Dear Prospective Student,

The purpose of pre-courses is to ensure that students have the necessary knowledge and skills to succeed in more advanced courses. These pre-courses provide foundational knowledge in key subject areas—you need to understand these basics before you can grasp the concepts taught in higher-level classes.

What you are receiving from us:

Three specially prepared online courses in Chemistry, Physics, and Biology.

The results of these short courses will be considered as bonus points in the final exams during the winter session for the respective subjects: Basics of clinical chemistry, Biophysics with elements of radiology, and Medical Biology.

It is in your best interest to complete the courses with good results. The deadline for completing these courses is 15.01.2026.

Please note: If a student fails to complete a pre-course, they will not receive any bonus points for the regular subject courses.

The ONLINE PRE-COURSES REGULATIONS are published on our website.

Access to three interactive textbooks on the Pearson online platform.

These resources will be available to you for 24 months from your first login. This means you will have continuous support in the basic preclinical subjects during both your first and second year of study. Pearson's platform offers interactive books that include videos and other multimedia elements.

We wish you all the best as you begin this exciting intellectual journey!

Recommendations for each pre-course subject can be found below.

Physics

Recommendations from dr Karolina Jezierska.

Tips and guidelines what to pay attention to/what to look for in the online-textbook before starting

the *Biophysics with elements of radiology* ***course on the 1ˢᵗ year***

Student has to :

1. presents units of physical quantities, describes their relationships with basic units; converts multiples and submultiples;

2. performs calculations and analyzes the obtained result;

3. distinguishes vector and scalar quantities;

4. creates tables, diagrams or charts, schematic or block drawings to illustrate phenomena or problems; properly scales, marks and selects axis ranges;

5. extracts key information for the described phenomenon or problem from texts, tables, diagrams or charts, schematic or block drawings; presents this information in various forms;

6. recognizes the increasing or decreasing dependence on the basis of data from the table or on the basis of the graph; recognizes simple proportionality on the basis of a graph;

7. fits a straight line to the data presented in the form of a graph; interprets the slope of this line and the intersections with the axes;

8. conducts selected observations, measurements and experiments using their descriptions; distinguishes the key steps and procedure and indicates the role of the instruments used and takes into account their resolution;

9. determines the average of several measurements as the final result of the repeated measurement;

10. uses the concept of measurement uncertainty of simple quantities; saves the measurement result with its unit and including information about the uncertainty;

11. performs calculations and records the result in accordance with the rules of rounding and maintaining the number of significant figures resulting from the measurement accuracy or from the data;

Mechanics.

Student is required to:

1. distinguishes between the terms: location, track and road;

2. uses vector quantities to describe movements: displacement, velocity and acceleration along with their units;

3. describes uniform and uniformly variable rectilinear motions, using the dependences of position, velocity and distance on time;

4. describes uniform circular motion using the concepts of period, frequency and linear velocity with their units;

5. graphically determines the resultant force for forces acting in any directions on the plane;

6. applies the principles of dynamics to describe the behaviour of bodies;

7. distinguishes resistances to motion (resistances of the medium and friction); discusses the role of friction on selected examples;

8. indicates the centripetal force as the cause of uniform circular motion;

9. distinguishes between inertial and non-inertial systems; uses the concept of inertia;

10. uses the concepts of mechanical work, power, kinetic energy, potential energy with their units; applies the principle of conservation of mechanical energy to calculations;

Gravity and elements of astronomy.

Student:

1. uses the law of universal gravitation to describe the gravitational interaction; points to the force of gravity as the cause of falling bodies;

2. describes the state of weightlessness and the state of overload and gives the conditions and examples of its occurrence;

Vibrations.

Student can:

1. describes the proportionality of the elastic force to elongation; uses the concept of elasticity coefficient and its unit;

2. analyzes the vibrating motion under the influence of the elastic force using the concepts of deflection, amplitude and period of vibration; gives examples of such movement;

3. analyzes energy transformations in vibrating motion;

4. describes forced and weakly damped vibrations; illustrates the phenomenon of mechanical resonance on selected examples;

Thermodynamics.

Student can:

1. describes the phenomenon of thermal expansion: linear expansion of solids and volumetric expansion of gases and liquids;

2. distinguishes energy transfer in the form of heat between systems of different temperatures from energy transfer in the form of work;

3. uses the concept of internal energy; analyzes the first law of thermodynamics as the law of conservation of energy;

4. uses the concept of specific heat and heat of phase change in heat balance analysis;

5. lists the special properties of water;

6. describes the phenomenon of diffusion as a result of the chaotic movement of molecules;

Electrostatics.

