

University of Tabriz

Faculty of Natural Sciences

Department of Animal Biology

**Semester lesson schedule: Cell Physiology**

**First semester**

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| **Faculty:** | Natural Sciences | **Department:** | Animal Biology |
| **Field of study:** | Animal Biology | **Major:** | Animal physiology |
| **Level:** | Master of Science | **Course:** | Cell Physiology |

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| **Instructor: Dr. Khakpay** | | | |
| 16-18 | **Time:** | Tuesday | **Day:** |
| Class 221 | **Location:** | 24.09.2024 till 07.01.2025 | **Semester period:** |

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| **The lesson purposes - Learning objectives** | |
| What specialized skills are necessary to develop? | |
| Practical knowledge: □ | Theoretical knowledge: ■ |
| Hard skills: □ | Soft skills: □ |

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| **Lesson description** |
| This lesson is related to the animal cells functions and signaling pathways in the cell. In this course, students will learn cell homeostasis, structure and function of plasma membrane, excitability, stimulus processing and response to stimulus. |

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| **Lesson references** |
| 1- Hall, J.E., Hall, M.E. (2020) Guyton and Hall Textbook of Medical Physiology (Guyton Physiology). 14th edition, Elsevier. |
| 2- Sperelakis, N. (2011) Cell Physiology Source Book. 4th Edition, Academic Press. |
| 3- Landowne, D. (2006) Cell Physiology (LANGE Physiology series). First edition, McGraw-Hill Education/Medical. |

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| **Evaluation methods** | | | |
| Practice: □ | Quiz: □ | Final exam: ■ | Midterm exam: ■ |
| Project: ■ | Weekly assignments: □ | Group activities: □ | Oral assessment: □ |
| **The total grade:** Theoretical exam (sum of mid-term and final exams) 18 scores + the project 2 scores. | | | |

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| **Teaching methods** | | | |
| Collaborative learning: □ | Group discussion: □ | Discussion: ■ | Lecture: ■ |
| Scientific visit: □ | Laboratory-based: □ | Project-based: ■ | Problem-based: □ |
| Demonstration (Presentation of the device or model performance method): □ | | | |

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| **Course number** | **Course name** | **Learning objectives** | **Teaching methods** | **Evaluation methods** | **Assignment type/Deadline/Grade** |
| **First** | An introduction to the principles of physiology | History of physiology, sub-branches of physiological researches, homeostasis and types of physiological regulation | Lectures, PowerPoints and textbooks | Class attendance, Discussion in the session | Discussion in the session, presentation of the lecture until the end of the semester |
| **Second** | Animal cell membrane | Cell membrane structure, membrane asymmetry, membrane permeability, membrane fluidity | Lectures, PowerPoints and textbooks | Class attendance, Discussion in the session | Discussion in the session, presentation of the lecture until the end of the semester |
| **Third** | Membrane transports | Membrane transports pathways, endocytosis and exocytosis | Lectures, PowerPoints and textbooks | Class attendance, Discussion in the session | Discussion in the session, presentation of the lecture until the end of the semester |
| **Forth** | Membrane transports | Simple diffusion, facilitated diffusion, primary and secondary active transport | Lectures, PowerPoints and textbooks | Class attendance, Discussion in the session | Discussion in the session, presentation of the lecture until the end of the semester |
| **Fifth** | Resting membrane potential (RMP) | Resting membrane potential, sodium/potassium pump involvement in the RMP, principles of membrane potentials | Lectures, PowerPoints and textbooks | Class attendance, Discussion in the session | Discussion in the session, presentation of the lecture until the end of the semester |
| **Sixth** | Action potential | Types of stimuli, threshold and subthreshold stimuli, all or none law, voltage-gated sodium and potassium channels | Lectures, PowerPoints and textbooks | Class attendance, Discussion in the session | Discussion in the session, presentation of the lecture until the end of the semester |
| **Seventh** | Action potential | Typical plateau action potential, after-hypolarization potential, absolute and relative refractory periods, rhythmicity | Lectures, PowerPoints and textbooks | Class attendance, Discussion in the session | Discussion in the session, presentation of the lecture until the end of the semester |
| **Eighth** | Smooth muscles | Types of smooth muscles, contraction and relaxation of smooth muscles, comparison of smooth and skeletal muscles, control of smooth muscles contraction | Lectures, PowerPoints and textbooks | Class attendance, Discussion in the session | Discussion in the session, presentation of the lecture until the end of the semester |

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| **امضای مدرس** | **امضای مدیر گروه** | **تاریخ** |
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