

# Welcome to BIOL744: Molecular Genetics (3 credits)

Spring 2025 (Wednesday 1:30 pm - 04:10 pm)

## \*IMPORTANT INFORMATION\*:

**A)** All course lectures are pre-recorded and will be on Blackboard for your access (i.e., for the lectures, there will NOT be any synchronous or in-person meetings). However, all exams will be administered **IN PERSON** in Colgan Hall (Manassas campus), room 327 (03/05/25 & 05/07/25).

**B)** We will meet **IN PERSON** for the first class on 01/22/25 for introduction and to go over the syllabus in Colgan Hall (Manassas campus), room 327.

**C)** We will meet by Zoom for the class presentations on 04/09/25 and 04/16/25 (please see schedule table on next page) Zoom meetings link, and meeting ID and passcode:

<https://us02web.zoom.us/j/5847654684?pwd=dU9jOXpjSzVYUExdmMwdjJ2RkRSUT09>

Meeting ID: 584 765 4684; Passcode: q4rUDb

This graduate level course covers a range of basic topics in molecular genetics such as DNA replication, transcription, translation, DNA repair mechanisms, nature of mutations, and regulation of gene expression. Basic principles of replication, transcription, translation, genetic mutations, and gene regulation will be first presented before exploring the various genetic applications and technologies that are medically important and relevant to genetic diseases.

## Main Course Objectives:

1. Develop a solid understanding of the complex nature of genes.
2. Learn the basic principles of gene regulatory mechanisms.
3. Learn some of the applications for diagnosis, treatment, and prevention of human genetic diseases.

Professor:	Ramin M. Hakami, Ph.D. E-mail: <a href="mailto:rhakami@gmu.edu">rhakami@gmu.edu</a> ; Phone: 703-993-7084. <u>Contact by e-mail is preferred.</u>
Office Hours:	Every Friday from 1:00 – 2:00 pm; please be sure to e-mail at least a day ahead to set up/confirm a meeting. <u>It will be conducted by Zoom unless an in-person meeting is required.</u>
Course Website:	Login at <a href="http://mymason.gmu.edu">http://mymason.gmu.edu</a> to access Blackboard for course-related materials. Please contact support center for Blackboard assistance (Phone: x3-8870, E-mail: <a href="mailto:courses@gmu.edu">courses@gmu.edu</a> )
Class Presentations:	Please go to Dr. Hakami's personal meeting room in Zoom: <a href="https://us02web.zoom.us/j/5847654684?pwd=dU9jOXpjSzVYUExdmMwdjJ2RkRSUT09">https://us02web.zoom.us/j/5847654684?pwd=dU9jOXpjSzVYUExdmMwdjJ2RkRSUT09</a> Meeting ID: 584 765 4684; Passcode: q4rUDb

There are a total of 2 exams for this course (midterm and final). There are absolutely no make-up exams during the semester for **any** reason. However, if you miss the midterm exam and have an appropriate **official verifiable document** for the excuse, then the weight for the missed test will be added to your final exam (e.g., if you miss the midterm with a valid verifiable excuse, your final exam will then account for 70% of your final grade rather than 35%). Absence from the final exam due to illness will be excused for which you must provide an **official verifiable document**. However, other causes for missing the final exam must be approved by the student's academic Dean or director. If absence from the final exam is unexcused, the grade for the course is entered as "F". If you miss the final exam with a valid excuse, then more equal weight will be given to your midterm exam.

## Grade Distribution and Policy:

Midterm exam	35%	} <b>If it turns out to be to the advantage of the class, test grades will be curved based on class average</b>
Final exam	35%	
Class presentation	30%	

Final Grades:	
87-100	A
84-86	A-
81-83	B+
78-80	B
75-77	B-
72-74	C

**SCHEDULE OF WEEKLY LECTURE TOPICS:**

<b>Date</b>	<b>Week</b>	<b>Topic</b>
January 22	1	Central Dogma
	2	Cell Division and Reproduction
	3	Chromatin
	4	DNA Replication
	5	DNA Repair and Mutation
	6	Transposons
March 5	7	<b>MIDTERM EXAM (closed book)</b>
	8	Spring Recess
	9	Splicing
	10	Gene Regulation
	11	Epigenetics
April 9	12	Bacterial and Viral Genetics Class Presentations #1, #2, #3
April 16	13	Noncoding and Regulatory RNAs Class Presentations #4, #5
	14	DNA Technology – Part 1
	15	DNA Technology – Part 2
May 7	16	<b>FINAL EXAM (closed book)</b>

## **GRADED MATERIALS:**

### **1. Midterm and Final Exams (70% of grade)**

- A. The exam question format will be a combination of multiple-choice questions and questions for which you must provide descriptive answers. The exams will include questions that are specific and require your in-depth understanding of important specific concepts and details or names that will be presented in the lectures, as it is an important means of testing your sufficient mastery of the course materials. I will provide you with sample test questions before the mid-term exam, in order to provide you with a clear idea of the type of questions that will be on the exams.

There is information in some lecture slides that is purely historical in nature; there will NOT be any questions on the exams on purely historical information and they are simply for making you aware of the historical context for some of the scientific discoveries/progress that is discussed.

- B. There are no make-up exams under any circumstances; however, if you have a valid excuse to miss the midterm exam (must provide appropriate official and verifiable documentation), the percentage of total grade assigned to that exam will be added to your final exam (i.e., your final exam will account for 70% of your grade). Absence from the final exam due to illness will be excused for which you must provide an appropriate official verifiable document. However, other causes for missing the final exam must be approved by the student's academic dean or director. If absence from the final exam is unexcused, the grade for the course is entered as "F". Only the lecture materials will be tested on the exams and the exam questions will be derived directly from the lecture slides. The midterm exam will cover lecture materials from week 1 through week 6. The final exam will cover lecture materials from week 9 through week 15. Please go to Colgan Hall (Manassas campus), room 327, to take the exams.

