Medicinski fakultet u Rijeci

IZVEDBENI NASTAVNI PLAN
2023/2024

Za kolegij

Physiology and Pathophysiology III

Studij:	**Medical Studies in English (R)** Sveučilišni integrirani prijediplomski i diplomski studij
Katedra:	**Katedra za fiziologiju, imunologiju i patofiziologiju**
Nositelj kolegija:	**prof. dr. sc. Trobonjača Zlatko, dr. med.**
Godina studija:	**3**
ECTS:	**10**
Stimulativni ECTS:	**0 (0.00%)**
Strani jezik:	**Mogućnost izvođenja na stranom jeziku**

Podaci o kolegiju:

The basic aim of this course is to enable the students to acquire knowledge about the physiological mechanisms of the gastrointestinal and hepatobiliary system, the metabolism and regulation of body temperature, and the morphological and functional structure of the endocrine system. Also, the aim of this course is to enable the students to acquire knowledge about the pathophysiological mechanisms and impaired functioning of the gastrointestinal and hepatobiliary system, basic and specific metabolic disorders and endocrinopathies. Encouraging horizontal and vertical integration of knowledge on natural courses of physiological and etiopathogenetic processes will contribute to the understanding of the specificity of the etiological factor activity, i.e. the mechanism of origin, course, and local and systemic consequences of different diseased states.

The course is performed in the winter semester at the third year of study, in the form of lectures (34 teaching hours), seminars (45 teaching hours), and practicals (25 teaching hours), which totals 10 ECTS credits. A) Lectures are a form of classes that provide an introduction and an overview of a thematic unit that is taught in more detail on seminars and practicals. B) Seminars and C) practicals are a form of classes where students actively review and critically discuss physiological and pathophysiological mechanisms (of certain morphological and functional units), which are then explained at the molecular, microenvironmental, organic, systemic and whole-organism level. Active participation of students in the curriculum program is further achieved by D) studying natural integrators of etiopathogenetic events, the so-called etiopathogenetic clusters, E) performing practicals in the laboratory and on computer programs that simulate pathological conditions and provide clinical correlates of certain diseases, and F) performing presentations of certain teaching unit content (PowerPoint presentations).

Class attendance and student participation in all forms of classes are compulsory in accordance with the Law and the Statute of the Faculty of Medicine in Rijeka. Accordingly, student attendance at lectures, seminars, and practicals will be regularly checked. Only justifiable absences due to, for example, illness will be acceptable within the limits allowed and according to the Ordinance on Studies.

The student is obligated to prepare in advance the predefined material that is being discussed on seminars and practicals. The teacher/course coordinator continuously evaluates student participation throughout seminars and practicals (demonstrated knowledge, the ability to correlate morphological, ultrastructural, biochemical and/or functional factors into a complete image of physiological functional systems and certain diseased states). Student activity during classes (lectures, seminars, practicals) is certified in thedaily work log.

Lectures, seminars, and practicals take place according to the Syllabus. Schedule of students by groups can be found on the SharePoint platform of the Department of Physiology and Immunology at the following website: https://spp.uniri.hr/ss_medri/katedre/427 - accessed via an AAI address

Popis obvezne ispitne literature:

1. Guyton A.C., Hall J.E. Textbook of Medical Physiology (13th edition), Elsevier, 2016.

2. Gamulin S., Marušić M., Kovač Z. Pathophysiology (7th edition), Medicinska naklada Zagreb, 2014.

3. Kovač Z. et al. Clinical Pathophysiology – Etiopathogenetic Nodes (Third Book: I-IV part). Medicinska naklada Zagreb 2013.

4. Rukavina, D., Radošević Stašić, B., Lučin, P., Ćuk, M. Handbook for Practicals in Physiology, Neurophysiology, and Immunology, Department of Physiology, Immunology, and Pathological Physiology, Faculty of Medicine in Rijeka, October 2001.

Popis dopunske literature:

1. Ganong, W.F. Review of Medical Physiology, (21st edition) Lange Medical Books / McGraw-Hill, Medical Pub. Division, New York 2004.

2. Vrhovac B. et al. Interna medicina [Internal Medicine], (4th edition), Naklada Ljevak, Zagreb 2008.

3. 3. McPhee,S.J, Ganong, W.F. Pathophysiology of Disease. An introduction to Clinical medicine, (5th edition), Lange Medical Books / McGraw-Hill, Medical Pub. Division, New York 2006.

Nastavni plan:

Predavanja popis (s naslovima i pojašnjenjem):

Lecture 1. Gastrointestinal physiology: part I

To describe the general principles of the gastrointestinal wall structure.

To describe the electrical activity of the gastrointestinal smooth muscle.

To explain the blood circulation of the digestive system. To describe the functional movements of the digestive system.

To describe the neural control of gastrointestinal functions (intestinal nervous system).

To explain food intake, chewing, and swallowing.

To describe the functions of the stomach, the movements of the small and large intestine.

Lecture 2. Gastrointestinal physiology: part II

To define general and locally specific principles of secretion in the digestive system.

