



BIOC 2203 RECOMBINANT DNA METHODS MASTER COURSE SYLLABUS

Instructors will provide students with additional course-specific information, including attendance/makeup policies, assignment/test scheduling, and instructor contact information, as necessary and appropriate.

Prerequisite(s):	BTEC 2192, 2192L
Co-requisite(s):	BIOC 2203L
Term(s) Offered:	Fall and Spring
Class Hours:	3
Lab Hours:	0
Credit Hours:	3

Course Description

This course provides a fundamental knowledge of DNA and protein structure at the molecular level. The course contents include an in-depth exploration of how molecular structure determines biological function such as basic cellular mechanisms, enzymatic activities, DNA replication and repair as well as gene expression. Modern molecular tools analyzing genes and genomes are also discussed in this course.

Course Competencies and Student Learning Outcomes

To introduce cell architecture and chemical components of cells.

Order	Description
1	To describe microscopy and cell architecture.
2	To describe chemical bonds and groups.
3	To describe the structure of sugars and lipids.
4	To describe the structure of amino acids in proteins.
5	To describe the structure of nucleotides in RNA and DNA.
6	To describe the properties of water.

To explain energy, catalysis and biosynthesis.

Order	Description
1	To explain the use of energy by cells.
2	To explain the purpose and importance of biological catalysts.
3	To explain the function of activated carrier molecules involved in biosynthesis.

To describe protein structure.

Order	Description
1	To describe peptide bond formation.
2	To describe the structural features of proteins.
3	To describe the levels of organization of protein structure.

- 4 To describe the various shapes of proteins.
- 5 To explain protein stabilization.
- 6 To explain protein separation by chromatography and electrophoresis.

To understand nucleic acid structure.

Order	Description
1	To examine the Griffith, the Avery et al. and the Hershey & Chase experiments.
2	To describe the structure of DNA and RNA.
3	To describe the structure of chromosomes including chromosomal packing.
4	To explain the regulation of chromosome structure.

To explain DNA replication and repair.

Order	Description
1	To describe the molecular composition and function of the replication machinery.
2	To examine the various functions of DNA polymerase during bidirectional DNA synthesis.
3	To examine the role of telomerase.
4	To explain the molecular consequences of mutations.
5	To explain the three mechanistic steps of DNA repair.
6	To describe DNA mismatch repair.

To explain DNA transcription and translation.

Order	Description
1	To describe the transcription of DNA sequences into mRNA.
2	To examine the role of RNA polymerase.
3	To explain the structural importance of promoters.
4	To explain RNA splicing.
5	To describe the significance of the genetic code.
6	To explain the structure and function of tRNA, rRNA and ribosomes.
7	To describe the initiation, progress and termination of translation.

To describe the molecular techniques used to analyze genes and genomes.

Order	Description
1	To describe restriction endonucleases and their mode of action.
2	To describe electrophoresis of DNA molecules.
3	To describe DNA hybridization and transfer.
4	To describe DNA ligations and the mechanism of DNA ligase.
5	To describe DNA sequencing.
6	To describe polymerase chain reaction amplifying selected DNA sequences.

Required Textbook(s) and Materials

Students enrolled in this course are obligated to have the following:

Alberts et al. *Essential Cell Biology* (Third Edition). Garland Science Publishing (ISBN 978-0-8153-4129-1).

Micklos and Freyer (with Crotty): *DNA Science – A First Course*.

Second Edition, Cold Spring Harbor Laboratory Press (ISBN 0879696362).

Grading Scale

The grading scale is detailed in the *Catalog and Student Handbook* and listed below for reference. All faculty members follow this scale when assigning grades to reflect a given student's performance in the classroom.

<u>Grade</u>	<u>Numerical Equivalent</u>	<u>Grade Point</u>
A/A*	90-100	4
B/B*	80-89	3
C/C*	70-79	2
D/D*	60-69	1
F/F*	0-59	0

Effective Summer Quarter 2006, Athens Technical College replaced the S/U grading system used for learning support classes with an A*-F* grading system. The registrar uses an asterisk (A*, B*, C*, D*, F*, W*, WF*, WP*) to designate learning support course grades on transcripts and grade reports because these grades are not components of the term grade point average.

Academic Support Center:

The Academic Support Centers of Athens Technical College (ATC) provide free tutoring for enrolled students. Both instructors and peer tutors provide tutoring in almost all subjects offered by the college. Information about the Center is accessible via the ATC website at <http://www.athenstech.edu/StudentDevelopmentServices/AcademicSupportCenter>. To find out the specific services available on the Athens, Greene, and Walton Campuses, please call (706) 583-2839. To contact the Academic Support Center on the Elbert County Campus, please call (706) 213-2129.

