2021-2022

**[2232012, Biology and Medical Sciences], [ 225.4402, human Biology] – [Molecular Mechanisms of Cell Death and Cancer ]
Semester [B] Prof. Sarit Larisch**

**Time:** Tuesday] [14-16], Room [608]

**Instructor:** no instructors in the course

**Office Hours:** upon coordination by email.

**Teaching Assistants & Office Hours:**

None

**Course Level:** MA, PhD**:**

**Course Type & Format:** [**mandatory**],[Lecture]

**Number of Hours/Credits: 2**

**Prerequisites:** second year Biology and up.

**Course Overview (Short Abstract):**

**The course teaches the various molecular mechanisms leading to cell death and its implication to the various cancer diseases.**

**In particular, the course will explain the morphological, biochemical, and molecular features of apoptosis versus necrosis. The various laboratory methods used to determine cell death. The role of apoptosis during development and in adulthood. The course describes the executioners of apoptosis, the various types of enzymes- termed caspases. The two main apoptotic pathways- the death receptor pathway, and the mitochondrial pathway. We will describe the main families of proteins that play an important role in promoting or inhibiting apoptosis-Inhibitor of Apoptosis (IAP) proteins, Bcl-2 family and others. We will also focus on the role of apoptosis in development of the various types of cancer. And will explain and describe the concepts of oncogenes, and tumor suppressor proteins, with specific examples of cancers which develop as a result of aberrant expression of these proteins. Finally, we will show how all the basic knowledge accumulated regarding molecular mechanisms of apoptosis is used to design novel anti-cancer therapies.**

**Learning Outcomes (What are the skills, abilities, or major concepts a student is expected to acquire in this course?) – At the end of the course students will be able to:**

1. Know the physiological, morphological, molecular differences between apoptosis and necrosis.
2. Know the molecular pathways leading to apoptosis.
3. Learn about the caspases, their mechanism of action, activation, specificity and various ways by which the promote the killing of a cell.
4. Pro-and anti-apoptotic proteins, inhibitors and activators of apoptosis.
5. The IAP family of proteins
6. The Bcl-2 family of proteins.
7. What is cancer, how a normal cell transforms into cancer cell.
8. Oncogenes and tumor suppressors
9. Anti-cancer drugs that are based on specific activation of apoptosis in cancer cells
10. Laboratory methods that determine apoptosis in cell lines and tissues.

**Assessment (Assessment Method and Grade Composition):**

[Requirement (Exam– [100]% grade

**Week-by-Week Content and Assignements:**

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| **Week #** | **Topic** | **Assignment**  |
| 1 |  | Exam at the end of the course |
| 2 |  |  |
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**Website:** [[Address]](http://online.haifa.ac.il)

**Reading List:**

1. etc. …