

SYLLABUS

Intro to Biochemistry (BCH3023, Section 860037) (Web-Enhanced Course)

"Nobody is born intelligent: intelligence feeds from strong effort and desire to learn"
-Anonymous

Term: Fall 2015-1

Class location: Room 9105

Class Meeting time: Thursday, 5:40 PM – 8:10 PM

Professor: Dr. Félix E. Rivera-Mariani

Office Room: 9105

Office Hours: 4:00 PM – 5:00 PM or by appointment

Email: friveram@mdc.edu

Phone: TBA

Required Textbook (print or ebook): Nelson, David and Michael M Cox. 2013. Lehninger Principles of Biochemistry. 6th Ed. W. H. Freeman & Co. New York, NY (ISBN 978-1-4292-3414-6).

Note: there are many options online to rent to the textbook book as well

Co-requisite: Organic Chemistry 1 (CHM2210), Organic Chemistry 1 Lab (CHM2210L), Organic Chemistry II (CHM 2211), Organic Chemistry II Lab (2211L), or CHM2200 and CHM2200L.

I. Rational of the course

To broaden your knowledge and provide a firm foundation of the structures, functions, and metabolic processes that participate in the synthesis, transformation, and degradation of macromolecules (i.e. carbohydrates, nucleic acids, lipids, proteins). In addition, real-life and scientific scenarios will be presented to learn the way biochemistry is scientifically practiced, and how biochemistry affects our lives.

II. Learning Objectives: *By the end of this course, you will be able to:*

1. Compare and contrast bonds and forces that contribute to the structures and functions of macromolecules
2. Explain and exemplify the biochemical properties and functions of water within different biochemical scenarios
3. Identify and classify carbohydrates based on their structures and biological functions
4. Compare and contrast structure and functions of different nucleic acids based on their backbone constituents and configurations
5. Summarize, compare and contrast, and integrate the mechanisms of DNA replication and transcription with the synthesis of nucleic acids
6. List, name and classify amino acids based on polarity, size, and charge

7. Predict (i.e. translate) amino acid sequences and protein conformations from DNA sequences
8. Summarize the pathway of translation and protein metabolism
9. Identify different mutations and demonstrate their effect within amino acid sequences, protein structures and functions
10. Classify, differentiate, and infer between enzymes based on the reactions being catalyzed
11. List and differentiate lipids based on their structure and functions
12. List and describe the different components of biological membranes
13. Describe and predict the physiological roles of membranes in biological systems
14. Summarize, and compare and contrast catabolic and anabolic pathways
15. Predict the biochemical outcomes of pathways when specific components are not present
16. Infer the health consequences from defects and malfunctions in biochemical macromolecules and pathways
17. Discuss and apply the principles and applications of laboratory techniques used in the study of biochemistry

III. Course Materials (Web-Enhanced Course)

- Syllabus, Professor's credentials, Reading assignments, Lectures, Assignment instructions, and Supplemental materials will be available at mdc.blackboard.com.
- Download and install **i>clickerGo™**, and bookmark <https://app.reef-education.com/#/login> into your smartphone. Instructions will be provided in class and in Blackboard Learn on how to create an account into **i>clickerGo™**

IV. Methods of Instructions

Flipped learning: in some occasions and with prior notification, digital formats of lectures and supplemental materials will be made available online in Blackboard Learn prior to meeting in the class. The professor will inform if before or after a particular class period you must access these materials. Keep in mind that ***you'll always be exposed to a new topic on your own.***

Reading assignments: through a series of online guide questions you will always be exposed to a new topic (e.g. terminology, protocols, interpretation of results) prior to meeting in the class. These questions will also guide you to **1)** read with a purpose (preparing for you for class), and **2)** engage you in **spaced practice** of your learning (i.e. allowing some forgetting to settle in for learning to be effortful) because we'll be carrying out discussions on the corresponding topics in class as well. ***These Pre-Lab reading assignments count for a grade (see Grading Scales).***

Group work will facilitate the discussion and peer-teaching of biochemical terms, processes, methods, health outcomes, scientific data, among others. You'll be grateful for peer-teaching in the classroom.

Student Responses Systems ("clicker") will help the discussion in the class when questions, scientific information, illustrations, among others are presented in class. Through the use of "clicker" applications in your smartphone, you will be able to answer instantaneously and

remotely. More importantly, this approach will allow us to discuss and exchange feedback in real-time in the class.

Written communications provide important information about your learning and how you are organizing knowledge. Formative assessments (i.e. not graded but important for feedback) will be common throughout the course in class, and essential to provide you with timely and useful feedback. In addition, a written assignment will be part of the grading scale: feedback will be provided at its different deadlines.

Monitoring your learning: I'll be monitoring your learning throughout the course. With the aid of carefully designed cumulative weekly quizzes, your responses in class, and exams, I'll be employing mathematical (e.g. statistics) and other analyses of your learning and proficiencies with the learning objectives of the course (see page 1). ***Don't forget your effort: numbers will tell the story about your effort as well.*** I'll be sharing with you how your learning is performing in the class.

