



The Hebrew University of Jerusalem

Syllabus

Metabolism - 96115

Last update 17-03-2025

HU Credits: 4.5

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Medicine

Academic year: 2025

Semester: 2nd Semester

Teaching Languages: Hebrew

Campus: Ein Karem

Course/Module Coordinator: Prof. Haya Lorberboum-Galski

Coordinator Email: hayag@ekmd.huji.ac.il

Coordinator Office Hours:

Teaching Staff:

Ms. sarah slama,
Prof. Haya Loberboum-Galski,
Prof. Abd Higazi

Course/Module description:

General introduction to types of metabolic pathways and common strategies used in energy metabolism and bioenergetics. An overview of carbohydrate and lipid metabolism. Structure of glycolysis, gluconeogenesis, glycogen metabolism, the pentose-phosphate pathway and the regulation of these pathways. Discussion about hormonal, covalent and allosteric control of enzymes. The citric acid cycle and its central role in metabolism. Oxidative phosphorylation, electron transfer and ATP synthesis. The urea cycle and degradation of amino acids. Lipid metabolism. The mobilization of fats. Fatty acid catabolism. Ketone body formation. Fatty acid biosynthesis. Regulation of fatty acid and lipid metabolism. Integration and overall control of metabolism.

Course/Module aims:

To provide students with an introduction to Biochemistry with an emphasis on metabolic pathways and their regulation

Learning outcomes - On successful completion of this module, students should be able to:

- On successful completion of this module, students should be able to:
- Outline how energy is produced and used to drive cellular reactions.
 - Describe and illustrate the metabolic pathways of: glycolysis, glycogen metabolism, the pentose-phosphate pathway, gluconeogenesis, the citric acid cycle, oxidative phosphorylation, the urea cycle, degradation of amino acids, the synthesis and degradation of fatty acids and the synthesis of ketone bodies.
 - Describe the interrelationships between the various metabolic pathways and outline their overall regulation.
 - Read and evaluate scientific papers.
 - Analyze and answer biomedical problems.

Attendance requirements(%):

Teaching arrangement and method of instruction: Lectures & Workshops

Course/Module Content:

- ATP as an energetic coin
- Glycolysis
- The citric cycle
- Oxidative phosphorylation
- Glycogen metabolism
- The pentose-phosphate pathway
- Gluconeogenesis
- The urea cycle
- Degradation of amino acids
- The synthesis and degradation of fatty acids
- The synthesis of ketone bodies
- The synthesis of cholesterol
- Hormonal regulation of lipids metabolism
- Integration of metabolism

Required Reading:

1. Stryer L. *Biochemistry* (latest addition) or *Leninger Biochemistry* (latest addition).
2. Selected papers from international scientific literature (changes every year)

Additional Reading Material:

Grading Scheme:

Written Exam % 100

Additional information:

Attendance to the workshops is required. Every workshop contains a short quiz plus submission of a written home-exercise. Successful participation in the workshops has a bonus-credit in the final mark of the course.
Explanation regarding the workshops will be given at the beginning of the course.