Module title: Absorption and Transfer in Plants

Term: First Term 1398-99

Lecturer: A. Einali (assistant prof.)

Assessments: 25% mid-term 1 exam
25% mid-term 2 exam
40% final exam
10% Quiz

References:

1. **Plant Solute Transport, 2007**
   Yeo A., Flowers T.

2. **Biochemistry and Molecular Biology of Plants, 2nd Edition, 2015**
   Bob B. Buchanan , Wilhelm Gruissem, Russell L. Jones

3. **Plant Physiology, 2002**
   Lincoln Taiz and Eduardo Zieger

4. **Plant Physiology: Absorption and transport of solutes across the membrane, 2004 (in Persian).**
   Shariati M, Haghjou MM.

Module subjects:

1. Membrane Structure and Membranous Organelles

1st week: Common properties and inheritance of cell membranes, The fluid - mosaic membrane model

2. Transport of Ions and Small Molecules Across Cell Membranes

2nd week: Overview of membrane transport, Passive Diffusion, Active transport, Chemical potential

3rd week: Electrochemical potential

4th week: Nernst potential

5th week: Goldman equation, Ion absorption kinetics

3. Membrane Transport Processes

6th week: Membrane transport proteins
7th week: Ion pumps,
8th week: P-type pumps, *First mid-term exam*
9th week: Ca^{2+}-ATPase pumps, V-type pumps
10th week: H^{+}-PPase pumps, ABC transporters
11th week: Carriers, Cotransport
12th week: Uniport transport, Ion channels
13th week: The role of Ion channels in plants
14th week: Mechanosensitive channels, *Second mid-term exam*

4. Transfer

15th week: Long-distance transport, Nutrition transport
16th week: Phloem elements, Phloem transport, *Preparation for final exam*