INFORMATION ABOUT THE COURSE

Anatomy

1. Basic information

Field of studies field of medical and health sciences, discipline: medical sciences **Unit responsible for the field of studies** Faculty of Medicine Bydgoszcz University of Science and Technology **Level of studies** Uniform master's studies **Profile of studies** General academic **Form of studies** Full-time	**Studies cycle** …….. **Course code** 17-EMS-ANA-SP1 17-EMS-ANA-SP2 **Language** English **Obligatory** Yes

Prerequisites	Students should have basic knowledge of human biology, which is considered to be fulfilled on the basis of the results of the high school leaving exam, which enabled them to be admitted to medical studies.
Introductory courses	None
Coordinator	Mateusz Badura, PhD

Study period	**Form of assessment** **Form and hours of classes**	**ECTS credits**
Winter semester	Pass with a grade Lecture: 30 Exercises: 60	7.0
Summer semester	Exam Lecture: 30 Exercises: 60	7.0

2. Learning outcomes

Code	**Description of learning outcomes**	**Learning outcomes reference**
Knowledge (student knows and understands):		
K1	The graduate knows and understands the structure of the human body in a topographical and functional approach, including the topographical relationships between individual organs, along with anatomical, histological, and embryological terminology	A.W1.
K2	Graduates know and understand the development, structure, and functions of the human body in normal and pathological conditions	O.W1.
Abilities (student can do/perform):		
A1	The graduate explains the anatomical basis of physical examination	A.U3.

A2	The graduate draws conclusions about the relationships between anatomical structures	A.U4.
Social skills (the student is ready to):		
S1	Graduates are ready to draw conclusions from their own measurements or observations	O.K8.

3. Programme contents

No.	Programme contents	Form of studies	Learning outcomes covered by the programme content
1	1. Basic anatomical concepts: axes, body lines, planes, body regions. Structure and types of bones. Bone joints – types of joints, structure, functions. 2. Bones of the upper limb. Joints of the upper limb. 3. Division of muscle tissue. Muscles of the upper limb girdle. Axilla and axillary cavity. Vessels and nerves of the arm. Muscles of the arm. Shoulder and arm regions. 4. Spine and thoracic bones. Muscles, fasciae of the chest and back. Vascularisation and innervation of the chest walls. 5. Anatomy and development of the heart. Vessels and innervation of the heart. Pericardium. Fetal circulation. Radiological anatomy of the chest. 6. Surgical anatomy of the anterior abdominal wall. Abdominal muscles. Peritoneum. 7. Autonomic nervous system of the abdomen and pelvis. 8. Veins of the abdomen. 9. Lymphatic system of the abdomen and pelvis. 10. Pelvic canal. 11. Male and female reproductive systems. 12. Joints of the lower limb. 13. Muscles of the lower limb. 14. Lumbosacral plexus. 15. Topographical elements of the lower limb.	Lecture (winter)	K1, K2
2	1. General characteristics of the skull. External projection of the skull. Sphenoid bone. 2. Temporal bone and mandible. Temporomandibular joint. 3. Close connections of the skull. Craniometric points of the skull. Topographical elements of the skull. 4. Muscles and fasciae of the head. Topographical elements of the head and neck: pterygopalatine fossa, buccal space, and masseteric space. 5. Oral cavity: division, boundaries, and contents. Soft palate. Tongue. Salivary glands. General structure of the tooth. Period of eruption of deciduous and permanent teeth. 6. Detailed structure of deciduous and permanent teeth. 7. Trigeminal nerve. Maxillary artery. 8. The organ of sight. The vestibulocochlear organ. 9. Muscles and fasciae of the neck. Topographical elements of the neck. 10. The throat and larynx. 11. Arteries and veins of the head and neck. 12. General characteristics of the central nervous system. Telencephalon. 13. Diencephalon. Brain stem. Cerebellum. 14. Motor nerve pathways. 15. Sensory nerve pathways: somatosensory and sensory.	Lecture (summer)	K1, K2
3	1. Organization of anatomy classes (classes in the dissection room – rules, conditions for passing). Introduction to anatomy. Axes and planes of the body. Structure and types of bones. Bone joints. Bone joints – types of joints, structure, functions. 2. Bones of the upper limb. Upper limb girdle. Scapula and clavicle. Free part of the upper limb. Humerus. Forearm	Exercise (winter)	K1, K2, A1, A2, S1