To explain digestion and absorption of various nutrients (carbohydrates, proteins, fats) in certain segments of the digestive system.

Lecture 3. Pathophysiology of gastrointestinal system

To describe the disorders of the throat, esophagus, and stomach.

To explain the disorders of the exocrine pancreatic function.

To describe the disorders of the small and large intestine.

To explain the pathophysiological forms and consequences of diarrhea.

To explain the mechanism and consequences of vomiting.

To describe the causes and consequences of ileus.

Lecture 4. Metabolism of proteins and carbohydrates

To describe the physiology of protein metabolism.

To explain the etiological factors, mechanisms, and consequences of impaired protein metabolism.

To explain the causes and consequences of protein deficiency.

To explain the mechanisms and effects of primary and secondary malnutrition.

To explain the physiology of carbohydrate metabolism and adenosine triphosphate formation.

To explain the etiological mechanisms and consequences of impaired carbohydrate metabolism.

To describe the causes and effects of hyperglycemia. To describe the causes and effects of hypoglycemia.

To explain the disorders of glycogen metabolism.

Lecture 5. Lipid metabolism

To describe the physiology of lipid metabolism.

To describe the causes, mechanisms, and pathophysiological effects of lipoprotein disorders (primary and secondary hyperlipoproteinemia, other disorders of lipoprotein metabolism).

To describe the causes, mechanisms, and pathophysiological effects of lipid deposition disorders (lipidosis, atherosclerosis, and obesity).

Lecture 6. Liver physiology

To explain the macromorphological and micromorphological structure of the liver.

To describe the basic function unit – hepatic lobule.

To explain blood flow through the liver and the hepatic macrophage system.

To describe the system of lymph glands in the liver.

To describe the liver metabolism of carbohydrates, amino acids, and ammonia.

To explain the synthesis and degradation of proteins in the liver (glycoproteins, angiotensinogen, coagulation factors, hematopoietic factors, acute phase proteins).

To describe the detoxification mechanisms (drugs, toxic substances).

To describe the alcohol metabolism.

To explain the hormone metabolism.

To describe the metabolism of lipids (fatty acids and triglycerides) and cholesterol.

To explain the bilirubin metabolism.

To describe the biliary tree and the creation, excretion, and role of bile in the digestion and absorption of fat.

To describe the iron and vitamin storage in the liver.

Lecture 7. Disorders of hepatobiliary system: part I

To explain the etiopathogenesis of metabolic and infiltrative liver diseases (metabolic disorders of bilirubin, jaundice, fatty liver).

To understand the etiopathogenesis of viral hepatitis (A, B, C, D, E) and autoimmune hepatitis.

To define toxic and medicated damage to the liver.

To explain the pathogenesis of alcoholic liver disease.

Lecture 8. Disorders of hepatobiliary system: part II

To describe the pathogenesis of alcoholic, posthepatic, primary biliary, secondary biliary, and cardiac liver cirrhosis.

To understand the development of complications of liver cirrhosis (portal hypertension, ascites, spontaneous bacterial peritonitis, hepatic encephalopathy, hepatorenal syndrome, hepatopulmonary syndrome, hypersplenism, coagulopathy).

To describe diseases of the biliary system (gallstones, cholangitis).

Lecture 9. Disorders of exocrine pancreas function – acute and chronic pancreatitis

To describe the physiological structure of the exocrine part of the pancreas.

To describe water and electrolyte secretion.

To explain formation and secretion of pancreatic digestive enzymes.

To describe control over pancreatic secretion.

To describe cystic fibrosis of the pancreas.

To explain the ethiopathogenic factors, course, and complications of (local, systemic) acute pancreatitis.

To explain the eiopathogenetic factors, course, and complications of chronic pancreatitis.

Lecture 10. Introduction to endocrinology, Pituitary hormones

To explain the structure of the endocrine system and the mechanisms of hormone activity.

To explain the mechanisms of adeno and neuro pituitary hormone production and function and their hypothalamic control.

To understand the causes and consequences of increased and decreased hormone secretion.

To understand the causes and consequences of disorders in the target tissue of the hormone.

To explain the disorders of hormone metabolism and regulation of hormonal systems. To explain the pituitary function disorders.

Lecture 11. Thyroid Metabolic hormones

To explain the production, secretion, and physiological functions of thyroid metabolic hormones.

To understand thyroid function disorders: thyrotoxicosis, hyperthyroidism, hypothyroidism, and goiter.

Lecture 12. Adrenocortical hormones

To explain the production, secretion, and physiological functions of adrenal cortex hormones.

To understand the causes, course, and consequences of hyperfunction and hypofunction of the adrenal cortex.

To understand the disorders of the adrenal gland core.

Lecture 13. Parathyroid Hormone, calcitonin, calcium and phosphate metabolism

To explain the production, secretion, and action of parathyroid hormone and calcitonin.

To understand the mechanisms for maintaining calcium and phosphate metabolism.

To explain calcium, phosphate, and magnesium turnover disorders.

To explain disorders with increased or decreased parathyroid hormone formation.

To explain disorders with increased or decreased calcitonin formation.

