



ACADEMIC EXCELLENCE, REDEFINED

American University of Ras Al Khaimah

BIOL 434: Cell Communication and Signal

Transduction

Spring 2018

I. Course Title: Cell Communication and Signal Transduction

Course Number: BIOL 434

Course Credit Hours: 3

II. Pre-requisites or Co-requisites: BIOL 270

III. Class Time and Location: Sunday, Tuesday, Thursday, 2:00 PM – 2:50 PM
Room No. D 101

IV. Instructor Information:

Name: Dr. Rawad Hodeify
Assistant Professor of Medical Biotechnology
Office: Faculty Block C, Room No. C47
Office Hours: Tuesday; 12:00 PM – 1:30 PM
Office Phone: 07 221 0500 ext. 1174
Office Fax: 07-2210300
Email: rawad.hodeify@aurak.ac.ae

V. Catalogue Description:

(3:3:0) this course focuses on how cells communicate with each other and their microenvironment, the signalling events that result from these interactions and their translation into cellular responses.

VI. Course Goals and Objectives:

- a. To provide an in-depth understanding of specialized areas of cell biology related to signaling pathways and specifically how cells interact/communicate with their microenvironment
- b. To develop an appreciation for how cell signaling pathways mediate cellular responses and the molecular mechanisms underlying these processes

VII. Course Student Learning Outcomes (CSLOs):

At the end of this course students will be able to:

CSLO No.	Course Student Learning Outcomes (CSLOs)
1	Explain the different types of cellular receptors and their characteristics
2	Describe some of the major signaling pathways by which cells communicate with each other and with the extracellular matrix and the molecular components of these communication pathways
3	Explain how the signalling pathways lead to specific cellular responses
4	Discuss how mutations in signaling proteins lead to dysregulated biological outcomes

VIII. Course Materials and Basic Resources:

Course material and resources include selected readings from books and journal articles which are placed on reserve in the University library as well as links on the World Wide Web, handouts, video clips and other interactive and visual resources.

Books/References:

Cell signalling, 3rd edition, Hancock, J. 2010. Oxford University Press, ISBN- 13:9780199232109 (Recommended)

Online resources for above textbook (contains hyperlinked references to some articles cited in each chapter and a very useful web link library some of which are associated with journals, while others are

maintained by companies which sell products related to cell signaling research):

<http://www.oup.com/uk/orc/bin/9780199232109/01student/weblinks/>

Molecular Cell Biology, 7th edition. Lodish, H., Berk, A., Kaiser, C., Krieger, M., Bretscher, A., Ploegh, H., Amon, A. And Scotte, M. 2012. W.H. Freeman & company, ISBN-13: 978-1-4292-3413-9 (Recommended as a basis for some topics)

Molecular Biology of the Cell, 5th edition. Alberts, B.; Johnson, A., Lewis, J., Raff, M., Roberts, K. and Walter, P. 2007, Garland Sciences, ISBN-13: 9780815341055 (Supplementary)

Online resources:

Biobank library: <http://lib.bioinfo.pl/courses/view/60> and additional online resources therein

Online access to Journal of Cell Biology via AURAK library databases <http://www.aurak.ae/library/library.html>

Course materials will be available through AURAK Blackboard, including the syllabus, PowerPoint slides of lectures, assignments, model answers to quizzes etc.

IX. Weekly Topics:

Week #	Topics	Major Assignment and Examination Dates	CSLO
1 28 th Jan – 1st Feb	Introduction to Course; Introduction to Cell communication		CSLO1, CSLO2, CSLO3, CSLO 4
Last day to Add/Drop course: 4th February 2018			
2 4 th Feb – 8 th Feb	Cell-cell interactions		CSLO1, CSLO2, CSLO3, CSLO 4
3 11 th – 15 th February	Cell-extracellular matrix interactions		CSLO1, CSLO2, CSLO3
4 18 - 22 th February	Cytoskeleton		CSLO1, CSLO2, CSLO3

