This syllabus is provided as a general informational guide. Some of the information may vary depending on the specific course section and instructor. Different sections of the same course may require different textbooks. Verify the section specific textbook information in the CUNY’s Academic Course Schedule Web Page. Modifications of the grading system presented here will be communicated by the instructors of the sections when they meet the class.

BOROUGH OF MANHATTAN COMMUNITY COLLEGE
City University of New York
Department of Science

Title of Course: Biotechnology  
BTE 201  
Semester: Fall 2021  
Credits: 5  
Schedule: Mondays 5:00-7:45 PM Online  
Wednesdays 4:00- 7:45 PM Online  
except Wednesday Oct 27 In Person N697 BMCC

Course Description  
This course introduces the student to theory and laboratory practices in molecular biotechnology with emphasis on the impact of biotechnology on daily life, health, ethics and society. The course is designed to impart the skills needed for entry-level jobs or to continue on a career path in biotechnology, by exposing students to a variety of careers, laboratory techniques and social issues in the biotechnology industry.  

Basic Skills ENG 095, ESL 095, ACR 095, MAT 051/056 or department approval  
Co-requisite: BIO 240  
Pre-requisite: CHE 201

Student Learning Outcomes and Assessments

<table>
<thead>
<tr>
<th>After completing this course, students will be able to</th>
<th>Assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Perform calculations to prepare buffers and stock solutions</td>
<td>Practical examination, laboratory, homework</td>
</tr>
<tr>
<td>2. Learn to use the major biological databases. Use bioinformatics software to analyze nucleic acids and proteins.</td>
<td>Homework</td>
</tr>
<tr>
<td>3. Understand the steps of identifying, designing and manufacturing a biotechnology product</td>
<td>Written examination, homework</td>
</tr>
<tr>
<td>4. Analyze health, ethical and social issues related to biotechnology</td>
<td>Written examination/ research paper</td>
</tr>
<tr>
<td>5. Practice Standard Operating Procedures</td>
<td>Practical examination/ homework/ Labster videos</td>
</tr>
<tr>
<td>6. Understand and uphold government regulations of biotechnology practices</td>
<td>Written examination/ research paper</td>
</tr>
</tbody>
</table>

General Education Goals  
Communication Skills- Students will read, write, listen and speak critically and effectively  
Quantitative Reasoning- Students will use quantitative skills and the concepts and methods of mathematics to solve problems  
Scientific Reasoning- Students will understand and apply the concepts and methods of natural sciences  
Information and Technology Literacy- Students will collect, evaluate and interpret information and effectively use information technologies  
Values- Students will make informed choices based on an understanding of personal values, human diversity.  

<table>
<thead>
<tr>
<th>Assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion, written examination</td>
</tr>
<tr>
<td>Practical examination, written examination</td>
</tr>
<tr>
<td>Practical examination, written examination</td>
</tr>
<tr>
<td>Research paper, practical examination, written examination</td>
</tr>
<tr>
<td>In-class and online discussion, written examination</td>
</tr>
</tbody>
</table>
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### multicultural awareness and social responsibility

### Required Text & Readings


Composition Notebook with Sewn Pages to use as Laboratory Notebook

Use of Technology (if applicable): BlackBoard, NCBI Databases, BLAST, Labster simulations, Video lessons on TED Ed, etc.

### Evaluation & Requirements of Students

Lecture and laboratory examinations and quizzes, written and oral reports, and practical examinations can be used to evaluate student performance.

