

## SUBJECT CARD

**Faculty of Medicine and Health Sciences**

**Field of studies: Medicine**

**Form of studies: Full-time**

**Degree: long-cycle Master's program**

**Specializations: No specialization**

**Academic year: 2022/2023**

THE URO-GENITAL SYSTEM	
<b>SUBJECT</b>	<b>The uro-genital system</b>
<b>NUMBER OF ECTS POINTS</b>	6
<b>LANGUAGE OF INSTRUCTION</b>	English
<b>TEACHER(S)</b>	Professor Jadwiga Mirecka, MD, PhD Assoc. Professor Piotr Kopiński, MD, PhD Assoc. Professor Paweł Szymanowski, MD, PhD Assoc. Professor Krzysztof Tomaszewski, MD, PhD Maciej Krupiński, MD, PhD Izabela Zamojska, MD, PhD Martyna Jastrzębska, MD, PhD Marcin Lipski, MD, PhD Marcin Purchała, MD, PhD Emanuel Kolanko, MD Bożena Wójcik, MSc Maciej Wierzbicki, MSc
<b>PERSON RESPONSIBLE</b>	Marcin Lipski, MD, PhD
NUMBER OF HOURS	
<b>LECTURES</b>	36 h
<b>CLASSES</b>	34 h
<b>SEMINARS</b>	8 h
GENERAL OBJECTIVES	
<b>OBJECTIVE 1</b>	Familiarization of students with the structure of the human body in terms of topography, functional and clinical approach - to familiarize students with the structure of the human body at the imaging scan.
LEARNING OUTCOMES	
<b>MK1</b>	<b>Knowledge:</b> The student uses the anatomical and histological nomenclatures in Polish and in English - describes the structure of the human body in terms of topography and function – presents characteristic feature of tissues.

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MS1	<b>Skills:</b> Student uses in spoken and in written anatomical nomenclatures in Polish and in English - recognizes anatomical structures on cadavers - explains the anatomical basis for the physical examination - recognizes anatomical structures in images diagnostic (X-ray, CT, MRI, ultrasound) - recognizes tissue components under optical microscope and on electronmicrographs.
MC1	<b>Social Competency:</b> The student manifests a respect for the corps.
INTRODUCTORY REQUIREMENTS	
Biology, anatomy at the level of grammar school /(US)high school.	
COURSE PROGRAM	DETAILED DESCRIPTION OF THE TOPIC BLOCKS
LECTURE 1	<b>Anatomy:</b> General overview of the urinary system (kidneys, minor and major calices, renal pelvis, ureter, urinary bladder, urethra). Kidneys, external and internal structures, coverings, internal structures, regional anatomy. Vascular supply, innervation. The ureter: parts and orifices, constriction, regional anatomy. Vascular supply and innervation.
LECTURE 2	<b>Anatomy:</b> The urinary bladder. External structures (parts). Internal structures. Regional anatomy (position). Fixation of the bladder. Muscles involved in micturition and continence. Vascular supply (arteries, veins and lymphatic drainage). Innervation. Female and male urethra. Vascular supply and innervation.
LECTURE 3	<b>Histology:</b> Histological structure of the kidney. Nephron and its components. Filtration barrier of the glomerulus. Differences in structure of the proximal and distal tubule. Intermediate tubules, short and long loops of Henle. Juxtaglomerular apparatus. Medullary part of the kidney, interstitial tissue and countercurrent exchanger. The urether and urinary bladder.
LECTURE 4	<b>Anatomy:</b> The genital system. Male genital system. Internal organs: testis, epididymis, ductus deferens, seminal gland, ejaculatory duct, prostate, male urethra, bulbo-urethral glands. External genital organs: scrotum, penis, male urethra.
LECTURE 5	<b>Anatomy:</b> Testis, external structure. Upper pole, lower pole, anterior border, posterior border, media surface, lateral surface. Tunica vaginalis. Internal structures: capsule, lobules, ducts. Descent of the testis. Innervation, vascular supply. Epididymis. External structures, supporting ligaments, duct and lobules. Vascular supply. Innervation.
LECTURE 6	<b>Anatomy:</b> Ductus deferens – parts (SFIP), spermatic cord – contents, coverings. Seminal glands: regional anatomy and ducts. Vascular supply and innervation. Bulbo-urethral glands. Prostate. (external structure, regional anatomy, internal structure, vascular supply, innervation.

