

SYLLABUS

FOUNDATION YEAR

2024/2025



University of Szeged

Faculty of Medicine

BIOLOGY I.**1st semester - 14 weeks (4 hrs/week)****TOPICS**

- What is life? How to study biology?
(*Life: The Science of Biology, 8th ed., Ch. 1.*)
- Composition and characteristics of living material. Atoms, functional groups, small molecules, water. (*Life: The Science of Biology, 8th ed., Ch. 2.*)
- Macromolecules: Proteins, carbohydrates, lipids.
(*Life: The Science of Biology, 8th ed., Ch. 3.*)
- Macromolecules: Structure and function of nucleic acids.
(*Life: The Science of Biology, 8th ed., Ch. 4.*)
- Characteristics of pro- and eukaryotic cells. Extracellular matrix. Endomembranes, the cell organelles. The cell nucleus. (*Life: The Science of Biology, 8th ed., Ch. 5.*)
- Cell membrane and membrane dynamics. Cytoplasm, cytoskeleton. (*Life: The Science of Biology, 8th ed., Ch. 5.*)
- Physiology of the cell membranes, specialized membrane structures.
(*Life: The Science of Biology, 8th ed., Ch. 6.*)
- Membrane transport mechanisms.
(*Life: The Science of Biology, 8th ed., Ch. 6.*)
- Cell signaling and communication. Signals and their receptors. How do cells change in response to signals? (*Life: The Science of Biology, 8th ed., Ch. 7.*)
- How do cells change in response to signals? Different types of receptors
(*Life: The Science of Biology, 8th ed., Ch. 7.*)
- Biological energy transformations. Enzymes and their functions. How do enzymes work? How are they regulated? (*Life: The Science of Biology, 8th ed., Ch. 8.*)
- Biological energy transformations. Aerobic, anaerobic pathways. (*Life: The Science of Biology, 8th ed., Ch. 9.*)
- The citric acid cycle and terminal oxidation. ATP formation. The electron transport chain. Comparison of energy yields and investments. (*Life: The Science of Biology, 8th ed., Ch. 9.*)
- The electron transport systems. The interconnection of metabolic pathways.
(*Life: The Science of Biology, 8th ed., Ch. 9.*)
- The cell cycle, control of cell division.
(*Life: The Science of Biology, 8th ed., Ch. 11.*)
- Mitotic cell division.
(*Life: The Science of Biology, 8th ed., Ch. 11.*)
- Meiotic cell division. Gametogenesis.
(*Life: The Science of Biology, 8th ed., Ch. 11.*)
- Mendel's laws. Genotype and phenotype. Genes and alleles.
(*Life: The Science of Biology, 8th ed., Ch. 12.*)
- Genes and chromosomes. How do alleles and genes interact?
(*Life: The Science of Biology, 8th ed., Ch. 12.*)
- Non-Mendelian inheritance. Sex linked inheritance. Pedigree analysis.
(*Life: The Science of Biology, 8th ed., Ch. 12.*)



CHEMISTRY I.**1st semester - 14 weeks (5 hrs/week)****TOPICS**

- Atomic theory. Basic terms and concepts: elements, compounds, isotopes, the mole concept, Avogadro's number. Atomic models.
(Atomic and molecular masses, mole calculations.)
- Electronic structure of atoms. The periodic table. Periodic properties.
(Practicing quantum numbers and electron configurations.)
- Molecules. Chemical bonding. Octet rule. Covalent, ionic and metallic bonding.
(Geometry of molecules.)
- Intermolecular forces: hydrogen bonding and van der Waals forces. States of matter.
(Practicing intermolecular forces.) Chemical nomenclature. Formula writing. Simple chemical reactions, balancing chemical equations.
- Chemical nomenclature. Formula writing. Simple chemical reactions, balancing chemical equations.
(Stoichiometric problems.)
- Solutions. Concentration of solutions.
(Composition of solutions I.)
- Inorganic chemistry I.: metals.
(Composition of solutions II.)
- Inorganic chemistry II.: nonmetals. Types of metathesis reactions.
(Practicing metathesis reactions.)
- Basic terms in thermodynamics: enthalpy, exothermic and endothermic processes. Rate of chemical reactions. Catalysts.
- Chemical equilibrium. LeChatelier's principle. Electrolytes. Arrhenius and Bronsted-Lowry acids and bases. Neutralization reactions. (Practicing the LeChatelier's principle.)
- Self-ionization of water. The pH of a solution.
(pH problems I.)
- Self-ionization of water. The pH of a solution.
(pH problems II.)
- Oxidation number. Redox reactions. Electrode potential. Voltaic cells, electromotive force.
(Oxidation numbers, balancing simple redox reaction equations.)

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PHYSICS I.**1st semester - 14 weeks (4 hrs/week)****TOPICS**

- The SI system
- Kinematics
- Dynamics
- Work, energy and power
- Linear momentum
- Circular motion
- Rotation of rigid bodies
- Oscillations
- Waves

MEDICAL ENGLISH I.**1st semester - 14 weeks (4 hrs/week)****TOPICS**

- Introduction to the word building system
- The levels of organization: cells, tissues, organs, and systems of the human body.
- The digestive system, structure and diseases of the alimentary tract.
- The endocrine system. Structure and diseases of the endocrine system.
- The respiratory system. Structure and diseases of the respiratory system
- The cardiovascular system. Structure and diseases of the cardiovascular system.
- Blood. The composition of blood. Some blood related diseases.