5 25 th Feb- 1 st March	Membrane Structure; Intracellular		CSLO1, CSLO2, CSLO3
6 4 th – 8 th March	Intracellular trafficking and signalling		CSLO1, CSLO2, CSLO3, CSLO 4
7 11 th -15 th March	Cell cycle	Midterm	CSLO1, CSLO2
8 18 -22 nd March	Cell cycle and cancer		CSLO1, CSLO2
25 th March – 7 th April	SPRING BREAK		
31st March 2018	Last date to withdraw a course without grade “F”		
9 8 th -12 th April	Overview of cellular signalling, Approaches & Methods for studying signalling		CSLO1, CSLO2, CSLO3
	29th March – Mid Terms Grades Report Due		
10 15 -19 th April	Concepts of ligand- receptor interactions & receptor activation induced by ligand binding		CSLO1, CSLO2, CSLO3
11 22 -26 th April	Intracellular signalling by receptor-activated cascades		CSLO1, CSLO2
12 29 th April -3 rd May	Phosphorylation and nuclear translocation of signal transducers by ligand- activated receptor		CSLO1, CSLO2
13 6 th – 10 th May	Conversion of a receptor into a biologically active signal transducer	+ Student Presentations	CSLO1, CSLO2

14 13 th -17 th May	Signalling pathways and development		CSLO1, CSLO2
15 20 -24 th May	Signalling pathways and cancer	+ Student Presentations	CSLO1, CSLO2, CSLO3, CSLO4
2nd June 2018 – FINAL EXAMINATION PERIOD			

- a. Guidelines for the essay and presentation will be provided at the time topic is provided.
- b. Several short homework assignments will be provided during the course and these will usually be due a week after being given unless informed otherwise by the instructor.
- c. In addition to the quizzes mentioned above, extra quizzes may be given and you will be informed of the dates of these quizzes in advance
- d. Please note that the above is a tentative schedule and is subject to change. You will be informed of any changes in advance.

X. Evaluation of Learning:

Evaluation Plan

<input type="checkbox"/>	Homework Assignments	10%
<input type="checkbox"/>	Participation	5%
<input type="checkbox"/>	Essay and presentations	15%
<input type="checkbox"/>	Quizzes	20 %
<input type="checkbox"/>	Midterm Exam	20%
<input type="checkbox"/>	Final Exam	30%

Assessment Tool (number)	CSLO achieved	Weightage
Homework Assignments (2)	CSLO 1, CSLO 2, CSLO 3, CSLO 4	10%

Essays-Presentations (1) (Each essay: 1200- 1500 words; Presentation: 10 minutes)	CSLO 1, CSLO 2, CSLO 3, CSLO 4	15%
Quizzes (4) [closed book, consisting of multiple choice questions and questions requiring True or False responses (30%) and short answer questions (70%)]	CSLO 1, CSLO 2, CSLO 3, CSLO 4	20%
Midterm Examination (closed book, consisting of multiple choice questions and short answer questions in equal weightage, 1 1/2 hours)	CSLO 1, CSLO 2, CSLO 3, CSLO 4	20%
Final Examination (closed book, consisting of multiple choice questions and short answer questions in equal weightage, 3 hours)	CSLO 1, CSLO 2, CSLO 3, CSLO 4	30%
Class participation (in-class readings, discussions, and writing activities.	CSLO2, CSLO3, CSLO4	5%

Quizzes and examinations will examine students' comprehension and understanding of the principles and concepts in Cell Communication and Signal Transduction. Assignments will consist of descriptive answers to questions requiring literature searches, problem-solving questions, assigned readings and critiques of research articles. Students will also be assigned two essay- presentations that will require students to perform literature searches and utilize critical thinking, writing and presentation skills. The topics for the essay- presentations will relate to principles and concepts in Cell Communication and Signal Transduction. Written feedback will be provided to students on assignments, quizzes, essays and presentations and examinations to highlight positive aspects of responses that need to be maintained as well as any deficiencies in student responses and aspects that need particular attention by way of improvement.

XI. Grading System and Scale:

University course work is measured in terms of quantity and quality. A credit normally represents one hour per week of lecture or recitation or not fewer than two hours per week of independent or laboratory work throughout a semester. The number of credits is a measure of quantity. The grade is a measure of quality. According to the Resolution No. 80-1-106/2015 “Grading Scale” effective Fall 2015 is described below:

Grade	GPA Points	Percentage Score
A	4	90 -100
A-	3.7	87 - 89
B+	3.3	84 - 86
B	3.0	80 - 83
B-	2.7	77 - 79
C+	2.3	74 - 76
C	2.0	70 - 73
C-	1.7	67 - 69
D+	1.3	64 - 66
D	1.0	60 - 63
F	0	0 - 59

