Medicinski fakultet u Rijeci

IZVEDBENI NASTAVNI PLAN
2026/2027

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:	**doc. dr. sc. Ćurko-Cofek Božena, dr. med.**
Godina studija:	**3**
ECTS:	**10**
Stimulativni ECTS:	**0 (0.00%)**
Strani jezik:	**Mogućnost izvođenja na stranom jeziku**

Podaci o kolegiju:

This course aims to enable students to acquire knowledge of the physiological mechanisms of the gastrointestinal and hepatobiliary system, metabolism and thermoregulation, and the morphological and functional organization of the endocrine system. It also aims to help students understand the pathophysiological mechanisms underlying disorders of the gastrointestinal and hepatobiliary systems, and metabolic and endocrine diseases. By fostering horizontal and vertical integration of knowledge of the physiological and pathophysiological processes underlying health and disease, the course will enhance students' understanding of the specific effects of etiological factors, as well as the mechanisms of disease development, progression, and their local and systemic consequences.

The course is offered in the winter semester of the third year of study and comprises 34 hours of lectures, 44 hours of seminars, and 25 hours of practicals, for a total of 10 ECTS credits.

A) *Lectures* provide an introduction to and overview of each thematic unit, which is subsequently explored in greater depth during seminars and practicals.

B) *Seminars* and **C) *practicals*** are designed to promote active student participation through the **review** and **critical discussion of** physiological and pathophysiological mechanisms underlying the structure and function of individual morphological and functional units. These mechanisms are examined at the molecular, cellular, tissue, organ, system and whole-organism levels.

Active student engagement is further promoted through **D)** the study of integrative etiopathogenetic concepts (etiopathogenetic clusters), **E) laboratory practicals** and computer-based simulations of pathological conditions that illustrate the clinical correlates of selected diseases.

Attendance and active participation in all forms of teaching are compulsory in accordance with the applicable legislation, the Statute of the Faculty of Medicine in Rijeka, and the Ordinance on Studies. Student attendance at lectures, seminars, and practical sessions will be monitored regularly. Absences are permitted only for justified reasons, and only within the limits and in accordance with the provisions of the Ordinance on Studies.

Students are required to prepare the assigned material in advance for seminars and practicals. Throughout the seminars and practicals**,** the teacher/course coordinator continuously assesses student participation, including demonstrated knowledge, and the ability to integrate morphological, ultrastructural,

biochemical and/or functional concepts into a comprehensive understanding of physiological functional systems and selected diseased states.

Lectures, seminars, and practical sessions are conducted according to the course Syllabus. The schedule of student groups is available through the INP application, which can be accessed using an **AAI account**.

Ishodi učenja:

List of lectures (with titles and learning outcomes):

Lecture 1. Gastrointestinal physiology: part I

Learning outcomes:

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 and the movements of the small and large intestine.

Lecture 2. Gastrointestinal physiology: part II

Learning outcomes:

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

To explain the digestion and absorption of carbohydrates, proteins, and lipids in different segments of the digestive system.

Lecture 3. Pathophysiology of the gastrointestinal system

Learning outcomes:

To describe the disorders of the throat, oesophagus, 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 diarrhoea.

To explain the mechanism and consequences of vomiting.

To describe the causes and consequences of ileus.

Lecture 4. Metabolism of proteins and carbohydrates

Learning outcomes:

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

Learning outcomes:

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.

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. 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: 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 4: 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).

Practical 5: 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

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.

Students are required to bring **a lab coat** to the practicals.

Students **ARE NOT ALLOWED** to swap groups unless they find a replacement!

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 50 grade points):

Assesment of acquired knowledge - two midterm exams (up to 50 grade points)

During the course, the acquired knowledge is assessed by **two midterm tests with 50 questions**. A student may obtain up to 25 grade points for each test, as indicated in the table:

Correct answers	Grade points
49,50	**25**
47,48	**24**
45,46	**23**
43,44	**22**
41,42	**21**
39,40	**20**
37,38	**19**
35,36	**18**
33,34	**17**
31,32	**16**
29,30	**15**
27,28	**14**
26	**13**
25	**12.5**
<25	**0**

Each test has **one retake** available for students who did not achieve the minimum grade points required to access the final exam, did not participate in the midterm exam, or are not satisfied with the grade points they obtained. If a student retakes the midterm exam because he/she is not satisfied with the score achieved, only the grade points obtained in the retaken midterm will be considered. Retakes of the midterm exams will be held before the first date of the final exam.