Coursebook:

The Language of Medicine in English - Part 1.

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GENERAL ENGLISH I.**1st semester - 14 weeks (4 hrs/week)****TOPICS**

- Grammar and Vocabulary Skills
- Reading Comprehension
- Listening Comprehension
- Learning to Learn
- Acquiring fluency in spoken English

HUNGARIAN LANGUAGE I.**1st semester - 14 weeks (2 hrs/week)****TOPICS**

- Greetings in Hungarian, Expressions of everyday life
- The Hungarian Alphabet, Pronunciation
- Numbers, the definite article
- Who are you? Conjugation of the verb 'to be'.
- Introduce yourself and your friends
- Days, Months, Endings: -ban/ben; -n/on/en/ön
- Location and time ('van' and 'nincs')
- What time is it?
- My timetable, Subjects at the university
- Verb conjugation, Present tense I.
- Verb conjugation, Present tense II.

Coursebook:

Durst, Péter 2017. *Lépésenként magyarul 1. Magyar nyelvkönyv kezdőknek.* MM Publications.

ISBN: 9789631276800

BIOLOGY II.**2nd semester - 14 weeks (4 hrs/week)****TOPICS**

- The structure and function of DNA
(*Life: The Science of Biology, 8th ed., Ch. 13.*)
- Transcription and translation
(*Life: The Science of Biology, 8th ed., Ch. 14-16.*)
- Viral and prokaryotic gene expression
(*Life: The Science of Biology, 8th ed., Ch. 16.*)
- Eukaryotic gene expression
(*Life: The Science of Biology, 8th ed., Ch. 16-17.*)
- The immune system
(*Life: The Science of Biology, 8th ed., Ch. 42.*)
- The human endocrine system
(*Life: The Science of Biology, 8th ed., Ch. 41.*)
- Human reproduction
(*Life: The Science of Biology, 8th ed., Ch. 41, Ch. 43.*)
- Neuronal communication
(*Life: The Science of Biology, 8th ed., Ch. 45.*)
- The human sensory systems
(*Life: The Science of Biology, 8th ed., Ch. 46.*)
- The human central and peripheral nervous system
(*Life: The Science of Biology, 8th ed., Ch. 47-48.*)
- The human respiratory and circulatory system
(*Life: The Science of Biology, 8th ed., Ch. 50.*)
- The human gastrointestinal system
(*Life: The Science of Biology, 8th ed., Ch. 51.*)
- The human kidneys: structure and function
(*Life: The Science of Biology, 8th ed., Ch. 52.*)



CHEMISTRY II.**2nd semester - 14 weeks (5 hrs/week)****TOPICS**

- Introduction to organic chemistry. Classification of organic compounds.
- Functional groups. Isomerism. Types of organic chemical reactions.
- Alkanes and cycloalkanes. Reactions (substitution).
- Alkenes. Reactions (addition, polymerization). Dienes (butadiene and isoprene). Alkynes.
- Aromatic hydrocarbons and their reactions (substitution). Huckel's rule.
- Organic halogen compounds.
- Alcohols, phenols and their reactions. Ethers.
- Oxo compounds: aldehydes and ketones.
- Carboxylic acids and their derivatives (esters and amides). Lipids.
- Amines and heterocyclic compounds.
- Chirality. Optical isomerism. Enantiomers, diastereomers.
- Carbohydrates: monosaccharides.
- Carbohydrates: di- and polysaccharides.
- Amino acids, peptides, and proteins.
- Nucleosides, nucleotides, and nucleic acids.



PHYSICS II.**2nd semester - 14 weeks (4 hrs/week)****TOPICS**

- Elasticity
- Fluids
- Optics
- Thermodynamics
- Electrostatics
- Electric current
- Magnetism
- Alternating current circuits
- Introduction to modern physics

MEDICAL ENGLISH II.**2nd semester - 14 weeks (4 hrs/week)****TOPICS**

- Medical specialties and other health related jobs
- The lymphatic system: functions and structure of the system, immunity and diseases, HIV and AIDS
- The nervous system: structure and functions, some diseases of the nervous system
- The muscle system: structure and functions, the nomenclature of major muscles in the human body
- The skeletal system: major bones in the human body, the classification of bones; Some diseases of the skeletal system
- The anatomical position, anatomical planes, directional references and anatomical terms; regions of the body

GENERAL ENGLISH II.**2nd semester - 14 weeks (4 hrs/week)****TOPICS**

- Grammar and Vocabulary Skills
- Reading Comprehension
- Listening Comprehension
- Learning to Learn
- Acquiring fluency in spoken English

HUNGARIAN LANGUAGE II.**2nd semester - 14 weeks (2 hrs/week)****TOPICS**

- Location and time ('van' and 'nincs')
- What time is it?
- My timetable, Subjects at the university
- Verb conjugation, Present tense I.
- Verb conjugation, Present tense II.
- Where are you??/Where are you going?/Where are you coming from? (endings: ba/be, -ra/-re, -ból/-ből, -ról/-ről)
- Object of the sentence
- Irregular verbs, -ik verbs
- With something (ending: -val/-vel)
- Situations: restaurant, café, shopping
- Daily routine
- Weather

Coursebook:Durst, Péter 2017. *Lépésenként magyarul 1. Magyar nyelvkönyv kezdőknek.* MM Publications.

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