XII. Teaching and Learning Methodologies:

Lectures will constitute the primary mode of instruction and will include a combination of audiovisuals, whiteboard and handouts. Group discussions and question and answer sessions will also form part of the learning process by facilitating active participation as well as individual and co-operative learning. Students are encouraged to make good use of the textbook and online resources that provide additional materials such as animations, interactive activities, suggested readings etc. Students will also be required to give oral presentations on topics related to the course material which will provide opportunities for critical thinking and enhancing presentation skills. Assignments will include problem-solving questions, descriptive answers to questions, assigned readings, essays and critiques of journal articles. Assignments will reinforce learning and involve self-study and literature searches that enhance skills in critical thinking and analysis, synthesis, writing and presentation with emphasis on understanding and applying the principles and concepts underlying cell signaling. Relevant and recent course-related information from scientific and popular media

will be incorporated into the lecture material. Quizzes and examinations will assess student knowledge, understanding and application of the basic concepts and principles underlying cell communication and signaling.

XIII. Class Attendance System

Attendance is a core aspect of student retention, progression and academic achievement. It is the University's view that students who actively participate in their learning by attending classes regularly, are more likely to achieve better results and successfully complete their course.

The University expects students to attend all learning and teaching sessions associated with their program, as set out in course schedules and syllabi. Such learning and teaching sessions include, but are not limited to, lectures, seminars, tutorials, workshops, laboratory and practical sessions, professional placements, field trips, industrial visits, and in the case of directed or independent study students, scheduled meetings with supervisors.

Students are required to arrive on time for classes and remain for the duration of the teaching session. Late arrival at, and early departure from, teaching sessions is deemed disruptive, discourteous, unprofessional and unfair to other class members and tutors.

Students will be expected to:

- Attend all learning and teaching sessions associated with their program of study
- Notify their course instructors in advance (in person, by phone or e-mail) that they will be absent from time-tabled class sessions
- Obtain prior permission from their instructor or course manager, for planned absences of two or more consecutive class sessions during the semester
- Provide a medical certificate or other corroborating evidence to explain their absence, if required by the University.

Unsatisfactory student attendance includes failure regularly to attend learning and teaching sessions without providing a satisfactory reason to instructors for absence and/or persistent late arrival at, or early departure from, learning and teaching sessions.

Where a student fails to attend classes for two weeks cumulatively without the University's permission, the student will receive a "non-attendance warning (NAW)", and will be required to provide satisfactory explanation for the non-attendance. With each subsequent NAW issued, a formal report on the student's non-attendance is made to his or her sponsor.

Where a student fails to attend classes for four or more weeks cumulatively, or where a recurring pattern of non-attendance (that is more than two NAWs) is observed, over the course of the semester, the student may be deemed to have failed the course, in which case he or she will receive an “F (Fail)” or “U (Unsatisfactory)” grade, as appropriate.

Course Instructors are responsible for reminding students of the importance of regular attendance at learning or teaching sessions, and for accurately recording student attendance. Instructors and Course Managers (Department Chairs or Program Coordinators) will be required to consult with the relevant School Deans, to ensure timely issuance of NAWs, non-attendance reports to sponsors (subject to data confidentiality stipulations) and to provide relevant academic counselling where necessary.

It is the policy of AURAK to make every reasonable effort to allow members of the University community to observe their religious holidays without academic penalty. Absence from class or examinations for religious reasons does not, however, relieve students from responsibility for any part of the course work required during the period of absence.

XIV. Additional information

A. The American University of Ras Al Khaimah Student Handbook:

Be sure that you read the latest edition of The American University of Ras Al Khaimah Student Handbook available at: <http://media.aurak.ac.ae/wp-content/uploads/2017/01/Student-Handbook-2016-17-23-Oct-16-24-Oct-2016.pdf> You will be held responsible for all that is contained therein. The following points repeat or supplement, but in no way are intended to contradict, the policies in your handbook. In case of conflict, the last word is the Student Handbook.

B. Make-up for missed exams or quizzes:

Ordinarily, a student will receive a score of ‘0’ for any missed exam or quiz. However, at the instructor’s discretion, this rule may be relaxed, and a make-up exam may be given, or an alternative method of evaluating the student’s knowledge of the course materials devised, only in the case of extreme emergencies (e.g., death in the family, severe illness) that are beyond the control of the student or when a student provides a written ‘excuse’ from a responsible party for missing the exam the next time he/she arrives on campus.

C. Late assignment/homework policy:

Assignments and homework should be handed in on the due date at the beginning of the class session. No late homework will be accepted for any reason.

D. Academic Misconduct:

Students should consult the American University of Ras Al Khaimah Catalog Book 2016 – 2017 that is available online <http://media.aurak.ac.ae/wp-content/uploads/2016/11/Catalog-2016-2017.pdf>

for the University policies on Academic Integrity, Plagiarism and Misconduct.

