

Protein Structure and Function

Chem 654

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Department of Chemistry and Biochemistry
Reichardt Building Room 184

Office Hours: after lecture (1h) or arrange meeting time (email, phone)

Lecture: Tuesdays, Thursdays, 9:45 am – 11:15 am, REIC 204

Text: Review articles and primary research literature
Proteins – Structure and Function
David Whitford
John Wiley&Sons, Ltd
ISBN: 0-471-49893-9 HB
ISBN: 0-471-49894-7 PB

Course:

This 3 credit course introduces the concept of the intricate relationships between protein structure and protein function, one of the most fundamental concepts of biochemistry. The four major topics include 1) basic aspects of protein structure, 2) protein function, 3) protein life history, and 4) protein structure in disease. With the chemistry of amino acids as a foundation, the course will examine the constraints on protein structure/motifs that determine ultimately their biological function as well as the detrimental consequences of protein misfolding disease particularly in the nervous system. Modern technologies to elucidate structure and function aspects of proteins are integrated.

Course Goals:

- Develop an understanding of protein structure-function relationship
- Integration of physicochemical concepts into protein folding and stability
- Become familiar with methods relevant to protein structure and function
- Navigate on line information related to protein structure
- Misfolding of proteins and its consequences

Learning Outcomes

- Identify key elements in proteins to predict function and stability
- Utilize knowledge to develop strategies for protein purification/analysis
- Design approaches to elucidate protein-protein interactions
- Design proteomics approaches to the study of proteins
- Apply key concepts to contemporary research

Instructional Methods:

Course material is exclusively composed of review articles and primary research literature pertinent to the topics. The suggested textbook serves merely as a basic reference. The course is composed to a large part of class discussion (approx. 50%) thus participation is vital, individual/group presentations (approx 30%), and lectures (20%), which are solely intended to introduce topics. Hence preparation and reading of material is critical as well as active participation.

Blackboard:

Blackboard will be utilized as the central communication platform for announcements, posting of lectures and reading material, distribution/collection of exams, and email notifications. It is assumed that you regularly visit blackboard and inform yourself of notifications, announcements and more.

Course Policies:

- Attendance:** Regular student attendance is expected to ensure consistency in discussions and presentations. Active student participation is essential and will be accounted for in the final grade.
- Exams:** Two exams will be given, one midterm and one final exam (50 % of final grade). These exams will be a combination of essay questions and topic reviews. Makeup exams will only be allowed with pre-approval of the instructor or with an acceptable, documented reason such as unexpected illness, family emergencies or other unavoidable events. The final exam could be an exclusive oral exam if students unanimously opt for this exam type.
- Presentations:** Students will receive adequate preparation time for all assignments. Content and organization of topics are the primary concern, however presentation and discussion are also subject to score (scoring sheet). In some cases, a written assignment is part of the oral presentation in form a key research paper, review article, or an essay.
- Essays:** discussion and presentation topics will be summarized in short essays and, on occasion, guided by a set of questions addressing specific problems. Sufficient time will be provided for writing.

Grading:

Students will be evaluated in four basic areas: *participation in class*, written assignments, oral assignments, and knowledge (exams).

Exams (Midterm, Final): 50% (25% each)

Participation: 20%

Written assignments: 10% (each assignment counting equally)

Oral Assignments: 20% (weighed at 20% for Proteomics, 35% for Structure/Function, and 45% for Folding/Disease)

- Participation will be based on an average score, which includes material read (10%), understanding of methodology (20%), ability to answer questions directly related to text (50%), ability to answer questions applying learned material (20%)

Written and oral assignment(s) will be scored as follows (detailed scoring sheets will be provided after completion of assignments):

Content:	30%
Organization:	30%
Presentation/Format:	25%
Quality of Discussion:	15%

Grade	Percentage
A +	97- 100
A	90 - 96
A –	88 - 89
B +	86 - 87
B	80 - 85
B -	78 - 79
C +	76 - 77
C	70 - 75
C -	68 - 69
D +	66 - 67
D	60 - 65
D -	58 - 59
F	0 - 57

Ethical Considerations:

The Chemistry Department's policy of cheating is as follows: *“any student caught cheating will be assigned a course grade of F. The student's academic advisor will be notified of this failing grade and the student will not be allowed to drop the course”.*

Plagiarism Policy:

Plagiarism is defined as the use of “other” intellectual property without proper reference to the original author. Intellectual property includes all electronic, spoken or print media ***thus any information taken of the web is included under this statement***. Students are expected to cite all sources used in oral and written presentations. Cases of plagiarism will be taken seriously with a grade 0 for the particular assignment. Severe cases may be referred to the Department Chair or Dean or class failing considered.

Services –Support, Disabilities:

Support services will be provided through the University of Alaska Library system, online resources and the instructor. Additional services are available through Student Support Services (<http://www.uaf.edu/ssss/>) at UAF. We will work with the Office of Disabilities Services (203 WHIT, 474-7043) to provide accommodations for students with disabilities.