

COURSE: Location: **Physical Science Building PS-113**

Time: TR 9:30 AM – 10:50 AM

Duration: 08/22/2020-12/16/2020

INSTRUCTOR: Dr. Mare Cudic

Office: SE-134

Email: mcudic@fau.edu

Phone: 561-297-4645

Office hours: Tuesday 1:00-2:00 pm, and by appointment

COURSE WEB-SITE

The Canvas site for this course, where students can obtain course information, can be reached using the address <http://canvas.fau.edu>. Your user name is the same as your FAUNET ID. It is the student's responsibility to read the entire syllabus and understand the contents herein. This syllabus forms the rules and regulations by which you must abide. In addition, it is the student's responsibility to monitor, read and understand all emails and announcements and course documents that are posted on the course Canvas site. Any corrections or additions to the syllabus will be posted at the course Canvas site and are understood to be part of the syllabus.

PREREQUISITE

Students must have completed undergraduate level BCH 3033 with a minimum grade of C before taking this course.

COURSE DESCRIPTION

This course is a comprehensive introduction to the study of proteins and their importance within biological systems. Topics will cover the structure and function of proteins, their biological diversity, and examples for biotechnological, medical and scientific use of proteins.

COURSE OBJECTIVES AND LEARNING OUTCOMES

The main objective of this course is to provide in depth understanding of the relationship between the structure and function of biological macromolecule such as proteins. Different strategies and methods for the production, isolation, structure determination, and modification of proteins will be covered. In addition, an overview of the main group of proteins (enzymes, membrane proteins, structural proteins, regulatory proteins) and their function, including enzyme catalysis and kinetic and thermodynamic characterization of protein-ligand interactions will be presented. The practical applications will be further explored through in-class student presentations from recent literature highlighting the current advances in the field. Upon completion of this course, students are expected to have a good understanding of the factors affecting protein functions, methods to determine the basic physicochemical and functional properties of proteins, and the ability to describe how proteins can be used for production and development of drugs, for biotechnological and other industrial and scientific purposes. These are necessary tools for successful involvement of undergraduate students in the areas of biological sciences.

TOPICS TO BE COVERED

1. Course overview and review of basic protein biochemistry

Class dates: Aug 25th

2. Amino acids: the building blocks of proteins/Peptide bond formation and peptide synthesis

Class dates: Aug 27th, Sept 1st

3. Protein composition and structure

Class dates: Sept 3rd, Sept 8th

4. Synthesis and purification of proteins

Class dates: Sept 10th, Sept 15th

5. Protein assays

Class dates: Sept 17th, Sept 22nd

6. Protein structure determination

Class dates: Sept 24th, Sept 29th, Oct 1st

7. Student presentations

Class dates: Oct 8th, Oct 13th, Oct 15th, Oct 20th

8. Post-translational protein modifications and their functional role

Class dates: Oct 22nd, Oct 27th, Oct 29th

9. Enzyme catalysis

Class dates: Nov 3rd, Nov 5th, Nov 10th

10. Student presentations

Class dates: Nov 17th, Nov 19th, Nov 24th, Dec 1st

11. Protein ligand interactions

Class dates: Dec 3rd

This tentative outline of course content is subject to change depending on the progress of the class.

COURSE TEXTBOOKS

There is no required text. You should have a good undergraduate Biochemistry text (Lehninger, Stryer, etc.).

Recommended textbooks:

1. "Proteins: Structure and Function", David Whitford, 2005, John Wiley and Sons, Ltd, ISBN: 978-0-471-49894-0
2. "Enzymes: A Practical Introduction to Structure, Mechanism, and Data Analysis", Robert A. Copeland, 2nd ed. (2000), Wiley-VCH, ISBN-13 978-0471359296
3. "Introduction to macromolecular binding equilibria", Charles P. Woodbury, 1st ed. (2007), CRC Press, ISBN-13: 978-1420052985
4. "Essentials of glycobiology", Ajit Varki, Richard D Cummings, Jeffrey D Esko, Hudson H Freeze, Pamela Stanley, Carolyn R Bertozzi, Gerald W Hart, and Marilyn E Etzler. 2nd ed. (2009), Cold Spring Harbor Laboratory Press, ISBN-13: 978-0879697709

HOMEWORK AND STUDENT PRESENTATION

Homework problem sets may be assigned. Students will be required to have in-class presentation based on the recent published article highlighting the current advances and practical application in the protein biochemistry field. The article must be approved by the Instructor at least 3 weeks before the presentation date. Students may choose to work on the individual or team assignment.

EXAMS

There will be three major exams during the semester: two progress exams (non-cumulative) and a comprehensive final exam. The comprehensive final exam is cumulative and may test any topic covered during the semester. The comprehensive final will be given during exam week at the end of the semester in accordance with the published FAU exam schedule. Each progress exam will be 80 minutes while the final exam will be 120 minutes in duration. The exams will test material covered in classes as well as assigned readings/homework. The exam dates are as follows:

Exam 1: Tuesday, Oct 6th, 9:30-10:50 AM

Exam 2: Thursday, Nov 12th, 9:30-10:50 AM

Final Exam: Thursday, Dec 10th, 8:00-10:00 AM

A student who misses a test during the semester or the final exam will receive a grade of 0 unless a) the student notifies the instructor prior to the exam that he or she will be absent and b) the student presents a legitimate, documented reason that meets FAU criteria for missing the exam. If these conditions are met, a make-up exam will be considered.

Any dispute concerning exam grades during the semester must be brought to the attention of the instructor within one week after exams are returned to the class. No appeal will be entertained at later dates.

ASSESSMENT AND GRADING SCALE

The course grade will be based on two progress exams (20 points each), final exam (40 points), and student presentation (20 points). The grade will be calculated as a percentage of the total points earned (100).

The “A” range is 90-100%, “B” range 89-80%, “C” range 70-79%, and “F” below 70%. The plus/minus grades may be given.

INCOMPLETE GRADE

Incompletes will not be given unless a) a student is passing the course and b) a student encounters severe and unexpected problems and was not able to complete some portion of the work assigned to all students as a regular part of the course. Incompletes are given only by arrangement with the instructor. Students are expected to make up incompletes as soon as reasonably possible. Incompletes are not given because a student is doing poorly in the course.

CREDIT HOUR DEFINITION

This course involves minimum of one hour of classroom instruction for each credit hour per week, and a minimum of two hours of out of class assignments each week for 15 weeks.

CLASSROOM ETIQUETTE POLICY

In order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular telephones and pagers, are to be disabled in class sessions.

CLASSROOM ATTENDANCE POLICY

The effect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of non-attendance. Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations or participation in University-approved activities. Examples of University-approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances and debate activities. It is the student’s responsibility to give the instructor notice prior to any anticipated absences and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student’s final course grade as a direct result of such absence.

DISABILITY POLICY STATEMENT

In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU’s campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses. For more information, please visit the SAS website at www.fau.edu/sas/.

COUNSELING AND PSYCHOLOGICAL SERVICES (CAPS) CENTER

Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU’s Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to <http://www.fau.edu/counseling/>

CODE OF ACADEMIC INTEGRITY POLICY STATEMENT

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty, including plagiarism, is considered a serious breach of these ethical standards, because it interferes with the University mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the University community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see the Code of Academic Integrity in the University Regulations:

http://www.fau.edu/regulations/chapter4/4.001_Code_of_Academic_Integrity.pdf