



Faculty of Engineering and Natural Sciences
Introduction to Molecular Biology
BIO301

Spring 2022

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TAs:

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LA:

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Course Address:

12:30 am - 13:40 pm	Monday	FASS 1076-1078	in-class and online
10:40 am – 12:30 pm	Wednesday	FASS 1076-1078	in class and online
9:40 am – 12:30 pm	Friday	FENS 2053	In-class

Zoom: <https://sabanciuniv.zoom.us/j/96524300417?pwd=NE96a0JXbzIqY3VuQ1FGbkJzWE4vQT09>

Meeting ID: 965 2430 0417

Passcode: 249810

Office Hours: by appointment!

Please make sure to schedule an appointment with the instructor and/or TAs prior the meeting.

Objectives:

This course is designed as two parts: i) lectures having the objectives of understanding concepts in molecular biology and gene regulation, ii) experimental lab sessions having the objectives of experiencing molecular cloning techniques to produce a particular gene product.

This lecture provides introductory information about the flow of information in living things at the molecular level. Starting from genomic information, structure of DNA, RNA, and protein, packaging to chromosomes, topics such as following will be discussed in the lecture 1) DNA replication, repair and recombination, 2) RNA transcription and modification, and 3) protein translation, folding and modification.

At the end of this course, the students will be able to:

- Demonstrate an understanding on DNA, RNA, and protein structures and their relationships
- Discuss the structure and function of proteins including the roles of individual amino acids in protein folding charge, acid/base properties, and protein-protein interactions.
- Discuss chromatin structure and how it can be modified to affect gene expression.
- Explain the mechanisms of DNA replication and repair, RNA synthesis and processing, and protein synthesis.
- Describe how gene expression is regulated at the transcriptional and post-transcriptional level.
- Demonstrate the ability to effectively communicate and work collaboratively with peers in the small group setting to successfully address problems sets in molecular cell biology and genetics.

Course Materials:

Main Book:

- Molecular Biology of the Gene, Seventh Edition, Pearson
J. D. Watson, T. A. Baker, S. P. Bell, A. Gann, M. Levine, R. Losick
ISBN-13: 9780321762436

Additional Sources:

- Molecular Biology Principles of Genome Function
N. Craig, R. Green, C. Greider, G. Storz, C. Wolberger, O. Cohen-Fix
ISBN-13: 978-0199658572
- Molecular Biology of the Cell
B. Alberts, A. D. Johnson, J. Lewis, D. Morgan, M. Raff, K. Roberts, P. Walter
ISBN-13: 978-0815344322
- Review articles
- Research articles

Weekly Plan

Week 1	28/02/2022	Course Introduction	
	02/03/2022	Nucleic Acids Convey Genetic Information	<u>Reading:</u> Chapter 2
Week 2	07/03/2022	The Structure of DNA	<u>Reading:</u> Chapter 4
	09/03/2022		
Week 3	14/03/2022	The Structure and Versatility of RNA	<u>Reading:</u> Chapter 5
	16/03/2022		
Week 4	21/03/2022	The Structure of Proteins	<u>Reading:</u> Chapter 6
	23/03/2022		
Week 5	28/03/2022	Midterm 1: Weeks 1-4	<u>Reading:</u> Chapter 7
	30/03/2022	Genome Structure, Chromatin, and the Nucleosome	
Week 6	04/04/2022	The Replication of DNA	<u>Reading:</u> Chapter 8
	06/04/2022		
Week 7	11/04/2022	The Mutability and Repair of DNA	<u>Reading:</u> Chapter 10
	13/04/2022		
Week 8	18/04/2022	Homologous Recombination at the Molecular Level	<u>Reading:</u> Chapter 11
	20/04/2022		
Week 9	25/04/2022	Site Specific Recombination and Transposition of DNA	<u>Reading:</u> Chapter 12
	27/04/2022		
Week 10	09/05/2022	No Class	
	11/05/2022	Midterm 2: Weeks 5-9	
Week 11	16/05/2022	Mechanisms of Transcription	<u>Reading:</u> Chapter 13
	18/05/2022		
Week 12	23/05/2022	RNA Splicing	<u>Reading:</u> Chapter 14
	25/05/2022		
Week 13	30/05/2022	Translation	<u>Reading:</u> Chapter 15
	01/06/2022		
Week 14	06/06/2022	The Genetic Code	<u>Reading:</u> Chapter 16
	08/06/2022		

Labs: Additional syllabus will be provided for the lab sections separately

Reading: Chapter 7: Techniques of Molecular Biology

Grading Policy:**Homework (15%):** There will be 5 homework assignments throughout semester

- Homework due dates will be announced for each homework.
- Late assignments: 10% late penalty will be implemented for up to 3 days. Homework submitted 3 days later than the due date will not be accepted; students' grade will be 0 for that assignment.

Midterms (2x15%): There will be two midterms:

Midterm 1: Students will be responsible for the material of week 1-4

Midterm 2: Students will be responsible for the material of week 5-9

Final (25%): Students will be responsible for the whole material of the course. Question will include: Week 1-9: 25%, Week 10-13: 75%**In class performance (5%):**

- There will be short questions during the lecture
- Timing of the questions can be different in each lecture
- At the end of the course, in class scores for each student individually will be ranked from highest to lowest, and only the highest half of the scores will be counted for the final score.

Lab Quizzes (5%):

- There will be short questions after each lab section
- Student will be able to turn in the quiz answers within 24 h,
- Due date of the quizzes: Saturday 12:30 pm

Lab Report (20%):

- Students will be expected to write a final lab report at the end of the semester; more instructions will be provided during the lab sessions
- Late submissions: 5% late penalty will be implemented for up to 6 days. Lab reports submitted 6 days later than the due date will not be accepted; students' grade will be 0 for that assignment.

- Tentative grade levels:

Highest	Lowest	Letter
100.00 %	93.00 %	A
92.99 %	87.00 %	A-
86.99 %	83.00 %	B+
82.99 %	77.00 %	B
76.99 %	73.00 %	B-
72.99 %	67.00 %	C+
66.99 %	63.00 %	C
62.99 %	57.00 %	C-
56.99 %	53.00 %	D+
52.99 %	50.00 %	D
49.99 %	0.00 %	F

Exam Policy:

- Exams may include multiple choice, fill-in-the-blank, problem solving, or short answers.
- All exams will be closed book and held in class.
- For exams you will only require a pencil and a calculator.
- Phones are not allowed and must be turned off.
- If you leave during an exam, you will not be allowed back in
- Late arriving students will not be allowed after the first student finishes the exam and leaves.

Grade disputes

- Students will have one week after the return of an exam or an assignment to challenge a grade for any question with a written note providing an explanation.
- Failure to challenge the grade within this period indicates a willingness to accept the grade as is.
- The challenge should consist of a written description of why the answer is correct based on other published material that you cite.

Academic Honesty:

- All students must follow the university guidelines of academic integrity.
<https://www.sabanciuniv.edu/en/academic-integrity-statement>
- A strict zero-tolerance policy for cheating will be enforced.