Lecture 14. Insulin, glucagon, and diabetes mellitus

To understand the mechanisms of production, secretion, and metabolic effects of insulin, glucagon, and somatostatin.

To explain the causes and consequences of impaired insulin, glucagon, and somatostatin action.

To understand the ethiopathogenesis of various types of diabetes.

To explain the course and acute and chronic consequences of diabetes.

Lecture 15. Predictors and clinical implications of metabolic syndrome

To define the components of the metabolic syndrome.

To describe the inherited and acquired etiopathogenetic factors of the metabolic syndrome.

To define the role of obesity (adipokine production and release of nonesterified fatty acids from adipose tissue and their action and ectopic accumulation in muscle tissue, liver, and pancreas) in the development of the metabolic syndrome.

To describe the release of PAI-1, TNF, IL-6, and resistin, the role in the progression of the metabolic syndrome.

To define the role of insulin resistance in the metabolic syndrome.

To describe the mechanisms and the role of atherogenic dyslipidemia, hypertension, hyperglycemia, prothrombotic, and failure status in the development of cardiovascular diseases.

Lecture 16. Reproductive functions and sex hormones

To describe the functional structure of male genitalia.

To describe the spermatogenesis and the male sexual act.

To understand the chemical structure, secretion, metabolism, and effects of male sex hormones.

To describe the disorders of male sexual functions.

To understand the functional anatomy of female genitalia.

To describe the female sex hormone system.

To describe the monthly ovarian cycle and the function of gonadotropic hormones.

To clarify the ovarian hormone functions, estradiol and progesterone.

To describe the interaction of ovarian and hypothalamic-pituitary hormones.

To explain the female sexual act.

To describe pregnancy, lactation, and the physiology of the fetus and newborn.

Lecture 17. Integral organismic reactions to noxious stimuli

To describe the strategy of the systemic pathobiological response of the organism under noxious stimuli.

To explain stress – spontaneous systematic directing of reactivity.

To describe acute-phase response during an inflammatory process.

To understand systemic inflammatory response and multiple organ failure.

To describe the immunological patterns of systemic response.

To understand healing and fibrosation processes and changes in tissue architecture (remodeling).

Vježbe popis (s naslovima i pojašnjenjem):

Practical 1: Gastrointestinal system and metabolism

I. Theoretical part:

To understand the material discussed on lectures (content of the L 1., L 2., L 3., L 4.) and seminars (content of the S 1., S 2., S 3., S 4., S 5., S 6.). This material covers the fields of physiology and pathophysiology of the digestive system, normal and impaired metabolism of proteins, carbohydrates, and lipids, as well as the fields of nutrition, energetics, metabolism intensity and thermoregulation.

II. Practical part:

To describe the performance and to understand the effects of vagus stimulation and histamine injection on gastric secretion. To solve the study guide algorhythms of the digestive system and metabolism. Textbook: Zdenko Kovač, Stjepan Gamulin editors: Study guide algorhythms – problem solver (Book two) Medicinska naklada Zagreb, 2011.:

Problem 22. Molecular-cellular pathogenesis of familial hypercholesterolemia (str.103 –106)

Problem 2. Etiopathogenesis of cystic fibrosis (str.5 – 8).

Problem 117. Pathophysiology of gluten sensitive enteropathy (str. 530-533).

Problem 118. Pathogenesis of diarrhea in the cholera syndrome (str. 534-537).

Problem 119. Pathophysiology of peptic disease in the course of gastrinoma (Zollinger- Ellison syndrome) (str. 538-541)

Practical 2: Liver physiology and pathophysiology

I. Theoretical part:

To understand the material discussed on lectures (content of the L 5., L 6., L 7., L 8.; L9). This material covers the field of physiology and pathophysiology of the hepatobiliary system and the field of physiology and pathophysiology of the pancreas.

II. Practical part:

To explain the performance and consequences of ligation of the ductus choleductus in a rat. To solve the study guide algorhythms of liver physiology and pathophysiology: Textbook: Zdenko Kovač, Stjepan Gamulin editors: Study guide algorhythms – problem solver (Book two) Medicinska naklada Zagreb, 2011.:

Problem 122. Pathophysiology of liver cirrhosis (str. 550 – 554).

Problem 124. Pathophysiology of the obstructive icterus caused by cholelithiasis (str. 561-564).

Problem 125. Pathophysiology of acute cholecystitis (str. 565 – 568).

Problem 126. Pathophysiology of acute liver failure in hepatitis B (str. 569 – 573).

Practical 3: Sports Physiology

I. Theoretical part:

To understand the effect of low oxygen pressure on the body. To explain physiological problems in deep-sea diving and other hyperbaric conditions. To describe the sports physiology.

II. Practical part:

To explain the performance of biofeedback tests. To describe the performance and significance of the physiology of aerobic exercises. To solve the etiopathogenetic clusters of liver physiology and pathophysiology

Practical 4: Endocrinology

I. Theoretical part:

To understand the material discussed on lectures (content of the L 9., L 10., L 11., L 12., L 13., L 14.) and seminars (content of the S 7., S 8., S 9., S 10.). This material covers the fields of physiology and pathophysiology of general endocrinology, pituitary hormones, thyroid metabolic hormones, adrenal cortex hormones, parathyroid hormone, calcitonin, calcium and phosphate metabolism, and insulin, glucagon, and diabetes.

