

University of Tabriz

Faculty of Natural Sciences

Department of Animal Biology

**Semester lesson schedule: Cell Membrane 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 Membrane Physiology |

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| **Instructor: Dr. Khakpay** | | | |
| 10-12 | **Time:** | Saturday | **Day:** |
| Class 221 | **Location:** | 28.09.2024 till 04.01.2025 | **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** |
| After completing this course, they will learn the characteristics and function of cell membranes, the transmembrane transport rules, the structure and function of membrane receptors and transporters, and the intra- and intercellular signaling. |

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| **Lesson references** |
| 1- Alberts, B. (2022), Molecular Biology of the Cell. Seventh Edition, W. W. Norton & Company. |
| 2- Krauss, G. (2014) Biochemistry of Signal Transduction and Regulation. Fifth Edition, Wiley-VCH Verlag. |
| 3- Lodish, H. (2016) Molecular Cell Biology, Eighth edition, W. H. Freeman and Company. |

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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** | Principles of membrane transport | The mechanisms of formation, identification, connection and fusion of the coated vesicle, including clathrin-coated vesicles, COPI- and COPII-coated vesicles | 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** | Endocytosis | The mechanism of the primary endosome, multivesicular body, secondary endosome, and lysosome formation, The endocytosed materials fate | 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** | Exocytosis | Mechanism of secretion in structural/constitutive and regulated pathways (toward lysosome and/or outside the cell) | 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** | Principles of membrane signaling | Membrane signaling methods, types of the membrane receptors, types of the intracellular signaling pathways | 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** | Principles of membrane signaling | The G-protein coupled signaling pathways, the phospholipid signaling pathways | 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** | Principles of membrane signaling | The calcium-calmodulin-dependent signaling pathways, the visual and olfactory receptor signaling pathways, the gas molecule-dependent pathways | 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** | Principles of membrane signaling | The tyrosine kinase receptor signaling pathways, the tyrosine kinase coupled receptors signaling pathways | 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** | Principles of membrane signaling | The serin/threonine kinase receptor signaling pathways, the intranuclear receptor signaling pathways | 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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