

Course title:

Introduction to Biology

Kursa kods: Biol 1077

Annotation:

This course is designed to provide conceptual understanding of and hands-on experience conducting biological science to students from a wide variety of academic backgrounds and interests. Broad coverage of the biological sciences presenting evolution as the unifying concept. Particular emphasis on basic biological processes in cells and the relationships/interactions between organisms and their environment. Topics include cell structure and function, genetics and inheritance, evolution and diversity, populations, communities and ecosystems, and topics related to biology and society.

Course content:

Chemistry and the Cell. Heredity and Gene Regulation. Evolution and the Diversity of Life. Human Structure and Function.

Course plan:

Course structure: Lectures - 40 hours, practical works - 16 hours.

Lecture topics:

1. Introduction to Biology. Essential Chemistry for Biology: Basic Chemistry, Water and pH.
2. The Molecules of Life: Large Biological Molecules. A Tour of the Cell: Part I - Overview of the Cell and Membrane Structure.
3. A Tour of the Cell: Part II - Nucleus, Endomembrane System, Semiautonomous Organelles and Cytoskeleton. The Working Cell: ATP, Enzymes and Membrane Function.
4. Cellular Respiration: Obtaining Energy from Food. Photosynthesis: Using Light to Make Food.
5. Cellular Reproduction: Part I - Cell Cycle and Mitosis. Cellular Reproduction: Part II - Meiosis and the Basis for Sexual Reproduction. Presentations.
6. Patterns of Inheritance: Mendel and Human Genetic Disorders. The Structure and Function of DNA: Part I – Nucleic Acid Structure and DNA Replication.
7. The Structure and Function of DNA: Part II – Transcription, Translation, and Viruses. How Genes are Controlled: Gene Regulation and the Genetic Basis of Cancer.
8. DNA Technology: Part I - Recombinant DNA Technology and Forensic Science. DNA Technology: Part II - Human Gene Therapy, Bioinformatics and Ethics.
9. How Populations Evolve: Part I – Darwin and Evidence for Evolution. How Populations Evolve: Part II – Natural Selection and Mechanisms of Evolution.
10. How Biological Diversity Evolves: Mechanisms of Speciation. Presentations.
11. Presentations.
12. The Evolution of Microbial Life: Part I - The Origin of Life. The Evolution of Microbial Life: Part II - Prokaryotes and Protists. Article Analysis.
13. Plants, Fungi, and the Move onto Land: Part I - Plant Diversity. Plants, Fungi, and the Move onto Land: Part II – Fungi. Article Analysis.
14. The Evolution of Animals: Part I - Major Invertebrate Phyla. The Evolution of Animals: Part II - Vertebrate Evolution. Article Analysis.
15. An Introduction to Ecology and the Biosphere. Population Ecology and Human Population Growth.
16. Communities and Ecosystems. Presentations.
17. Specialized Instructor Topics & Applications. Unifying Concepts of Human Animal Structure and Function.
18. Circulation and Respiration. The Body's Defenses: Innate Defense, Adaptive Defense, and Human Immune Disorders.
19. Hormones: The Human Endocrine System. Reproduction and Development.
20. Martini F. Fundamentals of anatomy and physiology.

Laboratory works topics:

1. Microscopy and Measurements
2. Macromolecules
3. Structure of Cells
4. Diffusion, Osmosis, and Biological Molecules
5. Bacteria and Protists
6. Human Respiration
7. Sensory Perception and Reflexes
8. Human Blood and Circulation