



## INSTRUCTOR INFORMATION

Instructor: Dr. **Narasimha Sreerama** (Sree)

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Communication Policy: Responses to emails will be provided within 24 hours

## PREREQUISITES FOR COURSE

Life102; C111 and C112, or concurrent registration

## COURSE DESCRIPTION & OBJECTIVES

To provide an integrated interdisciplinary molecular genetics experience for biomedically oriented students with backgrounds and interests in biochemistry, cell and molecular biology, microbiology, developmental biology, and genetics.

Upon the completion of this course, students will be able to:

1. Describe the basic features of the molecules and macromolecules of genetics: nucleic acids, proteins, chromatin, chromosomes.
2. Explain the molecular processes of the central dogma of molecular genetics: replication, DNA repair, recombination, transcription, RNA processing, translation.
3. Compare and contrast the principles of the fundamental experimental techniques used in molecular genetics.
4. Describe the principles of genome evolution.
5. Explain the molecular and cellular processes involved in molecular genetics: cell cycle/mitosis, meiosis, development, cancer.

## TEXTBOOK / COURSE READINGS

**Essential Cell Biology.** **Alberts et al., 5<sup>th</sup> edition**, New York: W.W. Norton & Company [ISBN 97803936679533]. Some topics we discuss are not covered in this textbook.

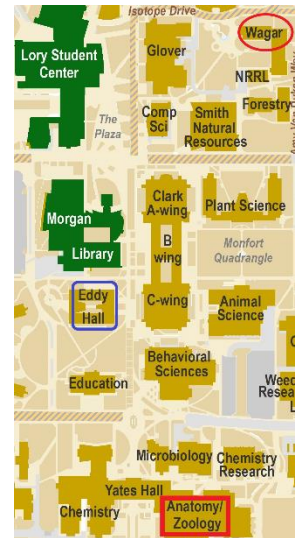
For those topics and the topics we discuss you can use the **Free Book** provided by NIH: **Molecular Biology of the Cell, Alberts et al, 4<sup>th</sup> ed (2002)**. This book is the expanded version of the book we are using. you will have to search for topics, and free searchable access is available at:

<https://www.ncbi.nlm.nih.gov/books/NBK26863/>

## COURSE MATERIALS & EQUIPMENT

Course content (Lectures and Problem Sets) will be placed on Canvas. A Laptop or a PC and internet to access Course Material is needed. Quizzes will be on Canvas (**Online, open-note, computer/internet needed**). **Exams are currently planned to be taken online (Online, open-note, computer/internet needed)**. *Let me know if that is not acceptable and you will need to take it in class.*

Lectures (Slides and Recordings) are posted for one exam at a time. Please keep up with the pace of the course, **about 3 lectures per week**, and Quizzes and Exams. ***There will be Quizzes or Exams almost every week, starting the 2<sup>nd</sup> week – Follow the schedule on Canvas.***



## PARTICIPATION/BEHAVIORAL EXPECTATIONS

Students are expected to access Canvas daily for course related activities. Students are expected to pay attention to announcements on Canvas and spend approximately 9 hours per week on course activities. **Students are expected to take Quizzes or Exams within a window of time** (*announced on Canvas*). There will be a total of 12 quizzes and 4 exams (*Check the Quiz and Exam Schedule*). Please review the [core rules of netiquette](#) for some guidelines and expectations on how to behave in an online learning environment.

## COURSE POLICIES (LATE ASSIGNMENTS, MAKE-UP EXAMS, ETC.)

There will be a total of 12 quizzes and 4 exams. All assignments must be completed on time. **Late assignments: Generally not accepted.** Contact instructor in case of emergencies (I forgot, I submitted a wrong Quiz, I had to walk the dog, etc. are not emergencies).

## GRADING POLICY

Grade	Range
A	100% to 90%
B	89.9% to 80%
C	79.9% to 70%
D	69.9 %to 60.0%
F	Below 60%

\*Grades may be curved and +/- Grades may be awarded at instructor's discretion

As a student enrolled in this course, one of your responsibilities is to submit course work by the due dates listed in Canvas. With that said, I take my role as your instructor very seriously, and, in fact, I care about how well you do in this course and that you have a satisfying, rewarding experience.

To that end, it is my commitment to you to respond individually to the work you submit in this class and to return your work in a timely manner. Quizzes will be online and will be returned right after the due date. Exams will be returned within 2 (week) days.

ASSIGNMENT	GRADE POINTS	GRADE PERCENTAGE
Weekly Quizzes (12 quizzes, 12/13 pts each)	145	29%
3 Mid-Term Exams (85 pts each)	255	51%
Final Exam (100 pts)	100	20%
<b>Total:</b>		<b>100 %</b>

\*Keep a copy of all work created for the course, including work submitted through Canvas course learning management system.