V. **Academic Integrity**

Each student is expected to maintain a high level of integrity and abide by the procedure 4074 of the Miami-Dade College Student Rights and Responsibility Handbook. Any work submitted by a student in the course for academic credit will be the student's own work. For the purpose of this course, collaboration is allowed in the following instances: in-class group work, case studies discussions, or when stated by the professor. Nevertheless, each student must submit their individual work unless indicated otherwise by the instructor. Avoid at all costs copying and pasting the information from your classmates' response or from any other sources.

As part of a collaborative and encouraging classroom, you are encouraged to study together and to discuss topics and concepts covered in class with other students. You can obtain "consulting" help from students as well as provide "consulting" help to other students. However, this allowed form of cooperation should never involve one student having possession of a copy of all or part of the work done by another student or someone else, in the form of digital files or printed documents.

In the case that copying occurs, both the student who copied work from another student and the student who contributed to this behavior will both automatically receive a zero for the corresponding assignment. The penalty for violation of this Code can include failure of the course and/or notifying the corresponding University authorities for disciplinary action.

During exams (i.e. quizzes and exams), you must do your own work. Talking or discussions are not allowed during the examinations. In addition, you cannot compare papers, copy from others, or collaborate in any way. Any form of the behaviors mentioned above will result in failure of the exam and can include notifying the corresponding University authorities for disciplinary action. **Cell phones cannot leave the classroom during exams, and must be turned off during class unless needed for our in-class discussions.**

Any form of **plagiarism** will constitute Academic Dishonesty, and points won't be earned during any form of this fault. **Make sure you understand what constitutes plagiarism and how to avoid it.**

Any other form of Academic Dishonesty listed in the Miami-Dade College Student Rights and Responsibility Handbook will not be accepted during the course.

VI. Attendance

Attendance at each class sessions parallels with your learning in the course. The course requires the input of time and effort in order to learn and be proficient in the learning objectives stated earlier in the syllabus. In addition, **20 easy points** for good attendance will be provided towards your final grade. **For each unexcused absence, unfortunately, I'll have to deduct 1 point, and 0.5 points for each unexcused tardiness.** In the event of an absence, the student will be allowed to make up work if the absence results from one of the following:

- A. Official campus activities (as designated by MDC)
- B. Family or personal emergencies (as designated by MDC)
- C. Medical reasons (discussed with the instructor)
- D. Work-related reasons (discuss with the instructor)

-Make-up exams are allowed only if your excuse meets any of the four requirements above.

-Make-up for quizzes are not permitted.

-With three unexcused absences, I won't be able to keep you on the class roster.

Late policy

Unless arrangement have been made prior to the due date or have a valid absence excuse (as stated in the Attendance section of this syllabus), I won't be able to award full grade on Late Assignments **(the final grade for any late assignment will be 30% less).**

VII. Accommodations for students with disabilities

In compliance with the Miami-Dade College and the Student Rights and Responsibility Handbook policy and equal access laws, I more than available to discuss any necessary academic accommodations that may be required for the student with disabilities. Requests for academic accommodations are to be made during the first week of the term, except for unusual circumstances, so arrangements can be made. Students are encouraged to contact the Student Services to verify their eligibility for appropriate accommodations.

VIII. Inclusivity Statement

Members (student, faculty, administrators) of the Miami-Dade College community represent a diversity of backgrounds and perspectives. In this course, and as a member of this community, I am a strong supporter of diversity and its benefits. Therefore, to maintain an adequate learning and diverse environment students in this course are strongly encouraged to:

- A. share their unique beliefs, experiences, and values
- B. be open to the opinions and views of others
- C. honor your colleagues' uniqueness
- D. appreciate the unique opportunity we have to learn from each other
- E. value each other's opinions and communicate in a respectful manner
- F. keep confidential discussions of personal and professional nature
- G. take advantage of this opportunity to share ways in an inclusive environment
- H. must maintain at all times a respectful environment

IX. Grading Scales:

Item	Points
Daily Quizzes	50
Attendance	20
Reading Assignments	30
Writing Assignment	80
1 st Exam	100
2 nd Exam	100
3 rd Exam	100
Total points	480

i-clicker questions (Bonus)

Grade	Percentage	Points
A	100 – 90.0%	432
B	89.9 – 80.0%	384
C	79.9 – 70.0%	336
D	69.9 – 60.0%	288
F	Below 60.0%	Below 288

Reading Assignments (30 total points): With the Reading assignments and the aid of guide questions, you will begin to settle new knowledge with each topic. These Reading Assignments will be available in Blackboard Learn (<http://mdc.blackboard.com>): their deadline will always be just before class time (5:39 PM) unless otherwise stated. Keep in mind that these guide questions won't be available when class time begins. Therefore, due the corresponding reading and complete the guide questions in advanced. Similar to points for attendance, these questions will be **30 easy points towards your final grade**. Nevertheless, won't be able to maintain your total 30 points when

- less than 7 out of 10 questions are answered incorrectly: will have to deduct 0.5 points.
- none of the questions is answered: will have to deduct 0.5 points.
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Exams: Three 100 points exams will be administrated during regular laboratory periods. Refer to the syllabus schedule to know the dates of the exams. Each of the exams will be a combination of true/false, multiple choice, fill the blanks, and open-ended questions. No scantrons are needed: questions will be answered on the printed exam provided. **Exams are cumulative.**

Academic Dishonesty regulations, as stated in the MDC student handbook, will have to be strictly enforced. Any violations will lead to a zero on the exam.

