

## **BIO 495 – Molecular Genetics**

**Western Kentucky University**

### **Syllabus and Course Information Sheet Summer 2020**

**INSTRUCTOR:** Dr. Chandra Emani Associate Professor

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#### **Class Schedule:**

Daily Video Lectures; Blackboard Course site (Monday through Friday)

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### **WELCOME TO BIO 495**

Congratulations to you all for joining the Western Kentucky University academic family and a warm welcome to our Genetics community. I am all excited and looking forward to exploring with you all the SECRET OF LIFE through the world of DNA, RNA and proteins. This course will be a memorable journey of an advanced area of biology that will lay a strong foundation of the basic concepts of molecular biology and genetics.

As in my earlier classes I will adopt the teaching methodology of “deep learning,” a process where the student learns with understanding as opposed to rote or surface learning where he/she just collects innumerable unrelated facts. I excitedly look forward to a fulfilling experience in our classes, where we will work together and undertake a journey through episodic historical anecdotes, real world examples and modular schematic visuals towards a greater understanding of ourselves and the life around us. The rest of the course information sheet will help you to understand the objectives we will achieve through this course, the methods used to measure and gauge your progress throughout the course, and the WKU academic policies and rules.

### **COURSE DESCRIPTION**

Biology 495 is an advanced survey of the principles of molecular biology and genetics that includes an introduction to basic concepts of how heredity is controlled by biomolecules such as DNA, RNA and proteins, the fine structure of genetic elements, the regulatory molecular processes of gene expression and the understanding of principles involved in basic molecular biology, genetics, and biotechnology.

### **COURSE OBJECTIVES AND STUDENT LEARNING OUTCOMES**

After successfully completing Biology 495, the student will have a working knowledge of:

1. The role of DNA, RNA and proteins in heredity.
2. The basics of molecular biology to understand gene expression and regulation.

3. The fine structure of the gene and the molecular structural elements involved in heredity.
4. The information in DNA, RNA and protein sequences to understand the sequence related functions.
5. The molecular processes underlying gene expression and regulation.
6. The genetic code and its functions that govern the central dogma of life. 7. The molecular basis of disease.

## **EXPANDED COURSE DESCRIPTION**

Please refer to the lecture schedule at the end of this document

## **REQUIRED TEXTBOOK**

**Lewin's Essential Genes** by Jocelyn E. Krebs, Elliot S. Goldstein and Stephen T. Kilpatrick (2020), Fourth Edition, Jones and Bartlett Publishers, Sudbury, Massachusetts. ISBN: 9781284173130.

## **CLASS POLICIES**

**Attendance:** WKU believes that regular class attendance is a crucial component for student success. Every class lecture is a vital foundation for subsequent class meetings. Without full participation and regular class attendance, students will be at a severe disadvantage for achieving success at college. Class participation especially in an online course heavily influences the outcome of your final grade. It is my responsibility as a faculty member, to determine how participation is achieved in all my classes. I will require students regularly attend the web sessions, and will keep a record of attendance from the first day of class and/or the first day the student's name appears on the roster through final examinations. When a student has 5 days unexcused absences in the form of inactivity in the discussion forums online, I will record the student's unexcused absences. The student will receive an emailed warning from me that upon one more day of unexcused absence, the student will be dropped from all classes in which the unexcused absences are reported. Some of the forms of absence that considered officially excused are: (1) Sick and medical emergencies (2) Representing WKU at an official institutional function. Other excuses will be considered, at my discretion, with documentation.

**Dropping:** If a student chooses to drop the course, it is that student's responsibility to ensure proper documentation with WKU. Failure to do so could result in a grade of F in the course. If you wish to withdraw from the course you should do so by the dates mandated by the University. Be sure you are aware of these dates because credit for the course will not be changed after the university's designated time. You also cannot drop the class or Withdraw after the designated time.

**Disabilities:** "Students with disabilities who require accommodations (academic adjustments and/or auxiliary aids or services) for this course must contact the Office for Student Disability Services at (270) 745-5004. Please DO NOT request accommodations directly from the professor or instructor without a letter of accommodation from the Office for Student Disability Services."

**Eating and drinking** are allowed during class limited to only bottled water or juices and noise-free snacks.

**Dishonesty Statement:** WKU does not tolerate cheating, plagiarism or other acts of dishonesty. Definitions of these acts and procedures for dealing with them are described in the WKU standards of professional conduct on the university website and in the student handbook.

**Civility Statement:** Members of the WKU community, which includes faculty, staff and students, are expected to act responsibly in classroom even in a virtual web-based environment. WKU holds all members accountable for their actions and words. Therefore, all members should commit themselves to behave in a manner befitting a responsible College and Civilian community. Responsible College and Civil behavior in an online environment applies to language and behavior in postings of discussion forums. Please desist from posting personal, offensive and inappropriate comments in the discussion forums.

## **COURSE REQUIREMENTS AND CRITERIA FOR GRADING**

**Lecture Exams and Final Exam:** There will be three lecture exams during the semester and a comprehensive final exam. Exams will be of multiple-choice questions that will be administered online. Make-up exams are only offered to students with an excused absence. Excused absences include those officially recognized by WKU, plus a death in the family, or an illness with doctor's certification. To arrange for a make-up exam see me during the first class period following your absence. **An unexcused absence from an exam will result in a grade of zero. There will be no make up for the Final Exam**

### **Point Distribution:**

Lecture Exams (3 exams x 100 points each) 300 points

Final exam 200 points

500 points

### **Lecture Topics and Schedule**

#### **INTRODUCTION-THE DNA STORY**

The Molecules of Life (Chapters 1, 2)

Methods of Molecular genetics (Chapters 3)

#### **Exam 1**

The Book of Life (chapters 4, 5)

The nuts and bolts of life (Chapters 6, 7)

Molecular Evolution (Chapters 8)

The chapters of life (Chapter 9, 10)

How DNA copies itself (Chapters 11, 12, 13)

## **Exam 2**

How DNA recombines and repairs itself (Chapters 14, 15, 16)

Jumping genes and Immune system genes (Chapters 17, 18)

Life messages (Chapters 19, 20)

The editing of life (Chapters 21, 22)

## **Exam 3**

The code and music of Life (Chapters 23, 24, 25)

The switchboard of life (Chapters 26, 27)

Selfish Gene (Chapters 28, 29)

The RNA world

## **Final**