**AGU Graduate School of Engineering and Science ……**
**Program**

| **COURSE RECORD** | |
|---|---|
| Code BENG 612 | |
| Name Cell Death | |
| Hour per week | 3 (3 + 0) |
| Credit 3 | |
| ECTS 10 | |
| Level/Year | Graduate |
| Semester | - |
| Type | Elective |
| Location | AGU |
| Prerequisites | None |
| Special Conditions | - |
| Coordinator(s) | Assistant Prof. Mona El Khatib |
| Webpage | |
| Content | Cell death results in the termination of normal cellular processes. This course provides an overview about the different cell death mechanisms and the guidelines that are followed based on morphological, biochemical and functional characteristics that are used to identify the different types of cell death. It will also introduce the different that are used to detect and dissect cell death pathways |
| Objectives | - Introduction to the guidelines and definition of cell death.<br>- Describe the difference between programmed and non-programmed cell death<br>- Present the different morphological, biochemical and functional characteristics of the different cell death mechanisms<br>- Review the latest insights into different cell death pathways<br>- Discuss cell death in the context of experimental and internal medicine including cancer, immunity and neuroscience.<br>- Introduce the different techniques to detect and dissect cell death pathways |
| Learning Outcomes | LO1: Be able to define the differences between various cell death mechanisms<br>LO2: Learn to identify the different mechanisms of cell death based on the morphological, biochemical and functional characteristics<br>LO3: Be able to read and discuss research articles and analyze the scientific data<br>LO4: Be able to describe the techniques to detect and dissect cell death pathways<br>LO5: Be able to present the recent findings of research articles in cell death mechanisms |
| Requirements | None. |
| Reading List | Research articles. |
| Ethical Rules and Course Policy | |

**LEARNING ACTIVITIES**

| **Activities** | **Number** | **Weight (%)** |
|---|---|---|
| Lecture | 7 | 30% |
| Group Works | 2 | 35% |
| Presentations | 7 | 35% |
| Site Visits | 0 | 0% |
| | Total | 100 |

**ASSESSMENT**

| **Evaluation Criteria** | **Weight** (%) |
|---|---|

| | |
|---|---|
| Quizzes | 20% |
| Weekly Assignments | 15% |
| Group Project Assignments & Presentations | 30% |
| Attendance/Participation | 05% |
| Final Exam/Submission | 40% |
| Total | 100% |

For a detailed description of grading policy and scale, please refer to the website https://goo.gl/HbPM2y section 28.

**COURSE LOAD** *Please, use this one as a reference for your course*

| **Activity** | **Duration** (hour) | **Quantity** | **Work Load** (hour) |
|---|---|---|---|
| In class activities | 2 | 14 | 28 |
| Lab | 0 | 0 | 0 |
| Group work | 2 | 12 | 24 |
| Research (web, library) | 6 | 14 | 84 |
| Required Readings | 3 | 14 | 42 |
| Pre-work for Presentation | 5 | 14 | 70 |
| Lab reports | 0 | 0 | 0 |
| | | **General Sum** | **248** |

**ECTS: 10** (Work Load/25-30)

**CONTRIBUTION TO PROGRAMME OUTCOMES***

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PO13 | PO14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LO1 | 1 | 5 | 3 | 4 | 5 | 5 | 5 | 4 | | | | | | |
| LO2 | 2 | 5 | 3 | 4 | 5 | 5 | 4 | 4 | | | | | | |
| LO3 | 2 | 5 | 5 | 5 | 5 | 4 | 4 | 3 | | | | | | |
| LO4 | 2 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | | | | | | |
| LO5 | 2 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | | | | | | |

* Contribution Level: 0: None, 1: Very Low, 2: Low, 3: Medium, 4: High, 5: Very High

**WEEKLY SCHEDULE**

| **W** | **Topic** | **Outcomes** |
|---|---|---|
| 1 | Introduction to cell death | LO1, LO2 |
| | Activity: None | |
| 2 | The difference between programmed and non programmed cell death | LO1, LO2, LO3 |
| | Activity: Research article discussion | |
| 3 | Intrinsic and extrinsic apoptotic pathways | LO1, LO2, LO3, |
| | Activity: Research article discussion | LO4, LO5 |
| 4 | Mitochondrial Permeability Transition (MPT)- driven necrosis | LO1, LO2, LO3, |
| | Activity: Research article discussion | LO4, LO5 |
| 5 | Necroptosis, Ferroptosis and Pyroptosis | LO1, LO2, LO3, |
| | Activity: Research article discussion | LO4, LO5 |
| 6 | Parthanatos | LO1, LO2, LO3, |
| | Activity: Research article discussion | LO4, LO5 |
| 7 | Entotic Cell Death | LO1, LO2, LO3, |
| | Activity: Research article discussion | LO4, LO5 |
| 8 | NETotic Cell Death | LO1, LO2, LO3, |
| | Activity: Research article discussion | LO4, LO5 |
| 9 | Entotic Cell Death | LO1, LO2, LO3, |
| | Activity: Research article discussion | LO4, LO5 |
| 10 | Lysosome Dependent Cell Death | LO1, LO2, LO3, |
| | Activity: Research article discussion | LO4, LO5 |
| 11 | Autophagy Dependent Cell Death | LO1, LO2, LO3, |
| | Activity: Research article discussion | LO4, LO5 |
| 12 | Immunogenic Cell Death | LO1, LO2, LO3, |
| | Activity: Research article discussion | LO4, LO5 |
| 13 | Cellular Senescence | LO1, LO2, LO3, |
| | Activity: Research article discussion | LO4, LO5 |
| 14 | Mitotic Catastrophe | LO1, LO2, LO3, |
| | Activity: Research article discussion | LO4, LO5 |

Prepared by Mona El Khatib
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