	bones: ulna and radius. Hand bones: wrist, metacarpal, and finger bones. 3. Joints of the upper limb. Joints of the upper limb girdle. Sternoclavicular joint and acromioclavicular joint (articular surfaces, joint capsule, ligaments, range of motion). Joints of the free part of the upper limb. Shoulder joint: articular surfaces, labrum, capsule, ligaments, range of motion. Elbow joint: humeroulnar joint, humeroradial joint, proximal radioulnar joint (articular surfaces, capsule, ligaments, range of motion). Interosseous membrane. Distal radioulnar joint, radiocarpal joint (articular surfaces, articular disc, range of motion). Joints of the hand: Intercarpal and intermetacarpal joints, carpometacarpal joints. Carpometacarpal joint of the thumb (articular surfaces and types of movements). Metacarpophalangeal and interphalangeal joints. X-ray anatomy of the bones and joints of the upper limb. 4. Division of muscle tissue. Muscles of the upper limb girdle: supraspinatus, infraspinatus, teres major and minor, deltoid, subscapularis - attachments, innervation, function. Chest and back muscles attached to the upper limb: trapezius, latissimus dorsi, levator scapulae, rhomboid, serratus, pectoralis, subclavian - the influence of these muscles on the movements of the upper limb joints. Arm muscles. Anterior arm muscle group: biceps brachii, coracobrachialis (attachments, innervation, function). Posterior arm muscle group: triceps brachii, ulnar (attachments, function, innervation). Forearm muscles: anterior, lateral, and posterior groups - identification of muscles, attachments, function, innervation. Hand muscles: muscles of the thumb, little finger, and middle hand (lumbrical and interosseous muscles) - identification, function, innervation. Hand fascia, tendon sheaths. 5. Upper limb vessels: subclavian artery - topography, branches. Axillary artery and vein - course in the axillary cavity, branches. Arteries and veins of the arm: brachial artery, topography, branches. Arteries and veins of the forearm: ulnar and radial arteries (topography, branches). Arteries of the hand and palmar arches: superficial and deep, metacarpal and digital arteries, veins of the hand: superficial and deep. Radial and ulnar veins. Pulse examination sites. 6. Nerves of the upper limb: brachial plexus - definition, topography, trunks and bundles of the brachial plexus. Short branches of the plexus - range of innervation. Long branches of the brachial plexus. Musculocutaneous nerve: origin, course, range of innervation. Nerves: ulnar, radial, median - origin, course, range of innervation, clinical symptoms of paralysis. 7. Topography of the upper limb: shoulder and arm area. Axillary fossa and cavity: boundaries, contents. Medial and lateral axillary foramen. Arm region and cutaneous nerves, arm fascia, intermuscular septa. Cubital fossa. Forearm region. Forearm fascia, intermuscular septa. Flexor and extensor retinacula. Cubital fossa, boundaries, topography of vessels and nerves in this region. Topography of the nerves: ulnar, median, and radial. Carpal tunnel, limitations, contents. Radial fossa. 8. Spine and thoracic bones. Characteristics of the spine (division into segments, curvatures, spinal canal). Function of the spine. Structure of the vertebra and characteristics of the vertebrae of individual sections of the spine. Fixed and mobile joints within the spine (structure and composition of the intervertebral disc). Ribs – structure (characteristics of the first and second ribs). Sternum – morphological features. Connections between the ribs and the sternum and spine. General structure, variability of shape and mechanics of the chest. Anatomy of a living human – identification of the bony landmarks of the chest (jugular notch, xiphoid process of the sternum, costal arch, subcostal		

	angle, spinous processes of the vertebrae). X-ray anatomy of the spine and chest bones. 9. Muscles, fasciae of the chest and back. Mammary gland – structure, vascularization, innervation, function, and lymphatic drainage from the nipple. Areas and landmarks of the chest. Muscles of the chest (attachments, innervation, vascularization, function): superficial – pectoralis major, pectoralis minor, subclavius, serratus anterior; deep – intercostal muscles, subcostal muscles, transverse thoracic muscle. Topography of the neurovascular bundle in the intercostal space. Thoracic fascia. Back – areas and landmarks on the back. Back muscles (attachments, innervation, vascularization, function): superficial – trapezius muscle, latissimus dorsi muscle, major and minor rhomboid muscles, levator scapulae muscle, serratus posterior muscles; deep – erector spinae muscle. Suboccipital muscles – attachments, innervation, vascularization, function. Dorsal fascia (thoracolumbar fascia). 10. Trachea and bronchi. Lungs. Pleura. Mediastinum. Diaphragm. Pleura – definition, division. Pleural recesses. Pulmonary ligament, pulmonary mesentery, pleural dome. Innervation and vascularization of the pleura. Function of the pleura. Trachea – definition, topographical relations, structure of the tracheal wall. Tracheal bifurcation and difference between the right and left main bronchi. Vascularization and innervation of the trachea. Lungs – topographical relationships, general structure (arrangement of structures in the lung root within the right and left lung cavities). Division of the intrapulmonary bronchial tree. Bronchopulmonary segments. Structure of lung parenchyma (definition of pulmonary lobule). Functional and nutritional vascularisation of the lungs. Innervation of the lungs. Lymphatic system of the lungs. Lung function (lung ventilation, gas diffusion through the alveolar-capillary membrane). Diaphragm – definition, parts of the diaphragm. Openings, hiatuses, fissures and their contents. Function of the diaphragm. Innervation and vascularization. Diaphragmatic hernias. Mechanics of breathing and types of breathing. Definition and division of the mediastinum. Organs, vessels, and nerves of the upper, anterior, and posterior mediastinum. Thymus – structure, topographical relations, function. 11. Heart. Vessels and innervation of the heart. Pericardium. Organs of the posterior mediastinum. Fetal circulation. X-ray anatomy of the chest. Heart – topographical relations in the chest (location, shape, attachment). Morphological features of the external surface of the heart. Internal structure of the heart. Structure of individual chambers of the heart. Heart valves – type, structure, function. Projection of the valves onto the anterior chest wall. Coronary circulation (topography of the coronary arteries, extent of vascularization, vascularization of the conduction system). Venous blood outflow from the heart walls. Innervation of the heart. Influence of the autonomic nervous system on the function of the heart muscle and the cardiac conduction system. Lymphatic system of the heart. Pericardium – definition, division (pericardial sinuses), function, vascularization, innervation. 12. Chest vessels. Vascularization of the chest walls. Branches of the subclavian artery (internal thoracic artery, highest intercostal artery, thoracodorsal artery, lateral thoracic artery). Branches of the thoracic aorta wall (superior phrenic artery, posterior intercostal arteries). Venous drainage from the chest wall (system of odd veins, skin veins of the anterior chest wall). Ascending aorta and aortic arch – branches, topography. Superior vena cava, brachiocephalic veins, subclavian veins, internal jugular veins – topography. Thoracic aorta – topographical relationships, branches.		

