



## University of Nicosia, Cyprus

<b>Course Code</b> BIOL-423	<b>Course Title</b> Cell Signaling	<b>ECTS Credits</b> 8
<b>Department</b> Life and Health Sciences	<b>Semester</b> Spring/Fall	<b>Prerequisites</b> BIOL-301 Developmental Biology & Human Embryology
<b>Type of Course</b> Life Sciences Elective	<b>Field</b> Biology, Biochemistry	<b>Language of Instruction</b> English
<b>Level of Course</b> 1 <sup>st</sup> Cycle	<b>Year of Study</b> 3 <sup>rd</sup> or 4 <sup>th</sup>	<b>Lecturer</b> Dr. Edna.Yamasaki-Patrikiou
<b>Mode of Delivery</b> Face-to-face	<b>Work Placement</b> N/A	<b>Co-requisites</b> None

### Objectives of the Course:

The aim of the course is to explore the inter- and intracellular communication activities upon cell stimulation. The main objectives of the course are to:

- Introduce the terminology associated with cell signaling and communication.
- Explore the major cell signaling pathways
- Discuss the current literature and the cellular and molecular techniques used in understanding key advances in this area.

### Learning Outcomes:

After completion of the course students are expected to be able to:

1. Name and describe central themes and mechanisms in cell signaling.
2. Identify and describe the major cell signaling pathways and their components.
3. Identify and describe the relationship between disease and components in cell signaling.
4. Identify and describe the principles of communicative and functional interactions between cell.
5. Critically analyze and interpret experimental findings from key research papers.

### Course Contents:

1. Introduction to signal transduction.
2. Odor perception and G-protein coupled receptors.
3. Fight or flight: adrenalin and cAMP.
4. Growth hormones and JAK/STAT.
5. Tyrosine kinase receptors.
6. Phosphoinositides in signaling, signaling modularity.
7. Cell growth and cell death/apoptosis signaling.

- 8. Insulin and diabetes.
- 9. MAP kinase signaling in yeasts.
- 10. Protein degradation in signaling.
- 11. Kinase function and regulation
- 12. Chemotaxis; Histidine kinases and two component signaling
- 13. Networks in signaling (patterning and hedgehog in Drosophilla)

**Learning Activities and Teaching Methods:**

Lectures, Discussions and interpretation of research papers, cooperative presentations on the relevance of signal transduction molecules and diseases.

**Assessment Methods:**

Assignments, Tests and Mid-term Exam; Final Exam

**Required Textbooks/Reading:**

Authors	Title	Publisher	Year	ISBN
1. Alberts, Bruce.	Molecular biology of the cell	Garland Science	2007, 5 <sup>th</sup> ed.	ISBN - 978-0-8153-4106-2
2. M.Diederich	Signal Transduction Pathways: Cell Signaling in Health and Disease: Pt. C (Ann. of the N.Y. York Acad. of Sci.)	Blackwell Publishing	2007	ISBN-10: 1573316954
3. John Hancock	Cell Signalling	OUP Oxford;	3 <sup>rd</sup> ed. 2010	<b>ISBN-10:</b> 0199232105 <b>ISBN-13:</b> 978-0199232109

**Recommended Textbooks/Reading:**

Authors	Title	Publisher	Year	ISBN
.Rakesh Srivastava,	Apoptosis, Cell Signaling, and Human Diseases: Molecular Mechanisms v. 2	Humana Press Inc.,U.S	2006	ISBN-10: 1588298825  <b>ISBN-10:</b> 0470025514
John Nelson Friedrich	Structure and Function in Cell Signalling Cellular Signal	Wiley Blackwell Garland	2008	<b>ISBN-13:</b> 978-0470025512 <b>ISBN-10:</b>

Marks, <div style="border: 1px solid black; padding: 2px; display: inline-block;">B001JS5V6U</div> Ursula Klingmüller, Karin Müller- Decker	Processing: An Introduction to the Molecular Mechanisms of Signal Transduction	Science;	2009	0815342152 <b>ISBN-13:</b> 978- 0815342151
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