

**Chem F675**  
**Cellular Signaling**  
**“Biochemistry of Signal Transduction and Regulation”**

**Instructor:** Thomas Kuhn, 474-5752, [tbkuhn@alaska.edu](mailto:tbkuhn@alaska.edu)  
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**Office Hours:** Tuesdays 1:00 pm to 2:00 pm

**Lecture:** Tuesdays, Thursdays, 2:00 pm – 3:30 pm, REIC 165

**Text:** *Signal Transduction*  
Gomperts BD, Kramer IM, Tatham PER  
2<sup>nd</sup> Edition, Academic Press 2009  
ISBN 978-0-12-369441-6

**Course:**

This 3 credit course will concentrate on cellular signal transduction and regulation in higher animal and humans only. Cellular signaling is of vital importance in complex biomolecular systems, development, physiology, and pathology and thus, constitutes a major topic in modern medical and pharmacological research. Major topics include G-proteins, Protein kinases, Ca<sup>2+</sup>, cAMP, lipid mediators, adaptor proteins and signal recognition domains. The suggested textbook serves as a basic reference. Course material is exclusively composed of review articles and primary research literature pertinent to the topics. All material will be distributed on a timely basis. Individual assignments will be distributed throughout the course of the semester.

**Course Goals:**

This course provides 1) an understanding of the basic principles of intra- and intercellular signaling on the molecular level and 2) a perspective of signaling process in the context of major cellular processes and their relation to diseases such as cancer. The underlying theme of structure-function relationships of proteins strongly emphasizes these aspects in the context of signaling.

**Learning Outcomes**

- Understand specificity of signals and amplification
- Integrate the structure/function relations in signal transduction
- Apply concepts to interpret experimental data, propose meaningful experimental approaches, and formulate hypotheses.
- Critical understanding of current research areas and problems

**Instructional Methods:**

The course is composed of lectures (approx. 15%), group discussion (approx. 70%), and individual oral presentations (approx 15%) depending on topic. Some course topic will be introduced through lectures by the Instructor and further explored in detail through discussions of primary literature and/or individual oral presentation from students. One aspect of discussions is to identify “missing knowledge” in our understanding of the molecular regulation of gene expression.

Blackboard will be utilized as a central communication platform for announcements, posting of lectures and reading material, and distribution/collection of exams.

**Grading:**

Students will be evaluated on the basis of their class *participation*, presentations, and exams.

Exams I (Midterm):	20%
Exam II (Final):	20%
Participation:	40%
Presentations:	20%

- Participation is extracted for each students and lecture topic. Active involvement in discussions are scored based on material read (15%), understanding of methodology (15%), ability to answer questions directly to text (45%), ability to answer questions extending the scope of text (25%)
- Presentations are scored as follows:

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

**Course Policies:**

*Attendance:* Regular student attendance is expected to ensure consistent discussion activities and. Active student participation is vital and will account for a large part (60%) of the final grade.

*Exams:* Two exams will be given, one midterm and one final exam. These exams will be a combination of essay questions related to topics discussed and application of knowledge to research data. 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.

*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).

**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 are provided by the University of Alaska Library system, online resources, and the instructor. Additional services are available through Student Support Services (<http://www.uaf.edu/sssp/>) at UAF. We will work with the Office of Disabilities Services (208 WHIT, 474-5655) to provide accommodations for students with disabilities.