LIFE 201B Sections 002/202
INTRODUCTORY GENETICS –Molecular/Immunological/Developmental

Spring Semester, 2019
Pathology 101, MWF 3:00-3:50 PM

Instructors:

- Dr. **Narasimha Sreerama** (Sree), Dept. of Biochemistry and Molecular Biology
  Office: **MRB 212** – Will change to Anatomy and Zoology bldg. in Feb/Mar
  Office hours: Will be announced in class and Posted on Canvas
  E-mail: Narasimha.Sreerama@colostate.edu or through Canvas
- GTA: Will be announced in class and Posted on Canvas
- Textbook: Essential Cell Biology, Alberts et al., 4th edition.

Tentative Schedule. *Unfinished portions will be carried over to next lecture. Page numbers posted are approximate.*

#	Day	Date	Topic	Reading	Instructor
1	Wed	1/23	Introduction to course and molecular genetics	None	
Section1: Molecules and Macromolecules					
2	Fri	1/25	Nucleic acid structure I	76-77, 171-179	
3	Mon	1/28	Nucleic acid structure II	"	
4	Wed	1/30	Protein structure	121-130, 137, 144-145	
5	Fri	2/1	Protein function	"	
6	Mon	2/4	Chromatin structure	185-191	
7	Wed	2/6	Chromosome structure	179-185	
Section 2: The Molecular Processes of the Central Dogma					
8	Fri	2/8	DNA replication I	197-211	
9	Mon	2/11	DNA replication II	"	
10	Wed	2/13	DNA damage repair I	211-216	
11	Fri	2/15	DNA damage repair II	216-218, 652-653	
	Mon	**2/18**	**Exam 1 (lectures 2-11)**		
12	Wed	2/20	Recombination	296/9, 307-311	
13	Fri	2/22	Transcription I	223-230	
14	Mon	2/25	Transcription II	265-269	
15	Wed	2/27	Transcription III	230-232; 270-277	
16	Fri	3/1	RNA processing	232-238; 252-257	
17	Mon	3/4	Translation I	238-252	

18	Wed	3/6	Translation II	"	
Section 3: Genomics and Genome Evolution					
19	Fri	3/8	Genomics I	325-354	
20	Mon	3/11	Genomics II	"	
21	Wed	3/13	Genomics III	"	
	Fri	**3/15**	**Exam 2 (lectures 12-21)**		
22	Mon	3/25	Genomics IV	"	
23	Wed	3/27	Genomics V	334-5, 339, 347-349, 354	
24	Fri	3/29	Gene and genome evolution I	289-321	
25	Mon	4/1	Gene and genome evolution II	"	
26	Wed	4/3	Gene and genome evolution III	"	
27	Fri	4/5	Gene and genome evolution IV	"	
Section 4: Molecular Cellular Processes					
28	Mon	4/8	Cell cycle and mitosis I	603-633	
29	Wed	4/10	Cell cycle and mitosis II	"	
30	Fri	4/12	Cell cycle and mitosis III	"	
	Mon	**4/15**	**Exam 3 (lectures 22-30)**		
31	Wed	4/17	Meiosis/Gametogenesis I	645-657	
32	Fri	4/19	Meiosis/Gametogenesis II	"	
33	Mon	4/22	Cell signaling	525-561	
34	Wed	4/24	Genetic basis of development I	26-37, 276-281, 346-356, 525-539, 633-642	
35	Fri	4/26	Genetic basis of development II	"	
36	Mon	4/29	Genetic basis of development III	"	
37	Wed	5/1	Stem cells	702-712	
38	Fri	5/3	Genetic basis of cancer I	218-220; 553-559; 712-725	
39	Mon	5/6	Genetic basis of cancer II	"	
40	Wed	5/8	Genetic basis of cancer III	"	
41	Fri	5/10	Genetic basis of cancer IV	"	
Finals (5/16)			**Exam 4 (lectures 31-41) (5/16 – 12 PM)**		

Learning Outcomes:

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

Lecture Slides:

The slides for each lecture or a block of lectures will be posted on Canvas before the lecture.

COURSE DESCRIPTION

Title:	**INTRODUCTORY GENETICS – MOLECULAR EMPHASIS**
Credits:	3
Term offered:	Spring 2019
Prerequisites:	Life102; C111 and C112, or concurrent registration.
Format:	The class will meet as a group three days/week for lectures
Evaluation:	Approximately 80-85% of your grade will be based on your performance on **4 exams** (50 minutes each, in class). **Exams** may be curved. Other ~15-20% of your grade will be based on online **quizzes**. These will generally be posted on Fridays, and due the next Monday. **Announced in class**

Potential Grading:		
	90%-100%	A
	80%-89.9%	B
	70%-79.9%	C
	60%-69.9%	D
	Below 60%	F

Plus/minus grading will be used.

Text:	Essential Cell Biology. Alberts et al., 4th edition.
Objective:	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.

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://highered.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).