## WEEKLY SCHEDULE

Below is the tentative schedule of topics and reading assignments. Page numbers from the text given are approximate. Use them in conjunction with the Lectures and Problems (Homework problems and Problem sets, for self-assessment, posted on Canvas). You may use the Free searchable Book at: <https://www.ncbi.nlm.nih.gov/books/NBK26863/>

**Lecture Slides/Notes:** *The slides for each lecture or a block of lectures will be provided. Meant to be a guide – Use text, homework problems, and problem sets to learn and apply yourself.*

Week	Topic	Reading
<b>Section 1: Molecules and Macromolecules</b>		
Week 1	Introduction; Macromolecules; Nucleic acid structure	39-48, 58-63, 78-79, 193-195, 171-178
Week 2	Protein structure; Protein function; Chromatin structure	117-127, 132-133, 137-138; 142, 152-154; 178-192
<b>Section 2: The Molecular Processes of the Central Dogma</b>		
Week 3	Chromosome structure; DNA replication	178-192; 199-214
Week 4	DNA damage; DNA repair; Recombination	215-224, 657-658; 315-316
<b>Exam 1 (Introduction – DNA replication) Lectures 1 - 10</b>		
Week 5	Transcription	227-234; 271-276; 235-237; 276-282
Week 6	RNA processing; Translation	237-243; 257-262; 243-257; 288-291
<b>Section 3: Genomics and Genome Evolution</b>		
Week 7	Genomics (Experimental Techniques)	333-359
<b>Exam 2 (Transcription – Sanger's Sequencing) Lectures 11 – 20</b>		
Week 8	Genomics Cont.	333-359
Week 9	Genes and genome evolution	297-328
<b>Section 4: Molecular Cellular Processes</b>		
Week 10	Comparative genomics, Cell cycle	609-618
<b>Exam 3 (Genomics – Cell Cycle) Lectures 21 - 29</b>		
Week 11	Mitosis	619-637
Week 12	Meiosis/Gametogenesis	651-663
Week 13	Cell signaling	533-567
Week 14	Genetic basis of development	26-35, 278-287, 639-646
Week 15	Stem cells; Genetic basis of cancer	709-718; 222-224; 559-569; 718-728
<b>Final Exam (Mitosis – Cancer) Lectures 30 - 41</b>		

## QUIZ AND EXAM SCHEDULE

**Quizzes** (6 Q, 1 attempt, 20 min; Dates are given below) will start **at Noon (12 PM) and end at Noon (12 PM)**. Quizzes will be on Canvas and will be open for 24-48 hrs. *Quizzes start on Monday, except for Quiz 6 and Quiz 12 which open on Friday.*

**Exams** will be on a block of lectures (Dates are given below). At this point they are offered online (on Canvas, open note, open during a 24 hr window – **Noon to Noon**). *If you want to take it in class let me know.*

Quiz and Exam Schedule				
	QUIZ	EXAM	Quiz Dates	Exam Date
Modules 1-4 (Weeks 2 – 4)	Quiz 1		Mon, Aug 30 – Sept 1	
	Quiz 2		Mon, Sept 6 – Sept 8	
	Quiz 3		Mon, Sept 13 – Sept 15	
		Exam 1 (Lect 1-10) 30 Q, 75 Min		Sept 17-18 (Fri-Sat)
Modules 5-7 (Weeks 5 – 7)	Quiz 4		Mon, Sept 27 – Sept 29	
	Quiz 5		Mon, Oct 4 – Oct 6	
	Quiz 6		Fri, Oct 8 – Oct 10	
		Exam 2 (Lect 11-20) 30 Q, 75 Min		Oct 11-12 (Mon-Tues)
Modules 8-11 (Weeks 8 – 11)	Quiz 7		Fri, Oct 22 – Oct 25	
	Quiz 8		Fri, Oct 29 – Nov 1	
		Exam 3 (Lect 21-29) 30 Q, 75 Min		Nov 3-4 (Wed-Thurs)
Module 4 (Weeks 12 – 15)	Quiz 9		Mon, Nov 15 – Nov 17	
	Quiz 10		Mon, Nov 29 – Dec 1	
	Quiz 11		Mon, Dec 6 – Dec 8	
	Quiz 12		Fri, Dec 10 – Dec 12	
		Finals (Lect 30-41) 35 Q, 90 Min		Dec 14 (Tues)

### THIRD PARTY HomeWork HELPER SITES

**The use of online “homework helper” sites including, but not limited to, Chegg, NoteHall, Quizlet, and Koofers is not permitted in this course.** Please reach out to us (me or GTAs) to discuss if a specific service you are thinking about using for this course is acceptable.