	Thoracic duct – origin, course, end, tributaries. Vessels and lymph nodes of the chest. Fetal circulation – remnants of fetal circulation in the chest. 13. Nerves of the chest. Innervation of the chest walls. Brachial plexus – supraclavicular part. Intercostal nerves. Dorsal branches of the spinal nerves of the thoracic segment. Phrenic nerve – thoracic part – topographical relations, range of innervation. Vagus nerve – thoracic part – topographical relations, range of innervation. Sympathetic trunk – thoracic part of the sympathetic trunk (topography, branches). Interpretation of X-ray images of the organs and vessels of the chest. 14. The abdomen as a whole. Pelvis. Abdominal wall. General concepts. Division into regions. Pelvis as a whole. Detailed structure of the pelvic and sacral bones. Sacroiliac joints and their function. Pubic symphysis. Pelvic ligaments. Greater and lesser sciatic foramen. The obturator foramen. Pelvic dimensions, conjugate planes, pelvic planes. 15. Abdominal muscles – attachments, innervation, vascularization, function. The concept of aponeurosis. Structure of the rectus sheath above and below the arcuate line and its contents. Internal surface of the anterior abdominal wall – folds, fossae. Inguinal canal – structure, location, contents. Superficial and deep inguinal ring. The concept of areas of reduced resistance of the abdominal wall. The concept of hernia. Abdominal hernias – congenital and acquired, internal, detailed knowledge of anatomical relationships in straight and oblique inguinal hernias. Anatomy of a living human – pelvic bone points, Lanza's point, McBurney's point, and the correlation between the location of individual organs and the sounds accompanying abdominal percussion. 16. Peritoneum. Stomach. Small intestine. Large intestine. Peritoneum – layered structure, functions of the peritoneum. Peritoneal cavity, peritoneal recesses. Topographical elements of the peritoneum: omental bursa, greater omentum, lesser omentum – location and structure. Structure of the mesentery and ligaments in the abdominal cavity. Relationship of organs to the peritoneum – intraperitoneal, extraperitoneal, and retroperitoneal location. Mutual position of abdominal organs. Determine the position of individual organs in a living specimen. Digestive tract – parts, general structure of the digestive tract walls – layers, innervation. Abdominal part of the esophagus. Topography of the vagus nerves surrounding the esophagus. Vasculature of the esophagus. Stomach – external and internal structure. Gastric mucosa – mucosal glands, differences in structure in different parts of the stomach, gastric digestive enzymes. Structure and function of the pylorus. Duodenum – external and layered structure. Mucous membrane of the duodenum – duodenal glands, digestive enzymes of the duodenum. Duodenal papillae. Jejunum and ileum – location, course, division into parts. Structure of the intestinal mucous membrane in the proximal and distal sections. Functions of the small intestine. Arterial blood supply to the stomach, duodenum, jejunum, and ileum. Angioarchitecture of vessels running in different sections of the intestine. Meckel's diverticulum – location, practical significance. Cecum, colon (ascending, transverse, descending, sigmoid), rectum – location, function, vascularization, relationship to the peritoneum. Appendicitis – structure, significance, location variants. Differences in the external structure, mucous membrane, and angioarchitecture of the small and large intestines. X-ray images of the digestive tract. 17. Liver, bile ducts, spleen, pancreas. Large vessels of the abdominal cavity. Innervation of the abdominal organs. Liver – location, external and internal structure. Cavity, ligaments of the liver. Liver function.		

	Bile – origin, physiological significance. Intrahepatic bile ducts. Functional and nutritional vascularisation of the liver. Hepatic veins. The concept of the hepatic segment, division of the liver. Extrahepatic bile ducts and their topography. Gallbladder – external structure, location, function. Anatomical and functional valves in the bile ducts. Pancreas – location, division into parts, microscopic structure. Enzymatic and hormonal function of the pancreas. Pancreatic ducts and their topography. Vascularization of the pancreas. Spleen – location, internal and external structure, ligaments. Function of the spleen. Vascularization. 18. Abdominal aorta – layered structure of the walls, location of the diaphragmatic crossing, location, branches of the aorta and their topography. Arterial collateral circulation in the abdominal cavity, physiology of visceral circulation. Inferior vena cava – layered structure of the walls, location of the diaphragmatic hiatus, tributaries, topographical areas from which it collects blood. Portal vein – formation and topography. Concept of portal circulation. Portal circulation in the abdominal cavity and its physiological significance. Portal hypertension. Collateral pathways of portal circulation – anastomoses between the portal vein and the main veins. Anatomical connections between the superior and inferior vena cava. Vessels and lymph nodes in the abdominal cavity, the mesenteric lymphatic reservoir. Fetal circulation – overview. Remnants of fetal circulation in the abdominal cavity. 19. Abdominal and pelvic nerves. Lumbar plexus – structure, location, short and long branches, range of innervation. Autonomic nervous system – physiology of the sympathetic and parasympathetic parts in relation to the organs of the digestive tract. Lumbar, abdominal, and pelvic segments of the sympathetic trunk. Celiac plexus – structure, location, branches, secondary plexuses. Nerve plexuses in the wall of the digestive tract. Visceral and somatic pain in relation to the innervation of the abdominal organs. Head's fields. 20. Kidneys, ureter, urinary bladder, adrenal glands. Lesser pelvis – topographical relationships, vessels and nerves. Kidney – location, external structure, attachment of the kidneys. Kidney capsules. Structure of the kidney in frontal section. Nephron – structure and function. Vascularisation of the kidneys. Segmental structure of the urinary tract. Ureter – layered structure of the walls, course, topography, peristalsis. Urinary bladder – external structure, relationship to the peritoneum. Structure of the urinary bladder mucosa – bladder triangle. Vascularisation and innervation of the bladder. Mechanism of urine retention and expulsion. Urethra – course, differences in the structure of the male and female urethra. Adrenal glands – location, external structure, function. Layered internal structure – hormones corresponding to individual layers and their function. Perineum and perineal region in men and women. Pelvic diaphragm, urogenital diaphragm – parts, structure, function. Rectum – layered structure, detailed structure of the mucous membrane, arterial and venous vascularization. Anal varicose veins and haemorrhoids. Internal iliac artery – visceral and wall branches. Sacral plexus – location, structure, short and long branches. Vaginal canal, ischiorectal fossa. 21. Internal and external male reproductive organs. Internal and external female reproductive organs. Testicle – structure, location, testicular membranes and their origin. Descent of the testicles. Hormonal and spermatogenic function of the testicles. Epididymis – structure, function. Vas deferens – course. Spermatic cord – components of the cord, course of the spermatic cord. Prostate gland – location, structure, detailed topographical relationships.		