II. Practical part:

To explain the performance and effect of thyroid hormone on oxygen consumption. To explain the performance and effect of inducing hypocalcemic tetany in rats. To explain the performance and significance of Thorn's test in rats. To explain the performance and effects of insulin hypoglycemia in rats. To explain the performance and significance of the glucose tolerance test. To solve the study guide algorhythms of the endocrine system. Textbook: Zdenko Kovač, Stjepan Gamulin editors: Study guide algorhythms – problem solver (Book two) Medicinska naklada Zagreb, 2011.:

Problem 36. Pathophysiology of hyperfunctioning thyroid adenoma caused by a point mutation in the thyrotropin receptor (str. 168 – 172).

Problem 38. Pathophysiology of hyperosmolal syndrome in the course of newly diagnosed diabetes mellitus (str. 178 – 182)

Problem 20. Pathogenesis of diabetes mellitus related chronic complications (str. 93 – 97)

Problem 39. Pathogenesis of primary aldosteronism (Conn’s syndrome) (str. 183 – 186)

Problem 40. Pathophysiology of Cushing’s disease (str. 187 – 190)

Practical 5: Reproduction

I. Theoretical part:

To understand the material discussed on lectures (content of the L 15.). This material covers the field of physiology and pathophysiology of reproductive functions and sex hormones. To describe the reproductive and hormonal functions in men. To explain the action of the epiphysis. To understand the physiology of women before pregnancy and the effects of female sex hormones. To describe pregnancy and lactation. To explain the physiology of the fetus and newborn.

II. Practical part:

To describe the performance and significance of demonstrating chorionic gonadotropin in the urine of pregnant women with the Ascheim–Zondek test. To explain the performance and significance of the effect of sex hormones on cytological findings of the vaginal smear in female rats. To solve the study guide algorhythms of reproduction. Textbook: Zdenko Kovač, Stjepan Gamulin editors: Study guide algorhythms – problem solver (Book two) Medicinska naklada Zagreb, 2011.:

Problem 71. Pathogenesis of fetal erythroblastosis (str. 330 – 333).

Problem 37. Pathophysiology of adrenocortical insufficiency syndrome (str. 173 – 177).

Seminari popis (s naslovima i pojašnjenjem):

Seminar 1. Gastrointestinal physiology

To explain the general principles of the gastrointestinal wall structure, blood circulation, and digestive tract mobility.

To describe the neural control of gastrointestinal functions.

To explain functional movements, suppression, and mixing of food in the digestive system.

To define general and locally specific principles of secretion in the digestive system.

To explain the digestion and absorption of different nutrients (carbohydrates, proteins, fats) in particular segments of the digestive system.

Seminar 2. Pathophysiology of gastrointestinal system

To explain the functional disorders of the pharynx, esophagus, stomach, exocrine part of the pancreas, small and large intestine.

To explain the pathophysiological forms of diarrhea and the vomiting mechanism.

To understand the causes and consequences of ileus.

Seminar 3. Metabolism of proteins and carbohydrates

To explain the physiology of carbohydrate metabolism and adenosine triphosphate formation.

To explain the etiological mechanisms and consequences of impaired carbohydrate metabolism.

To understand the causes and effects of hyperglycemia.

To understand the causes and effects of hypoglycemia.

To explain the disorders of glycogen metabolism.

To understand the physiology of protein metabolism.

To explain the etiological mechanisms and consequences of impaired protein metabolism.

To understand the causes and consequences of protein deficiency.

To explain the mechanisms and effects of primary and secondary malnutrition.

Seminar 4. Lipid metabolism

To understand the physiology of lipid metabolism.

To describe the causes, mechanisms, and pathophysiological effects of lipoprotein disorders.

To describe the causes, mechanisms, and pathophysiological effects of lipid deposition disorders

Seminar 5. Dietary Balances, regulation of feeding, metabolism, body temperature regulation

To describe the energetics and intensity of metabolism.

To explain the mechanisms of maintaining normal body temperature.

To describe the organism's response to environmental temperature changes.

To explain the pathogenetic causes, course, and consequences of hyperthermia and hypothermia.

Seminar 6. Metabolism of specific metabolic substances

To explain the metabolism and mechanisms of action of vitamins and minerals.

To explain the etiopathogenesis of turnover disorders of specific metabolic substances.

To understand vitamin change disorders (hypovitaminosis, hypervitaminosis).

To understand the disorders in changes of elements in traces.

Seminar 7. General endocrinology, pituitary gland

To explain the structure of the endocrine system and the mechanisms of hormone action.

To explain the mechanisms of adeno and neuro pituitary hormone production and action and their hypothalamic control.

To understand the causes and consequences of increased and decreased hormone secretion.

To understand the causes and consequences of disorders in the target hormone tissue.