Student:

1. uses the principle of conservation of charge;

2. calculates the value of the force of mutual interaction of charges using Coulomb's law;

3. uses the concept of electric field; graphically illustrates the electric field using field lines; describes a homogeneous field;

4. qualitatively describes the distribution of charges in conductors and the disappearance of the electric field inside the conductor (Faraday cage);

Electric current.

Student:

1. uses the concepts of electric current, electric voltage and power with their units;

2. distinguishes between metals and semiconductors; discusses the dependence of resistance on temperature for metals and semiconductors;

3. uses the proportionality of direct current to voltage for conductors (Ohm's law);

4. uses the rated data of electrical devices for calculations;

Magnetism.

Student:

1. uses the concept of a magnetic field; draws magnetic field lines;

2. describes qualitatively the influence of the magnetic field on conductors and moving charged particles;

3. describes the characteristics of alternating current;

Waves and optics.

Student:

1. describes the propagation of waves on the surface of water and sound in the air based on the image of wave surfaces;

2.   qualitatively describes the wave diffraction on the slit;

3.   uses the principle of wave superposition; gives the conditions for strengthening and extinction of waves; describes the phenomenon of wave interference and the spatial image of interference;

4.   analyzes the Doppler effect for waves when the source or observer moves much slower than the wave; gives examples of this phenomenon;

5.   describes the phenomena of simultaneous reflection and refraction of light at the boundary of two media with different speeds of light propagation; describes the operation of optical fiber as an example of using the phenomenon of total internal reflection;

6.   distinguishes transverse and longitudinal waves; describes light as an electromagnetic wave; describes the polarization of light resulting from the transverse nature of the wave;

7.   describes the spectrum of white light as a mixture of waves with different frequencies;

8.   describes examples of optical phenomena in nature;

Atomic physics.

Student:

1.   analyzes the thermal radiation of bodies and its dependence on temperature on selected examples;

2.   describes the particle-wave duality of light; explains the concept of a photon and its energy;

3.   describes qualitatively the origin of the emission and absorption spectra of gases;

4.   interprets spectral lines as a result of transitions between energy levels in atoms with the emission or absorption of a light quantum; distinguishes between the ground state and excited states of an atom;

5.   describes the ionization, photoelectric and photochemical phenomena as caused only by radiation with a frequency higher than the limit.

Nuclear physics.

Student:

1.   uses the terms element, atomic nucleus, isotope, proton, neutron, electron to describe the composition of matter; describes the composition of the atomic nucleus based on mass and atomic numbers;

2.   writes nuclear reactions using conservation of nucleon number and conservation of charge;

3.   lists the properties of nuclear radiation; describes alpha and beta decays;

4.   uses the concept of a stable and unstable nucleus; describes the formation of gamma radiation;

5.   describes the decay of a radioactive isotope; uses the concept of half-life;

6.   uses the principle of conservation of energy to describe nuclear reactions; uses the concepts

of binding energy and mass deficit; calculates these quantities for any isotope;

7.   shows the influence of ionizing radiation on matter and on living organisms;

8.   lists examples of the use of radioactivity in technology and medicine.

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Chemistry

Recommendations from dr hab. n. med. Maria Dąbkowska

Tips and guidelines what to pay attention to/what to look for in the online-textbook before starting the Basics of clinical chemistry *course on the 1st year*

1. Matter and measurements

2. Atoms and periodic table

3. Ionic compounds

4. Molecular compounds-chemical bonds

5. Classification and Balancing of Chemical Reactions

6. Chemical Reactions: Mole and Mass Relationships

7. Chemical Reactions: Energy, Rates, and Equilibrium

8. Gases, Liquids, and Solids

9. Solutions

10. Acids and Bases

11. Body Fluids

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Biology

Recommendations from dr n. med. Helena Rudnicka

Tips and guidelines what to pay attention to/what to look for in the online-textbook before starting

the *Medical Biology* ***course on the 1st year***

1. Cellular organization.

2. Types and functions of the cell organelles.

3. DNA and RNA.

4. DNA replication.

5. Gene expression.

6. Gene-definition, structure.

7. Cell cycle.

8. Mitosis.

9. Meiosis

10. Chromosomes.