Attendance

Regular class attendance is important and expected. The college considers both tardiness and early departure from class as forms of absenteeism. Students absent from class for any reason are still responsible for all work missed. Instructors have the right to determine whether work missed can be made up and have the liberty to set reasonable expectations for attendance based on frequency of class meetings and on the instructional delivery method, subject, type, and level of the class. Class attendance policies will be clearly stated for students by their respective instructors on separate documents (course outlines/schedules) or appendices to the master syllabus.

Course Withdrawal

Students may withdraw from a course without academic penalty until the midpoint of the term. Students withdrawing after the midpoint of the term receive grades of WP – Withdrawal Passing, or WF – Withdrawal Failing. Students who stop attending class(es) without formally withdrawing risk earning a final grade of F, which will appear on the academic transcript. Withdrawing from a course may impact financial aid status, academic standing, and GPA. Refer to the ATC *Catalog and Student Handbook* for further details: <http://www.athenstech.edu/Catalog/>

Course Technology

Course addendum will provide details concerning the use of technology in the course. Course schedule types include **web-enhanced** – taught face-to-face; **online** – taught online using the internet, may require proctored exam; **hybrid** – class time is split between face-to-face and online; **video conference** – taught at two or more campus locations simultaneously with instructor located at one of the classroom locations. More details are available on the Athens Technical College website: <http://www.athenstech.edu/eLearning/CourseList.cfm>

Continuation of Instruction

In the event of severe weather or other emergency, students will be expected to continue participating in learning activities via ANGEL, Athens Technical College email, or other modality. Instructors will provide a plan for the continuation of instruction.

Work Ethics:

To fulfill the responsibility to teach essential workplace ethics, the college provides students instruction in, and evaluates students on, the following ten work ethics traits: attendance, character, teamwork, appearance, attitude, productivity, organizational skills, communication, cooperation, and respect. To best equip students for successful workplace experiences in their chosen profession, instruction and evaluation takes place in the context of their program of study.

Academic Honesty

Academic honesty is expected at all times. Any student found to have engaged in academic misconduct such as cheating, plagiarism, or collusion is subject to disciplinary sanctions as outlined in the Student Code of Conduct detailed in the *ATC Catalog and Student Handbook*. See the following link for the complete Academic Honesty policy:

<http://www.athenstech.edu/StudentAffairs/AcademicHonesty/Academic%20Honesty.pdf>

Students are also advised to complete the tutorial on Academic Honesty available here:

<http://www.athenstech.edu/StudentAffairs/AcademicHonesty>

Americans with Disabilities Act

It is our goal at Athens Technical College to provide equal access to education for all students. Any student with a documented disability is eligible to receive reasonable academic adjustments and auxiliary aids in the classroom and/or for testing at Athens Technical College, as long as appropriate documentation of the disability has been submitted to the Disability Services Office in a timely manner. Students can access the application packet on our website:

http://www.athenstech.edu/CurrentStudents/orientation/files/disability_services_application.pdf

Cell Phones and Electronic Devices

Cell phone use in the classroom for non-instructional purposes, with the exception of receiving emergency notifications, is prohibited.

Food/Drinks in Classroom

Food and beverages (other than water) are not allowed in classrooms/labs.

Communication with ATC Faculty and Staff

Students, faculty, and staff must use Athens Technical College email and ANGEL accounts for all college-related communications. Students are obligated to check their email and ANGEL accounts on a regular basis, preferably daily.

Warranty of Graduates

The Technical College System of Georgia warrants every graduate of technical programs in which students may earn technical certificates of credit, diplomas, or associate degrees. The warranty guarantees that graduates demonstrate the knowledge and skills and can perform each competency as identified in the industry-validated standards established for every program of study. If one of our graduates educated under a standard program or his/her employer finds that the graduate is deficient in one or more competencies as defined in the course/program standards, Athens Technical College will retrain the employee at no instructional cost to the employee or the employer. This guarantee is in effect for two years after graduation.

TEACH Act

According to the TEACH Act of 2002, Athens Technical College is obligated to advise you that instructional material included in this course may be subject to copyright protection. As such, you must not share, duplicate, transmit, or store the material of this course beyond the purpose and time frame explicitly stated in the syllabus of your course. If you are not certain whether a particular piece of material is covered by copyright protection, you should contact your instructor and obtain his/her written clarification. Failing to observe copyright protection is a violation of law.