	Seminal vesicles and bulbourethral glands. Physiological significance of the accessory sex glands. Anatomical relationships in the digital rectal examination. Scrotum. Penis – external and internal structure, vascularisation and innervation. Mechanism of erection and ejaculation. Urethra – course, division into parts, gland openings. Sexual dimorphism in terms of general body structure. Skeleton. Innervation of the external genital organs. Ovary – location, structure, ligaments, vascularization. Hormonal function of the ovary. Release of the egg cell. Fallopian tube – division into parts, layered structure of the walls, function, vascularization. Uterus – external and layered structure. Endometrium, myometrium, perimetrium, parametrium. Normal and abnormal position and orientation of the uterus. Ligaments of the uterus. Cyclical changes in the uterine mucosa. Vulva – perineum, vaginal vestibule and vestibular glands, urethral opening, clitoris, labia minora and labia majora, hymen. Vagina – layered structure of the vaginal vault walls. Female urethra. Anatomy of insemination and fertilization. Childbirth – birth canal, topographical relationships during rectal examination and bimanual examination in women. 22. Bones of the lower limb. Bones of the lower limb girdle: pelvic bone, hip bone, ischium, pubic bone. Acetabulum. Obturator foramen. Greater and lesser sciatic foramen. Common space: space between muscles and vessels. Vaginal canal. Bones of the free part of the lower limb: femur, lower leg bones (tibia and fibula), foot bones (tarsal, metatarsal, and phalangeal bones). 23. Connections of the lower limb bones. Joints of the lower limb girdle: sacroiliac joint, pubic symphysis. Pelvis as a whole. Joints of the free part of the lower limb: hip joint (articular surfaces, capsule, ligaments, range of motion), knee joint (articular surfaces, capsule, external and internal ligaments, range of motion). Tibiofibular joint and syndesmosis. Interosseous membrane of the shin. Upper and lower ankle joints, articular surfaces, range of motion. Transverse tarsal joint. Tarsometatarsal and intermetatarsal joints. Toes joints. Foot joint mechanics. Arch of the foot. X-ray anatomy of the bones and joints of the lower limb. 24. Muscles of the lower limb girdle. Anterior group - iliopsoas muscle (attachments, function, innervation). Posterior superficial layer - gluteal muscles, tensor fascia lata, piriformis muscle (attachments, function, innervation). Posterior deep layer - muscles: obturator, gemellus, quadratus femoris (attachments, function, innervation). Hip fascia and gluteal fascia. Thigh muscles. Anterior thigh muscle group - sartorius muscle, quadriceps femoris muscle (attachments, function, innervation). Medial thigh muscle group – adductor muscles, pectineus and gracilis muscles (attachments, function, innervation). Posterior thigh muscle group – biceps femoris, semitendinosus, and semimembranosus muscles (attachments, function, innervation). Broad fascia. Iliotibial band. Intermuscular septa. Anterior group of the shin: tibialis anterior muscle, extensor digitorum longus, extensor hallucis longus (attachments, function, innervation). Lateral group of the shin muscles: peroneal muscles (attachments, function, innervation). Posterior group of shin muscles (attachments, function, innervation): superficial layer: gastrocnemius muscle, soleus muscle, plantar muscle, deep layer: popliteus muscle, flexor digitorum longus, tibialis posterior, flexor hallucis longus. Popliteal fascia. Short muscles of the foot: dorsal muscles of the foot and plantar muscles. 25. Nerves of the lower limb. Lumbar plexus – formation, topography, branches, their course, and range of innervation. Sacral plexus – formation, topography, branches, their course, and range of		