To explain disorders of hormone metabolism and regulation of hormone systems.

To explain impaired function of the anterior and posterior pituitary lobe.

Seminar 8. Thyroid and adrenal gland

To explain the production, secretion, and physiological functions of thyroid metabolic hormones.

To understand thyroid function disorders: thyrotoxicosis, hyperthyroidism, hypothyroidism, asphyxiation.

To explain the production, secretion, and physiological functions of adrenal cortex hormones.

To understand the causes, course, and consequences of hyperfunction and hypofunction of the adrenal cortex.

To understand the disorders of the adrenal gland core.

Seminar 9. Parathyroid glands

To explain the production, secretion, and action of parathyroid hormone and calcitonin.

To understand the mechanisms of maintaining calcium and phosphate metabolism.

To explain the disorders of calcium, phosphate, and magnesium turnover.

To explain the disorders with increased and decreased parathyroid hormone production.

To explain the disorders with increased and decreased calcitonin formation.

Seminar 10. Endocrine pancreas, diabetes mellitus

To understand the mechanisms of production, secretion, and metabolic effects of insulin, glucagon, and somatostatin.

To explain the causes and consequences of impaired insulin, glucagon, and somatostatin action.

To understand the etiopathogenesis, course, and acute and chronic consequences of diabetes.

Seminar 11. Reproductive functions and sex hormones

To explain the formation, secretion, and action of male and female sex hormones.

To understand biofeedback mechanisms in the regulation and function of sex hormones.

To explain hormonal effects in pregnancy.

Obveze studenata:

Students are obligated to regularly attend and actively participate in all forms of classes. The student should be prepared for seminar and practical classes and familiarize with the material from the syllabus for each seminar and practical.

Ispit (način polaganja ispita, opis pisanog/usmenog/praktičnog dijela ispita, način bodovanja, kriterij ocjenjivanja):

ECTS grading system:

Student work will be evaluated during classes and at the final exam. A maximum of 50 grade points can be obtained during classes and up to 50 grade points at the final exam, which totals 100 grade points.

I. The following components are evaluated during classes (up to 70 grade points):

Acquired knowledge (up to 50 grade points)
During classes, acquired knowledge will be evaluated by means of two tests comprising 50 questions. The first test will be held after teaching the following content: physiology and pathophysiology of metabolism, digestive and hepatobiliary systems. The second test will be held after teaching the following content: physiology and pathophysiology of the endocrine system. A student may obtain up to 25 grade points on each test as follows:

Correct answers	Grade points
48,49,50	**25**
45,46,47	**24**
42,43,44	**23**
39,40,41	**22**
37,38	**21**
35,36	**20**
33,34	**19**
31,32	**18**
29,30	**17**
27,28	**16**
25,26	**15**

Out of the maximum 50 grade points that can be obtained during classes, the student must earn at least 50% (25) grade points in order to take the final exam. A student can access the correction of the first and second midterm exam if they did not obtain a minimum criteria the first time, in case of absence at the midterm exam the first time, or if they are not satisfied with the obtained credits at the exam the first time. If a student retakes the midterm exam because they are not satisfied with the obtained grade points, only the credits obtained at the retaken midterm exam will be considered. Correction of midterm exams will take place between two exam terms in February 2025.
Students who obtain 0-49.9% (0-24.9 grade points) during the course, earn a grade of F (failed), cannot earn ECTS credits and must re-enroll in the course.

II. Final exam (up to 50 grade points)
The final exam consists of an oral and a written part. A student must solve at least 50% of the test in order to access the oral part of the final exam. The written and the oral part of the final exam comprise a sum, and the final grade corresponds to the total number of grade points.

At the written part of the final exam, the student can obtain a maximum of 25 grade points, and a minimum of 13 grade points as shown in the table:

Correct answers	Number of grade points
78,79,80	**25**
75,76,77	**24**
72,73,74	**23**
68,69,70,71	**22**
64,65,66,67	**21**
60,61,62,63	**20**
57,58,59	**19**
54,55,56	**18**
51,52,53	**17**
48,49,50	**16**
46,47	**15**
43,44,45	**14**
40,41,42	**13**

A student can access the oral part of the final exam only if they obtained a minimum of 13 grade points (at least 50% of the test) at the written part of the final exam. A student can obtain grade points at the oral part of the exam as shown in the table:

Grade obtained at the oral part of the final exam	Number of grade points obtained at the oral part of the final exam
excellent (5)	**20-25**
very good (4)	**14-19**
good (3)	**8-13**
sufficient (2)	**2-7**
insufficient (1)	**0**

Who can access the final exam:

Students who obtained 25-50 grade points during classes are obligated to access the final multiple-choice questions (MCQ) test, where they can obtain additional grade points.

• Students who obtained less than 25 grade points during classes or were absent for more than 30% of classes are not allowed to access the final exam.

