



**Faculty of Engineering and Natural Sciences**  
**Introduction to Molecular Biology**  
**BIO301**  
**Spring 2021**

**Instructor:** Nur Mustafaoglu

**Email:** [nur.mustafaoglu@sabanciuniv.edu](mailto:nur.mustafaoglu@sabanciuniv.edu)

**Website:** <http://mustafaoglu.com/>

**TAs:**

- Eda Kuş, Email: [eda.kus@sabanciuniv.edu](mailto:eda.kus@sabanciuniv.edu)
- Nilay Çiçek, Email: [nilay.cicek@sabanciuniv.edu](mailto:nilay.cicek@sabanciuniv.edu)
- Serap Sezen, Email: [seraph@sabanciuniv.edu](mailto:seraph@sabanciuniv.edu)
- Sinem Demirbağ, Email: [dsinem@sabanciuniv.edu](mailto:dsinem@sabanciuniv.edu)

**Course Address:**

<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

<b>Week 1 (23-24 February):</b>	Nucleic Acids Convey Genetic Information <u>Reading:</u> Chapter 2
<b>Week 2 (2-3 March):</b>	The Structure of DNA <u>Reading:</u> Chapter 4
<b>Week 3 (9-10 March):</b>	The Structure and Versatility of RNA <u>Reading:</u> Chapter 5
<b>Week 4 (16-17 March):</b>	The Structure of Proteins <u>Reading:</u> Chapter 6
<b>Week 5 (23-24 March):</b>	Genome Structure, Chromatin, and the Nucleosome <u>Reading:</u> Chapter 7 <b>Midterm 1: Weeks 1-4</b>
<b>Week 6 (30-31 March):</b>	The Replication of DNA <u>Reading:</u> Chapter 8
<b>Week 7 (6-7 April):</b>	The Mutability and Repair of DNA <u>Reading:</u> Chapter 10
<b>Week 8 (13-14 April):</b>	Homologous Recombination at the Molecular Level <u>Reading:</u> Chapter 11
<b>Week 9 (20-21 April):</b>	Site Specific Recombination and Transposition of DNA <u>Reading:</u> Chapter 12
<b>Week 10 (27-28 April):</b>	Mechanisms of Transcription <u>Reading:</u> Chapter 13 <b>Midterm 2: Weeks 5-9</b>
<b>Week 11 (4-5 May):</b>	RNA Splicing <u>Reading:</u> Chapter 14
<b>Week 12 (18 May):</b>	Translation <u>Reading:</u> Chapter 15
<b>Week 13 (25-26 May):</b>	The Genetic Code <u>Reading:</u> Chapter 16

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

<b>Week 6 (2 April):</b>	Techniques of Molecular Biology <u>Reading:</u> Chapter 7
<b>Week 7:</b>	Introduction to Labs: instructions, safety, reports
<b>Weeks 8-13:</b>	Experiments

## Grading Policy:

### Homework (10%):

- There will be weekly homework assignments; however, only the highest 8 homework's scores will be taken into account.
- Homework due dates are every Wednesday by midnight.
- 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%):

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 (30%):** Students will be responsible for the whole material of the course. Question will include: Week 1-9: 10%, Week 10-13: 20%

### In class performance (10%):

- 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

### Lab Report (15%):

- 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

## Academic Honesty:

All students must follow the university guidelines of academic integrity.

<https://www.sabanciuniv.edu/en/academic-integrity-statement>