

Molecular Biology

Course description: This course is designed for non-biology students, such as from computer science, engineering, mathematics and others. This course will provide introduction to the molecular basis of life and inheritance, with a detail in the structure and function of biological macromolecules and the biochemical mechanisms that control the maintenance and expression of genome in prokaryotes and eukaryotes. Students will work on several assignments and pass two examinations. At the end of this course students will gain basic level knowledge in molecular biology and applying these to their research.

Pre-requisite:

All graduate students are welcome. Students with basic knowledge in biology, organic chemistry and genetics are preferred.

Required Textbook: Watson, James D., Tania A. Baker, Stephen P. Bell, Alexander Gann, Michael Levine, Richard Losick. *Molecular Biology of the Gene*. 7th ed. San Francisco, CA: Pearson/Benjamin Cummings, 2013. ISBN: 978-0321905376

Required Equipment: Non

Topics and Schedules:

Week	Topic	Type	Assignments
1	Introduction of courses	Lecture	
2	Chemistry in Life	Lecture	
3	The Mendelian View of the World	Lecture	Homework 1
4	The Structures of DNA and RNA	Lecture	
5	Genome Structure, Chromatin, and the Nucleosome	Lecture	Homework 2
6	The Replication of DNA	Lecture	
7	The Mutability and Repair of DNA	Lecture	Homework 3
8	Recombination	Lecture	
9		Midterm Exam	
10	Mechanisms of Transcription	Lecture	
11	RNA Splicing	Lecture	Homework 4
12	Translation	Lecture	
13	Transcriptional Regulation in Prokaryotes	Lecture	
14	Transcriptional Regulation in Eukaryotes	Lecture	Homework 5
15	Translational regulation	Lecture	
16	Regulatory RNAs	Lecture	Homework 6
17	Techniques of Molecular Biology	Lecture	
18		Final Exam	

Workload: There will be 6 assignments and two examinations.

The text book provides an extensive set of questions for each chapter. A homework assignment will be given biweekly. The assignments and exams will be mainly based on the textbook, but sometimes I will add some questions of my own. Some of the questions will be discussed in class. Your preparation is essential for a good discussion.

Grading:

Grading for the course will be assigned on the basis of six homework assignments (10% each) and two exams (20% each). The expected grade distribution should be: 88-100 = A; 78-87 = B; 68-77 = C; 58-67 = D.