



BIOTECHNOLOGY

CODE: BIT 210

TITLE: Molecular Genetics

DIVISION: STEM

COURSE DESCRIPTION: This course describes recombinant DNA techniques, as well as molecular biology of genes. It discusses molecular cloning, plasmid design, transfection and protein expression systems. It provides laboratory experience with plasmid isolation, transformation, electrophoresis, and PCR.

PREREQUISITE: BIO 103, BIO 104

CREDITS: 3 cr.

REQUIRED MATERIALS (CHECK BOOKSTORE FOR LATEST EDITION):

Click on the bookstore for the supplies which you are attending each class.

Rcbc.edu/bookstore

COURSE LEARNING OUTCOMES:

Upon completion of this course, students will be able to:

- Explain the fundamental molecular processes of the cell, including DNA replication, transcription and translation.
- Compare and contrast prokaryotic and eukaryotic cells with regard to cell structure and molecular processes.
- Perform techniques, such as gel electrophoresis, polymerase chain reaction, and transformation and restriction digest analysis.
- Identify and discuss global issues that affect biotechnology such as therapeutic cloning, stem cell research and the Human Genome Project.
- Demonstrate proficiency in maintenance of a laboratory notebook.
- Compare and contrast the process of gene regulation in prokaryotic and eukaryotic cells, particularly as it affects the synthesis of recombinant proteins.

GENERAL EDUCATION OUTCOMES IN THIS COURSE:

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| Written and Oral Communication: Communication | * Students will logically and persuasively support their points of view or findings. |
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| | <p>* Students will communicate meaningfully with a chosen audience while demonstrating critical thought.</p> <p>* Students will conduct investigative research which demonstrates academic integrity, originality, depth of thought, and mastery of an approved style of source documentation.</p> |
| Quantitative Knowledge and Skills: Mathematics | <p>* Students will analyze data to solve problems utilizing appropriate mathematical concepts.</p> <p>* Students will translate quantifiable problems into mathematical terms and solve these problems using mathematical or statistical operations.</p> <p>* Students will logically solve problems using the appropriate mathematical technique.</p> |
| Scientific Knowledge and Reasoning: Science | <p>* Students will understand and employ the scientific method of inquiry to draw conclusions based on verifiable evidence.</p> <p>* Students will explain the impact of scientific theories, discoveries, or technological changes on society.</p> <p>* Students will demonstrate critical thinking skills in the analysis of scientific data.</p> |
| Technological Competency or Information Literacy: Technology | <p>* Students will demonstrate competency in office productivity tools appropriate to continuing their education.</p> <p>* Students will use critical thinking skills for computer-based access, analysis, and presentation of information.</p> <p>* Students will exhibit competency in library online database tools appropriate to accessing information in reference publications, periodicals and bibliographies.</p> <p>* Students will demonstrate the skills required to find, evaluate, and apply information to solve a problem.</p> |

CORE COURSE CONTENT:

- DNA, Chromosomes, Cells Safety
- Replication Microbial Techniques
- Transcription Pour Agarose Gels
- Pipetting Exercises
- Translation Load DNA gels
- Electrophoresis what size is your DNA

- Mutation and Repair Isolation of Plasmid/Chromosomal DNA
- Viral Genetics
- Restriction Digest / Ligation
- Prokaryotic Genetics and Regulation
- Molecular Techniques
- Transformation
- Genomics
- Southern Blot
- Molecular Analysis of Genes
- Eukaryotic Gene Expression
- Mitochondrial DNA / PCR
- Gene Regulation
- Vaccines
- Confirm Amplification

COURSE ACTIVITIES:

Course activities vary from course to course and instructor to instructor. Below is a listing of some of the activities students can anticipate in this course:

- ▶ Writing assignments: students will analyze current issues in the field using current articles from the popular press as well as library research including electronic resources databases.
- ▶ Speaking assignments: students will present research individually or in groups using current technology to support the presentation (e.g., PowerPoint presentation); students will participate in discussions and debates related to the topics in the lessons. Discussions may also focus on cross-cultural and legal-ethical dilemmas as they relate to the course content.
- ▶ Simulation activities: Trends and issues will analyzed for their ethical as well as social or legal significance. Students might role-play common situations for classmates to analyze. Current news articles may be used to generate discussion.
- ▶ Case Studies: Complex situations and scenarios will be analyzed in cooperative group settings or as homework assignments.
- ▶ Lectures: This format will include question and answer sessions to provide interactivity between students and instructor.
- ▶ Speakers: Representatives from various related fields may be invited to speak.
- ▶ Videos: Related topics will provide impetus for discussion.

EDUCATIONAL TECHNOLOGY:

Rowan College at Burlington County advocates a technology enhanced teaching and learning environment. Advanced technological tools may be used in any course section to facilitate instruction. Many of our sections are web-enhanced, which means that some of your work will be submitted or completed online. Web enhancements may include on-line materials, grade books, testing and quizzes and assignment submission. Many students enjoy the flexibility and convenience that these online enhancements have provided, however if you have concerns about the technology involved, please speak to your instructor immediately.

STUDENT EVALUATIONS:

The student will be evaluated on the degree to which student learning outcomes are achieved. A variety of methods may be used such as tests, quizzes, class participation, projects, homework assignments, presentations, etc.

See individual instructor's course handouts for grading system and criteria (point value for each assessment component in course, e.g. tests, papers, presentations, attendance etc.), number of papers and examinations required in the course, and testing policy including make ups and/or retests.

GRADING STANDARD:

- A Mastery of essential elements and related concepts, plus demonstrated excellence or originality.
- B+ Mastery of essential elements and related concepts, showing higher level understanding.
- B Mastery of essential elements and related concepts.
- C+ Above average knowledge of essential elements and related concepts.
- C Acceptable knowledge of essential elements and related concepts.
- D Minimal knowledge of related concepts.
- F Unsatisfactory progress. This grade may also be assigned in cases of academic misconduct, such as cheating or plagiarism, and/or excessive absences.

For other grades, see the current ROWAN COLLEGE AT BURLINGTON COUNTY catalog.

COLLEGE POLICIES:

The current college catalog and student handbook are important documents for understanding your rights and responsibilities as a student in the RCBC classroom. Please read your catalog and handbook as they supplement this syllabus, particularly for information regarding:

- ▶ Academic Integrity Code
- ▶ Student Conduct Code

▶ Student Grade Appeal Process

OFFICE OF STUDENT SUPPORT AND DISABILITIES SERVICES:

RCBC welcomes students with disabilities into the college's educational programs. Access to accommodations and support services for students with learning and other disabilities is facilitated by staff in the Office of Student Support (OSS). In order to receive accommodations, a student must contact the OSS, self-identify as having a disability, provide appropriate documentation, and participate in an intake appointment. If the documentation supports the request for reasonable accommodations, the OSS will provide the student with an Accommodation Plan to give to instructors. Contact the Office of Student Support at 609-894-9311, ext. 1208 or visit the website at:

www.rcbc.edu/studentsupport

ADDITIONAL SUPPORT/LABS:

RCBC provides academic advising, student support personal counseling, transfer advising, and special accommodations for individuals with disabilities free to all students through the Division of Student Services. For more information about any of these services, visit the Laurel Hall on the Mt. Laurel Campus, or call (609) 894-9311 or (856) 222-9311, then dial the desired extension:

- Ext. 1557 Academic Advisement and Counseling
- Ext. 1803 Special Populations
- Ext. 2737 Transfer Center

Or visit the following websites:

Academic Advising www.rcbc.edu/advising
Student Support Counseling www.rcbc.edu/counseling
Transfer Center www.rcbc.edu/transfer

RCBC offers a free tutoring for all currently enrolled students. For more information regarding The Tutoring Center call Extension 1495 at (609) 894-9311 or (856) 222-9311 or visit the Tutoring Center Website at www.rcbc.edu/tutoring

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