

PATHOPHYSIOLOGY	
GENERAL INFORMATION	
Course coordinator	Professor Kristina Selthofer-Relatić, MD, PhD
Assistant/Associate	Professor Jerko Barbić, MD, PhD Professor Lada Zibar, MD, PhD Professor Jasminka Milas Ahić, MD, PhD Asst. Prof. Lana Maričić, MD, PhD Asst. Prof. Silvija Canecki Varžić, MD, PhD Damir Mihić, MD Domagoj Loinjak, MD Ivana Lukić, MD Lucija Klobučar, MD Željka Breškić Ćurić, MD
Study Programme	Integrated undergraduate and graduate university study of Medicine
Status of the course	Mandatory
Year of study, semester	3 rd year, 5 th semester
ECTS	11
Workload (hours)	Lectures (40); Seminars (64), Exercises (31)
Expected number of students	70
COURSE DESCRIPTION	
Course objectives	
<p>To introduce, understand and independently interpret fundamental principles of disease development, etiological factors and organ dysfunction.</p> <p>Students will be thought about latest, integrative approach to biomedical science based on preclinical and clinical research which are focused on disease development and treatment.</p> <p>By the end of this course, students will be able to understand pathophysiological principles as a base for studying clinical courses.</p>	
Enrolment requirements and entry competencies	
Passed exams of all previous years are required for enrolment.	
Learning outcomes at the Programme level	
1.1., 2.1., 3.1., 3.5.	
Learning outcomes	
<p>After the attendance and participation in lectures, seminars and practicals students will be able to:</p> <ol style="list-style-type: none"> 1. critically assess and understand pathophysiological problems, and to compare pathophysiological entities in theory and in clinical practice; 2. independently evaluate the role of etiological factors in different pathophysiological processes 3. bring conclusions about different organ system disorders 4. interpret pathophysiological mechanisms of disease development and independently solve different etiopathogenetic clusters 5. integrate and evaluate knowledge of disease development mechanisms 	
Course content	
Lectures	

Introduction to pathophysiology: general pathophysiological processes causes and development; Disorders of macromolecules structure and function; Disorders of subcellular structures and cell death; Etiological factors of diseases; Electrolytes and water distribution disorders; Acid-base disorders; Disorders of basic substances metabolism; Pathophysiology of carcinogenesis and cancer growth; Disorders of metabolism of micronutrients; Energy metabolism disorders; Pathophysiology of inflammation/ Endogenous bioactive compounds; Autoimmune diseases and hypersensitivity; Pathophysiology of endocrinopathies; Pathophysiology of gastrointestinal diseases, Pathophysiology of liver insufficiency and hepatobiliary system disorders, disorders of fluid and sodium distribution, ascites, influence on other organs; Pathophysiology of anemias; Pathophysiology of respiratory disorders; Pathophysiology of heart disorders; Pathophysiology of acute kidney injury; Arterial hypertension; Hemodynamic shock; Pathophysiology of skeletal disorders; Disorders of neurovegetative regulation and central nervous system

Seminars

General causes and mechanisms of disease development; Pathophysiology of aging; Pathogenesis of phenylketonuria; Pathogenesis of haemophilia A; Pathophysiology of infectious diseases; Pathophysiology of carbon monoxide intoxication; Hemodynamic shock in crush syndrome; Pathogenesis of acute respiratory alkalosis; Pathogenesis of diabetic ketoacidosis; Pathophysiology of megaloblastic anemia; Pathophysiology of iron deficiency anemia; Four pathogenetic groups of tumor growth; Pathogenetic role of c-ras oncogene in development of lung adenocarcinoma; Erythrocyte sedimentation rate; Pathophysiology of fever; Pathophysiology of hyperosmolar syndrome in diabetes mellitus; Pathophysiology of diabetes insipidus; Pathophysiology of obesity; Energy metabolism in malnutrition; Endogenous inflammatory mediators, Types of pain and mechanisms of pain development; Pathogenesis of sepsis and multiple organ failure; Pathophysiology of hypovolemic shock; Familial hypercholesterolemia; Pathogenesis of chronic diabetes complications; Goodpasture syndrome; Immunodeficiency – AIDS; Pathophysiology of adrenal insufficiency; Pathophysiology of Cushing's disease; Inflammatory bowel disease; Pathophysiology of peptic disease; Pathogenesis of chronic pancreatitis; Cholelithiasis, cholangitis, pathophysiology of jaundice; GVHD - pathophysiology of renal allograft rejection; Pathophysiology of anemias, Pathophysiology of chronic myeloid leukemia; Hyper- and hypocoagulability; Hyper- and hypoventilation; Obstructive lung diseases; Pathophysiology of myocardial infarction; Pathophysiology of cardiac diastolic dysfunction; Pathophysiology of nephrotic syndrome; Pathophysiology of chronic kidney disease; Pathophysiology of renovascular hypertension; Dynamics of the heart overload hypertrophy; Pathogenesis of heart failure; Pathophysiology of pulmonary edema in left ventricle failure; Pathophysiology of acute aortic syndromes; Pathophysiology of osteoporosis in postmenopausal women; Pathophysiology of primary hyperparathyroidism; Molecular pathophysiology of Gaucher disease; Pathogenesis of osteogenesis imperfecta; Pathophysiology of asthma; Pathophysiology of hypercapnic respiratory failure; Pathophysiology of stress; Pathophysiology of anaphylactic shock