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<b>LECTURE 7</b>	<p>Histological structure of the male gonad. Seminiferous tubules. Sertoli cells and structural basis for the blood-testis barrier. Spermatogenesis and spermiogenesis. Structure of spermatozoon. Leydig cells. Excurrent male ducts. Glands associated with the male reproductive tract( seminal vesicles, prostate and bulbourethral glands.</p>
<b>LECTURE 8</b>	<p><b>Anatomy:</b> Scrotum – external structures, layers, vascular supply and innervation. Penis (external structures, internal structures, vascular supply and innervation. Male urethra.</p>
<b>LECTURE 9</b>	<p><b>Anatomy:</b> Female genital system. Internal genital organs (ovary, uterine tube, uterus, vagina), external genital organs: vestibule, Bartholin’s glands, lesser vestibular glands, labia majora, labia minora, clitoris, bulb of vestibule. Ovary – external structure, peritoneal folds and their corresponding arterial supply. Internal structures, vascular supply and innervation.</p>
<b>LECTURE 10</b>	<p><b>Histology:</b> Microscopical structure of the ovary. Characteristics of the ovarian follicles in different phases of their maturation. Mechanism of ovulation and formation of the corpus luteum. Corpus luteum , its structure, function and degeneration. Athresia of ovarian follicles..The oviduct - cyclic changes in the epithelium.</p>
<b>LECTURE 11</b>	<p><b>Anatomy:</b> Uterine tube – external structure, internal structure, vascular supply and innervation. Uterus – external structure, internal structure, uterine surfaces and their position. Supporting apparatus. Peritoneal folds. Vascular supply and innervation. Vagina – external and internal structures, regional anatomy. Vascular supply, innervation. Female external genitalia (vulva). Perineum and its muscles. The mammary glands, anatomy in pregnancy</p>
<b>LECTURE 12</b>	<p><b>Histology:</b> Structure of the uterus and changes taking place in endometrium during the menstrual cycle. Histological structure of the vagina. Principles of cytodiagnostics of vaginal smears. Accessory structures related to the female reproductive tract. Placenta, umbilical cord and fetal membranes. Mammary gland and changes in its structure dependent on age and phase of reproductive cycle.</p>
<b>LECTURE 13</b>	<p><b>Physiology:</b> Organization of the urinary system. Overview of kidney function. Nephron as the functional unit of the kidney. Types of nephrons. Renal vasculature. Renal (RBF) and plasma (PBF) blood flow. Renal autoregulation. RBF regulation by nervous system, hormones and autacoids.</p>
<b>LECTURE 14</b>	<p><b>Physiology:</b> Concept of renal clearance. Glomerular filtration, characteristics of glomerular filtration barrier. Starling forces across glomerular capillaries. The concept of glomerular filtration rate. Filtration fraction. Reabsorption and secretion – concepts, measurement. Glucose – example of reabsorption. Urea – example of passive reabsorption.</p>

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<b>LECTURE 15</b>	<b>Physiology:</b> Weak acids/bases and non-ionic diffusion. Salt reabsorption, potassium and magnesium balance in nephrons. Calcium and phosphate balance. Water balance – concentration and dilution of urine. Corticopapillary osmotic gradient. Countercurrent multiplication in Henle loop. Steps in production of hyperosmotic urine.
<b>LECTURE 16</b>	<b>Physiology:</b> Female and male gonads. Hypothalamic-pituitary-testicular axis. Hypothalamic-pituitary-ovarian axis. Physiological role of testosterone. Micturition. Bladder enervation and function. Spinal micturition reflex.
<b>LECTURE 17</b>	<b>Physiology:</b> Ovarian and endometrial cycles. Physiology of pregnancy. Implantation. Placenta. Maternal physiology. Fetal physiology. Parturition.
<b>CLASS 1</b>	<b>Anatomy:</b> Dissection of the kidneys – external and internal structures. Position, coverings. Vessels of the abdominal cavity and pelvis. The urinary bladder its position and structures. Female and male urethra. <b>2h</b>
<b>CLASS 2</b>	<b>Anatomy:</b> testis, epididymis, ductus deferens, seminal gland, ejaculatory duct, prostate, male urethra, bulbo-urethral glands. External genital organs: scrotum, penis, male urethra. Vessels of the lesser pelvis dissection and anatomage. <b>2h</b>
<b>CLASS 3</b>	<b>Anatomy:</b> Ductus deferens – parts (SFIP), spermatic cord – contents, coverings. Seminal glands: regional anatomy and ducts. Vascular supply and innervation. Bulbo-urethral glands. Prostate. <b>2h</b>
<b>CLASS 4</b>	<b>Anatomy:</b> Perineum and its muscles. <b>2h</b>
<b>CLASS 5</b>	<b>Anatomy:</b> Internal genital organs (ovary, uterine tube, uterus, vagina), external genital organs: vestibule, Bartholin's glands, lesser vestibular glands, labia majora, labia minora, clitoris, bulb of vestibule. <b>2h</b>
<b>CLASS 6</b>	<b>Anatomy:</b> Uterine tube – external structure, internal structure, vascular supply and innervation. Uterus – external structure, internal structure, uterine surfaces and their position. Supporting apparatus. Peritoneal folds. Vascular supply and innervation. <b>2h</b>
<b>CLASS 7</b>	<b>Anatomy:</b> Nervous structures of the lesser pelvis. <b>2h</b>
<b>CLASS 8</b>	<b>Anatomy:</b> The mammary glands. <b>2h</b>
<b>CLASS 9</b>	<b>Histology:</b> Microscopic structure of the kidney: cortical and medullary part. Identification of renal corpuscles, their vascular and urinary poles. Ultrastructure of the filtration barrier. Recognition of proximal and distal tubule under optical and electron microscope. Tubules of the renal medulla. Urether and the urinary bladder. <b>2h</b>