### **2. Class Presentation (30% of grade)**

- A. Each student is assigned a topic related to molecular genetics on which to do a class presentation. The idea is to present the topic in detail to the class during a 25 minute slide presentation, followed by 5 minutes of open class discussion. The following aspects should be presented in sufficient detail and clarity: 1) The scientific background and also relevant historical background to the topic; 2) The main scientific progress that has been made to date; 3) Any relevant real life applications that have occurred and their outcomes plus the reasons why these efforts may have succeeded or failed. If there has not been any real life application yet, then the potential for future real life applications should be discussed. A summary slide should be presented at the end to summarize the main points of the presentation. For example, if the assigned topic is "Gene Therapy", the background to how the field of gene therapy began should be presented (e.g., who were the original scientists who initiated the field and how that came to be), the main scientific methods and approaches that have been developed to date for doing gene therapy should be described in sufficient detail and clarity so that the audience understands them well, and the real life applications of gene therapy for treatment of diseases and the outcome of these real life efforts should be described plus why the efforts may have succeeded or failed. Finally, a summary slide should be presented.
- B. The references that have been used for preparing the presentation should be provided on a slide at the end. Please be sure to use trustworthy sources that contain accurate content for obtaining the information for your presentation, such as peer-reviewed published articles in solid journals. While there are many solid internet sources of information, there is also plenty of inaccurate content on the internet so please be sure to do your due diligence to make sure of the accuracy of the information.
- C. For the class presentations, use of a short accurate video that you may have found on the internet (not more than a few minutes in duration) is fine but otherwise the presentation should be your own.
- D. When presenting, in addition to having your microphone on, you must also turn on your video. Furthermore, for your presentation, you should not read directly off previously written text, or read word for word directly from the written text on your slides. As part of developing and demonstrating

good presentation skills, you must be able to describe what you are presenting to the audience in your own words and without having to read off previously written text.

- E. When using any technical terminology, such as the name of a particular technique or procedure, or the name or descriptive phrase for a process, you need to provide at least a brief explanation of what it is in order to demonstrate that you have a sufficient understanding of it.
- F. If you miss your class presentation but have an official and verifiable documented excuse that is appropriate, the percentage of total grade assigned for the class presentation will be added to your final exam (i.e., your final exam will account for 65% of your final grade for the course).

### **3. Extra Credit Opportunity**

If you are consistently active in engaging in meaningful discussions/questions during the open class discussion period that follows each class presentation, I will provide you with extra credit to help with your course grade. At my discretion, the extent of the extra credit assistance will depend on your level of engagement in these discussions and the quality/thoughtfulness of your comments or questions.

### **ACADEMIC INTEGRITY**

GMU is an Honor Code university; please see the University Catalog for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else's work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. When you take any test, you will not cheat. Another aspect of academic integrity is the free play of ideas. Class discussions are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas and perspectives. When in doubt (of any kind), please ask for guidance and clarification.

### **SUGGESTED READING:**

Lewin's GENES XII, 12th Edition. by Jocelyn E. Krebs (Author), Elliott S. Goldstein (Author), Stephen T. Kilpatrick (Author)

### **SOME IMPORTANT DATES:**

January 28	Last day to add class
February 4	Last day to drop with 100% tuition refund
February 11	Last day to drop with 50% tuition refund
Feb. 12-Feb. 25	Unrestricted Withdrawal Period: 100% Tuition Liability
March 5	Midterm exam
May 7	Final exam

Each student must verify the accuracy of their enrollment before the end of add/drop period. Students not properly enrolled by the deadlines will not be granted any schedule adjustments by the Department or the Dean's Office.

### **GMU EMAIL ACCOUNTS**

Students must use their Mason email accounts to receive important University information, including messages related to this class. See <http://masonlive.gmu.edu> for more information.

### **NOTICE OF MANDATORY REPORTING OF SEXUAL ASSAULT, SEXUAL HARASSMENT, INTERPERSONAL VIOLENCE, AND STALKING**

As a faculty member, I am designated as a "Non-Confidential Employee," and must report all disclosures of sexual assault, sexual harassment, interpersonal violence, and stalking to Mason's Title IX Coordinator per University Policy 1202. If you wish to speak with someone confidentially, please contact one of Mason's confidential resources, such as Student Support and Advocacy Center (SSAC) at 703-993-3686 or Counseling

and Psychological Services (CAPS) at 703-993-2380. You may also seek assistance or support measures from Mason's Title IX Coordinator by calling 703-993-8730, or emailing [titleix@gmu.edu](mailto:titleix@gmu.edu).

### **OFFICE OF DISABILITY SERVICES**

If you are a student with a disability and you need academic accommodations, please see me and also contact the Office of Disability Services (ODS) at 993-2474. All academic accommodations must be arranged through the ODS. <http://ods.gmu.edu>

### **OTHER USEFUL CAMPUS RESOURCES**

WRITING CENTER: A114 Robinson Hall; (703) 993-1200; <http://writingcenter.gmu.edu>

UNIVERSITY LIBRARIES "Ask a Librarian" <http://library.gmu.edu/ask>

COUNSELING AND PSYCHOLOGICAL SERVICES (CAPS): (703) 993-2380; <http://caps.gmu.edu>

### **UNIVERSITY POLICIES**

The University Catalog, <http://catalog.gmu.edu>, is the central resource for university policies affecting student, faculty, and staff conduct in university academic affairs. Other policies are available at <http://universitypolicy.gmu.edu/>. All members of the university community are responsible for knowing and following established policies.

**QUESTIONS? PLEASE ASK!**