## LECTURE SYLLABUS

<table>
<thead>
<tr>
<th>WEEK</th>
<th>TOPICS</th>
</tr>
</thead>
</table>
| 1    | *Ch 01: The Biotechnology Century and Its Workforce*  
Overview of Chapter Topics, Biotech Jobs |
| 2    | *Ch 02: An Introduction to Genes and Genomes*  
Cellular Molecules and Processes |
| 3    | *Ch 03: Recombinant DNA Technology and Genomics*  
Recombinant DNA History, Overview of Lab Techniques, Intro to Genomics |
| 4    | *Ch 04: Proteins as Products*  
Protein Structure, Industrial Protein Production, Purification |
| 5    | *Ch 05: Microbial Biotechnology*  
Microbes as Biotech Tools, Vaccines |
| 6    | *Ch06: Plant Biotechnology*  
Selective Breeding, Genetic Engineering, Applications |
| 7    | *Ch 07: Animal Biotechnology*  
Animals in Research, Alternatives, Cloning, Transgensics |
| 8    | *Ch 08: DNA Fingerprinting and Forensic Analysis*  
DNA Fingerprinting in Forensics, Familial Relationships, Non-human ID |
| 9    | *Ch 09: Bioremediation*  
Microbes, Soil and Water Remediation, Genetic Engineering Applications |
| 10   | *Ch 10: Aquatic Biotechnology*  
Aquaculture, Quality Control, Medical Applications |
| 11   | *Ch 11: Medical Biotechnology*  
Biomarkers for Diagnosis, Precision Medicine, Gene Therapy |
| 12   | *Ch 12: Biotechnology Regulations*  
Regulatory Framework, USDA, EPA, FDA |
| 13   | *Ch 13: Ethics and Biotechnology*  
Definitions of Ethics, Ethics in Science and Business |
| 14   |  |
| 15   | Cumulative Final Exam |
LABORATORY SYLLABUS

<table>
<thead>
<tr>
<th>WEEK</th>
<th>TOPICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Classroom Activity 1: Performing a Risk Assessment (Lab Manual page 4)</td>
</tr>
</tbody>
</table>
| 2    | Lab Exercise 3: Keeping a Laboratory Notebook (page 57)  
Classroom Activity 8: Writing and Following an SOP (page 66) |
| 3    | Lab Exercise 4: Recording Measurements with Correct Number of Significant Figures (page 77)  
Lab Exercise 5: Good Weighing Practices (page 84) |
| 4    | Lab Exercise 37: Aseptic Technique in an Open Lab Bench (page 310)  
Lab Exercise 38B: Using an Autoclave to Sterilize a Solution (page 318) |
| 5    | Lab Exercise 7 Laboratory Procedure Part A: Familiarization with Volume-Measuring Devices and Measuring Pipettes, part B: Practice Operating Micropipettes (page 104)  
Lab Exercise 9: measuring pH with Accuracy and Precision (page 112) |
| 6    | Lab Exercise 38 Laboratory Procedure Part A: Make LB Agar Plates, Part B: Pour Agar Plates (page 322) |
| 7    | Lab Exercise 31: Separating Molecules by Agarose Gel Electrophoresis (page 272)  
Part B: Casting an Agarose Gel (page 276)  
Part C: Familiarization with Electrophoresis Apparatus  
Part D: Performing Electrophoresis |
| 8    | Lab Exercise 10: Color and the Absorbance of Light, part B: Preparing Absorbance Spectra Using a Non-Scanning Spectrophotometer (page 130: red, green, yellow food coloring).  
Hands-on with Micropipetters, Agarose Gel Electrophoresis, Microcentrifuge, Microscope, Spectrophotometer |
| 9    | Lab Exercise 39: Gram Staining (page 326) |
| 10   | Classroom Activity 11: Getting Ready to Prepare Solutions with One Solute: Calculations (page 162) |
| 11   | Classroom Activity 12: Getting Ready to Prepare Solutions with One Solute: Ordering Chemicals (page 168) |
| 12   | Lab Exercise 15: Preparing Solutions to the Correct Concentration (page 178) |
| 13   | Classroom Activity 13: Planning for Separating Materials Using a Centrifuge (page 249) |
| 14   | Lecture Final Exam |
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College Policies

Class Participation
Participation in the academic activity of each course is a significant component of the learning process and plays a major role in determining overall student academic achievement. Academic activities may include, but are not limited to, attending class, submitting assignments, engaging in in-class or online activities, taking exams, and/or participating in group work. Each instructor has the right to establish their own class participation policy, and it is each student’s responsibility to be familiar with and follow the participation policies for each course.

BMCC Mask Mandate Policy for In-Person Classes
CUNY has put in place a temporary mask mandate policy that requires the wearing of masks indoors in all campus buildings. See: https://www.cuny.edu/coronavirus/university-updates/clarity-new-mask/

Face masks help prevent the spread of COVID-19. As it is possible to have or carry the coronavirus without having or showing symptoms, it is necessary for every person in our community to wear a mask even if you are fully vaccinated and/or have tested negative for COVID19, or think you are completely healthy. For appropriate/acceptable masks and guidelines on use, see CDC guidelines at: https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/diy-cloth-face-coverings.html.