Exercises:

Acid-base balance; Etiopathogenetic clusters – hypokalemia and hypercalcemia; Hyperkalemia effects on heart; Edema and ascites; Etiopathogenetic clusters – hypoglycemia and hyperglycemia; Etiopathogenetic clusters – cachexia and obesity; Patients with endocrine system diseases; Etiopathogenetic clusters – leukocytosis and leukopenia; Patients with autoimmune diseases; Patients with pulmonary diseases; Etiopathogenetic clusters – ischemia of heart, extremities and intestines; Pathological ECG; Patients with urinary system diseases; Patients with gastrointestinal system diseases; Etiopathogenetic clusters – hypotension and hypertension; Patients with hematologic diseases

Mode of teaching						
Lectures; Seminars; Exercises						
Student obligations						
Students are expected to attend all class sessions, as well as to take all the examinations. However, they are allowed for excused absences, totalling 30% of all classes.						
Monitoring student work (<i>alignment of learning outcomes, teaching methods, and grading</i>)						
Teaching activity	ECTS	Learning outcome	Student activity	Assessment methods	Grade points	
					Min.	Max.
Lectures	0.5	1 – 5	Class attendance	Evidence sheet	2	4
Seminars	0.5	1 – 5	Interactive participation in problem solving	Interactive solving of theoretical problems and tasks	2	4
Practicals	1	1 – 5	Active participation in problem solving	Active solving of theoretical problems and tasks	2	4
Written exam	2	1 – 5	Continuous learning	Grading of the written exam	14	18
Exam - etiopathogenetic cluster	2	1 – 5	Solving the etiopathogenetic cluster	Grading of the written exam	10	15
Oral exam	5	1 – 5		Oral exam	30	55
Total	11				60	100
<p>Final exam: Student has the right to take the final exam after regular attendance of all types of classes (lectures, seminars, practicals). The exam consists of written part which is based on General pathophysiology (multiple-choice questions); etiopathogenetic cluster solving and oral exam. Final exam is mandatory.</p> <p>Calculation of the final grade: Students are assessed during the course, as well as in all parts of final exam. The possible grades are: - fail (1), sufficient (2), good (3), very good (4), excellent (5)</p> <p>The written exam consists of 100 multiple-choice questions (five possible answers, of which one is correct). In order to pass the written exam, students must have 60% or more correct answers. The etiopathogenetic cluster solving is the next part of the final exam, it is also in written form. In order to pass this part of exam, students must have 60% or more of the total points. Oral exam consist of five questions based on organ systems disorders.</p>						
Table 2. Grading of the written exam						

Percentage of correct answers (%)	Grade points
91 – 100	45 – 55
81 – 90	31 – 44
71 – 80	16 – 30
60 – 70	1 – 15

Grading of the oral exam:

1 – 15 grade points: the answer meets the minimum criteria

16 – 30 grade points: average answer with few mistakes

31 – 44 grade points: very good answer with insignificant mistakes

45 – 55 grade points: extraordinary answer

ECTS grades:

A – excellent (5): 90 – 100 grade points

B – very good (4): 80 – 80.99 grade points

C – good (3): 70 – 70.99 grade points

D – sufficient (2) 60 – 69.99 grade points

Required reading (available in the library and through other media)

	Number of copies in the library	Availability through other media
1. Gamulin S., Kovač Z., Marušić M. Patofiziologija, udžbenik, Medicinska Naklada, Zagreb, 8. izdanje, 2018.	21	

Additional reading

1. Kovač Z. i sur. Patofiziologija. Zadaci za problemske seminare II izdanje, Medicinska Naklada, Zagreb, 2011. god.
2. Kovač Z. I sur. Klinička patofiziologija. Etiopatogenetski čvorovi. Medicinska naklada, Zagreb, 2013. god.

Course evaluation procedures

Anonymous, quantitative, standardized student survey providing feedback on the course as well as on the work of course coordinators and their assistants/associates is being conducted by the QA Office of the School of Medicine Osijek.

Note /Other

E-learning does not count towards course contact hours, but is being used in teaching and comprises links to various web pages, as well as video and audio materials available on web pages.