Module title: Plant Metabolism

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 metabolism, 1997**
David T. Dennis, D. B. Layzell

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

Module subjects:

1. Bioenergetics and Thermodynamics

1st week: Concept of Metabolism, Principles of Bioenergetics, Gibbs free energy, Enthalpy, Entropy

2nd week: The Standard Free-Energy Change, Actual Free-Energy Changes

3rd week: Phosphoryl Group Transfers and ATP, Redox Reactions

2. Enzymes: The Catalysts of Life

4th week: An Introduction to Enzymes, How Enzymes Work,

5th week: Enzyme Kinetics, The Relationship between Substrate Concentration and Reaction Rate, Michaelis-Menten kinetics
6th week: Reversible and Irreversible Inhibition, Kinetic Tests for Determining Inhibition Mechanisms
7th week: Regulatory Enzymes, Allosteric Enzymes, The Kinetic Properties of Allosteric Enzymes, *First mid-term exam*

3. Metabolic Regulation

8th week: Pacemaker enzyme, coarse control of metabolism
9th week: Fine control of metabolism

4. Carbohydrate Metabolism

10th week: sucrose synthesis, starch synthesis
11th week: sucrose and starch degradation
12th week: Regulation of carbohydrate metabolism, *Second mid-term exam*
13th week: Glycolysis, Fates of Pyruvate under Anaerobic Conditions:Fermentation
14th week: Regulation of glycolysis, Enzymes of Glycolysis
15th week: Pentose Phosphate Pathway of Glucose Oxidation, TCA cycle
16th week: Electron transport chain, Gluconeogenesis, *Preparation for final exam*