Each chapter has a homework "quiz", and discussion topic EXAM 2 Cultural Competency 2
4	12: Mendel & Heredity 14: DNA 15: Genes & Proteins <u>Exam 3*</u>	See chapter learning objectives below	<ul style="list-style-type: none"> Each chapter has a homework "quiz", and discussion topic EXAM 3 Cultural Competency 3
5	33: Form & Function 35: Nervous System 43: Reproduction <u>Exam 4*</u>	See chapter learning objectives below	<ul style="list-style-type: none"> Each chapter has a homework "quiz", and discussion topic EXAM 4 Cultural Competency 4

*See Brightspace calendar for exam dates and assessment due dates

SUGGESTED COURSE SCHEDULE FOR ASYNCHRONOUS LEARNING

Below is a suggested schedule for viewing course content asynchronously that follows a Monday, Wednesday, Friday schedule – the remaining days should be spent reviewing and studying the content. All course work and content will be available on Brightspace and you will work through it at your own pace provided you complete all of the unit level course work by the due date. Exams will only be available on exam days so please plan your schedule accordingly.

The best advice I can give you when learning asynchronously is to set a schedule and stay on top of the work. It is easy to fall behind and challenging to get caught back up.

SUMMER SESSION 1 <u>SUGGESTED</u> COURSE SCHEDULE to view content (due dates below)				
Date		CH	BIO 101 Lecture Topic	BIO 103 Lab (check their site)
05/23	M	1	Study of Life	Labs this week: Reaction time, DNA Presentation, Computer Graphing Microscopy & Pipetting
05/26	W	2	The Chemical Basis of Life	
05/27	F	3	Biological Macromolecules (Exam 1)	
05/30	M	4	Cell Structure	Labs this week: Molecular Bio: Prep DNA for PCR, Digest DNA, Run DNA on gel
06/01	W	5	Plasma Membrane	
06/03	F	6	Metabolism	
06/06	M	7	Cellular Respiration	Labs this week: Cellular Respiration, Mitosis Meiosis
06/08	W	10	Cellular Reproduction (Exam 2)	
06/10	F	11	Meiosis & Sexual Reproduction	
06/13	M	12	Mendel & Heredity	Labs this week: Genetics Daphnia Physiology
06/15	W	14	DNA Structure & Function	
06/17	F	15	Genes & Proteins (Exam 3)	
06/20	M	33	Basic Form & Function	Labs this week: Genetic Variation, Gene Expression, Circulatory System, Heart Dissection
06/22	W	35	Animal Nervous System	
06/24	F	43	Animal Reproduction (Exam 4)	

DUE DATES (highlighted above):

Unit 1 (red) = Friday 05/27 (all unit 1 course work including exam 1 must be submitted by 11:59pm)

Unit 2 (orange) = Wednesday 06/08 (all unit 1 course work including exam 1 must be submitted by 11:59pm)

Unit 3 (green) = Friday 06/17 (all unit 1 course work including exam 1 must be submitted by 11:59pm)

Unit 4 (blue) = Friday 06/24 (all unit 1 course work including exam 1 must be submitted by 11:59pm)

SUMMER SESSION 2 SUGGESTED COURSE SCHEDULE to view content (due dates below)

Date		CH	BIO 101 Lecture Topic	BIO 103 Lab (check their site)
06/27	M	1	Study of Life	Labs this week: Reaction time, DNA Presentation, Computer Graphing Microscopy & Pipetting
06/29	W	2	The Chemical Basis of Life	
07/01	F	3	Biological Macromolecules (Exam 1)	
07/05	T	4	Cell Structure	Labs this week: Molecular Bio: Prep DNA for PCR, Digest DNA, Run DNA on gel
07/06	W	5	Plasma Membrane	
07/08	F	6	Metabolism	
07/11	M	7	Cellular Respiration	Labs this week: Cellular Respiration, Mitosis Meiosis
07/13	W	10	Cellular Reproduction (Exam 2)	
07/15	F	11	Meiosis & Sexual Reproduction	
07/18	M	12	Mendel & Heredity	Labs this week: Genetics Daphnia Physiology
07/20	W	14	DNA Structure & Function	
07/22	F	15	Genes & Proteins (Exam 3)	
07/25	M	33	Basic Form & Function	Labs this week: Genetic Variation, Gene Expression, Circulatory System, Heart Dissection
07/27	W	35	Animal Nervous System	
07/29	F	43	Animal Reproduction (Exam 4)	

