MCB 4304/6937 Syllabus Molecular Genetics 2022

Sections 0665/01H1/3014/3015/2525
(3 credits) (Fall) Molecular Genetics; transcription, translation, replication, gene regulation, RNA structure and function, chromosome structure and function, prokaryotic/eukaryotic (and human) molecular genetics and evolution
Instructor: Dr. Nemat O. Keyhani

Office: Micro Blgd, Rm 1001
Class hours: All materials will be on the CANVAS site including lecture videos, Powerpoint presentations, and study guides. In class sessions to be determined as needed.
Required Book: Molecular Biology 5th Edition, Robert F. Weaver, McGraw Hill

Supplemental reading (not required); Genome, Matt Ridley
Behavioral Genetics, R. Plomin, J.C. DeFries, G.E. McClearn, and P. McGuffin

Office hours: Can be arranged as needed.

COURSE OBJECTIVES:

→To understand the molecular basis for transcription, translation, replication, and gene regulation and other topics in molecular genetics for both prokaryotes and eukaryotes
→To understand the underlying theoretical principles of the scientific methods and approaches of molecular genetics
→ To be able to critically interpret experimental designs related to molecular genetics
→ To acquire an appreciation for the impact of molecular genetics (particularly of human) in physiology, evolution, and disease

EVALUATION OF LEARNING:

Learning will be evaluated based on the following criteria:

1. 100 points each × 3 exams

EXAMS ARE TYPICALLY ESSAY QUESTIONS/SHORT ANSWERS & some multiple choice/other

2. Presentation (25%)
    a. 100 pts

400 points total for the CLASS

Final grades will be based on the following performance standard:
>360 points = A
348-359 points = B+
330-358 points = B
320-329 points = B-
305-319 points = C+
290-304 points = C
280-289 points = C-
240-279 = D
Less than 239 = E

Exams: The three exams (100 points each) are scheduled throughout the semester for this course. The exams will focus on the material covered in class. The student should read the textbook chapters as needed. Most (almost all) information will be covered in the lecture videos and notes.

EXAM POLICY: No materials are allowed for any of the exams, online or in class. Online exams cannot be printed, no outside materials used. If for any reason online exam cannot be certified as to its integrity, the exam will need to be retaken at a testing center or equivalent facility.

Student Presentation: Students will make a short (15 minute, Powerpoint) presentation (via ZOOM or in class to be decided by the student) on a topic relevant to the course including but not limited to the impact of genetics/genomics on medicine and/or society, the future of genetic and genomic research, and genetic testing promises and pitfalls. Information concerning the organization and what is expected for this will be given in greater detail in class. This will comprise 25% of the student grade.

Make-up policy: No make-up exams. If an exam is missed, it will result in a score of 0 for the test (see below for "Excused absences").

Honor Code and Academic Honesty: All students are bound by the University of Florida Student Honor Code. As a result of completing the registration form at the University of Florida, every student has signed the following statements: "I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure

to comply with this commitment may result in disciplinary action up to and including expulsion from the University." Any violations will be forwarded to the appropriate University oversight committee for review.

ONLINE EXAM TAKING: Online exams MUST adhere to the Honor system and the integrity of the process needs to be maintained. If the integrity of the test taking PROCESS cannot be verified, even due to accidental reasons, the exam may be voided. Depending upon the situation a MAKE-UP exam may be offered at the discretion of the instructor.

Excused absences: Documentation MUST be provided for absences caused by serious illness, accident, jury duty or death in the immediate family. You MUST contact the instructor IN ADVANCE of the missed exam. An alternative time for the exam will be arranged by the instructor.

UF Counseling Services: Resources are available on-campus for students having personal problems or lacking clear career and academic goals that interfere with their academic performance. These resources include:
1. University Counseling Center, 301 Peabody Hall, 392-1575. Personal &career counseling.
2. Student Mental Health, Student Health Care Center, 392-1171. Personal counseling.
3. Sexual Assault Recovery Services, Student Health Care Center, 392-1161. Sexual assault counseling.
4. Career Resource Center, Reitz Union, 291-1601. Career development counseling.

Software Use: All faculty, staff and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. *We, the member of the University of Florida, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.*

Accommodations for Students with Disabilities: The Dean of Students Office provides individualized assistance for students with documented disabilities. Services are based upon student need and impact of their specific disability. There is no requirement for any student to self-identify as having a disability. However, students requesting academic accommodations must register with the Dean of Students Office and provide the appropriate documentation verifying their disability. The Dean of Students Office determines what is and is not appropriate documentation. Examples of

accommodations that are available to students include, but are not limited to, registration assistance,
approval of reduced course load, course substitutions, classroom and examination accommodations, auxiliary learning aids, additional course drops when disability related, and assistance in other university activities. The designated coordinator for compliance with Section 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) is the Assistant Dean of Students responsible for Students with Disabilities Programs, P202 Peabody Hall, 392-1261 (Voice), or 392-3008 (TDD).

Lectures

Class is mainly lecture-based. All information pertinent to class, exams, etc are discussed during lectures. A "study guide" MAY be provided at the instructor's discretion.

MCB 4304/6937 Syllabus 2022
Molecular Biology, Weaver 5th Edition

Date	Topic
Week 1	1. Welcome 2. Introduction- The Rational & Irrational 3. Overview & Background 4. Chapter 1: Initial Concepts 5. Chapter 2: Molecular Nature of Genes
Week 2	6. Chapter 3: Introduction to Gene Function 7. Risk & Pseudoscience 8. Case Study 1: Genetic of Gender 9. Chapter 4: Molecular Cloning (part 1) 10. Chapter 4 – Part 2
Week 3	11. Notes on Genetic Engineering

12. Chapter 5 – Molecular Tools (Part 1)
13. Chapter 5 – Part 2
14. Chapter 5 – Part 3

Week 4

15. Mechanism and applications of CRISPR-Cas9
16. Chapter 6 – Mechanisms of transcription (Part 1)
17. Chapter 6 – Part 2
18. Chapter 6 – Part 3

Week 5

19. Chapter 7 – Gene Regulation & Operons (Part 1)
20. Chapter 7 – Part 2
21. Chapter 7 – Part 3
22. Chapter 7 – Part 4

EXAM 1 Sept 30/Oct 1

Week 6

Chapter 8 & 9: DNA Protein Interactions
Ascent of Genetics

Week 7

Chapter 10: Eukaryotic Transcription
Genomes and genome analyses
PRESENTATIONS (don't forget you will need to sign up)
Presentations will go from Week 7/8 to Week 13 as needed

Week 8

Chapter 11: Eukaryotic General Transcription Factors
Evolutionary Genetics

Week 9

Chapter 12: Mechanisms of action: Eukaryotic Transcription Activators
Chapter 13: Chromatin Structure

Week 10

Topics in Genomics

EXAM 2 Nov 4/5

Week 11

Chapter 14/15: Topics in RNA Splicing
Chapter 16: Posttranslational modifications

	Topics in Translation
Week 12	Chapter 21/22: DNA replication, Mutation, and Repair
Week 13	Human Genetics
Week 14	Epigenetics: DNA methylation
Week 15	Epigenetics: RNAi
	EXAM 3 Dec 7