Use of these types of resources will be considered receiving unauthorized assistance and, therefore, **a violation of the student conduct code**. Using them may result, at the discretion of the instructor, **in a zero for the course, assignment, quiz, or exam**. *All incidents of this type will be referred to the CSU Student Resolution Center and may be subject to additional University disciplinary action.*

### Important information for students on COVID-19

**All students are required to follow public health guidelines in any university space, and are encouraged to continue these practices when off-campus(es).** For the latest information about the University’s COVID resources and information, please visit the **CSU COVID-19 site** (<https://covid.colostate.edu/>)

## CANVAS INFORMATION & TECHNICAL SUPPORT

Canvas is the where course content, grades, and communication will reside for this course.

- [Login for Canvas](#)
- [Canvas Support](#)
- For passwords or any other computer-related technical support, contact the [Central IT Technical Support Help Desk](#).
  - (970) 491-7276 ○ [help@colostate.edu](mailto:help@colostate.edu)

The [Technical Requirements](#) page identifies the browsers, operating systems, and plugins that work best with Canvas. If you are new to Canvas quickly review [the Canvas Student Orientation](#) materials.

## ACADEMIC INTEGRITY & CSU HONOR PLEDGE

This course will adhere to the CSU [Academic Integrity/Misconduct](#) policy as found in the General Catalog and the [Student Conduct Code](#).

Academic integrity lies at the core of our common goal: to create an intellectually honest and rigorous community. Because academic integrity, and the personal and social integrity of which academic integrity is an integral part, is so central to our mission as students, teachers, scholars, and citizens, I will ask that you affirm the CSU Honor Pledge as part of completing your work in this course.

Further information about Academic Integrity is available at CSU's [Academic Integrity - Student Resources](#).

## UNIVERSAL DESIGN FOR LEARNING/ACCOMMODATION OF NEEDS

I am committed to the principle of universal learning. This means that our classroom, our virtual spaces, our practices, and our interactions be as inclusive as possible. Mutual respect, civility, and the ability to listen and observe others carefully are crucial to universal learning.

If you are a student who will need accommodations in this class, please contact me to discuss your individual needs. Any accommodation must be discussed in a timely manner. A verifying memo from [The Student Disability Center](#) may be required before any accommodation is provided.

The Student Disability Center (SDC) has the authority to verify and confirm the eligibility of students with disabilities for the majority of accommodations. While some accommodations may be provided by other departments, a student is not automatically eligible for those accommodations unless their disability can be verified and the need for the accommodation confirmed, either through SDC or through acceptable means defined by the particular department. Faculty and staff may consult with the SDC staff whenever there is doubt as to the appropriateness of an accommodative request by a student with a disability.

The goal of SDC is to normalize disability as part of the culture of diversity at Colorado State University. The characteristic of having a disability simply provides the basis of the support that is available to students. The goal is to ensure students with disabilities have the opportunity to be as successful as they have the capability to be.

Support and services are offered to student with functional limitations due to visual, hearing, learning, or mobility disabilities as well as to students who have specific physical or mental health conditions due to epilepsy, diabetes, asthma, AIDS, psychiatric diagnoses, etc. Students who are temporarily disabled are also eligible for support and assistance.

Any student who is enrolled at CSU, and who self-identifies with SDC as having a disability, is eligible for support from SDC. Specific accommodations are determined individually for each student and must be supported by appropriate documentation and/or evaluation of needs consistent with a particular type of disability. SDC reserves the right to ask for any appropriate documentation of disability in order to determine a student's eligibility for accommodations as well as in support for specific accommodative requests. The accommodative process begins once a student meets with an accommodations specialist in the SDC.

### THIRD-PARTY TOOLS/PRIVACY

Please note that this course may require you to use third-party tools (tools outside of the Canvas learning management system), such as Skype and others. Some of these tools may collect and share information about their users. Because your privacy is important, you are encouraged to consult the privacy policies for any third-party tools in this course so that you are aware of how your personal information is collected, used and shared.

### COPYRIGHTED COURSE MATERIALS

Please do not share material from this course in online, print, or other media. Course material is the property of the instructor who developed the course. Materials authored by third parties and used in the course are also subject to copyright protections. Posting course materials on external sites (commercial or not) violates both copyright law and the CSU Student Conduct Code. Students who share course content without the instructor's express permission, including with online sites that post materials to sell to other students, could face appropriate disciplinary or legal action.

## UNDOCUMENTED STUDENT SUPPORT

Any CSU student who faces challenges or hardships due to their legal status in the United States and believes that it may impact their academic performance in this course is encouraged to visit [Student Support Services for Undocumented, DACA & ASSET](#) for resources and support. Additionally, only if you feel comfortable, please notify your professor so they may pass along any additional resources they may possess.