	innervation. Innervation of the skin of the buttocks and thigh. Innervation of the skin of the lower leg and foot. Topography and range of innervation of the sciatic, tibial, and common peroneal nerves and their branches. 26. Blood supply to the lower limb. Clinical aspects of foot anatomy. Femoral artery - topography, branches. Popliteal artery - origin, course, division. Tibial arteries - course, branches. Knee joint network. System of superficial veins (saphenous and fibular veins) and deep veins of the lower limb (femoral and popliteal veins, tibial veins) - tributaries, topography. Lymphatic system of the lower limb, lymph node groups. Anatomy of a living human: viewing and palpation of bone points, muscles, and tendons in the lower limb, pulse examination in typical locations. X-ray anatomy, angiography of the lower limb. Joint networks. 27. Topography of the lower limb. Popliteal fossa. Shin fascia. Greater and lesser sciatic foramen. Supra- and infra-tibial foramen (boundaries, contents). Common hiatus: muscle and vascular hiatus. Femoral triangle, iliopubic fossa. Adductor canal - boundaries, contents. Femoral canal: femoral ring, tibial hiatus. Femoral hernia, obturator canal - boundaries, contents. Popliteal fossa - boundaries and contents. Shin fascia. Extensor, peroneal, and flexor tendons. Medial malleolar canal - boundaries, contents.		
4	Skull – general structure. Basic information about the structure of the skull bones: composition, shape, internal structure, development. Identification of constituent bones: paired bones, unpaired bones, division into splanchnocranium and neurocranium. Individual development of the human skull – bones formed on connective and cartilaginous tissue. Infant and child skull, fontanelles. Terms: vault, forehead, parietal bone, temporal bone, occipital bone. Skull bone connections: tight (syndesmoses, synostoses, osteosynostoses) and articular. Wedge-shaped as a special type of connection. Sutures: coronal, sagittal, angular, sphenoid-parietal, squamous, sphenoid-squamous, parietal-mastoid, occipital-mastoid, frontal-zygomatic, sphenoid-zygomatic, median palatine, transverse, frontal-nasal, frontal-maxillary, zygomatic-maxillary. Approximate time of suture closure. Joint connections – examples, temporomandibular joint, (lifting, lowering, protrusion, retraction, lateral movements, and mechanics of movements. Differences in skull structure related to age and gender. Skull base and main openings at the base of the skull. Mechanics – behavior of the face and cranium under the influence of trauma – anatomical basis of skull base fractures. 2. Detailed structure of the skull. Skull base - anterior, middle, and posterior fossae (bones forming these fossae, boundaries of the fossae), contents - all openings at the base through which larger vessels and cranial nerves or their branches pass. Skull bones: occipital (basal part, squama, lateral parts – and structures associated with these parts, including the pharyngeal tubercle, elements located on the external and internal surface of the squama: external and internal occipital protuberance, nuchal lines, external and internal occipital crest, sinus grooves: superior sagittal, transverse, occipital condyles, hypoglossal canal, condylar canal, cervical notch), parietal (margins, elements visible on the external and internal surfaces: parietal tubercle, temporal lines, superior sagittal sinus groove), temporal (lambdoid part, mastoid, tympanic, petrous = pyramid and elements related to these parts, including: zygomatic process, mandibular fossa, mastoid notch, base, apex and three surfaces of the pyramid, internal auditory meatus, jugular notch, carotid canal, styloid process, sphenoid-mastoid foramen, facial nerve	Exercise (summer)	K1, K2, A1, A2, S1

	canal, external auditory canal), sphenoid (body, greater and lesser wings, pterygoid processes and elements related to these parts: sella turcica, sphenoid sinuses, oblique processes, carotid groove, round, oval and spinal foramen, optic canal, pterygopalatine fossa), frontal (lambdoid process, orbital parts, nasal part and elements associated with them: frontal tubercles, glabella, supraorbital rim, supraorbital foramen and notch, frontal notch, frontal foramen, zygomatic process, superior sagittal sinus groove, cerebral arches, finger impressions, nasal spine), zygomatic (body, frontal process, temporal), maxillary (body, process, zygomatic, frontal, alveolar, palatine and related elements: maxillary sinus and maxillary fossa, infraorbital foramen and margin, nasal notch and anterior nasal spine, premaxillary fossa, premaxillary canal, premaxillary foramina), ethmoid (ethmoid plate, vertical plate, ethmoid labyrinth and related elements: crest, lateral=orbital lamina, medial lamina, superior and middle nasal conchae), palatine (horizontal lamina, vertical lamina, processes: pyramidal, orbital, sphenoid, and related elements: greater and lesser palatine foramen). 3. Topography of the skull: bony boundaries of the orbit en nasal cavity. Other cranial fossae, their location, contents and connections with other spaces. Temporal fossa (temporal muscle, superficial and deep temporal vessels, deep temporal nerves from V3, temporal branch of the zygomatic nerve-from V2, auriculotemporal nerve from n.V3, temporal and zygomatic branches from n.VII), infratemporal fossa (pterygoid muscles, pterygoid venous plexus, maxillary artery, mandibular nerve, chorda tympani), retromandibular fossa (part of the parotid gland, terminal branches of the facial nerve, branches of the external carotid artery: posterior auricular artery, superficial temporal artery, maxillary artery, auriculotemporal nerve). Orbit – walls of the orbit. Pneumatic spaces of the skull connected by the frontal, ethmoid, sphenoid, maxillary and temporal bones. Connections of the skull with vertebra I - atlanto-occipital. The mechanism is smooth. 4. 4. Muscles in triangles of the neck. Neck muscles (superficial - m. latissimus dorsi, m. sternocleidomastoid; middle - mm. infrahyoid and suprahyoid; deep - mm. scalene) - attachments, innervation, vascularization, function. Prevertebral muscles - division: Fascia of the neck. Triangles of the neck - limitation of contents. Muscles of mastication: masseter, temporal, pterygoid, lateral and medial. Muscles of facial expression: muscles of the cranial vault, surrounding the eyelids, surrounding the mouth, surrounding the nostrils, auricle. Muscles of the neck: superficial layer- platysma, sternocleidomastoid, middle layer: supra- and infrahyoid muscles, deep layer: scalenes, prevertebral muscles. 5. Nerves of the head and neck: cervical plexus-definition, topographical relations, cutaneous and muscular branches. Dorsal branches of the spinal nerves. Topography of the hypoglossal nerve. Additional information - topography, scope of innervation. The best way to do this is to do this – topography and branches. 6. Vessels of the head and neck: common carotid artery – place of origin, course, place of division (carotid sinus – innervation, function). Ball of splint. Neurovascular cord of the neck – composition, topographical relations. It is possible to be just about the temperature of these bones. Nieuwe vagus – cervical segment (topography and branches). External carotid artery – topography, branches Superior thyroid artery, lingual artery, occipital artery, posterior auricular artery, ascending pharyngeal artery. Here are the most common soorten afbeeldingen – formation, topography, dubbel. Lymphatic system of the neck. 7. Thyroid gland and		