DUE DATES (highlighted above):

Unit 1 (red) = Friday 07/01 (all unit 1 course work including exam 1 must be submitted by 11:59pm)

Unit 2 (orange) = Wednesday 07/13 (all unit 1 course work including exam 1 must be submitted by 11:59pm)

Unit 3 (green) = Friday 07/22 (all unit 1 course work including exam 1 must be submitted by 11:59pm)

Unit 4 (blue) = Friday 07/29 (all unit 1 course work including exam 1 must be submitted by 11:59pm)

CHAPTER LEARNING OBJECTIVES

Instructional Objectives: At the completion of this course, the students will be able to:

- I. identify the characteristics and the basic needs of living organisms.
- II. explain the chemical principles underlying the functioning of biological systems including the energetics of cellular respiration.
- III. describe basic cell structure and function, including an overview of the processes associated with the central dogma of molecular biology.
- IV. distinguish between sexual and asexual reproduction in animals including mitosis, meiosis, and basic transmission genetics.
- V. describe levels of organization and distinguish related organizational functions in animals.
- VI. identify structures and compare related functions of systems in animals at multiple levels of organization.
- VII. distinguish between environmental and genetic sources of variation.
- VIII. distinguish between natural and artificial selection (more detail in BIO 102).
- IX. explain the basis of Darwin's theory that species evolved by a process of natural selection (more detail in BIO 102).
- X. apply evidence from the fossil record, comparative anatomy, and DNA sequences to support the theory that life gradually evolved on earth over billions of years (more detail in BIO 102).

These specific chapter learning objectives serve as your "study guide" for this course.
Students should be able to....

Chapter 1: Introduction

1.1 The Science of Biology

- Identify the shared characteristics of the natural sciences
- Summarize the steps of the scientific method
- Compare inductive reasoning with deductive reasoning
- Describe the goals of basic science and applied science

1.2 Themes and Concepts of Biology

- Identify and describe the properties of life
- Describe the levels of organization among living things
- Recognize and interpret a phylogenetic tree
- List examples of different subdisciplines in biology

Chapter 2: The Chemical Foundation of Life

2.1 Atoms, Isotopes, Ions and Molecules: The Building Blocks

- Define matter and elements
- Describe the interrelationship between protons, neutrons, and electrons
- Compare the ways in which electrons can be donated or shared between atoms
- Explain the ways in which naturally occurring elements combine to create molecules, cells, tissues, organ systems, and organisms

DISCLAIMER: The contents of this syllabus are subject to change at the instructor's discretion.

2.2 Water

- Describe the properties of water that are critical to maintaining life
- Explain why water is an excellent solvent
- Provide examples of water's cohesive and adhesive properties
- Discuss the role of acids, bases, and buffers in homeostasis

2.3 Carbon

- Explain why carbon is important for life
- Describe the role of functional groups in biological molecules

Chapter 3: Biological Macromolecules

3.1 Synthesis of Biological Macromolecules

- Understand macromolecule synthesis
- Explain dehydration (or condensation) and hydrolysis reactions

3.2 Carbohydrates

- Discuss the role of carbohydrates in cells and in the extracellular materials of animals and plants
- Explain carbohydrate classifications
- List common monosaccharides, disaccharides, and polysaccharides

3.3 Lipids

- Describe the four major types of lipids
- Explain the role of fats in storing energy
- Differentiate between saturated and unsaturated fatty acids
- Describe phospholipids and their role in cells
- Define the basic structure of a steroid and some steroid functions
- Explain how cholesterol helps maintain the plasma membrane's fluid nature