III. The final grade represents the sum of all grade points obtained during classes and at the final exam. It is based on the absolute redistribution according to the following scale:

A (90-100%)	**excellent (5)**
B (75-89,9%)	**very good (4)**
C (60-74,9%)	**good (3)**
D (50-59,9%)	**sufficient (2)**
F (student who has solved less than 50% of the test at the final exam or fail at the oral exam)	**insufficient (1)**

Ostale napomene (vezane uz kolegij) važne za studente:

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SATNICA IZVOĐENJA NASTAVE 2023/2024

Physiology and Pathophysiology III

Predavanja (mjesto i vrijeme / grupa)	**Vježbe** (mjesto i vrijeme / grupa)	**Seminari** (mjesto i vrijeme / grupa)
02.10.2023		
Lecture 1. Gastrointestinal physiology: part I: • P01 (10:15 - 12:00) [209] ○ PAPI_379		
prof. dr. sc. Trobonjača Zlatko, dr. med. [209]		
03.10.2023		
Lecture 2. Gastrointestinal physiology: part II: • P08 (08:15 - 10:00) [209] ○ PAPI_379		
prof. dr. sc. Trobonjača Zlatko, dr. med. [209]		
05.10.2023		

		Seminar 1. Gastrointestinal physiology:
		• P04 (08:00 - 11:00) [395]
		  ○ PAP3-S2
		• P05 (13:00 - 16:00) [393]
		  ○ PAP3-S1

Lukanović Jurić Silvija, dr. med. [393] · doc. dr. sc. Ćurko-Cofek Božena, dr. med. [395]		
10.10.2023		
Lecture 3. Pathophysiology of gastrointestinal system: • P08 (08:15 - 10:00) [209] ○ PAPI_379		
prof. dr. sc. Trobonjača Zlatko, dr. med. [209]		
12.10.2023		

		Seminar 2. Pathophysiology of gastrointestinal system:
		• Zavod za fiziologiju - Vježbaonica (08:00 - 11:00) [499]
		  ○ PAP3-S2
		• P05 (12:00 - 15:00) [395]
		  ○ PAP3-S1

prof. dr. sc. Barac Latas Vesna, dr. med. [499] · doc. dr. sc. Ćurko-Cofek Božena, dr. med. [395]		
17.10.2023		
Lecture 4. Metabolism of proteins and carbohydrates: • P08 (08:15 - 10:00) [523] ○ PAPI_379		
prof. dr. sc. Grabušić Kristina, dipl. ing. biol. [523]		
19.10.2023		

		Seminar 3. Metabolism of proteins and carbohydrates: • Zavod za fiziologiju - Vježbaonica (08:00 - 11:00) [394] ◦ PAP3-S2 • P15 - VIJEĆNICA (13:00 - 16:00) [523] ◦ PAP3-S1
prof. dr. sc. Blagojević Zagorac Gordana, dr. med. [394] · prof. dr. sc. Grabušić Kristina, dipl. ing. biol. [523]		
23.10.2023		
Lecture 5. Lipid metabolism: • P15 - VIJEĆNICA (09:15 - 11:00) [209] ◦ PAPI_379		
prof. dr. sc. Trobonjača Zlatko, dr. med. [209]		
24.10.2023		
Lecture 6. Liver physiology: • P08 (08:15 - 10:00) [396] ◦ PAPI_379		
prof. dr. sc. Jakovac Hrvoje, dr. med. [396]		
26.10.2023		
		Seminar 4. Lipid metabolism: • P15 - VIJEĆNICA (09:00 - 12:00) [523] ◦ PAP3-S2 • P15 - VIJEĆNICA (12:00 - 15:00) [209] ◦ PAP3-S1
prof. dr. sc. Grabušić Kristina, dipl. ing. biol. [523] · prof. dr. sc. Trobonjača Zlatko, dr. med. [209]		
30.10.2023		
Lecture 7. Disorders of hepatobiliary system: part I: • P15 - VIJEĆNICA (13:15 - 15:00) [209] ◦ PAPI_379		
prof. dr. sc. Trobonjača Zlatko, dr. med. [209]		
31.10.2023		
Lecture 8. Disorders of hepatobiliary system: part II: • P08 (08:15 - 10:00) [209] ◦ PAPI_379		
prof. dr. sc. Trobonjača Zlatko, dr. med. [209]		
02.11.2023		
		Seminar 5. Dietary Balances, regulation of feeding, metabolism, body temperature regulation: • P08 (09:00 - 12:00) [523] ◦ PAP3-S2 • P08 (12:00 - 15:00) [499] ◦ PAP3-S1
prof. dr. sc. Barac Latas Vesna, dr. med. [499] · prof. dr. sc. Grabušić Kristina, dipl. ing. biol. [523]		