	parathyroid glands – structure, topographical relations, vascularization, innervation, function. Larynx – skeleton of the larynx (morphological features of the laryngeal cartilages). Tight joint connections of the laryngeal cartilages. Mechanical state of the articulations. Membranous and ligamentous connections of the laryngeal cartilages with adjacent structures. Membranous and ligamentous connections inside the larynx (elastic cone, quadrangular membrane). Functional division of the muscles of the larynx (attachments). Division of the laryngeal cavities. What is the sound in the throat? Upper cavity of the larynx. Intermediate cavity of the larynx (definition of vestibular folds, vocal folds, vocal lips, glottic slit, laryngeal pouch). Lower cavity of the larynx. Vascularization and innervation of the larynx. Function of the larynx. 8. Oral cavity. Nose and nasal cavity. Paranasal sinuses. Hard and soft palate. Pharynx. Nasal cavity - vault, side walls, floor, anterior nostrils - "gates" to the nasal cavity, posterior nostrils. Nasal cartilages - septum, lateral, greater, lesser pterygoid, sesamoid, vomeronasal. Nasal turbinates. Olfactory field and its location. Bones forming the hard palate, muscles of the palate and their innervation. Olfactory pathway. Paranasal sinuses - sphenoid, frontal, maxillary and ethmoid cells - size of sinuses, importance, innervation. Places of opening of paranasal sinuses and lacrimal sacs into the nasal cavity. Tongue. Salivary glands. Teeth. Pharynx. Papillae of the tongue, their role and location - circumvallate, filamentous, conical, fungiform, leafy. Internal and external muscles of the tongue. Vascularization and innervation of the tongue. Taste pathway: receptors - taste buds. First neuron - ganglion cells in the ganglion: geniculate (VII), inferior ganglion (IX and X) from here via the solitary tract. Second neuron - nucleus of the solitary tract, from here to the opposite thalamus. Third neuron - accessory arcuate nucleus of the thalamus - to the insular cortex and the lower part of the postcentral gyrus. Salivary glands: parotid, submandibular, sublingual - composition of saliva and importance, functional division into serous, mucous, mixed salivary glands, location, place of opening in the oral cavity. Incisors, canines, premolars and molars. Pattern of primary and permanent dentition. Pharynx - division into parts: nasal, oral and laryngeal. Diagram of the structure of the pharyngeal wall. Sphincters and levators of the pharynx and their innervation. Sensory innervation of the pharynx. Retropharyngeal space and its clinical significance. Vascularization of the head: arteries and veins of the head and neck. 9. Central nervous system. Meninges of the brain and spinal cord. Dura mater and its structures: falx cerebri and cerebellum, tentorium cerebellum, supra- and infratentorial space, tentorial notch, falx cerebellum, diaphragm sella. Clinical significance of the above structures. Venous sinuses of the dura mater, arachnoid granulations. Vascularization and innervation of the dura mater. Vascularization of the meninges. Supra- and subdural space. Spider mater. Cerebrospinal fluid reservoirs. Perivascular spaces. Meninges of the spinal cord. Telencephalon. Lobes, gyri, and sulci. Boundaries of the lobes, ability to indicate gyri of a given lobe. Microscopic structure of gray and white matter. Functional centers in the cerebral cortex: the limbic system, the hippocampal formation and the functions assigned to them. 10. Internal structure of the cerebral hemispheres. Amygdala, prominence, basal nuclei: caudate nucleus, lenticular nucleus. Striatum. Globus pallidus. Internal structure of the hemispheres – white matter. Association, commissural and projection tracts – precise definitions, examples of individual tracts. Internal, external		