3.4 Proteins

- Describe the functions proteins perform in the cell and in tissues
- Discuss the relationship between amino acids and proteins
- Explain the four levels of protein organization
- Describe the ways in which protein shape and function are linked

3.5 Nucleic Acids

- Describe nucleic acids' structure and define the two types of nucleic acids
- Explain DNA's structure and role
- Explain RNA's structure and roles

Chapter 4: Cell Structure

4.1 Studying Cells

- Describe the role of cells in organisms
- Compare and contrast light microscopy and electron microscopy

- Summarize cell theory

4.2 Prokaryotic Cells

- Name examples of prokaryotic and eukaryotic organisms
- Compare and contrast prokaryotic and eukaryotic cells
- Describe the relative sizes of different cells
- Explain why cells must be small

4.3 Eukaryotic Cells

- Describe the structure of eukaryotic cells
- Compare animal cells with plant cells
- State the role of the plasma membrane
- Summarize the functions of the major cell organelles

4.4 The Endomembrane System and Proteins

- List the components of the endomembrane system
- Recognize the relationship between the endomembrane system and its functions

4.5 The Cytoskeleton

- Describe the cytoskeleton
- Compare the roles of microfilaments, intermediate filaments, and microtubules
- Compare and contrast cilia and flagella
- Summarize the differences among the components of prokaryotic cells, animal cells, and plant cells

4.6 Connections between Cells and Cellular Activities

- Describe the extracellular matrix
- List examples of the ways that plant cells and animal cells communicate with adjacent cells

Chapter 5: Structure and Function of Plasma Membranes

5.1 Components and Structure

- Understand the cell membrane fluid mosaic model
- Describe phospholipid, protein, and carbohydrate functions in membranes
- Discuss membrane fluidity

5.2 Passive Transport

- Explain why and how passive transport occurs
- Understand the osmosis and diffusion processes
- Define tonicity and its relevance to passive transport

5.3 Active Transport

- Understand how electrochemical gradients affect ions
- Distinguish between primary active transport and secondary active transport

5.4 Bulk Transport

- Describe endocytosis, including phagocytosis, pinocytosis, and receptor-mediated endocytosis
- Understand the process of exocytosis

Chapter 6: Metabolism

6.1 Energy & Metabolism

- Explain metabolic pathways and describe the two major types
- Discuss how chemical reactions play a role in energy transfer

6.2 Potential, Kinetic, Free and Activation Energy

- Define “energy”
- Explain the difference between kinetic and potential energy
- Discuss the concepts of free energy and activation energy
- Describe endergonic and exergonic reactions

6.3 The Laws of Thermodynamics

- Discuss the concept of entropy
- Explain the first and second laws of thermodynamics

6.4 ATP: Adenosine Triphosphate

- Explain ATP's role as the cellular energy currency
- Describe how energy releases through ATP hydrolysis

6.5 Enzymes

- Describe the role of enzymes in metabolic pathways
- Explain how enzymes function as molecular catalysts
- Discuss enzyme regulation by various factors

Chapter 7: Cellular Respiration

7.1 Energy in Living Systems

- Discuss the importance of electrons in the transfer of energy in living systems
- Explain how ATP is used by cells as an energy source

7.2 Glycolysis

- Describe the overall result in terms of molecules produced during the chemical breakdown of glucose by glycolysis
- Compare the output of glycolysis in terms of ATP molecules and NADH molecules produced

7.3 Oxidation of Pyruvate and the Citric Acid Cycle

- Explain how a circular pathway, such as the citric acid cycle, fundamentally differs from a linear biochemical pathway, such as glycolysis
- Describe how pyruvate, the product of glycolysis, is prepared for entry into the citric acid cycle

7.4 Oxidative Phosphorylation

- Describe how electrons move through the electron transport chain and explain what happens to their energy levels during this process
- Explain how a proton (H^+) gradient is established and maintained by the electron transport chain

7.5 Metabolism without Oxygen

- Discuss the fundamental difference between anaerobic cellular respiration and fermentation
- Describe the type of fermentation that readily occurs in animal cells and the conditions that initiate that fermentation

