Ahvaz Jundishapur University of Medical Sciences

Course Title: Membrane Biochemistry and Transport
Field and Level: Master's in Clinical Biochemistry
Faculty: Medicine Academic Year: 2025-2026
Prerequisite: - Credits: 2 Semester: Fall
Instructor Group: Dr. Faridi / Dr. Hashemnia / Dr. Igeder
Class Day and Time: Monday 10-13

Instructor Name	Teaching Method	Learner Activities	Outline (Concepts to be Taught)	Date	Session
Dr. Faridi			Introduction to Membrane Structure, Carbohydrates, Cell Membrane Lipids, Role of Various Carbohydrates and Lectins, etc. in the Membrane, Role and Types of Membrane Lipids		First
Dr. Faridi			Introduction and Classification of Types of Membrane Proteins and Their Role in Maintaining Cell Shape and Interactions, Transport, etc.		Second
Dr. Faridi			Structure and Proteins of the RBC Membrane		Third
Dr. Faridi			Simple Transport and Active Transport, Diffusion and Factors Affecting It, Facilitated Transport and Its Types, Kinetics of Simple Diffusion and Facilitated Transport		Fourth
Dr. Hashemnia			Structure and Function of Various Types of Ion Channels: Voltage-Gated, Ligand-Gated, and Mechanically-Gated Ion Channels		Fifth
Dr. Hashemnia			Role of Ion Channels in the Function of the Five Senses		Sixth
Dr. Hashemnia			Role of Ion Channels in Generating the Resting Membrane Potential, Nerve Impulse Transmission, and Generating the Action Potential		Seventh
Dr. Hashemnia			Membrane Transport, Nernst Equation, and Free Energy Changes in Membrane Transport		Eighth
Dr. Hashemnia			Neurotransmitters, Function of Ion Channels in Synapses,		Ninth

			Postsynaptic Potential, Importance of Frequency and Amplitude in Nerve Impulses		
Dr. Hashemnia			**Role of Ion Channels in Maintaining Intracellular pH, Lysosomes, Blood, and Brief Introduction to Diseases Related to Ion Channel Dysfunction**		**Tenth**
Dr. Hashemnia			**Membranes of Intracellular Organelles (Mitochondria, Lysosomes, etc.) and Their Differences from the Plasma Membrane**		**Eleventh**
Dr. Igeder			**Paracellular and Transcellular Transport, Principles and Mechanisms of Vesicular Transport, Surface Markers of Carrier Vesicles and Target Membranes**		**Twelfth**
Dr. Igeder			**Targeted Transport of Proteins from the Endoplasmic Reticulum to Target Organelle Membranes (Golgi Apparatus, Mitochondria, Lysosomes, and Plasma Membrane)**		**Thirteenth**
Dr. Hashemnia			**Exocytosis and Endocytosis, Receptor-Mediated Endocytosis, Formation of Clathrin-Coated Vesicles and Caveolae**		**Fourteenth**
Dr. Hashemnia			**Extracellular Matrix and Its Components**		**Fifteenth**
Dr. Igeder			**Liposomes and Synthetic Membranes and Their Applications**		**Sixteenth**
Dr. Hashemnia			**Techniques for Studying Membrane Channels, Brief Introduction to Diseases Related to Ion Channel Dysfunction**		**Seventeenth**