	and final capsule. Brain commissures: great, anterior, posterior, fornix, habenula. Short and long association tracts – examples. Cerebrospinal fluid – composition and function. Formation of cerebrospinal fluid in the choroid plexuses of all ventricles. Absorption of cerebrospinal fluid. Arachnoid granulations. Lateral ventricles and third ventricle – production and circulation of cerebrospinal fluid. Horns of the lateral ventricles. Ventricular walls and connecting foramina. Division of the diencephalon. Pineal gland and its product – melatonin. Habenula, habenular nucleus. Thalamus - specific nuclei:): lateral geniculate bodies, medial geniculate bodies, VPL, VPM, VL/VA, AV. Division of the hypothalamus into parts: supraoptic, nodular, mammillary. Supraoptic, paraventricular, suprachiasmatic nuclei, anterior nucleus. Complex of mammillary nuclei. Hypothalamus function. Pituitary gland, division into parts: posterior - neurohypophysis and anterior - adenohypophysis. Influence of the hypothalamus on the pituitary gland. Neurosecretion. Hypothalamic-pituitary portal circulation. Hormones of the anterior pituitary. Third ventricle, its location, connecting openings with the lateral ventricles, recesses. 11. Brain stem: midbrain, pons, medulla oblongata. Elements of the external structure of the brain stem. Structure of the brainstem in cross sections through the superior and inferior colliculi, pons, latch, and pyramidal crossing. Elements: gracilis and cuneate bundles and their nuclei, pyramidal crossing, internal arcuate fibers, medial band, olivary nucleus, inferior, middle, and superior cerebellar peduncles, red nucleus, substantia nigra, tegmentum, tectum, aqueduct. Exit sites and nuclei of the cranial nn. in the brainstem. Fourth ventricle, floor of the fourth ventricle. Roof of the fourth ventricle: cerebellum, cerebellar peduncles, and medullary curtains and choroid plexus. Floor of the fourth ventricle: rhomboid fossa. Division and structural elements distinguishable on the floor of the rhomboid fossa in the superior and inferior triangles. Location of the cranial nn. nuclei in the brainstem. 12. Cerebellum. Reticular formation. Vermis and hemispheres, upper and lower surfaces. Morphological division into lobes: anterior lobe, first fissure, middle-posterior lobe, posterolateral fissure, nodular-flocculent lobe. Cerebellar tonsils. Morphological-clinical division into longitudinal zones: vermis, intermediate zone, lateral zone. Cerebellar cortex, medullary body. Nuclei: superior, conical + spherical, dentate. Cerebellar peduncles: inferior, middle, superior. Structure of the cerebellar cortex. Functional aspects of morphological structures of the cerebellum. Reticular formation, functions: motor, sensory, visceral, related to consciousness, sense of existence, wakefulness. 13. Spinal cord. Pathways of voluntary movements. External and internal structure. Concept of cord, horn and column. Interneurons: associational, commissural, and projection. Corpus gelatinosa. Motor cells of the anterior horns. Sympathetic intermediate nucleus, parasympathetic intermediate nucleus. White commissure, anterior and posterior gray. White matter. Clinical syndromes: spinal shock, Brown-Sequard syndrome, syringomyelia. Corticospinal and corticonuclear (motor) tracts. Descending tracts. Corticospinal (pyramidal) tract. Corticonuclear tract. Central and peripheral neuron paralysis. Stroke. 14. Spinal nerve. Roots, trunk, branches. Anterior root: projections of motor cells of the anterior horn and autonomic cells of the lateral horn. Posterior root, spinal ganglion. The trunk of the spinal nerve: branches (ventral, dorsal, meningeal, preganglionic white connecting and postganglionic gray connecting. The gray matter of the spinal cord in cross-section - anterior, posterior, lateral		

	horn, intermediate gray matter. The white matter of the spinal cord in cross-section - anterior, lateral and posterior column. The commissures of the spinal cord. The meninges of the spinal cord and their relationship to the elements of the spinal nerve. The path of superficial sensation (heat, cold, pain) - anterolateral spinothalamic path. The path of conscious deep sensation and pressure, discriminative touch and vibration. Plexuses, ganglia, nerves. 15. Vascular supply of the brain and spinal cord. The internal cervical artery and its branches: the cervical part - from the beginning to the petrous part of the temporal bone. The foramen and canal of the internal carotid artery. The scope of vascular supply: brain, eye socket with contents, eyelids, dura mater of the anterior cranial fossa, mucous membrane, sinuses and nose. Vertebral artery: branches: posterior spinal artery, anterior spinal artery, posterior inferior cerebellar artery. Basilar artery and its branches. Cerebral arterial circle. Venous outflow from the brain. Superficial and deep cerebral veins. Venous sinuses of the dura mater. Anatomical and practical aspects: hemorrhagic and ischemic strokes, aneurysms, arteriovenous malformations, epidural, subdural, subarachnoid hematoma. Strokes in the area of the internal capsule. Segmental vascularization of the spinal cord. 16. Cranial nerves: olfactory nerves, optic nerve, extraocular nerves (III, IV, VI). Trigeminal nerve, facial nerve and intermediate nerve. Glossopharyngeal nerve, vagus nerve, accessory nerve, hypoglossal nerve. Types of fibers conducted by cranial nerves, course of the cranial nerves, their branches, and scope of innervation. 17. Autonomous nervous system of the head and neck. Parasympathetic ganglia of the head. Secretory pathways to the lacrimal gland and salivary glands. Superior centers of the autonomic system (limbic system, amygdala, hypothalamus, locus coeruleus, reticular formation, etc.). Functional division of the autonomic system. Sympathetic part. Sympathetic trunk, sympathetic nerves: gg. along the arteries, cardiac nn., visceral nn. Plexuses: cardiac, intermesenteric, superior and inferior hypogastric. Superior cervical ganglion. Cervical cardiac branches. Stellate ganglion. Greater celiac nerve. Lesser celiac nerve. Parasympathetic part of the autonomic nervous system. Ciliary ganglion, pterygopalatine ganglion. Submandibular ganglion. Auricular ganglion. Centers of the autonomic nervous system in the spinal cord. 18. Sense organs: eye. Layered structure of the eye. Sclera, cornea – layers and innervation, bulbar and palpebral conjunctiva, conjunctival sac, palpebral apparatus. Vascular membrane. Anterior and posterior chambers of the eye. Production, absorption and circulation of ocular fluid. Glaucoma. The eye as an optical instrument. Concept of diopters, refractive power of lenses, lens defects. Optical defects of the eye: myopia and hyperopia, presbyopia, astigmatism, spherical and chromatic aberration. Lens - layers. Endosperm and cataract. Retina, its parts, serrated limbus and layers: pigment and neuronal. Retinal layers. Blind spot, yellow spot. Formation of the optic nerve. Visual pathway. Cranial nerves III, IV, VI and motor, autonomic and sensory innervation of the eye. 19. Sense organs: ear - structure. Division: external, middle, inner ear. Elements of the structure of the auricle, external auditory canal. Tympanic cavity - division into pneumatic spaces. Walls of the tympanic cavity, Contents of the tympanic cavity: auditory ossicles and their connections. Tympanic membrane - acoustic mechanics in the middle ear. Innervation of the middle and external ear and clinical consequences. Hearing receptor – organ of Corti. Endolymph. Perilymph. Mechanism of hearing – auditory pathway. Mechanism of recording head movements in		

