BIOC 2203L
RECOMBINANT DNA METHODS LAB

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):	Permission of Department BTEC 2192 with a grade of C or higher, BTEC 2192L with a grade of C or higher
Co-requisite(s):	BIOC 2203
Term(s) Offered:	Fall and Spring
Class Hours:	0
Lab Hours:	9
Credit Hours:	3

Course Description

The recombinant DNA laboratory course provides students with fundamental molecular techniques involved in genetic engineering. Intensive bench training includes large scale plasmid isolation, restriction analysis, ligations, generation of recombinant DNA, preparation of a genomic library, Southern blot analysis and purification of a restriction enzyme. Further, students will develop and perform PCR protocols as part of a research project analyzing a selected class of genetically modified organisms. The research project must be accompanied by authoring a formal research report to be presented in class.

Course Competencies and Student Learning Outcomes

To prepare a recombinant plasmid conferring double antibiotic resistance in E. coli.

Order	Description
1	To prepare large scale plasmid DNAs.
2	To prepare specific restriction digests and ligation products.
3	To perform a transformation of an appropriate host strain with the recombinant ligation mixture.
4	To explain the transformation results yielding a specific recombinant plasmid structure using proper selection.

To generate a phage library using blue-white cloning.

Order	Description
1	To prepare special media containing a chromogenic substrate.
2	To prepare restriction digests and ligation products using appropriate vector DNA and specific insertion fragments.
3	To perform a blue-white cloning procedure.
4	To examine a phage library construct.

To purify and to assay a restriction enzyme.

Order	Description
1	To demonstrate the ability to pack and to equilibrate DEAE-cellulose columns.
2	To perform the purification of EcoRI.
3	To examine purified EcoRI using assays verifying and documenting its specific restriction activity.

To perform a Southern blot analysis.

Order	Description
1	To demonstrate the ability to transfer DNA fragments from a gel onto a membrane.
2	To describe the design of sequence-specific DNA probes for detection.
3	To describe non-isotopic detection systems using specific biotinylated probes.
4	To point out DNA-DNA hybridization products using specific protocols for color development.

To conduct and to analyze PCR reactions based on standard protocols.

Order	Description
1	To demonstrate the ability to perform PCR reactions using standard protocols such as for genetic typing, reverse transcriptase and water quality testing.
2	To examine PCR-based Alu-human DNA typing results.
3	To examine reverse transcriptase PCR results.
4	To examine PCR-based water quality testing results for coliforms.

To develop, conduct and to complete an independent PCR project.

Order	Description
1	To describe specific primer design required to amplify loci detecting genetically modified maize and/or soy.
2	To develop specific PCR protocols allowing the detection of genetically modified plant DNAs.
3	To demonstrate the ability to perform PCR reactions based on developed protocols.
4	To examine PCR results testing maize and/or soy genomes for the presence of genetically modified DNAs.
5	To produce a unique laboratory report documenting PCR research results.

Required Textbook(s) and Materials

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

Micklos and Freyer (with Crotty): *DNA Science - A First Course*.
Second Edition, Cold Spring Harbor Laboratory Press (ISBN 0879696362).

Laboratory notebook (Scientific Notebook Company #1301 required)

Scientific calculator

Lab coat

Safety glasses

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.

Grade	Numerical Equivalent	Grade Point

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 warranties 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.