Advanced Biochemistry (Chemistry 710)  
Spring 2021  
Department of Chemistry and Biochemistry  
Queens College, City University of New York  

Professor Susan A. Rotenberg   Susan.Rotenberg@qc.cuny.edu  

Lecture: Wednesday and Friday, 10:20 AM – 12:10 PM  
Office hour: Wednesday 1-2 PM  


Course description: Metabolism of lipids, amino acids, nucleotides, nucleic acids, and proteins.  

Course goals:  
Biochemistry II covers the biosynthesis of the most of the major classes of cellular components: amino acids and proteins, nucleotides and nucleic acids, membrane lipids, and photosynthetic formation of carbohydrates. This survey of biosynthesis includes the chemistry of individual reactions, regulation of the catalytic activity of enzymes, organization of enzymatic reactions into metabolic pathways, and interactions within and between the metabolic pathways. The first part of the semester covers synthesis of small molecules, including amino acids, membrane lipids and nucleotides. The second part covers synthesis of macromolecules, including DNA, RNA, and proteins.  

After completing the course, students will be able to:  
- Describe and analyze the major biosynthetic pathways of cell components, including amino acids, lipids, and nucleotides, from common metabolic intermediates.  
- Explain how defects in metabolic reactions can lead to disease.  
- Analyze the regulation and interactions of metabolic pathways to generate optimal levels of cell components and respond to environmental and physiological conditions.  
- Describe the conversion of light energy into chemical energy by photosynthesis.  
- Explain how DNA is maintained as a stable repository of genetic information through replication and repair.  
- Follow the expression of genetic information from DNA through RNA into proteins and analyze the control of gene expression at the levels of transcription and translation.  

GRADING  There will be three lecture exams (counts as 20% of the final grade) and a comprehensive final exam (counts as 25% of the final grade). No makeup exams will be given; written documentation is required if you miss an exam.  

Term paper  Each student will submit a term paper on a research article; the paper is worth 15% of the final grade.
Schedule of Exams:

**Exam 1:** Friday, February 26   Chapters 20, 21

**Exam 2:** Wednesday, April 7   Chapters 22, 8, 9

**Exam 3:** Friday, May 7th         Chapters 24, 25, 26

**Final Exam:** May           Comprehensive

<table>
<thead>
<tr>
<th>Topics</th>
<th>Chapter</th>
<th>Dates of live lecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photophosphorylation</td>
<td>20</td>
<td>1/29, 2/3, 2/5</td>
</tr>
<tr>
<td>Carbohydrate biosynthesis in plants</td>
<td>20</td>
<td>2/10, 2/17</td>
</tr>
<tr>
<td>Lipid biosynthesis</td>
<td>21</td>
<td>2/19, 2/24</td>
</tr>
<tr>
<td>Biosynthesis of amino acids</td>
<td>22</td>
<td>3/3, 3/5</td>
</tr>
<tr>
<td>Biosynthesis of nucleotides</td>
<td>22</td>
<td>3/10, 3/12</td>
</tr>
<tr>
<td>Nucleotides and nucleic acids</td>
<td>8</td>
<td>3/17, 3/19</td>
</tr>
<tr>
<td>DNA-based information technologies</td>
<td>9</td>
<td>3/24, 3/26</td>
</tr>
<tr>
<td>Genes and chromosomes</td>
<td>24</td>
<td>4/9, 4/14</td>
</tr>
<tr>
<td>DNA metabolism</td>
<td>25</td>
<td>4/16, 4/21</td>
</tr>
<tr>
<td>RNA metabolism</td>
<td>26</td>
<td>4/23, 4/28</td>
</tr>
<tr>
<td>Protein metabolism</td>
<td>27</td>
<td>4/30, 5/5</td>
</tr>
<tr>
<td>Regulation of gene expression</td>
<td>28</td>
<td>5/12, 5/14</td>
</tr>
</tbody>
</table>

Note: There will be no class on Friday, Feb 12th. No classes on March 31st and April 2nd due to Spring Break.

**CUNY POLICY ON ACADEMIC INTEGRITY**
The Policy on Academic Integrity, as adopted by the Board is available to all candidates. Academic Dishonesty is prohibited in The City University of New York and is punishable by penalties, including failing grades, suspension, and expulsion. This policy and others related to candidates’ issues are available to you at: [http://qcpages.qc.cuny.edu/provost/Policies/index.html](http://qcpages.qc.cuny.edu/provost/Policies/index.html).

**REASONABLE ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES**
Students with disabilities needing academic accommodation should register with the Special Services Office by emailing QC.SPSV@qc.cuny.edu. For more information about services available to Queens College students, visit the Office of Special Services website: [https://www.qc.cuny.edu/studentlife/services/specialserv/Pages/default.aspx](https://www.qc.cuny.edu/studentlife/services/specialserv/Pages/default.aspx).

**CUNY POLICY ON ACADEMIC INTEGRITY**
Academic dishonesty is prohibited in The City University of New York and is punishable by penalties, including failing grades, suspension, and expulsion as provided at [https://www.cuny.edu/about/administration/offices/legal-affairs/policies-procedures/academic-integrity-policy/](https://www.cuny.edu/about/administration/offices/legal-affairs/policies-procedures/academic-integrity-policy/).

**ONLINE ETIQUETTE**
Please maintain a professional demeanor when posting online. You can be respectful even when you have a difference of opinion. Treat others as you would want to be treated yourself. Don't type in all caps, as that is the online equivalent of shouting. If you need to emphasize a word or phrase, use italics.
Students who participate in this class with their camera on or use a profile image are agreeing to have their video or image recorded solely for the purpose of creating a record for students enrolled in the class to refer to, including those enrolled students who are unable to attend live. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live.

COUNSELING SERVICES
Counseling Services are available to any Queens College student. This office assists students with personal concerns that can affect their enjoyment of and success in college. Services are free and confidential. All sessions take place on Zoom or by Telephone, depending on student preference. To make an appointment, students should call 718-997-5420 and leave a message with their phone number and CUNY ID. They may also email counselingservices@qc.cuny.edu.