

CELL SCIENCE

Department of Genetics, Cell- and Immunobiology

Address: NET Building, H-1089 Budapest, Nagyvárad tér 4.

Course director: *Edit Buzás MD, DSc*

Course coordinator: *Orsolya Láng MD, PhD*

Office hours are given on the Department website
(<http://gsi.semmelweis.hu/index.php/en/education/information>)

Credit: 3

Aim of the course:

Course Cell Science is developed for medical students as a part of the Basic Module. The Course presents the most important aspects of cell-morphology and cell function. Cell Science Course provides a detailed discussion of compartmentalization in the eukaryotic cell as well as describes the most significant characteristics of the basic cellular functions (migration, endocytosis, cell-cell communication, division, stem cell differentiation, ageing and cell death). The practices introduce the students to the microscopic techniques used for cell morphological studies. The purpose of the course is to demonstrate the complexity of cell structure and function relationships as well as to present basic methods of in vitro cell culturing and their potential medical applications.

Location of the course:

Selye János Lecture Hall and Lab rooms L13-L16 are located on the first floor of the NET building (1089 Budapest, Nagyvárad tér 4.)

Lecturers: Prof Edit Buzás, Dr. András Kristóf Fülöp, Dr. Hargita Hegyesi, Dr László Kóhidai, Dr. Eszter Lajkó, Dr. Orsolya Láng

Lectures (1 hours per week):

1. Cell theory. Model cells in Medicine
2. Cell membrane
3. Structure and function of nucleus
4. Endoplasmic reticulum
5. Golgi complex, vesicular transport and secretion
6. Endocytosis. Autophagy
7. Cell adhesion and cell junctions
8. Cytoskeleton
9. Cellular movement
10. Structure and function of mitochondria and peroxisomes
11. Cell communication. Extracellular vesicles.
12. Cell cycle and mitosis
13. Stem cells and differentiation
14. Cellular aging and cell death

Practices (2 hours per week):

1. The light microscope
2. The general cell structure. Light microscopic microtechnique
3. The electron microscope. Cell membrane
4. The interphase nucleus. Cyto(histo)chemistry
5. Immunohistochemistry. Super-resolution microscopy
6. Cell and tissue culture
7. Endoplasmic reticulum

8. Golgi complex and secretion
9. Endocytosis and lysosomes
10. Cell surface differentiation, enzyme-histochemistry
11. Store and supply of energy. Mitochondria. Peroxisome.
12. Mitosis
13. Meiosis
14. Cell death (necrosis and apoptosis)

The order of topics may vary

Course requirements: Students must participate at least 75% of the classes. More than three absences from the practice or more than three absences from the lecture invalidate the semester, no signature is given. There are no extra practices.

Midterms: During the semester two Moodle exam will be organized at week 6th and 12th. Based on the total performance maximum 3 bonus points can be obtained. These extra scores will be added to the exams scores as bonus scores. No opportunity to improve the bonus scores.

Exam: The course ends with a written exam. It contains multiple choice, essays, drawings, etc. covering both theoretical and practical part of the subject. The written exam score should achieve 50% of the total scores for passing. At 13th week of the semester, a competition will be organized. Those who achieve the good or excellent level get the exam grade. Further details will be announced at the website of the department (<http://gsi.semmelweis.hu>) and in the Moodle.

Core text: Alberts et al. Essential Cell Biology (4th edition) Garland Science ISBN-13: 978-0815344544 ISBN-10: 0815344546

Lecture and practice presentations and additional texts are available on the homepage: <http://gsi.semmelweis.hu> (The user name and password is on course datasheet of the Neptun)