	space. Auditory pathway. Vestibular part of the bony vestibule: vestibule and semicircular canals. Utricle, sacculus, semicircular ducts. Kinetic labyrinth. Static labyrinth. Clusters of supporting and sensory cells. Macula of the utricle, macula of the sacculus. Otoliths. Vestibular pathway. 20. Peripheral nervous system. Plexuses, ganglia, nerves, receptors.		

4. Methods of verifying and assessing the learning outcomes achieved by the student

Winter semester

Form of studies		
Lecture	**Methods of studies form:**	
	Lecture	
	Methods of verification:	**Involvement:**
	Written test	100%
	Conditions for passing the course:	
	according to the information provided in the detailed description of the rules for passing the course (summer semester)	
Exercise	**Methods of studies form:**	
	Exercises in mortuary	
	Methods of verification:	**Involvement:**
	Written test	80%
	Observation	10%
	Entrance test	10%
	Conditions for passing the course:	
	according to the information provided in the detailed description of the rules for passing the course (summer semester)	

Summer semester

Form of studies		
Lecture	**Methods of studies form:**	
	Lecture	
	Methods of verification:	**Involvement:**
	Written exam	50%
	Practical exam	50%
	Conditions for passing the course:	

<table>
<tr><td></td><td>The subject of correct anatomy ends with an exam after the second semester consisting of two parts: practical and theoretical.

The practical exam consists of the student recognizing 20 anatomical structures on an anatomical preparation. The side should always be given when recognizing bone details and when the side is a component of the name of a given structure - e.g. right coronary artery. The maximum number of points that can be obtained for the practical part is 20. The pass threshold is 60%, i.e. 12 points. The time allocated for recognizing one anatomical structure is 30 seconds. In the practical exam, the correct anatomical name of each structure should be given in English or Latin - giving the Latin name is justified due to the origin of most names from this language. Failure to pass the practical part is tantamount to receiving an insufficient grade in the exam in correct anatomy.

The theoretical exam consists of a closed 80-question test in Polish – the maximum number of points is 80. The pass threshold is 60%, i.e. 48 points. The time allotted for the test is 80 minutes. It is not possible to extend the test exam time or extend the time for taking the practical exam. The points from the practical and theoretical parts are added together.

In the event of a justified absence from the exam, the student may take it with the examiner at a time agreed by the parties.</td></tr>
<tr><td>Exercise</td><td>Methods of studies form:

Exercises in mortuary

<table><tr><td>Methods of verification:</td><td>Involvement:</td></tr><tr><td>Written exam</td><td>50%</td></tr><tr><td>Practical exam</td><td>50%</td></tr></table>
Conditions for passing the course:

The material of the anatomy subject is divided into parts. Each part ends with a final colloquium during which the mastery of the material is checked practically and theoretically:

The practical test consists of the student recognizing 10 anatomical structures on an anatomical slide. The side should always be given when recognizing bone details and when the side is a component of the name of a given structure - e.g. the right coronary artery. The maximum number of points that can be obtained for the practical part is 10. The pass threshold is 60%, i.e. 6 points. The time allocated for recognizing one anatomical structure is 30 seconds. During the practical colloquium, the correct anatomical name of each structure should be given in English or Latin - giving the Latin name is justified due to the origin of most names from this language. Passing the practical part does not condition taking the theoretical test.

The theoretical test consists of a closed 20-question test - the maximum number of points is 20. The pass threshold is 60%, i.e. 12 points. The time allotted for the theoretical colloquium is 20 minutes. It is not possible to extend the time for writing the test colloquium or extend the time for taking the practical colloquium. The points from the practical and theoretical parts are added together.

The student is obliged to systematically prepare for classes. Failure to prepare for the exercises may result in the necessity to pass them with the Subject Coordinator.

In the event of justified absence from the colloquium, the student may take it with his/her Assistant on a date agreed by the parties.</td></tr>
</table>

Learning outcomes	Methods of verification				
	Written test	Entrance test	Observation	Written exam	Practical exam
K1	x	X		X	X
K2	x	X		x	x
A1		X			x
A2		X			X
S1			x		

5. Student workload – balance of hours and ECTS credits

Students activity		**Student workload Number of hours**
Classes conducted with the direct participation of an academic teacher or other persons conducting classes	Lecture	60
	Exercise	150
Student's own work	Preparing for classes	75
	Studying literature	20
	Preparing for a test	15
	Preparing for an exam	30
Total student workload		350
ECTS		14

One (teaching) hour is 45 minutes.

6. Literature

The list of required and recommended literature will be provided by the lecturer at the first meeting.