II. Final exam (up to 50 grade points)

The final exam is an oral exam and assesses specific competencies defined for each section.

Who can take the final exam:

Students who have been graded positively on both midterm exams and have achieved 25 to 50 grade points during the course will take the final exam, in which they can achieve a maximum of 50 points.

Who CANNOT take the final exam:

Students who haven't been graded positively on both midterm exams and have achieved **less than 25 points** during the course or were **absent for more than 30% of classes** are not eligible to take the final exam and must re-enrol in the course the next academic year (**insufficient F**).

The final exam is an oral. To pass the final exam, the student must get a positive grade in the oral part of the exam.

A student can access the final exam if he/she has been graded positively on both midterm exams and has obtained at least 25 grade points (50%) during the course. In the oral part of the exam, the student can obtain **25 to 50 grade points** 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)	**45-50**
very good (4)	**38-44**
good (3)	**31-37**
sufficient (2)	**25-30**
insufficient (1)	**0**

III. The final grade represents the sum of all grade points obtained during classes and at the final exam.

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 2026/2027

Physiology and Pathophysiology III

Predavanja (mjesto i vrijeme / grupa)	**Vježbe** (mjesto i vrijeme / grupa)	**Seminari** (mjesto i vrijeme / grupa)
05.10.2026		
Lecture 1. Gastrointestinal physiology: part I: • P01 (10:15 - 12:00) [395] ○ PAPI_379		
doc. dr. sc. Ćurko-Cofek Božena, dr. med. [395]		
06.10.2026		
Lecture 2. Gastrointestinal physiology: part II: • P15 - VIJEĆNICA (08:15 - 10:00) [395] ○ PAPI_379		
doc. dr. sc. Ćurko-Cofek Božena, dr. med. [395]		
08.10.2026		

		Seminar 1. Gastrointestinal physiology:
		• P05 (09:00 - 12:00) [395]
		  ○ PAP3-S2
		• P05 (12:00 - 15:00) [394]
		  ○ PAP3-S1

prof. dr. sc. Blagojević Zagorac Gordana, dr. med. [394] · doc. dr. sc. Ćurko-Cofek Božena, dr. med. [395]		
13.10.2026		
Lecture 3. Pathophysiology of gastrointestinal system: • P08 (08:15 - 10:00) [395] ○ PAPI_379		
doc. dr. sc. Ćurko-Cofek Božena, dr. med. [395]		
15.10.2026		

		Seminar 2. Pathophysiology of gastrointestinal system:
		• P08 (09:00 - 12:00) [396]
		  ○ PAP3-S2
		• Zavod za fiziologiju - Vježbaonica (12:00 - 15:00) [395]
		  ○ PAP3-S1

prof. dr. sc. Jakovac Hrvoje, dr. med. [396] · doc. dr. sc. Ćurko-Cofek Božena, dr. med. [395]		
20.10.2026		
Lecture 4. Metabolism of proteins and carbohydrates: • P08 (08:15 - 10:00) [523] ○ PAPI_379		
prof. dr. sc. Grabušić Kristina, dipl. ing. biol. [523]		
22.10.2026		

		Seminar 3. Metabolism of proteins and carbohydrates: • P08 (12:00 - 15:00) [394] ○ PAP3-S1
prof. dr. sc. Blagojević Zagorac Gordana, dr. med. [394]		
26.10.2026		

Lecture 5. Lipid metabolism:
• P15 - VIJEĆNICA (09:15 - 11:00) [523]
  ○ PAPI_379
		Seminar 3. Metabolism of proteins and carbohydrates:
		• ONLINE (16:00 - 19:00) [212]
		  ○ PAP3-S2

prof. dr. sc. Grabušić Kristina, dipl. ing. biol. [523] · doc.dr. sc. Marcelić Marina, mag. pharm. inv. [212]		
27.10.2026		
Lecture 6. Liver physiology: • P08 (08:15 - 10:00) [396] ○ PAPI_379		
prof. dr. sc. Jakovac Hrvoje, dr. med. [396]		
29.10.2026		

		Seminar 4. Lipid metabolism:
		• P15 - VIJEĆNICA (09:00 - 12:00) [209]
		  ○ PAP3-S2
		• P15 - VIJEĆNICA (12:00 - 15:00) [209]
		  ○ PAP3-S1

prof. dr. sc. Trobonjača Zlatko, dr. med. [209]		
02.11.2026		
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]		
03.11.2026		
Lecture 8. Disorders of hepatobiliary system: part II: • P08 (08:15 - 10:00) [209] ○ PAPI_379		
prof. dr. sc. Trobonjača Zlatko, dr. med. [209]		
05.11.2026		