## TITLE IX/INTERPERSONAL VIOLENCE

For the full statement regarding role and responsibilities about reporting harassment, sexual harassment, sexual misconduct, domestic violence, dating violence, stalking, and the retaliation policy please go to: [Title IX – Sexual Assault, Sexual Violence, Sexual Harassment](#).

If you feel that your rights have been compromised at CSU, several resources are available to assist:

- Student Resolution Center, 200 Lory Student Center, 491-7165
- Office of Equal Opportunity, 101 Student Services, 491-5836

A note about interpersonal violence: If you or someone you know has experienced sexual assault, relationship violence and/or stalking, know that you are not alone. As instructors, we are required by law to notify university officials about disclosures related to interpersonal violence. Confidential victim advocates are available 24 hours a day, 365 days a year to provide support related to the emotional, physical, physiological and legal aftermath of interpersonal violence.

Contact the Victim Assistance Team at: 970-492-4242.

## RELIGIOUS OBSERVANCES

CSU does not discriminate on the basis of religion. Reasonable accommodation should be made to allow individuals to observe their established religious holidays. Students seeking an exemption from attending class or completing assigned course work for a religious holiday will need to fill out the [Religious Accommodation Request Form](#) and turn it in to the Division of Student Affairs, located on the second level of the Administration building.

Once turned in, the Division of Student Affairs will review the request and contact the student accordingly. If approved, the student will receive a memo from the Dean of Students to give to their professor or course instructor.

Students are asked to turn in the request forms as soon as the conflict is noticed. Similarly, unanticipated conflicts requiring a religious observance, such as a death in the family, can also be reviewed.

## CSU PRINCIPLES OF COMMUNITY

**Inclusion:** We create and nurture inclusive environments and welcome, value and affirm all members of our community, including their various identities, skills, ideas, talents and contributions.

**Integrity:** We are accountable for our actions and will act ethically and honestly in all our interactions.

**Respect:** We honor the inherent dignity of all people within an environment where we are committed to freedom of expression, critical discourse, and the advancement of knowledge.

**Service:** We are responsible, individually and collectively, to give of our time, talents, and resources to promote the well-being of each other and the development of our local, regional, and global communities.

**Social Justice:** We have the right to be treated and the responsibility to treat others with fairness and equity, the duty to challenge prejudice, and to uphold the laws, policies and procedures that promote justice in all respects.

## DIVERSITY AND INCLUSION

The [Mission, Vision, and Focus](#) webpage of the Vice President for Diversity includes a comprehensive statement of CSU's commitment to diversity and inclusion.

This course will adhere to the CSU Academic Integrity Policy as found in the General Catalog – 1.6, pages 7-9 (<http://www.catalog.colostate.edu/Content/files/2012/FrontPDF/1.6POLICIES.pdf>) and the Student Conduct Code (<http://www.conflictresolution.colostate.edu/conduct-code>). At a minimum, violations will result in a grading penalty in this course and a report to the Office of Conflict Resolution and Student Conduct Services.



The Colorado Commission on Higher Education has approved **Life201B** for inclusion in the Guaranteed Transfer (GT) Pathways program in the **GT-SC2** category. For transferring students, successful completion with a minimum C– grade guarantees transfer and application of credit in this GT Pathways category. For more information on the GT Pathways program, go to <http://higher.ed.colorado.gov/academics/transfers/gtpathways/curriculum.html>.

The content criteria and student learning outcomes (SLOs) listed below are required for GT-Pathways courses in the Natural and Physical Sciences content area, in the GTSC-2(Lecture course without required laboratory) category. The peculiar numbering of the SLOs is due to the fact that they are excerpted from a comprehensive list of SLOs across all GT-Pathways courses. The SLOs are listed within categories that the GT-Pathways program calls “competencies” and are displayed in italics below.

**GT Pathways Natural & Physical Sciences - Course without Required Laboratory (GT-SC2) Content Criteria:**

1. The lecture content of a GT Pathways science course (**GT-SC2**):
  - a. Develop foundational knowledge in specific field(s) of science.
  - b. Develop an understanding of the nature and process of science.
  - c. Demonstrate the ability to use scientific methodologies.
  - d. Examine quantitative approaches to study natural phenomena.

**GT Pathways Natural & Physical Sciences - Course without Required Laboratory (GT-SC2) Competencies:**

***Inquiry & Analysis***

4. Select or Develop a Design Process
  - a. Select or develop elements of the methodology or theoretical framework to solve problems in a given discipline.
5. Analyze and Interpret Evidence
  - a. Examine evidence to identify patterns, differences, similarities, limitations, and/or implications related to the focus. b. Utilize multiple representations to interpret the data.
6. Draw Conclusions
  - a. State a conclusion based on findings.

***Quantitative Literacy***

1. Interpret Information
  - a. Explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).
2. Represent Information
  - a. Convert information into and between various mathematical forms (e.g., equations, graphs, diagrams, tables, words).