

Program of Study : Dentistry – English Programme

Course : Biology and Genetics

Abbreviation : BIO/ZAA11

Schedule : 30 hours of lectures
45 hours of lab work

Course Distribution : first year, first semester

Number of Credits : 0

Course Form : Lectures, lab work

Lectures:

Teachers: Doc. RNDr. Vladimír Divoký, Ph.D.
Doc. Mgr. Monika Horváthová, Ph.D.
Doc. MUDr. Peter Rohoň, Ph.D.
RNDr. Ivana Fellnerová, Ph.D.
RNDr. Leona Rašková Kafková, Ph.D.

Study: Continuous

	Date	Subject	No. of Less.	Teacher
1	23.9. 2022	Cell Structure	2	Dr.Fellnerová
2	30.9. 2022	Biopolymers	2	Dr. Rašková
3	7.10. 2022	Gene expression	2	Doc. Divoký
4	14.10. 2022	Biomembranes: Structure & Cell transport	2	Dr. Fellnerová
5	21.10. 2022	Reproduction of Cells	2	Doc. Divoký
6	28.10.2022	Public holiday		
7	4.11. 2022	Biology of blood	2	Doc. Rohoň
8	11.11. 2022	Genetics, genomics in medicine		Dr. Gurský
9	18.11. 2022	Cell Cycle	2	Dr. Rašková
10	25.11. 2022	Cell signalling	2	Dr. Rašková
11	2.12. 2022	Cytogenetics I Chromosome structure, karyotype	2	Doc. Horváthová
12	9.12. 2022	Cytogenetics II Chromosomal abnormalities	2	Doc. Horváthová
13	16.12. 2022	Genetics of Cancer	2	Doc. Divoký
14	6.1. 2023	Ontogenesis, Teratogens	2	Dr. Šimková
15	13.1.2023	Summary of lectures	2	Dr. Šimková

Lab work: (Textbook - Alberts et al.: Essential Cell Biology. Garland Publishing, Inc. New York)

Leading Teacher: Mgr. Dana Šimková, Ph.D.

Teachers: Mgr. Pavla Kořalková, Ph.D.

RNDr. Leona Rašková Kafková, Ph.D.

Study: Continuous

	Date	Subject	No. of Less. Textbook
1	19.9. 2022	Introduction to lab work. Microscopy Techniques Elementary skills in microscopy, preparation of a native specimen.	3
2	26.9. 2022 28.9.2022 Public holiday	Microscopy Techniques How to observe stained vs. unstained structures – manipulating the contrast and penetration power. Magnification vs. resolving power. Demonstration of selected techniques. Fluorescent microscopy - observation of labelled organelles in adherent cells. Inoculation of plates.	3 pp. 1-8
3	3.10. 2022	Microorganisms Evaluation of exposed plates. Bacterial streak plate, yeast streak plate. The epithelial cells colonized by bacteria in mouth cavity. The vital specimen of motile bacterium <i>Clostridium butyricum</i> . Stained preparation of bacterium <i>Escherichia coli</i> . Observation of aspergillosis in human tissues.	3 Chapter 1 Chapter 9
4	10.10. 2022	Cell Structure and their Cultivation: Mammalian Cells Mammalian cells cultures, characterization of cell growth. Cell viability estimation. Semisolid cell cultures; liquid cell cultures. Adherent cell culture. 3D cell culture.	3 Chapter 2 Chapter 16
5	17. 10. 2022	DNA, genetic information, chromosome structure Genomic DNA isolation, colorimetric proof of DNA in plant tissues.	3 Chapter 6 Chapter 8
6	24.10. 2022 28.10.2022 Public holiday	Proteins Demonstration: Detection of abnormal haemoglobin on acrylamide gel. Immunodetection of cytoplasmic and nuclear protein. Inclusion bodies of abnormal haemoglobin in red blood cells. Proof of haemoglobin.	3 Chapter 5 Chapter 7
7	31.10. 2022	Enzymes Human amylase activity in a saliva sample. Proof of saccharase. Proof of peroxidase in blood serum.	3 Chapter 5 Chapter 7
8	7.11. 2022	Individual students' presentations	
9	14.11. 2022 17.11.2022 Public holiday	Biomembranes, Osmosis, Homeostasis Self-assembly of lecithin molecules. Blood cells lysis by detergent. Blood cells in hypertonic solution. Plasmolysis and de-plasmolysis.	3 Chapter 11 Chapter 12 Chapter 14
10	21.11. 2022	Cell cycle. Mitosis Cell cycle analysis using flow-cytometry, examination of cell nuclei using light microscopy. Cell growth. Mitosis in plant cells.	3 Chapter 17 Chapter 18
11	28.11. 2022	Meiosis. Gametogenesis Meiosis in locust. Spermatogenesis in human. Blastocyst formation.	3 Chapter 17

12	5.12. 2022	Cell differentiation, apoptosis Differentiation of hematopoietic stem cell into blood lineages, blood smears examination. Impaired differentiation in cancer cells. Estimation of caspase 3 activity. Observation of differential stages of <i>C.elegans</i> worms and <i>Ascaris suum</i> eggs.	3 Chapter 15 Chapter 18
13	12.12. 2022	Blood and Cells of Immune System Blood smears. Haematopoiesis. Induction of differentiation of K562 cells.	3
14	19.12. 2022	Oncogenes, tumour suppressor genes Individual presentations to the theme	3 Chapter 18 Chapter 19

Completed by : Credit

Held in the room: TU-BIOA (2.017)

Requirements : The 100% attendance of obligatory lab works and seminars in regular or in substitute terms.

70% of the maximal points from the minor tests.

Recognition of selected microorganisms as well as the recognition of blood elements in peripheral blood or bone marrow smears is required for obtaining the winter semester credit.

Literature :

1. Practical lab works from biology (presentations and texts) and lecture presentations: files are available on website: <http://biologie.upol.cz>
2. B. Alberts et al.: Essential Cell Biology. Garland Publishing, Inc.
3. Thompson & Thompson: Genetics in Medicine. W.B. Saunders Company