06.11.2023		
	Practical 1: Gastrointestinal system and metabolism: • Zavod za fiziologiju - Vježbaonica (08:15 - 12:00) [394] ◦ PAP3-S2	
prof. dr. sc. Blagojević Zagorac Gordana, dr. med. [394]		
07.11.2023		
Lecture 9. Disorders of exocrine pancreas function – acute and chronic pancreatitis: • P08 (08:15 - 10:00) [209] ◦ PAPI_379		
prof. dr. sc. Trobonjača Zlatko, dr. med. [209]		
09.11.2023		
		Seminar 6. Metabolism of specific metabolic substances: • P08 (08:00 - 11:00) [210] ◦ PAP3-S2 • P08 (12:00 - 15:00) [214] ◦ PAP3-S1
prof. dr. sc. Mahmutefendić Lučin Hana, dipl. ing. biol. [210] · prof. dr. sc. Mrakovčić-Šutić Ines, dr. med. [214]		
10.11.2023		
	Practical 1: Gastrointestinal system and metabolism: • Zavod za fiziologiju - Vježbaonica (09:15 - 13:00) [393] ◦ PAP3-S1	
Lukanović Jurić Silvija, dr. med. [393]		
14.11.2023		
Lecture 10. Introduction to endocrinology, Pituitary hormones: • P08 (08:15 - 10:00) [499] ◦ PAPI_379		
prof. dr. sc. Barac Latas Vesna, dr. med. [499]		
16.11.2023		
		Seminar 7. General endocrinology, pituitary gland: • P08 (09:00 - 12:00) [214] ◦ PAP3-S2 • P08 (12:00 - 15:00) [395] ◦ PAP3-S1
prof. dr. sc. Mrakovčić-Šutić Ines, dr. med. [214] · doc. dr. sc. Ćurko-Cofek Božena, dr. med. [395]		
20.11.2023		

	Practical 2: Liver physiology and pathophysiology: • Zavod za fiziologiju - Vježbaonica (08:15 - 12:00) [209] ◦ PAP3-S2	
prof. dr. sc. Trobonjača Zlatko, dr. med. [209]		
22.11.2023		
Lecture 11. Thyroid Metabolic hormones: • ONLINE (14:15 - 16:00) [395] ◦ PAPI_379		
doc. dr. sc. Ćurko-Cofek Božena, dr. med. [395]		
23.11.2023		
	Practical 2: Liver physiology and pathophysiology: • Zavod za fiziologiju - Vježbaonica (08:15 - 12:00) [396] ◦ PAP3-S1	Seminar 8. Thyroid and adrenal gland: • P08 (09:00 - 12:00) [523] ◦ PAP3-S2 • P08 (12:00 - 15:00) [396] ◦ PAP3-S1
prof. dr. sc. Grabušić Kristina, dipl. ing. biol. [523] · prof. dr. sc. Jakovac Hrvoje, dr. med. [396]		
27.11.2023		
Lecture 12. Adrenocortical hormones: • ONLINE (13:45 - 15:30) [396] ◦ PAPI_379		
prof. dr. sc. Jakovac Hrvoje, dr. med. [396]		
28.11.2023		
Lecture 13. Parathyroid Hormone, calcitonin, calcium and phosphate metabolism: • P08 (08:15 - 10:00) [394] ◦ PAPI_379		
prof. dr. sc. Blagojević Zagorac Gordana, dr. med. [394]		
30.11.2023		
		Seminar 9. Parathyroid glands: • P08 (09:00 - 12:00) [209] ◦ PAP3-S2 • P08 (12:00 - 15:00) [394] ◦ PAP3-S1
prof. dr. sc. Blagojević Zagorac Gordana, dr. med. [394] · prof. dr. sc. Trobonjača Zlatko, dr. med. [209]		
04.12.2023		
Lecture 15. Predictors and clinical implications of metabolic syndrome: • P01 (14:15 - 16:00) [214] ◦ PAPI_379		
prof. dr. sc. Mrakovčić-Šutić Ines, dr. med. [214]		
07.12.2023		

		Seminar 10. Endocrine pancreas, diabetes mellitus: • P09 - NASTAVA NA ENGLESKOM JEZIKU (09:00 - 12:00) [393] ○ PAP3-S2 • P09 - NASTAVA NA ENGLESKOM JEZIKU (12:00 - 15:00) [214] ○ PAP3-S1
Lukanović Jurić Silvija, dr. med. [393] · prof. dr. sc. Mrakovčić-Šutić Ines, dr. med. [214]		
11.12.2023		
	Practical 3: Sports Physiology: • Zavod za fiziologiju - Vježbaonica (08:15 - 12:00) [214] ○ PAP3-S2	
prof. dr. sc. Mrakovčić-Šutić Ines, dr. med. [214]		
12.12.2023		
	Practical 3: Sports Physiology: • Zavod za fiziologiju - Vježbaonica (16:15 - 20:00) [1132] ○ PAP3-S1	
Omerović Alen, dr. med. [1132]		
14.12.2023		
Lecture 14. Insulin, glucagon, and diabetes mellitus: • ONLINE (16:00 - 17:30) [499] ○ PAPI_379		
prof. dr. sc. Barac Latas Vesna, dr. med. [499]		
18.12.2023		
	Practical 4: Endocrinology: • Zavod za fiziologiju - Vježbaonica (08:15 - 12:00) [393] ○ PAP3-P2	
Lukanović Jurić Silvija, dr. med. [393]		
20.12.2023		
	Practical 4: Endocrinology: • Zavod za fiziologiju - Vježbaonica (08:15 - 12:00) [395] ○ PAP3-S1	
doc. dr. sc. Ćurko-Cofek Božena, dr. med. [395]		
08.01.2024		
Lecture 16. Reproductive functions and sex hormones: • P15 - VIJEĆNICA (08:15 - 10:00) [1194] ○ PAPI_379		
prof. dr. sc. Laškarin Gordana, dr. med. [1194]		

