Attachment No. 3		Course program for the first cycle of studies			
1.	Course title	Pathophysiology			
2.	Code	DMMPP2			
3.	Study program	Dentistry - integrated first and second cycle of studies			
4.	Organizer of the study program (unit, i.e., institute, department, division)	University "Ss. Cyril and Methodius" in Skopje. Faculty of Medicine - Skopje, Department of Pathophysiology			
5.	Degree (first, second, third cycle)	Integrated first and second cycle studies			
6.	Academic year/semester	Year	2	Semester	4
7	Course workload expressed in ECTS credits	6			
8.	Teacher (in case of multiple teachers, designated teacher in charge)	Responsible teacher: Prof. Dr. Venjamin Majstorov (Head of Department) *- All teachers, research assistants, and assistants of the department participate in the teaching			
9.	Language in which the curriculum is conducted	English			
10.	Necessary prerequisites for listening and taking the class	Listened to all compulsory subjects from the first year			
11.	Course objectives (competences) and learning outcomes:	The purpose of the course is for students to gain and develop an understanding of the mechanisms of the occurrence of diseases and the altered reactions of the human body when changes occur in its external and internal environment. The student will be able to apply the acquired knowledge in analyzing, interpreting, and solving the changes in the physiology of the human body occurring as a result of various external and internal factors that change the homeostasis of the organism. Outcomes After completing the subject program, the student will be able to discuss the pathophysiological mechanisms of the diseases and will be able to recognize and explain them. The student will be able to demonstrate the experimental methods presented in practical teaching, be able to identify the main changes to the experimental model, and assess the effect of various pathogenic factors. They will also be able to make a connection between theoretical knowledge and the acquired practical knowledge.			
12.	Detailed course content by chapter and units, with the learning outcomes for each chapter	Theoretical teaching - lectures 1. Chapter - Subject, methods, and meaning of pathophysiology. - method unit: Disease.....1 class Results from chapter 1: The student will be able to define what health and disease are, what the symptoms of the disease are, and how they are divided, to distinguish the phases and stages of the disease. 2. Chapter - General etiopathogenesis, effect of the physical etiological factor - method unit: Mechanical factor, shock, crush syndrome, thermal factor.....2 classes - method unit: Effects of electrical current, effects of ultrasound, laser, tremors, and vibrations...2 classes - method unit: Effects of rays - light, infrared, ultraviolet, radioactive...2 classes			

		Results from chapter 2 - The student will focus on education regarding the various forms of effects of the mechanical factor (electrical current, ultrasound, laser, tremors and vibrations, effects of various types of rays), they will study the pathophysiology of shock and crush syndrome, and will acquire knowledge about the effect of the thermal factor. 3. Chapter - General etiopathogenesis, effect of biological etiological factor - method unit: Fever.....1 class Results from chapter 3- The student will focus on the education of the types of hyperthermia and fever, the developmental stages of fever, and the changes in the body during fever. 4. Chapter - General etiopathogenesis, effects of the chemical factor - method unit: Chemical factor.....1 class Results from chapter 4.....- The student will focus on education regarding the effect of the chemical factor, how it's introduced into the body, the factors on which the effect and biotransformation processes depend. 5. Chapter - General etiopathogenesis, effect of the psychic factor - method unit: Psychic factor.....1 class Results from chapter 5.....- The student will focus on education regarding the body's response mechanisms in stressful situations. 6. Chapter - Hypoxia - method unit: Hypoxia.....1 class Results from chapter 6.....- the student will focus on education regarding the types of hypoxia and the compensatory mechanisms of the organism during hypoxia. 7. Chapter - Pathophysiology of the immune system - method unit: Non-specific and specific immunity.....1 class - method unit: Hypersensitivity type 1, 2, 3, and 4.....2 classes - method unit: Immunodeficiency diseases, autoimmunity.....1 class - method unit: Transplantation reactions, tumors, and immune system.....1 class Results from chapter 7.....- The student will focus on education regarding the types of immunity, the various forms and reactions of hypersensitivity, will get to know the immunodeficiency diseases and autoimmunity, as well as the transplantation reactions, and the interaction between tumors and the immune system. 8. Chapter - Disorders of the energy metabolism and the nutrient metabolism - method unit: Disorders of energy metabolism, disorders of protein metabolism.....2 classes - method unit: Disorders of carbohydrate and fat metabolism....2 class - method unit: Disorders of the water and electrolyte metabolism ...1 Results from chapter 8.....- The student will focus on education regarding energy metabolism disorders, disorders of protein, fat, and carbohydrate metabolism, as well as water and electrolytes. 9. Chapter - Local circulation disorders - method unit: Local circulation.....1 class Results from chapter 9.....- The student will focus on education regarding disorders of the local circulation - hyperemia, ischemia, thrombosis, embolism, and angiopathy. 10. Chapter - Pathophysiology of the hematopoiesis system - method unit: Erythrocyte and leukocyte lineage disorders..2 classes Results from chapter 10.....- The student will focus on education regarding the erythrocyte lineage - anemia disorder, classification, and pathogenesis of anemias and polycythemias, as well as learn about quantitative and qualitative disorders of leukocytes.