7.6 Connections of Carbohydrate, Protein and Lipid Metabolic Pathways

- Discuss the ways in which carbohydrate metabolic pathways, glycolysis, and the citric acid cycle interrelate with protein and lipid metabolic pathways
- Explain why metabolic pathways are not considered closed systems

7.7 Regulation of Cellular Respiration

- Describe how feedback inhibition would affect the production of an intermediate or product in a pathway
- Identify the mechanism that controls the rate of the transport of electrons through the electron transport chain

Chapter 10: Cell Reproduction

10.1 Cellular Division

- Describe the structure of prokaryotic and eukaryotic genomes
- Distinguish between chromosomes, genes, and traits
- Describe the mechanisms of chromosome compaction

10.2 The Cell Cycle

- Describe the three stages of interphase
- Discuss the behavior of chromosomes during karyokinesis/mitosis
- Explain how the cytoplasmic content is divided during cytokinesis
- Define the quiescent G_0 phase

10.3 Control of the Cell Cycle

- Understand how the cell cycle is controlled by mechanisms that are both internal and external to the cell
- Explain how the three internal “control checkpoints” occur at the end of G_1 , at the G_2/M transition, and during metaphase
- Describe the molecules that control the cell cycle through positive and negative regulation (Time Permitting)

10.4 Cancer and the Cell Cycle

- Describe how cancer is caused by uncontrolled cell growth
- Understand how proto-oncogenes are normal cell genes that, when mutated, become oncogenes
- Describe how tumor suppressors function
- Explain how mutant tumor suppressors cause cancer

10.5 Prokaryotic Cell Division

- Describe the process of binary fission in prokaryotes

Chapter 11: Meiosis and Sexual Reproduction

11.1 The Process of Meiosis

- Describe the behavior of chromosomes during meiosis, and the differences between the first and second meiotic divisions
- Describe the cellular events that take place during meiosis
- Explain the differences between meiosis and mitosis
- Explain the mechanisms within the meiotic process that produce genetic variation among the haploid gametes

11.2 Sexual Reproduction

- Explain that meiosis and sexual reproduction are highly evolved traits
- Identify variation among offspring as a potential evolutionary advantage of sexual reproduction
- Describe the three different life-cycle types among sexually reproducing multicellular organisms. (time permitting)

Chapter 12: Mendel's Experiments and Heredity

12.1 Mendel's Experiments and the Laws of Probability

- Describe the scientific reasons for the success of Mendel's experimental work
- Describe the expected outcomes of monohybrid crosses involving dominant and recessive alleles
- Apply the sum and product rules to calculate probabilities

12.2 Characteristics and Traits

- Explain the relationship between genotypes and phenotypes in dominant and recessive gene systems
- Develop a Punnett square to calculate the expected proportions of genotypes and phenotypes in a monohybrid cross
- Explain the purpose and methods of a test cross
- Identify non-Mendelian inheritance patterns such as incomplete dominance, codominance, recessive lethals, multiple alleles, and sex linkage

12.3 Laws of Inheritance

- Explain Mendel's law of segregation and independent assortment in terms of genetics and the events of meiosis
- Use the forked-line method and the probability rules to calculate the probability of genotypes and phenotypes from multiple gene crosses
- Explain the effect of linkage and recombination on gamete genotypes
- Explain the phenotypic outcomes of epistatic effects between genes

Chapter 14: DNA Structure & Function

14.1 Historical Basis of Modern Understanding

DISCLAIMER: The contents of this syllabus are subject to change at the instructor's discretion.

