BIO 6530 - PROTEINS STRUCTURE AND DYNAMICS (Undergraduate)
WINTER 2020

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Class meets twice a week from March 7th through May 4th on Tuesday and Thursday from 11:30 to 12:30

Office hours: Wednesday 2:30 to 3:30

1 credit (lecture)

Text: No text book is assigned. Following books are recommended for reading.

How Proteins Work
Authors: Mike Williamson
Publisher: Garland Science

Protein Structure and Function
Authors: Gregory Petsko and Dagmar Ringe
Publisher: New Science Press Ltd

Introduction to Protein Structure
Authors: Carl Branden and John Tooze
Publisher: Garland Publishing

Proteins: Structure and Function
Authors: David Whitford
Publisher: John Wiley and Sons

Proteins Structure and Molecular Properties
Authors: T. E. Creighton
Publisher: W. H. Freeman and Company

The Tools of Biochemistry
Authors: T. G. Cooper
Publisher: John Wiley and Sons

Additional Reading Material: Powerpoint slides of all lectures will be posted on the Blackboard before or shortly after the lecture. PDFs of review and primary literature articles to be discussed in the class will be posted on Blackboard. A reading list for the semester will be provided.

Learning Objectives:

- A solid understanding of the structure of proteins including folding of proteins into native conformation and dynamic nature of protein structure
- An understanding of the physiological function of proteins
- Understanding of the concept of the structure-function relationship: how the structure of proteins allow them to perform their assigned cellular function
- Introduction to the concept of half lives of protein; protein stability and programmed protein degradation
- An understanding that the molecular basis of a number of diseases is associated with protein abnormalities

Quiz and discussions: A number of closed book, in-class quizzes will be given throughout the semester. In addition, students will be marked for their participation in paper discussion. Altogether, the in-class quizzes and paper discussion marks will total 50 points. No make-ups will be given for missed or late quizzes.

Exam format: There will be only one exam, the final exam, which will be comprehensive and cannot be dropped. The final exam will consist of short answer questions, analytical questions, experimental design, drawing chemical structures and essay type questions.

Grading:

Short Assignments	50 points
Final Exam	150 points
TOTAL	**200 points**

Grade Scale:

91.6-100	A
90.0-91.5	A-
88.5-89.9	B+
81.6-88.4	B
80.0-81.5	B-
78.5-79.9	C+
71.6-78.4	C
70.0-71.5	C-
68.5-69.9	D+
61.6-68.4	D
60.0-61.5	D-
0-59.9	F

Grading Policy: Grades will be from 0 to 100. There will be no curve. Anyone caught cheating on an exam or the assignments will automatically receive a failing grade for the class.

General Policy: 1) Make-up assignments and exams will **NOT** be given except under extremely extenuating circumstances. Missed assignments and exams

are scored as a zero. If you miss a quiz or exam, this will serve as your dropped score.

2) Any special considerations (disabilities, religious holiday conflicts, etc.) must be brought to the attention of the instructor in the first week of classes. If you have a documented disability that requires accommodations, you will need to register with Student Disability Services for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. SDS telephone number is 313-577-1851 or 313-577-3365 (TTY: telecommunication device for the deaf; phone for hearing impaired students only). Once you have your accommodations in place, I will be glad to meet with you privately during my office hours to discuss your special needs. Student Disability Services' mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University.

3) Conflicts regarding the grading of exams or assignments must be resolved within one week of the return date. The exam or assignment in question must be returned along with a written statement explaining the concern.

4) In the event of a University closure on the day of an exam, the exam will be given during the next regularly schedule lecture period. University closures will be publicized through:

- the University Newsline (313) 577-5345*
- WSU Homepage (www.wayne.edu)*
- WSU Pipeline (www.pipeline.wayne.edu)*
- WDET-FM (Public Radio 101.9)
- by other local radio and television stations

* Note: The information on closures and class cancellations is likely to be found at these locations before it is broadcast by local radio and television stations.

5) For any and all issues not covered in this syllabus, refer to the "Student Due Process Policy".

Brief description of topics:

Session 1: **Amino acids**
Session 2: **Primary structure** of proteins
Session 3: **Secondary structure** of proteins
Session 4: **Tertiary and quaternary structure** of proteins
Session 5: **Paper I**
Session 6: **Supersecondary structures**; domains and motifs

Session 7: **Enzyme catalytic mechanisms**
Session 8: **Posttranslational modifications** of proteins and their regulatory role; phosphorylation, acetylation, methylation, sulfonation, glycosylation, ubiquitination etc.
Session 9: **Paper II**
Session 10: **Protein stability and flexibility**
Session 11: **Protein folding**; concept of prion and infectious proteins
Session 12: **Paper III**
Session 13: **Protein degradation**; lysosomal and ubiquitin-mediated degradation
Session 14: **Paper IV**
Session 20: **Proteins as molecular basis of diseases**