There are no make-ups for Exams unless the absence meets the requirements of the Attendance sections of this syllabus.

Quizzes: During the first 15 minutes of each class section, cumulative quizzes will be administered. These quizzes will rehearse your knowledge with effortful learning through open-ended questions. They will also provide valuable information on how and what you are learning.

Writing assignment

The purpose of the writing assignment is to assess your written communication skills to a non-expert audience: **an individual not an expert in biochemistry**. With your writing assignment, **you must provide enough information for a non-expert individual to understand the importance of that particular biochemistry topic in our daily lives.**

- You must choose from **any of the topics to be discussed in the course.**

- The writing assignment has four different deadlines (refer to the schedule below): **selection of the topic, outline, the first draft, and final draft.**

Rubric (80 pts total points)

Submitting topic, outline, 1 st draft on/before deadlines	15 points (3 deadlines x 5 points)
Submitting final draft on/before deadline	10 points
Correctly applying a particular MLA writing format	10 points
Having paragraphs with leading, supporting, and transition sentences	10 points
Language is appropriate for a non-expert	15 points
Discussing one idea per paragraph	10 points
Following the page limits (not less than 3, not more than 5 pages)	10 points
Total points	80 points

X. Incomplete Grades and Withdrawals

Incomplete (I) grades will be posted only in consultation with the student and professor, and only when extenuating circumstances will prevent the student to complete the requirements of the course. At least one-half of the course must have been completed with a C or better grades. It is important that the incomplete (I) be completed within the timeframe agreed between the student and the professor. Unfortunately, if not completed within the agreed time frame, the incomplete must be submitted as an F.

Withdrawals: The professor is not entitled to withdraw a student from the course: it is the students' duty to evaluate and monitor how he/she is doing in the course. Knowing your status in the course will be important in the case you determine it is necessary to withdraw from the course. The deadline to withdraw (W) from the course **November 3rd, 2015**. Keep in mind that a "W" grade will be permanent in your grade transcripts, and constitute an attempt for the course.

XI. Tentative Course Schedule (schedule may change due to unexpected events)

(Weekly topics and Quizzes, due dates of Reading Assignments, Deadlines of Assignments, Projects, Exams, among others will also be posted in mdc.blackboard.com)

Date	Week	Topic	Due Dates for <u>Pre-Lab Reading</u> and <u>Lab Reports</u>
Aug-27	W1	-Course Introduction -Discussion of Syllabus -Assessment of Student's Prior Knowledge -Foundations of Biochemistry	
Sep-3	W2	-Properties of Water	-Quiz 1 -Reading Assign. 1 (Ch. 2)
<u>Sept-10</u>	<u>W3</u>	-Amino Acids, Peptides, Proteins	-Quiz 2 -Reading Assign. 2 (Ch. 3) <u>-Submit topic of writing assignment</u>
Sept-17	W4	-Protein Function and Enzymes	-Quiz 3 -Reading Assign. 3 (Ch. 5, 6)
Sept-24	W5	-Carbohydrates	-Quiz 4

<u>Oct-1</u>	<u>W6</u>	<u>-Exam 1</u>	-Reading Assign. (Ch. 7)
Oct-8	W7	-Nucleic Acids -Techniques to Study Nucleic Acids	-Reading Assign. (Ch. 8, 9) <u>-Submit outline of writing assignment</u>
Oct-15	W8	-Lipids	-Quiz 5 -Reading Assign. (Ch. 10)
<u>Oct-22</u>	<u>W9</u>	-Membranes and Biosignaling	-Quiz 6 -Reading Assign. (Ch. 11, 12)
<u>Oct-29</u>	<u>W10</u>	<u>Exam 2 (Midterm Exam)</u>	
Nov-5	W11	-Bioenergetics and Biochemical Reactions -Carbohydrate Metabolism	-Reading Assign. (Ch. 13, 14, 16) <u>-Submit first draft of writing Assignment</u>
Nov-12	W12	-Metabolic Regulation -Oxidative Phosphorylation	-Quiz 7 -Reading Assign. (Ch. 15, 17)
<u>Nov-19</u>	<u>W13</u>	-Synthesis of Amino Acids and Nucleotides -Genes and Chromosomes	-Quiz 8 -Reading Assign. (Ch. 22, 24)
<u>Nov-26</u>	<u>W14</u>	<u>Thanksgiving</u>	
Dec-3	W15	-DNA and RNA metabolism -Protein Metabolism	-Quiz 9 -Reading Assign. (Ch. 25, 26, 27) <u>-Submit final draft of writing assignment</u>
Dec-10	W16	-Regulation of Gene Expression -Techniques used in Biochemistry	-Quiz 10 -Reading Assign. (Ch. 28) -Supplemental Reading
<u>Dec-17</u>	<u>W17</u>	<u>-Exam 3 (Final Exam)</u>	