		11. Chapter - Pathophysiology of the cardiovascular system - method unit: Violations of the heart minute volume, heart failure.....1 class - method unit: Cardiac valve disorders, arrhythmias....2 classes - method unit: Coronary circulation disorders....1 class - method unit: Arterial blood pressure disorders.....1 class Results from chapter 11...- The student will acquire knowledge about the most common disorders of the heart minute volume, will be able to distinguish the conditions of left- and right-heart weakness with their consequences, will be able to describe the most common diseases of the heart valves, will be able to identify the types of arrhythmias and disorders of the coronary circulation, will acquire knowledge about the etiopathogenesis of arterial hypertension. 12. Chapter - Pathophysiology of the respiratory system - method unit: Disorders of ventilation...1 class - method unit: Disorders of ventilation/perfusion ratio and disorders of gas diffusion....1 class - method unit: Pathophysiology of the pleura...1 class Results from chapter 12 - The student will be able to define the restrictive and obstructive disorders of ventilation, will acquire knowledge about the disorders of the relationship between ventilation and perfusion, will be able to describe the pathogenetic mechanisms of the occurrence of pulmonary edema, and will become familiar with the diseases of the pleura - pneumothorax and atelectasis. 13. Chapter - Pathophysiology of the gastrointestinal system - method unit: Disorders of the function of the pharynx, esophagus, and stomach.....1 class - method unit: Disorders of the function of the small intestine, pancreas, and colon....2 classes Results from chapter 13...- The student will acquire knowledge about the most common swallowing disorders, the disorders of the motor and mucosal function of the stomach, will be able to understand the pathogenesis of ulcer disease and the disorders of the function of the intestinal mucosa, and will be able to identify the most important disorders of the pancreas and colon function. 14. Chapter - Pathophysiology of the hepatobiliary system - method unit: Disorder of metabolic functions of the liver, disorders in excretion, composition, and function of the gallbladder...1 class - methodic unit: Blood flow disorders - portal hypertension and the occurrence of ascites....1 class Results from chapter 14 - The student will acquire knowledge about the disorders of carbohydrate, fat and protein metabolism in hepatic diseases, will be able to distinguish the types of disorders of bilirubin metabolism, will acquire knowledge about the pathogenesis of disorders in the excretion, composition and function of the gallbladder, as well the pathogenesis of portal hypertension and its consequences. 15. Chapter - Pathophysiology of the nephron-urinary system - method unit: Disorder of the concentration and dilution ability of the kidney - polyuria and oliguria, impairment of renal function - prerenal, renal, and postrenal causes...1 class - method unit: Renal insufficiency - acute and chronic, renal edema...2 Results from chapter 15 - The student will be able to describe the most common disorders of the concentration and dilution ability of the kidney, will acquire knowledge about the mechanisms of oliguria and polyuria, will be able to identify changes in the composition of urine, as well as the causes and mechanisms of renal failure and renal edema. 16. Chapter - Acid-base balance disorders - method unit: Forms of acid-base balance disorders...1 class Results from chapter 16 - The student will acquire knowledge about the mechanisms of maintaining the acid-base balance and will be able to identify the main types of acid-base balance disorders.

		17. Chapter - Pathophysiology of the endocrine system - method unit: Pituitary function disorders....1 class - method unit: Disorders of the thyroid and parathyroid function....2 - method unit: Adrenal and sex hormone dysfunction...1 class Results from chapter 17 - The student will be able to define and explain the disorders in the function of the hypothalamus and pituitary gland, will acquire knowledge about the diseases of the thyroid gland, parathyroid glands and adrenal glands, will be able to describe the disorders in the secretion of male and female sex hormones. Total: .....45 classes Practical teaching - exercises - From the first chapter.....3 classes - From the second chapter.....6 classes - From the fourth chapter.....3 classes - From the ninth chapter.....6 classes - From the tenth chapter.....3 classes - From the twelfth chapter.....3 classes - From the seventeenth chapter...6 classes Total .....30 classes			
13	Interrelation of subjects	Prior knowledge in the subjects of Biochemistry and Physiology is required/related to the subject Pathophysiology			
14.	Detailed description of the teaching and working methods for the subject	Lectures, interactive teaching, laboratory exercises, and work in small groups, presenting and performing laboratory procedures, demonstrating methods used			
15.	Total Available Time	180 classes			
16.	Forms of teaching activities	16.1.	Lectures - theoretical teaching. Classes	45	
		16.2.	Exercises (laboratory, auditorium), seminars, teamwork: classes	30	
		16.3.	Practice: classes		
17.	Other forms of activities	17.1.	Project assignments: classes		
		17.2.	Independent assignments: classes		
		17.3.	Home study - assignments	105	
18	Signature requirements	In order to receive a signature, the student needs to attend theoretical and practical classes and score minimum points: 1 point from 30% of the theoretical classes attended and 10 points from 10 exercises attended out of 12 exercises			
19	Method of grading				
	19.1.	Tests: points		Colloquium (test) 1...18-30 Colloquium (test) 2...18-30	
	19.2.	Seminar work/project, written and oral presentation: points		/	
	19.3.	Final exam: points		12-20	
	19.4.	Attendance and participation in theoretical instruction: points Attending and participating in Practical teaching: points		1-5 10-15	
20.	Evaluation criteria (points/grade)		up to 59 points	5 (five) (F)	
			60 to 68 points	6 (six) (E)	
			69 to 76 points	7 (seven) (D)	
			77 to 84 points	8 (eight) (C)	
			85 to 92 points	9 (nine) (B)	
			93 to 100 points	10 (ten) (A)	
21.	Method of monitoring the quality of teaching	Self-evaluation by students, assistant control during the practical teaching and assessment of the achieved student success, as well as the pass rate of students who have passed the subject			
22.	Literature				
	22.1.	Required literature			
		Ord. number	Author	Title	Publisher	Year

		1.	Vaskova O., Miceva Ristevska S., Pop Gjorcheva D., Miladinova D., Loparska S.	Pathophysiology Textbook and Practicum for dental students	Boro Grafika Skopje	2010
	22.2.	Additional literature				
		Ord. number	Author	Title	Publisher	Year
		1.	McPhee, Genong	Pathophysiology of Diseases – Introduction to Clinical Pathophysiology	Tabernakul	2010