The Honor Code and Honor System:

The Honor Code is an integral part of university life. Students are responsible, therefore, for understanding the code's provisions. Cheating and attempted cheating, plagiarism, lying, and stealing of academic work and related materials constitute Honor Code violations. In the spirit of the code, a student's word is a declaration of good faith acceptable as truth in all academic matters. To maintain an academic community according to these standards, students and faculty must report all alleged violations to the Honor Committee.

AURAK expects its students to uphold high standards of academic integrity and conduct. In particular, students are required to:

- Attend classes regularly and punctually.
- Be actively involved in class discussions and other course related classroom activities.
- Complete assignments on time.
- Meet the requirements for course and program completion.
- Abide by high standards of academic integrity, ethics, and honesty.
- Refrain from cheating on homework and examinations, plagiarizing other people's work by submitting it as their own, or any other forms of academic dishonesty.

- Adhere to the published test or examination rules and regulations.
- Make every effort to maintain good academic standing.

Given the internet and easy access to information and knowledge sources, the University is committed to students' learning in an ethical manner. For all academic assignments, project work, and presentations, students need to ensure that due acknowledgement is given to the source of any information which they incorporate in their work. The following are some examples of academic misconduct:

- Cheating/using unfair means in examinations
- Significant paraphrasing in written academic work that is unacknowledged
- Unacknowledged use of information or ideas unless such ideas are commonplace
- Citing sources which student has not read or referred to
- Breaching the word limit of assignments and mentioning wrong word count
- Plagiarism

Plagiarism:

Plagiarism is a serious academic offense. Plagiarism is the use of someone else's ideas, words, projects, artwork, phrasing, sentence structure or other work without properly acknowledging the ownership (source) of the property (item). Plagiarism is dishonest because it misrepresents the work of someone else as one's own. It is intellectual theft as it robs others of credit for their work. Plagiarism takes many forms including:

- Using someone else's words without putting those words in quotation marks and providing full information about their source, sufficient information so that another person could easily locate the words that are being quoted, whether it is in an article, a book, or on the web.
- Using unique, original ideas, phrases, sentences, paragraphs, or other materials, etc. from a single source or a variety of sources such as a text, journal, web page, electronic source, design, artwork, etc. in one's work without citing all sources. For a student found plagiarizing, the punishment will be a failing grade in the assignment without the right to redo the assignment up to a failing grade in the course.

Examples of Cheating:

Acts of cheating include, but are not limited to, the following:

1. Copying from another student's paper during an exam, or allowing or encouraging another student to copy from your paper during an exam.
2. Having someone else take your exam in your place, or taking an exam for someone else.
3. Obtaining unauthorized access to exams and accepting exams obtained by unauthorized access.

Examples of Plagiarism:

Acts of plagiarism include, but are not limited to, the following:

1. Handing in as 'original', work prepared by someone else or preparing/completing someone else's work.
2. Copying from a book or other publication without citing sources.
3. Using the same work to satisfy the requirements of two or more courses (during the same or different terms).
4. Having someone else rewrite a rough draft or rewriting a rough draft that is not your own work.

Violations of plagiarism are subject to evaluation according to the criterion of "reasonable doubt". The student's right to appeal and the procedures to be followed in carrying out the appeal of the University's decision is clearly stated in the Student Handbook.

Any violations of the University's academic rules, regulations or directives are reported to the DVCAA and may result in one of the following disciplinary measures:

- Verbal or written warning
- Repeating the term
- Dismissal

Please refer to the relevant section in the Handbook and ensure a clear understanding of the provisions of the University honor code and honor system in order to avoid infringement of the policy and attendant penalization.

E. Mobile Phones:

All mobile phones, pagers and/or other communication devices should be turned off before entering the classroom. If your mobile device sounds off during class, you will be asked to leave the room, thereby incurring one-half absence. If your mobile device sounds off during an exam or quiz, you will not be allowed to make-up the exam or quiz.

F. Diversity and the Use of English:

English is the common language of the AURAK campus, the use of which includes everyone. It is the only language to be used in the classroom. AURAK brings together students and faculty from diverse cultural and linguistic backgrounds, which is one of the strengths of the university. This diversity provides an opportunity to share our different experiences and enlarge our understanding of the world. Classroom discussions and other activities are to be conducted with courtesy and civility and respect for one another and for our differences.