		Seminar 5. Dietary Balances, regulation of feeding, metabolism, body temperature regulation:
		• P08 (09:00 - 12:00) [395]
		  ○ PAP3-S2
		• P08 (12:00 - 15:00) [523]
		  ○ PAP3-S1

prof. dr. sc. Grabušić Kristina, dipl. ing. biol. [523] · doc. dr. sc. Ćurko-Cofek Božena, dr. med. [395]		
06.11.2026		

	Practical 1: Gastrointestinal system and metabolism:
	• Zavod za fiziologiju - Vježbaonica (09:15 - 13:00) [1132]
	  ○ PAP3-S1
	• ONLINE (09:30 - 13:15) [214]
	  ○ PAP3-S2	

prof. dr. sc. Mrakovčić-Šutić Ines, dr. med. [214] · Omerović Alen, dr. med. [1132]		
09.11.2026		
	Practical 2: Liver physiology and pathophysiology: • P04 (08:15 - 12:00) [396] ○ PAP3-S2	
prof. dr. sc. Jakovac Hrvoje, dr. med. [396]		
10.11.2026		
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]		
12.11.2026		

		Seminar 6. Metabolism of specific metabolic substances:
		• P04 (09:00 - 12:00) [214]
		  ○ PAP3-S2
		• P04 (12:00 - 15:00) [210]
		  ○ PAP3-S1

prof. dr. sc. Mahmutefendić Lučin Hana, dipl. ing. biol. [210] · prof. dr. sc. Mrakovčić-Šutić Ines, dr. med. [214]		
13.11.2026		
	Practical 2: Liver physiology and pathophysiology: • Zavod za fiziologiju - Vježbaonica (09:15 - 13:00) [209] ○ PAP3-S1	
prof. dr. sc. Trobonjača Zlatko, dr. med. [209]		
17.11.2026		
Lecture 10. Introduction to endocrinology, Pituitary hormones: • P08 (08:15 - 10:00) [395] ○ PAPI_379		
doc. dr. sc. Ćurko-Cofek Božena, dr. med. [395]		
19.11.2026		

		Seminar 7. General endocrinology, pituitary gland:
		• Zavod za fiziologiju - Seminarska (09:00 - 12:00) [210]
		  ○ PAP3-S2
		• Zavod za fiziologiju - Seminarska (12:00 - 15:00) [395]
		  ○ PAP3-S1

prof. dr. sc. Mahmutefendić Lučin Hana, dipl. ing. biol. [210] · doc. dr. sc. Ćurko-Cofek Božena, dr. med. [395]		
20.11.2026		
Lecture 11. Thyroid Metabolic hormones: • P14 - PATOLOGIJA predavaonica (14:15 - 16:00) [395] ○ PAPI_379		
doc. dr. sc. Ćurko-Cofek Božena, dr. med. [395]		
24.11.2026		
Lecture 12. Adrenocortical hormones: • P08 (08:15 - 10:00) [396] ○ PAPI_379		
prof. dr. sc. Jakovac Hrvoje, dr. med. [396]		
26.11.2026		

		Seminar 8. Thyroid and adrenal gland:
		• P08 (09:00 - 12:00) [396]
		  ○ PAP3-S2
		• P08 (12:00 - 15:00) [395]
		  ○ PAP3-S1

prof. dr. sc. Jakovac Hrvoje, dr. med. [396] · doc. dr. sc. Ćurko-Cofek Božena, dr. med. [395]		
01.12.2026		
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]		
03.12.2026		

		Seminar 9. Parathyroid glands:
		• P08 (09:00 - 12:00) [523]
		  ○ PAP3-S2
		• P15 - VIJEĆNICA (12:00 - 15:00) [394]
		  ○ PAP3-S1

prof. dr. sc. Blagojević Zagorac Gordana, dr. med. [394] · prof. dr. sc. Grabušić Kristina, dipl. ing. biol. [523]		
07.12.2026		

Lecture 14. Insulin, glucagon, and diabetes mellitus:
• P15 - VIJEĆNICA (12:15 - 14:00) [395]
  ○ PAPI_379
 	