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<b>CLASS 10</b>	<b>Histology:</b> Microscopic structure of the testis; Sertoli cells and spermatogenic epithelium. The cells of Leydig. Ultrastructure of the spermatozoon. The prostate gland and seminal vesicles. <b>2h</b>
<b>CLASS 11</b>	<b>Histology:</b> Ovary, ovarian follicles on different stages of development. The corpus luteum and its structure. Atretic follicles. The uterine tube under optical and electron microscope. <b>2h</b>
<b>CLASS 12</b>	<b>Histology:</b> Microscopic structure of the uterus, components of endometrium. The vagina; cytology of the vaginal smears. Endometrium during pregnancy. The placenta and placental villi. The umbilical cord and fetal membranes. The mammary gland in different phases of development. <b>2h</b>
<b>CLASS 13</b>	<b>Physiology:</b> Measuring volumes of body compartments. Shifts of water between body fluid compartments. Measurement of renal plasma flow and renal blood flow. Measurement of GFR. RAA system and kidneys. <b>3h</b>
<b>CLASS 14</b>	<b>Physiology:</b> Commonly used terms and abbreviations in renal physiology, including single nephron. Urine clinical tests. Normal urine test results – its macroscopic and microscopic examination, physiological components, protein in the urine, metabolites of the hem. <b>3h</b>
<b>CLASS 15</b>	<b>Physiology:</b> Acid-base balance. Acidosis, alkalosis, mechanisms of renal compensation. Sodium / potassium reabsorption in kidneys. Renal aldosterone function. Henderson-Hasselbach diagrams. <b>2h</b>
<b>CLASS 16</b>	<b>Physiology:</b> Hormones in human reproductive functions. Biased woman physiology in pregnancy. <b>2h</b>
<b>SEMINAR 1</b>	Kidneys in regulation of homeostasis, in water and acid-base balance – summary. Endocrine function of kidneys (RAA, calcium/phosphate metabolism, erythropoietin). Repetition.
DIDACTIC METHODS (APPLIED)	
	Lectures; Laboratory Classes; Work in teams; Multimedia presentations.
STUDENTS WORKLOAD	
<b>NUMBER OF HOURS UNDER SUPERVISION</b>	78 hours
<b>NUMBER OF PREPARATION HOURS</b>	Preparation for classes: 60 hours Preparation for the exam: 40 hours
<b>TOTAL NUMBER OF HOURS FOR THE COURSE</b>	178 hours

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CONDITIONS FOR COURSE COMPLETION	
	Attendance of all lectures, classes and seminars + final exam
METHODS OF ASSESMENT	
IN TERMS OF KNOWLEDGE	Oral questioning in classes, quizzes, written exams
IN TERMS OF SKILLS	Practical exam recognition of anatomical details (macroscopically), Practical recognition of microscopic images and electronmicrographs
IN TERMS OF SOCIAL COMPETENCY	Not applicable.
FORMATIVE	In class quizzes, oral questioning
SUMMATIVE (I & II terms)	<b>I term (EXAM):</b> MCQ -100 questions <b>II term (RETAKE EXAM):</b> open questions
GRADING SCALE	
3,0 (SATISFACTORY)	55%-60% correct answers
3,5 (SATISFACTORY PLUS)	61%-68% correct answers
4,0 (GOOD)	69%-85% correct answers
4,5 (GOOD PLUS)	86%-95% correct answers
5,0 (VERY GOOD)	96%-100% correct answers
BASIC LITERATURE	
<p>[1] Kyung W. Chung, Harold M. Chung. Gross Anatomy. Lippincott Williams &amp; Wilkins, 2011;            [2] A.L.Mescher :Junqueira's Basic Histology. Text and Atlas. United States of America 2016.            McGraw-Hill Education;            [3] Linda S. Costanzo. Physiology, Oxford, 2018, Elsevier Ltd.</p>	
SUPPLEMENTARY LITERATURE	
<p>[1] Keith L. Moore; Arthur F. Dalley; Anne M.R. Agur — <i>Clinically oriented anatomy</i>,            Philadelphia, 2010, Wolters Kluwer;            [2] J.S.Lowe, P.G.Anderson, S.I.Anderson: Stevens &amp; Lowe's: Human Histology. Elsevier .            China. 2020;            [3] Ganong`S Review of Medical Physiology, Ed. McGraw-Hill 2016.</p>	