Course Syllabus - BIOL 540

Course Number:	BIOL 540
Course Name:	Signal Transduction
Quarter:	SP
Year:	2018
Start Date:	03/26/2018
End Date:	06/13/2018
Credits:	3.0
Last Date To Add This Course:	04/09/2018
Last Date To Drop This Course:	04/09/2018
Last Date To Change Grading Option:	04/09/2018
Minimum Class Size:	5

Meeting Days and Times

Day	Start	End	Location	Description
M	9:45 am	11:15 am	CA Campus	Graduate Office Large Conference Room
M	12:45 pm	2:15 pm	FL Campus	B158
W	9:45 am	11:15 am	CA Campus	Graduate Office Large Conference Room
W	12:45 pm	2:15 pm	FL Campus	B158

Course Managers

Role	Last Name	First Name	Department	Mail Code	Phone	Email	Organization Name (non-TSRI personnel)
Course Director	Solt	Laura	Department of Molecular Therapeutics	1B2	(561) 228-2295	lsolt@scripps.edu	
TA	Chan	Alanna	TSRI Graduate Program	TPC-19	(858) 784-8469	abchan@scripps.edu	
TA	Tsuda	Shanel	TSRI Graduate Program	3B2	(561) 228-2385	stsuda@scripps.edu	

Course Description

Our everyday jobs depend on communication among diverse constituents. Likewise, in the body, various internal or external signals, via stepwise coordination, regulate essential functions in cells such as division, growth, metabolism, and even death. Signal transduction is evolutionarily developed to maintain cellular homeostasis. Accordingly, aberrations in signal transduction disrupt the homeostasis and lead to various diseases such as cancer, diabetes, obesity and neurodegeneration. Thus, signaling pathways are being extensively targeted for disease therapy. Knowledge of the mechanism and regulation of signal transduction pathways is necessary.

The objective of this course is to provide an in-depth knowledge of the physiological functions and aberrations of disease-related signaling pathways. Therefore, each lecture will discuss the fundamentals of the specific signaling pathway and its implications in respective diseases. Additional topics that have been covered in conventional courses will be also optimally discussed to demonstrate their disease linkage, including the neuroendocrine system, hormones and neurotransmitters.

Background Preparation (Prerequisites)

Prior courses on a cell, molecular biology or biochemistry are recommended but not required. Pre reading of the book, 'Signal Transduction, principles, pathways and processes' by Lewis C. Cantley et al. is also recommended, but its purchase is not necessary. Students would find helpful to read relevant material before the class.

Texts and Journal References

Type	Title	Author	Date	ISBN/ISSN
Required	In addition to the reference book mentioned above, required reading will be selected from current journal articles to exemplify the subject of each lecture.			
Useful To Consult	Signal Transduction, principles, pathways and processes	Cantley et al.		978-0879699017

Course Learning Outcomes

By the end of this course, students will be able to:

1. Understand the basic concepts of signal transduction.

2. Appreciate the impact of signal transduction on physiology and pathology.

3. Establish a basic understanding of emerging scientific fields relevant to signal transduction to be able to critically evaluate the literature related to that field.

4. Understand the strengths and limitations of various experimental approaches for studying signal transduction.

5. Acquire knowledge of animal models, cell culture and molecular techniques used to study various signaling processes in healthy and diseased states. Manuscript discussion lectures will be designed to meet these criteria.

6. Identify specific experimental results; formulate them into important new questions; Design experiments to answer these questions and devise alternative approaches to reach a definitive conclusion.

7. Develop succinct presentation skills; describe the background, questions addressed, approach, conclusions, as well as strengths and weaknesses of scientific papers.

Course Requirements and Assignments

1. Journal club discussions/papers and attendance: 35%

Learning Purpose: Supports learning outcomes 1 thru 7 and involves active learning, and allows assessment of mastery of course material

2. Midterm examination: 30%

Learning Purpose: Supports learning outcomes 1 thru 6 and allows assessment of mastery of course material

3. Final Exam: 35%

Learning Purpose: Supports learning outcomes 1 thru 6 and allows assessment of mastery of course material.

Other Information

Attendance Statement

Students are expected to attend all classes. Students who are unable to attend class must seek permission for an excused absence from the course director or teaching assistant. Unapproved absences or late attendance for three or more classes may result in a lower grade or an "incomplete" for the course. If a student has to miss a class, he or she should arrange to get notes from a fellow student and is strongly encouraged to meet with the teaching assistant to obtain the missed material. Missed extra-credit quizzes will not be available for re-taking.

Scientific and Professional Ethics

Each student should complete any assignment on his/her own. It is allowed to build on, react to, criticize, and analyze the ideas of others, but the student should acknowledge the origin of the idea. Students must therefore explicitly acknowledge origin of ideas and references, including classmates, professors and literature authors if appropriate. The course professor will be responsible for clear guidance, if students have questions about drawing the line between citing work of others and and their own. Unauthorized collaboration on answers to exams/assignments, unless expressly permitted, may result in an automatic failing grade and possible expulsion from the Graduate Program.