While the mask mandate is in effect, the following will apply to all in-person classes (including in-person classes associated with hybrid courses):

- In a classroom, if a fully vaccinated instructor is teaching a class and can maintain social distance from all others in the classroom, he/she may choose not to wear a mask (subject to any additional Department guidelines regarding the use of face shields or other layers of protection).
- Students who attempt to enter a classroom without wearing masks will be asked by the instructor to put on their masks before entering. Students who remove their masks during a class session will be asked by the instructor to put on their masks. Masks will be available for distribution for those who need one.
- Students may remove their masks momentarily during class (to drink something quickly), in classrooms other than labs, but must replace their masks immediately after that. The consumption of food is not permitted in any classroom or lab.
- Students who are not fully vaccinated are also required to maintain social distancing between themselves and all others in a classroom.
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**BMCC Policy on Plagiarism and Academic Integrity Statement**

Plagiarism is the presentation of someone else’s ideas, words or artistic, scientific, or technical work as one’s own creation. Using the idea or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations, require citations to the original source. Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism. Students who are unsure how and when to provide documentation are advised to consult with their instructors. The library has guides designed to help students to appropriately identify a cited work. The full policy can be found on BMCC’s Web site, [www.bmcc.cuny.edu](http://www.bmcc.cuny.edu). For further information on integrity and behavior, please consult the college bulletin (also available online).

**FREE BMCC STUDENT SUPPORT SERVICES**

BMCC is committed to the health and well-being of all students. It is common for everyone to seek assistance at some point in their life, and there are free and confidential services on campus that can help.

**Advocacy and Resource Center (ARC)** [https://www.bmcc.cuny.edu/student-affairs/arc/](https://www.bmcc.cuny.edu/student-affairs/arc/) room S230, 212-220-8195, [arc@bmcc.cuny.edu](mailto:arc@bmcc.cuny.edu). If you are having problems with food or housing insecurity, finances, health insurance or anything else that might get in the way of your studies at BMCC, contact the Advocacy and Resource Center (formerly Single Stop) for assistance. Please contact us at [arc@bmcc.cuny.edu](mailto:arc@bmcc.cuny.edu), call 212-220-8195, or come by the office at room S230. You may also contact the Office of Student Affairs, S350, 212-220-8130, [studentaffairs@bmcc.cuny.edu](mailto:studentaffairs@bmcc.cuny.edu), for assistance.

**Counseling Center** [www.bmcc.cuny.edu/counseling](http://www.bmcc.cuny.edu/counseling), room S343, 212-220-8140, counselingcenter@bmcc.cuny.edu. Counselors assist students in addressing psychological and adjustment issues (i.e., depression, anxiety, and relationships) and can help with stress, time management and more. Counselors are available for walk-in visits.

**Office of Compliance and Diversity** [https://www.bmcc.cuny.edu/about-bmcc/compliance-diversity](https://www.bmcc.cuny.edu/about-bmcc/compliance-diversity), room S701, 212-220-1236. BMCC is committed to promoting a diverse and inclusive learning environment free of unlawful discrimination/harassment, including sexual harassment, where all students are treated fairly. For information about BMCC’s policies and resources, or to request additional assistance in this area, please visit or call the office, or email olevy@bmcc.cuny.edu, or twade@bmcc.cuny.edu. If you need immediate assistance, please contact BMCC Public safety at 212-220-8080.

**Office of Accessibility** [www.bmcc.cuny.edu/accessibility](http://www.bmcc.cuny.edu/accessibility). Students who need academic accommodations in connection with a disability must initiate the request with BMCC’s Office of Accessibility (OA). Students need to register with the Office of Accessibility in order to officially disclose their disability status to the College and to determine eligibility for appropriate reasonable accommodations (including any prior IEPs or 504s). Please contact the OA at the start of the semester (or as soon as possible) to coordinate any accommodation request/s: [www.bmcc.cuny.edu/accessibility](http://www.bmcc.cuny.edu/accessibility), Room N360 (accessible entrance: 77 Harrison Street), 212-220-8180, [accessibility@bmcc.cuny.edu](mailto:accessibility@bmcc.cuny.edu).