CHEM 3812: Membranes and Metabolism

Winter 2023

January 3 - March 13

Allegra Aron
allegra.aron@du.edu

Course location: Sturm 234
Office location: SGM, Room 251

Instructor information

Office hours. Mondays & Thursdays 5-6pm or by appointment

What I Expect From You

I expect you to know the syllabus, due dates for assignments and exams, read announcements, participate in class discussions, communicate through the inbox tool/discussions/email. If you have any issues or questions, I expect you will reach out to me, either via email or by attending my office hours.

What You Can Expect From Me

If you contact me via email, you can expect a response within 2 work days. I cannot guarantee that I will reply to emails over the weekend.

Course Description and Outcomes

This course discusses the structure and function of biological molecules including lipids, carbohydrates, and lipid-bound proteins. In addition, this course covers concepts like bioenergetics and metabolic pathways. Students will be required to read and evaluate primary literature relevant to the course and write a literature review article.

At the end of this course, students will be able to:

- Know central metabolic and (certain) secondary metabolic processes
- Understand basic bioenergetic concepts and how they influence biochemical processes
- Appreciate how evolution directed the emergence of metabolic pathways
- Understand relationships between lipids and membrane properties
- Read scientific papers and write a scientific review article

Additionally, students will be able to:

- Write out the entire central metabolism scheme (structures, enzyme names, reactions) from glycolysis to ETC
- Recall amino acid biosynthetic routes
- Distinguish between energetically favorable and unfavorable reactions
- Calculate changes in energy and membrane potential
- Propose and write a scientific review over a metabolic process
- Critique and revise scientific reviews from peers
Defend the concept that evolution drives the formation of metabolic processes
Relate membrane composition to physical properties to include protein and lipid structures

Course Materials

Required MATERIALS

- Access to DU Library eJournal database
- Access to Canvas
- Access to YouTube

Weekly Topics/Course Calendar

Click on "Modules" in the left navigation to explore the content by week. See below for a short overview of the topics that will be covered each week. A more detailed (and tentative) schedule can be found here.

<table>
<thead>
<tr>
<th>Week of the Quarter</th>
<th>Topic Covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Course Intro, Background, &amp; Review</td>
</tr>
<tr>
<td>Week 2</td>
<td>Lipids</td>
</tr>
<tr>
<td>Week 3</td>
<td>Membranes</td>
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<tr>
<td>Week 4</td>
<td>Membranes &amp; Bioenergetics</td>
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<tr>
<td>Week 5</td>
<td>Oxidative Phosphorylation</td>
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<td>Week 6</td>
<td>Carbohydrates</td>
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<tr>
<td>Week 7</td>
<td>Glycolysis</td>
</tr>
<tr>
<td>Week 8</td>
<td>Pentose Phosphate</td>
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<tr>
<td>Week 9</td>
<td>TCA Cycle</td>
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<tr>
<td>Week 10</td>
<td>Fatty Acid Degradation</td>
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Class Participation

Attendance Policy: Attendance and weekly participation in the classroom and discussions is mandatory. Attendance will be monitored by in class activities.

Assignments Overview

Assignments for this class will consist of 2 midterm exams, 1 final exam, 1 review article, and in-class activities. Suggested homework problems will not be graded.
DUE DATES AND DETAILS

Unless otherwise noted, all assignments are due at 11:59 p.m. on the due date. All times are posted as Mountain Time. If you believe you will be late with an assignment, it is your responsibility to communicate well in advance. Unless approved by the instructor prior to the due date, assignments submitted late will receive a grade deduction of 10% per day up to three days.

See the assignment grid below for an overview of the course assignments and point values. Assignment details are found on the "Assignments Index" page and within the weekly modules.

<table>
<thead>
<tr>
<th>Week of The Quarter</th>
<th>Assignment Due</th>
<th>Point Value</th>
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</thead>
<tbody>
<tr>
<td>Weeks 1-10</td>
<td>In-class activities and participation</td>
<td>100 Points (10 pts/week)</td>
</tr>
<tr>
<td>Week 4</td>
<td>Midterm Exam #1</td>
<td>100 Points</td>
</tr>
<tr>
<td>Week 8</td>
<td>Midterm Exam #2</td>
<td>100 Points</td>
</tr>
<tr>
<td>Week 10</td>
<td>Review Article</td>
<td>100 Points</td>
</tr>
<tr>
<td>Week 10</td>
<td>Final Exam</td>
<td>100 Points</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>500 Points</strong></td>
</tr>
</tbody>
</table>

ASSIGNMENT SUBMISSIONS

Review paper will be submitted through Cavas. Feedback and grades are returned through Canvas.

DU Writing Center & Research Center

DU Writing Center

The DU Writing Center offers one-on-one, group, and online (for online students) writing consultations for undergraduate and graduate students working on all kinds of projects at any stage of the writing process: from brainstorming ideas to practicing editing. Consultants use a collaborative approach to help you develop strategies and habits to improve your writing in light of your specific goals and needs as a writer. To make an appointment for a free, 45-minute consultation, go to https://du.mywconline.com or call 303-871-7456. Visit our website (www.du.edu/writing/writingcenter/) for additional information.

DU Research Center

The DU Research Center offers expert guidance through the research process, including the following: refining a topic, finding and evaluating relevant sources, and creating a Reference Page. Students can schedule a one-on-one research consultation, Submit a Question or Chat with a Librarian, or can call the Research Desk at 303-871-2905 for help with research at any stage of a course project.

Grading Criteria and Evaluation
This course is to be completed in ten weeks. Barring emergency situations, Incomplete grades are not issued. You are strongly advised to prioritize this class; expect to spend 10-12 hours a week on coursework including assignments, readings, and course discussions.

Your final grade in the course is based on the percentage of points you earn out of the total number possible. To access information regarding how assignments are evaluated, please review the assignment details and the grading rubric in Canvas. Grading follows the standard Department grading scale.

**Canvas Learning Management System**

You are expected to use the Canvas learning management system to access course materials, submit assignments, check grades, and communicate with professors.

- To access the Canvas Learning Management system, the Canvas website and log-in with your DU credentials.
- To obtain Canvas support, click on the "Help" icon in the left navigation menu. Here you can chat live with a support agent or call the Canvas Support hotline. Additionally, visit the Canvas Student Guides (Links to an external site.) for FAQs. You may also contact the Student Support Center at 303-871-2291 or 800-347-2042.

**Plagiarism Checker**

The University of Denver uses Turnitin, an online tool integrated into Canvas, to assess students' written assignments for originality. Turnitin provides originality checking to prevent plagiarism and encourage best practices for using and citing other people's written material. Turnitin compares student submissions to a global repository of student work and other resources on the web. Visit the Office of Teaching and Learning's Turnitin Knowledge Base to access more information about Turnitin, including how to interpret and view originality reports.

**DU Policies and Procedures**

**Academic Integrity and DU Honor Code**

It is critically important for you to adhere to the University of Denver's Honor Code and Academic Integrity policies. Plagiarism will not be tolerated in this course; you are expected to produce original work at all times. Students must read and follow the plagiarism and academic conduct policy. Locate this policy in your student handbook.

**Students with Disabilities**

Students with disabilities may request accommodations at any time and are required to follow policies and procedures as outlined in the DU Handbook for Students with Disabilities on the Disability Services website.

If you have a disability protected under the Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act and need to request accommodations, please make an appointment with the Disability Services Program. I cannot make an accommodation without official documentation from Disability Services. It is your responsibility to provide the accommodations letter to me as soon as possible.