



Subject card

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|--|--|--|--------------|--|--|------------|-----|
| Subject name and code | Human Physiology, PG_00064118 | | | | | | |
| Field of study | Mechanical and Medical Engineering | | | | | | |
| Date of commencement of studies | October 2024 | Academic year of realisation of subject | | | 2024/2025 | | |
| Education level | first-cycle studies | Subject group | | | Obligatory subject group in the field of study | | |
| Mode of study | Full-time studies | Mode of delivery | | | at the university | | |
| Year of study | 1 | Language of instruction | | | Polish | | |
| Semester of study | 2 | ECTS credits | | | 1.0 | | |
| Learning profile | general academic profile | Assessment form | | | assessment | | |
| Conducting unit | Institute of Mechanics and Machine Design -> Faculty of Mechanical Engineering and Ship Technology | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | Piotr Badtke | | | | |
| | Teachers | | | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 15.0 | 0.0 | 0.0 | 0.0 | 0.0 | 15 |
| E-learning hours included: 0.0 | | | | | | | |
| Learning activity and number of study hours | Learning activity | Participation in didactic classes included in study plan | | Participation in consultation hours | | Self-study | SUM |
| | Number of study hours | 15 | | 1.0 | | 9.0 | 25 |
| Subject objectives | To familiarize the student with the proper functioning of the human body, from the systemic level to the knowledge of the functions of the most important organs and tissues. | | | | | | |
| Learning outcomes | Course outcome | Subject outcome | | | Method of verification | | |
| | [K6_U01] is able to acquire knowledge and self-studying, he/she is able to find needed information in specialist books, databases and other sources, he/she is able to integrate information and draw conclusions, he/she is able to communicate by using different technics in work and outside | The student knows the basic physiological nomenclature and knows the basic functional parameters of individual systems and organs of the human body. | | | [SU3] Assessment of ability to use knowledge gained from the subject | | |
| | [K6_U04] is able to utilize empirical, analytical, simulation, and computer-based methods to formulate and solve engineering tasks in the field of medical and mechanical engineering | The student interprets the numerical data concerning the basic physiological variables. | | | [SU3] Assessment of ability to use knowledge gained from the subject | | |
| [K6_W01] has knowledge in the field of natural sciences, including mathematics, contemporary physics, chemistry, and human anatomy with physiology | The student is able to assess the functioning of a healthy organism and understands the basic mechanisms that regulate and protect the organism against changes in the external environment. | | | [SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge | | | |

| Subject contents | <p>The concept of homeostasis. Regulating systems and their components. Excitability and agitation. Terms: depolarization, hyperpolarization. Absolute and relative refraction. Transmission of information between cells. Types of nerve fibers. Feeling and perception. Types of contractions: isometric, isotonic, auxotonic and: single, summed, tetanic. Smooth muscle activity. Spinal reflexes. Passive and active muscle tone. Reflex activity. Autonomous nervous system and its regulatory role. Fundamentals of cardiac electrophysiology. Introduction to electrocardiography. Heart cycle. Contractility and contraction force. Blood pressure. Reflex from arterial baroreceptors and chemoreceptors. Heart rate and pulse wave spread factors. Basic elements of blood circulation regulation. Methods of assessing the circulatory system. Blood composition and its basic functions in the body. The transport of oxygen and carbon dioxide through the blood. Components of blood counts. Primary and secondary haemostasis. Respiratory system physiology. Introduction to spirometric measurements. Gas exchange in the alveoli. Hormones - their structure, mechanisms of action and basic effects. Hormone nomenclature of the hypothalamus and pituitary gland. Feedback in the endocrine system. Hormonal regulation of blood glucose levels. Metabolism and its measurement. System energy balance. The motor activity of the digestive tract. Basic digestive functions. The distribution of water in the body. Outline of mechanisms regulating the volume and composition of body fluids. The role of the kidneys. Basic elements of the acid-base balance of the body. Senses: taste and smell. Hearing and balance. Vision and visual perception.</p> | | | | | | | | | | | |
|--|---|-------------------------------|--|--------------------------|---|-------------------------------|--------------------------|--|--------|----------------------|----------------------------------|--|
| Prerequisites and co-requisites | Basic knowledge of the subjects: biology, anatomy, chemistry and physics | | | | | | | | | | | |
| Assessment methods and criteria | <table border="1" data-bbox="448 551 1487 616"> <thead> <tr> <th data-bbox="448 551 794 584">Subject passing criteria</th> <th data-bbox="794 551 1141 584">Passing threshold</th> <th data-bbox="1141 551 1487 584">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 584 794 616">Final test</td> <td data-bbox="794 584 1141 616">60.0%</td> <td data-bbox="1141 584 1487 616">100.0%</td> </tr> </tbody> </table> | | | Subject passing criteria | Passing threshold | Percentage of the final grade | Final test | 60.0% | 100.0% | | | |
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| Final test | 60.0% | 100.0% | | | | | | | | | | |
| Recommended reading | <table border="1" data-bbox="448 622 1487 907"> <tbody> <tr> <td data-bbox="448 622 794 656">Basic literature</td> <td colspan="2" data-bbox="794 622 1487 656">Fizjologia człowieka pod red. Jana Górskiego, PZWL Warszawa, 2015</td> </tr> <tr> <td data-bbox="448 656 794 869">Supplementary literature</td> <td colspan="2" data-bbox="794 656 1487 869"> T. Brzozowski (red.): Konturek Fizjologia człowieka; Edra, Urban@Partner Wrocław 2019 H..Krauss, M. Gibas-Dorna: Fizjologia człowieka. Podstawy; PZWL, Warszawa, 2021 </td> </tr> <tr> <td data-bbox="448 869 794 907">eResources addresses</td> <td colspan="2" data-bbox="794 869 1487 907">Adresy na platformie eNauczanie:</td> </tr> </tbody> </table> | | | Basic literature | Fizjologia człowieka pod red. Jana Górskiego, PZWL Warszawa, 2015 | | Supplementary literature | T. Brzozowski (red.): Konturek Fizjologia człowieka; Edra, Urban@Partner Wrocław 2019 H..Krauss, M. Gibas-Dorna: Fizjologia człowieka. Podstawy; PZWL, Warszawa, 2021 | | eResources addresses | Adresy na platformie eNauczanie: | |
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| Example issues/ example questions/ tasks being completed | <p>Wybrane zagadnienia: 1. Głównie czynniki od których bezpośrednio zależy ciśnienie tętnicze skurczowe i rozkurczowe 2. Górne zakresy NORMY ciśnienia tętniczego. Kryteria ilościowe nadciśnienia tętniczego 3. Wpływ insuliny i glukagonu na osoczone stężenie glukozy 4. Terminy: potencjał błonowy, depolaryzacja, hiperpolaryzacja, repolaryzacja 5. Terminy: objętość wyrzutowa, pojemność minutowa, frakcja wyrzutowa 6. Terminy: Próg pobudliwości - obniżenie, podwyższenie: Pobudliwość zwiększona i zmniejszona; Wpływ zmian chwilowego potencjału błonowego na pobudliwość komórki. Pytania testowe:</p> <p>1. Nagły wzrost ciśnienia tętniczego: A) wywołuje odruchowe pobudzenie włókien współczulnych zaopatrujących mięśniówkę naczyń tętniczych. B) pobudza baroreceptory tętnicze C) hamuje chemoreceptory w ścianie aorty D) powoduje przyspieszenie rytmu serca 2. W warunkach prawidłowych pobudzenie dla skurczów serca powstają (są generowane): A) w mięśniu przedsionków B) w węzle zatokowo-przedsionkowym C) w węzle przedsionkowo-komorowym D) w pęczku Hisa 3. Pobudzenie przywspółczulnej części autonomicznego układu nerwowego prowadzi do: A) wzrostu ciśnienia tętniczego krwi B) wzrostu oporu oddechowego wskutek zwężenia oskrzeli C) rozszerzenia źrenic D) przyspieszenia częstości akcji serca 4. W warunkach spoczynkowych u zdrowego człowieka: A) mięśnie wydechowe praktycznie nie uczestniczą w oddychaniu B) częstość akcji serca wynosi ok. 100/min C) objętość minutowa krwi tętniczej przez lewą komorę wynosi ok. 25 litrów D) prężność tlenu we krwi tętniczej wynosi ok. 40 mm Hg</p> | | | | | | | | | | | |
| Work placement | Not applicable | | | | | | | | | | | |

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