Course Grading Statement

The overall course grade will be derived as follows:
35% contributions to discussions, written papers and attendance
30% take home midterm based on the first 6 lecturers
35% take home final exam based on the 7 lecturers following the midterm

Letter Grade Descriptions

Letter Grade	Grade Point	Description	Learning Outcome
A	4.00	Outstanding achievement. Student performance demonstrates full command of the course subject matter and evinces a high level of originality and/or creativity that far surpasses course expectations.	
A-	3.67	Excellent achievement. Student performance demonstrates thorough knowledge of the course subject matter and exceeds course expectations by completing all requirements in a superior manner.	
B+	3.33	Very good work. Student performance demonstrates above-average comprehension of the course subject matter and exceeds course expectations on all tasks as defined in the course syllabus. There is notable insight and originality.	
B	3.00	Satisfactory work. Student performance meets designated course expectations and demonstrates understanding of the course subject matter at an acceptable level.	
B-	2.67	Marginal work. Student performance demonstrates incomplete understanding of course subject matter. There is limited perception and originality.	
C+	2.33	Unsatisfactory work. Student performance demonstrates incomplete and inadequate understanding of course subject matter. There is severely limited or no perception or originality. Course will not count toward degree.	
C	2.00	Unsatisfactory work. Student performance demonstrates incomplete and inadequate understanding of course subject matter. There is severely limited or no perception or originality. Course will not count toward degree.	
P	0.00	Satisfactory work. Student performance demonstrated complete and adequate understanding of course subject matter. Course will count toward degree.	
F	0.00	Unacceptable work/Failure. Student performance is unacceptably low level of knowledge and understanding of course subject matter. Course will not count toward degree. Student may continue in program only with permission of the Dean.	
I	0.00	Incomplete is assigned when work is of passing quality but is incomplete for a pre-approved reason. Once an incomplete grade is assigned, it remains on student's permanent record until a grade is awarded.	
W	0.00	Withdrew from the course with Dean's permission beyond the second week of the term.	

- All courses will be recorded and maintained in the student's permanent academic record; only courses that apply towards the degree will appear on the academic transcript. Non-credit or audited courses will not appear on the transcript.
- 4 core courses taken for a letter grade (pass = A or B for a core course)
- 2 elective courses taken pass/fail (pass = A, B, C for an elective)
- Because students are encouraged to take electives outside their area of expertise, a "C" letter grade is passing.
- Grading will be based on general attendance/participation, student presentations of the classic and contemporary publications, and

Course Schedule

Date	Type	Topic or Lecture Title	Presenter Last Name	Presenter First Name	Presenter Department	Presenter Mail	Presenter Phone	Presenter Email	Organization Name (non-TSRI personnel)
03/26/2018	Lecture	Course overview: Signals, receptors, second messenger	Solt	Laura	Department of Molecular Therapeutics	1B2	(561) 228-2295	lsolt@scripps.edu	
03/28/2018	Lecture	GPCR signaling	McDonald	Patricia	Department of Molecular Therapeutics	2A2	(561) 228-2222	mcdonaph@scripps.edu	
04/02/2018	Lecture	Lipid signaling	Hansen	Scott	Department of Molecular Therapeutics	2C1	(561) 228-2415	shansen@scripps.edu	
04/04/2018	Journal Club								
04/09/2018	Lecture	Neuroendocrine signaling	Xu	Baoji	Department of Neuroscience	3C1	(561) 228-2340	bxu@scripps.edu	
04/11/2018	Lecture	Cell signaling in immunity and inflammation	Sundrud	Mark	Department of Cancer Biology	2C2	(561) 228-2328	msundrud@scripps.edu	
04/16/2018	Journal Club								
04/18/2018	Lecture	Nuclear receptors in metabolic and inflammatory signaling	Solt	Laura	Department of Molecular Therapeutics	1B2	(561) 228-2295	lsolt@scripps.edu	
04/23/2018	Lecture	Post translational regulation of signaling pathways	Solt	Laura	Department of Molecular Therapeutics	1B2	(561) 228-2295	lsolt@scripps.edu	
04/25/2018	Exam	Take home exam							
04/30/2018	Journal Club								
05/02/2018	Lecture	Signal transduction pathways that regulate energy metabolism	Solt	Laura	Department of Molecular Therapeutics	1B2	(561) 228-2295	lsolt@scripps.edu	
05/07/2018	Lecture	Insulin signaling	Bruno	Nelson	Department of Integrative Structural and Computati	2C1	(561) 228-3231	nbruno@scripps.edu	
05/09/2018	Journal Club								
05/14/2018	Lecture	Small G protein regulated signaling	Kissil	Joseph	Department of Cancer Biology	2C1	(561) 228-2170	jkissil@scripps.edu	
05/16/2018	Lecture	Integration of signaling through the epigenetic landscape of chromatin	Gerace	Larry	Department of Molecular Medicine	IMM-10	(858) 784-8514	lgerace@scripps.edu	
05/21/2018	Journal Club								
05/23/2018	Lecture	Signaling pathways in stem cells	Phinney	Donald	Department of Molecular Therapeutics	2A2	(561) 228-2214	dphinney@scripps.edu	

05/28/2018	No Class	Memorial Day						
05/30/2018	Lecture	Signaling and aging	Robbins	Paul	Department of Metabolism & Aging	3B3	(561) 228-2126	probbins@scripps.edu
06/04/2018	Journal Club							
06/06/2018	Lecture	Bioinformatics of signaling pathways Take Home Exam	Wu	Chunlei	Department of Integrative Structural and Computati	SR-402	(858) 784-2111	cwu@scripps.edu