10.01.2024		
		Seminar 11. Reproductive functions and sex hormones: • P15 - VIJEĆNICA (08:00 - 11:00) [393] ◦ PAP3-S1
Lukanović Jurić Silvija, dr. med. [393]		
11.01.2024		
		Seminar 11. Reproductive functions and sex hormones: • P15 - VIJEĆNICA (09:00 - 12:00) [1194] ◦ PAP3-S2
prof. dr. sc. Laškarin Gordana, dr. med. [1194]		
15.01.2024		
Lecture 17. Integral organismic reactions to noxious stimuli: • P15 - VIJEĆNICA (12:15 - 14:00) [396] [209] ◦ PAPI_379	Practical 5: Reproduction: • Zavod za fiziologiju - Vježbaonica (08:15 - 12:00) [211] ◦ PAP3-S2	
izv. prof. dr. sc. Gulić Tamara, mag. biol. [211] · prof. dr. sc. Jakovac Hrvoje, dr. med. [396] · prof. dr. sc. Trobonjača Zlatko, dr. med. [209]		
18.01.2024		
	Practical 5: Reproduction: • Zavod za fiziologiju - Vježbaonica (08:15 - 12:00) [1194] [209] ◦ PAP3-S1	
prof. dr. sc. Laškarin Gordana, dr. med. [1194] · prof. dr. sc. Trobonjača Zlatko, dr. med. [209]		

Popis predavanja, seminara i vježbi:

PREDAVANJA (TEMA)	Broj sati	Mjesto održavanja
Lecture 1. Gastrointestinal physiology: part I	2	P01
Lecture 2. Gastrointestinal physiology: part II	2	P08
Lecture 3. Pathophysiology of gastrointestinal system	2	P08
Lecture 4. Metabolism of proteins and carbohydrates	2	P08
Lecture 5. Lipid metabolism	2	P15 - VIJEĆNICA
Lecture 6. Liver physiology	2	P08
Lecture 7. Disorders of hepatobiliary system: part I	2	P15 - VIJEĆNICA
Lecture 8. Disorders of hepatobiliary system: part II	2	P08
Lecture 9. Disorders of exocrine pancreas function – acute and chronic pancreatitis	2	P08
Lecture 10. Introduction to endocrinology, Pituitary hormones	2	P08
Lecture 11. Thyroid Metabolic hormones	2	ONLINE
Lecture 12. Adrenocortical hormones	2	ONLINE
Lecture 13. Parathyroid Hormone, calcitonin, calcium and phosphate metabolism	2	P08

Lecture 14. Insulin, glucagon, and diabetes mellitus	2	ONLINE
Lecture 15. Predictors and clinical implications of metabolic syndrome	2	P01
Lecture 16. Reproductive functions and sex hormones	2	P15 - VIJEĆNICA
Lecture 17. Integral organismic reactions to noxious stimuli	2	P15 - VIJEĆNICA

VJEŽBE (TEMA)	Broj sati	Mjesto održavanja
Practical 1: Gastrointestinal system and metabolism	5	Zavod za fiziologiju - Vježbaonica
Practical 2: Liver physiology and pathophysiology	5	Zavod za fiziologiju - Vježbaonica
Practical 3: Sports Physiology	5	Zavod za fiziologiju - Vježbaonica
Practical 4: Endocrinology	5	Zavod za fiziologiju - Vježbaonica
Practical 5: Reproduction	5	Zavod za fiziologiju - Vježbaonica

SEMINARI (TEMA)	Broj sati	Mjesto održavanja
Seminar 1. Gastrointestinal physiology	4	P04 P05
Seminar 2. Pathophysiology of gastrointestinal system	4	P05 Zavod za fiziologiju - Vježbaonica
Seminar 3. Metabolism of proteins and carbohydrates	4	P15 - VIJEĆNICA Zavod za fiziologiju - Vježbaonica
Seminar 4. Lipid metabolism	4	P15 - VIJEĆNICA
Seminar 5. Dietary Balances, regulation of feeding, metabolism, body temperature regulation	4	P08
Seminar 6. Metabolism of specific metabolic substances	4	P08
Seminar 7. General endocrinology, pituitary gland	4	P08
Seminar 8. Thyroid and adrenal gland	4	P08
Seminar 9. Parathyroid glands	4	P08
Seminar 10. Endocrine pancreas, diabetes mellitus	4	P09 - NASTAVA NA ENGLESKOM JEZIKU
Seminar 11. Reproductive functions and sex hormones	4	P15 - VIJEĆNICA

ISPITNI TERMINI (završni ispit):

1.	10.07.2024.
2.	02.09.2024.
3.	16.09.2024.
4.	02.02.2024.
5.	16.02.2024.