- Explain transformation of DNA
- Describe the key experiments that helped identify that DNA is the genetic material
- State and explain Chargaff's rules

14.1 DNA Structure and Sequencing

- Describe the structure of DNA
- Explain the Sanger method of DNA sequencing
- Discuss the similarities and differences between eukaryotic and prokaryotic DNA

14.3 Basis of DNA Replication

- Explain how the structure of DNA reveals the replication process
- Describe the Meselson and Stahl experiments

14.4 DNA Replication in Prokaryotes

- Explain the process of DNA replication in prokaryotes
- Discuss the role of different enzymes and proteins in supporting this process

14.5 DNA Replication in Eukaryotes

- Discuss the similarities and differences between DNA replication in eukaryotes and prokaryotes
- State the role of telomerase in DNA replication

14.6 DNA Repair

- Discuss the different types of mutations in DNA
- Explain DNA repair mechanisms

Chapter 15: Genes & Proteins

15.1 The Genetic Code

- Explain the "central dogma" of DNA-protein synthesis
- Describe the genetic code and how the nucleotide sequence prescribes the amino acid and the protein sequence

15.2 Prokaryotic Transcription

- List the different steps in prokaryotic transcription
- Discuss the role of promoters in prokaryotic transcription
- Describe how and when transcription is terminated

15.3 Eukaryotic Transcription

- List the steps in eukaryotic transcription
- Discuss the role of RNA polymerases in transcription
- Compare and contrast the three RNA polymerases
- Explain the significance of transcription factors

15.4 RNA Processing in Eukaryotes

- Describe the different steps in RNA processing
- Understand the significance of exons, introns, and splicing for mRNAs
- Explain how tRNAs and rRNAs are processed

- 15.5 Ribosomes and Protein Synthesis
- Describe the different steps in protein synthesis
- Discuss the role of ribosomes in protein synthesis

Chapter 33: The Animal Body: Basic Form & Function

33.1 Animal Form and Function

- Describe the various types of body plans that occur in animals
- Describe limits on animal size and shape
- Relate bioenergetics to body size, levels of activity, and the environment

33.2 Animal Primary Tissues

- Describe epithelial tissues
- Discuss the different types of connective tissues in animals
- Describe three types of muscle tissues
- Describe nervous tissue

33.3 Homeostasis

- Define homeostasis
- Describe the factors affecting homeostasis
- Discuss positive and negative feedback mechanisms used in homeostasis
- Describe thermoregulation of endothermic and ectothermic animals

Chapter 35: Nervous System

35.1 Neurons and Glial Cells

- List and describe the functions of the structural components of a neuron
- List and describe the four main types of neurons
- Compare the functions of different types of glial cells

35.2 How Neurons Communicate

- Describe the basis of the resting membrane potential
- Explain the stages of an action potential and how action potentials are propagated
- Explain the similarities and differences between chemical and electrical synapses
- Describe long-term potentiation and long-term depression

35.3 The Central Nervous System (time permitting)

- Identify the spinal cord, cerebral lobes, and other brain areas on a diagram of the brain
- Describe the basic functions of the spinal cord, cerebral lobes, and other brain areas

35.4 The Peripheral Nervous System (time permitting)

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- Describe the organization and functions of the sympathetic and parasympathetic nervous systems
- Describe the organization and function of the sensory-somatic nervous system

Chapter 43: Animal Reproduction and Development

43.1 Reproduction Methods

- Describe advantages and disadvantages of asexual and sexual reproduction
- Discuss asexual reproduction methods
- Discuss sexual reproduction methods

43.2 Fertilization

- Discuss internal and external methods of fertilization
- Describe the methods used by animals for development of offspring during gestation (time permitting)
- Describe the anatomical adaptations that occurred in animals to facilitate reproduction (time permitting)

43.3 Human Reproductive Anatomy and Gametogenesis (time permitting)

- Describe human reproductive anatomies
- Discuss the human sexual response
- Describe spermatogenesis and oogenesis and discuss their differences and similarities

43.4 Hormonal Control of Human Reproduction (time permitting)

- Describe the roles of reproductive hormones
- Discuss the interplay of the ovarian and menstrual cycles
- Describe the process of menopause

43.5 Human Pregnancy and Birth (time permitting)

- Explain fetal development during the three trimesters of gestation
- Describe labor and delivery
- Compare the efficacy and duration of various types of contraception
- Discuss causes of infertility and the therapeutic options available

43.6 Fertilization and Early Embryonic Development (time permitting)

- Discuss how fertilization occurs
- Explain how the embryo forms from the zygote
- Discuss the role of cleavage and gastrulation in animal development