Lecture 15. Predictors and clinical implications of metabolic syndrome:
• P15 - VIJEĆNICA (14:15 - 16:00) [395]
  ○ PAPI_379		

doc. dr. sc. Ćurko-Cofek Božena, dr. med. [395]		
10.12.2026		

		Seminar 10. Endocrine pancreas, diabetes mellitus:
		• P15 - VIJEĆNICA (09:00 - 12:00) [214]
		  ○ PAP3-S2
		• P15 - VIJEĆNICA (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]		
15.12.2026		
Lecture 16. Reproductive functions and sex hormones: • P15 - VIJEĆNICA (08:15 - 10:00) [1194] ○ PAPI_379		
prof. dr. sc. Laškarin Gordana, dr. med. [1194]		
17.12.2026		

		Seminar 11. Reproductive functions and sex hormones:
		• P15 - VIJEĆNICA (09:00 - 12:00) [214]
		  ○ PAP3-S2
		• P15 - VIJEĆNICA (12:00 - 15:00) [393]
		  ○ PAP3-S1

Lukanović Jurić Silvija, dr. med. [393] · prof. dr. sc. Mrakovčić-Šutić Ines, dr. med. [214]		
18.12.2026		

	Practical 3: Endocrinology:
	• ONLINE (09:15 - 13:00) [393] [1132]
	  ○ PAP3-S1
	  ○ PAP3-P2	

Lukanović Jurić Silvija, dr. med. [393] · Omerović Alen, dr. med. [1132]		
11.01.2027		
	Practical 4: Reproduction: • ONLINE (08:15 - 12:00) [1132] ○ PAP3-S2	
Omerović Alen, dr. med. [1132]		
12.01.2027		

Lecture 17. Integral organismic reactions to noxious stimuli: • P15 - VIJEĆNICA (08:15 - 10:00) [395] ◦ PAPI_379		
doc. dr. sc. Ćurko-Cofek Božena, dr. med. [395]		
14.01.2027		
	Practical 4: Reproduction: • Zavod za fiziologiju - Seminarska (08:15 - 12:00) [393] ◦ PAP3-S1	
Lukanović Jurić Silvija, dr. med. [393]		
18.01.2027		
	Practical 5: Sports Physiology: • Zavod za fiziologiju - Vježbaonica (08:15 - 12:00) [1132] ◦ PAP3-S2 • Zavod za fiziologiju - Seminarska (14:15 - 18:00) [214] ◦ PAP3-S1	
prof. dr. sc. Mrakovčić-Šutić Ines, dr. med. [214] · Omerović Alen, dr. med. [1132]		

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	P15 - VIJEĆNICA
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	P14 - PATOLOGIJA predavaonica
Lecture 12. Adrenocortical hormones	2	P08
Lecture 13. Parathyroid Hormone, calcitonin, calcium and phosphate metabolism	2	P08
Lecture 14. Insulin, glucagon, and diabetes mellitus	2	P15 - VIJEĆNICA
Lecture 15. Predictors and clinical implications of metabolic syndrome	2	P15 - VIJEĆNICA
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	ONLINE Zavod za fiziologiju - Vježbaonica
Practical 2: Liver physiology and pathophysiology	5	P04 Zavod za fiziologiju - Vježbaonica
Practical 3: Endocrinology	5	ONLINE
Practical 4: Reproduction	5	ONLINE Zavod za fiziologiju - Seminarska
Practical 5: Sports Physiology	5	Zavod za fiziologiju - Seminarska Zavod za fiziologiju - Vježbaonica

SEMINARI (TEMA)	Broj sati	Mjesto održavanja
Seminar 1. Gastrointestinal physiology	4	P05
Seminar 2. Pathophysiology of gastrointestinal system	4	P08 Zavod za fiziologiju - Vježbaonica
Seminar 3. Metabolism of proteins and carbohydrates	4	ONLINE P08
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	P04
Seminar 7. General endocrinology, pituitary gland	4	Zavod za fiziologiju - Seminarska
Seminar 8. Thyroid and adrenal gland	4	P08
Seminar 9. Parathyroid glands	4	P08 P15 - VIJEĆNICA
Seminar 10. Endocrine pancreas, diabetes mellitus	4	P15 - VIJEĆNICA
Seminar 11. Reproductive functions and sex hormones	4	P15 - VIJEĆNICA

ISPITNI TERMINI (završni ispit):

1.	01.02.2027.
2.	15.02.2027.
3.	05.07.2027.
4.	01.09.2027.
5.	15.09.2027.