

# Welcome to BIOL744: Molecular Genetics (3 credits)

Spring 2022 (Wednesday 1:30 pm - 04:10 pm)

Only first class is in person (SciTech campus: K. Johnson Hall, room 247). All remaining lectures will be synchronous online classes:

<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. Contact by e-mail is preferred.
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 to ensure social distancing measures.</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> )
Course Lectures:	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 quizzes and 2 exams for this course (midterm exam, and final exam). There are absolutely no make-up exams during the semester for **any** reason. If you miss a quiz or the midterm exam and have an appropriate **official verifiable document** for the excuse, then 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 60% of your final grade rather than 30%). 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	30%	} If it turns out to be to the advantage of the class, test grades will be curved based on class average
Final exam	30%	
Two quizzes	20%	
Class presentation	15%	
Attendance	5%	

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 26	1	Central Dogma
February 02	2	Cell Division and Reproduction
February 09	3	Chromatin
February 16	4	DNA Replication <b>Quiz #1 (closed book)</b>
February 23	5	DNA Repair and Mutation Class Presentation #1
March 02	6	Transposons Class Presentation #2
March 09	7	Splicing Class Presentation #3
March 16	8	<b>Spring Recess (no class)</b>
March 23	9	<b>MIDTERM EXAM (closed book)</b>
March 30	10	Gene Regulation Class Presentation #4
April 6	11	Epigenetics Class Presentation #5
April 13	12	Bacterial and Viral Genetics Class Presentation #6
April 20	13	Noncoding and Regulatory RNAs <b>Quiz #2 (closed book)</b>
April 27	14	DNA Technology 1 Class Presentation #7
May 4	15	DNA Technology 2 Class Presentation #8
May 11	16	<b>FINAL EXAM (closed book)</b>

## **GRADED MATERIALS:**

### **1. Midterm and Final Exams (60% of grade)**

The exam question format will be a combination of multiple-choice questions and questions for which you must provide descriptive answers. 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 60% 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. The midterm exam will cover lecture materials from week 1 through week 7. The final exam will cover lecture materials from week 10 through week 15.

### **2. Quizzes (20% of grade)**

The quiz question format will be multiple-choice only, and as with the exams all questions will be derived directly from the lecture materials. There will be 2 quizzes for the course, as indicated in the course schedule above. Quiz #1 will cover lecture materials from week 1 through week 3, and quiz #2 will cover lecture materials from week 9 through week 11. There are no make-up quizzes under any circumstances; however, if you have a valid excuse to miss a quiz (must provide appropriate official and verifiable documentation), the percentage of total grade assigned to the missed quiz will be added to your final exam (i.e., your final exam will account for 40% of your final grade).

### **3. Class Presentation (15% of grade)**

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) 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.

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. For the class presentations, use of short accurate videos that you may have found on the internet (only a few minutes in duration) is fine but otherwise the presentation should be your own.

If you miss your class presentation but have an official and verifiable documented excuse that is appropriate, a make-up time will be provided to provide you with the opportunity to do your presentation.

### **4. Class Attendance (5% of grade)**

You must be online and have your video turned on for the entire length of all the online lectures to receive full credit for this portion of the grade. The percentage of total grade assigned to online attendance is

distributed equally among all the lecture classes for the semester. If you miss a class and do not have a valid documented excuse, or your “absence from class request” has not been granted in advance, you will not receive credit for the portion of grade for that class. If you have a legitimate reason not to attend, you should notify me in advance and arrange to receive any notes, etc. from a classmate.

**\*\*\*EXTREMELY IMPORTANT\*\*\*:**

All quizzes and exams will be administered through the Respondus Lockdown browser with both webcam and microphone, which does both video and sound recording of you and your environment during the entire time that you are taking the test. You MUST make sure to do all the items listed below with due diligence. It is entirely YOUR responsibility to observe all that has been indicated below with regard to taking the quizzes and exams using the Respondus software, and you must fully accept the consequences if you fail to observe one or more of these items. Everyone in the class is required to send me an e-mail indicating that you have fully understood this section of the syllabus and that you agree to accept FULL RESPONSIBILITY for observing all that has been indicated and also FULLY ACCEPT the consequences if you fail to observe one or more of these items:

1. Before taking a quiz or exam, you must make sure to have the Respondus Lockdown browser installed on your computer with webcam and microphone and test it to make sure it works (NO EXCEPTIONS). If you run into any IT issues, including when you go to take a quiz or exam, you should contact the GMU IT services; the following link provides information on various ways to contact the IT services at GMU for assistance: <https://its.gmu.edu/help-support/its-support-center/>
2. It is your responsibility to do your part in ensuring that Respondus does not fail to record your exams and quizzes in their entirety. Therefore, you must make sure that you plan ahead to take the exam in a location that has strong and uninterrupted/reliable internet connection.
3. Before you begin the test, you are required to pan the camera slowly to clearly show the ENTIRE room in which you are taking the exam, including everything that is on the desk at which you sit to take the exam and everything that is in front of you, plus underneath the desk, the entire floor and ceiling of the room as well. It is fine to have a white piece of paper and pen with you in case you need to write things down as you are taking the test, but you must show to the camera both the front and back side of the sheet to show that it is an empty sheet. There should not be anyone with you in the room during the exam and you are not allowed to leave the room at any time during the test.
4. NO FORM OF COMMUNICATION BY PHONE OR ANY OTHER DEVICES IS ALLOWED DURING AN EXAM.
5. You must make sure that your entire face is seen by the camera throughout the exam. You also need to pay attention to where you are looking (your eye movements) when you are taking the test. If you often look away from the computer screen for the test with a fixed look or stare at something else that could be indicative of reading something other than the test, the software flags your video and it can raise suspicions.
6. All students must abide by the letter and the spirit of the Honor Code at Mason. Please be sure to diligently do all the steps indicated above and strictly follow the Honor Code at GMU as described below. If a suspicion of Honor Code violation is raised (such as suspicion of cheating on an exam), the Office for Academic Integrity (OAI) at GMU must be informed according to what has been requested of the faculty. If they find evidence of Honor Code violation, the OAI could choose to impose severe sanctions that could have major implications. As I am always very much invested in the success of every student and deeply wish that all the students in the class do as well as possible, it would sadden me greatly to have to refer any case to the OAI. To avoid this and prevent a difficult situation for yourself, please be sure to be alert and strictly follow the Honor Code:

**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 (quiz or exam), 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 31 Last day to add class  
February 07 Last day to drop with 100% tuition refund  
February 14 Last day to drop with 50% tuition refund  
March 23 Midterm exam  
May 11 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.

### **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!**