

1. COURSE DESCRIPTION – GENERAL INFORMATION			
1.1. Course teacher	Professor Danica Galešić Ljubanović, MD PhD Assistant Professor Stela Bulimbašić, MD PhD	1.6. Year of study	2 nd
1.2. Name of the course	Human physiology and anatomy	1.7. Credit value (ECTS)	9
1.3. Associate teachers	Ivica Horvatić, MD PhD Danko Muller, MD PhD Jasna Bacalja, MD Miroslav Tišljar, MD	1.8. Type of instruction (number of hours L+E+S+e-learning)	60+0+45
1.4. Study programme (undergraduate, graduate, integrated)	Pharmacy integrated study programme	1.9. Expected enrolment in the course	130
1.5. Status of the course	Compulsory	1.10. Level of use of e-learning (1, 2, 3 level), percentage of instruction in the course on line (20% maximum)	2 nd
2. COURSE DESCRIPTION			
2.1. Course objectives	Course will provide students with basic knowledge regarding anatomical and physiological organisation of human tissues, organs and organism in whole. Providing this knowledge, students will be able to understand interrelation of anatomical structure, function and regulatory mechanisms necessary for the normal function of human organism.		
2.2. Enrolment requirements and required entry competences for the course	Passed course Cellular biology and genetics is required.		
2.3. Learning outcomes at the level of the study programme to which the course contributes	<ul style="list-style-type: none"> • Apply expert knowledge and skills to provide advice on pharmacotherapy and medical care to patients. 		
2.4. Expected learning outcomes at the level of the course (4-10 learning outcomes)	<p>At the end of the course the student will be able to:</p> <ol style="list-style-type: none"> 1. Describe anatomy of human organs and organ systems; 2. Define functions and describe physiology of human organs and organ systems; 3. Explain basic homeostasis mechanisms necessary for the normal function of human organism; 4. Establish association of physiological changes to the pathophysiological basis of diseases. 		
2.5. Course content broken down in	LECTURES:		

detail by weekly class schedule
(syllabus)

- Introduction to the Physiology; Basics of Histology.
- Physiology of cell membranes, nerves and muscles.
- Anatomy and physiology of the heart.
- Vascular system anatomy.
- Physiology of the circulation 1: basic principles; functions of arterious and venous system; mycrocirculation and lymphatic system; local and humoral control of tissue blood flow.
- Physiology of the circulation 2: nervous regulation of the circulation and rapid control of arterial pressure; role of the kidneys in long-term control of the arterial pressure; cardiac output, venous return and their regulation; muscule blood flow and cardiac output during exercise.
- Body fluids and kidneys 1: body fluids compartments; anatomy and histology of the kidney; production of the urine; urine concentration and dilution.
- Body fluids and kidneys 2: regulation of the extracellular fluid osmolarity and sodium concentration;renal regulation of potassium, calcium, phosphate, and magnesium; integration of renal mechanisms for control of the blood volume and extracellular fluids; acid-base regulations.
- Blood cells, immunity and blood coagulation 1: red blood cells, leukocytes, granulocytes, monocyte-macrophage system; inflammation, immunity and allergy.
- Blood cells, immunity and blood coagulation 2: blood type, transfusion, tissue and organ transplantation;hemostasis and blood coagulation.
- Respiratory system1: anatomy of the respiratory system; pulmonary ventilation and circulation.
- Respiratory system 2: physical principles of gas exchange; diffusion of oxygen and carbon dioxidethrough respiratory membrane and transport in blood and tissue fluids, regulation of respiration.
- Osteomuscular anatomy I (bones).
- Osteomuscular anatomy II (joints and muscules)
- Central nervous system anatomy.
- Peripheral nervous system anatomy.
- The nervous system: general principles and sensory physiology; the chemical senses.
- Special senses: anatomy and phisiology of the eye and ear; sense of vision and hearing.
- Motoric and integrative neurophysiology.
- The limbic system and hypothalamus; vegetative nervous system; adrenal medulla;cerebral blood flow, cerebrospinal fluid.
- Digestive system 1: anatomy of digestive organs; general principles of gastrointestilal functions; motility, propulsion and mixing of food.
- Digestive system 2: secretion functions, digestion and absorption in gastrointestinal tract.
- Metabolism of carbohydrates, lipids and proteins; liver as an organ, regulation of feeding; vitamines and minerals; energetcs and metabolic rate; temperature regulation.
- Endocrine system 1: introduction to endocrinology; anatomy and physiology of hypotalamus, pituitary gland and thyroid.
- Endocrine system 2: adrenocortical hormones; pancreatic hormones: insulin and glucagon; parathyroid hormone; calcitonin; calcium and phosphate metabolism and vitamine D.

	<ul style="list-style-type: none"> • Male and female reproductive organ anatomy. • Reproductive and hormonal functions of the male. • Reproductive and hormonal functions of the female before pregnancy. • Human embrional and fetal developement; hormonal functions during pregnancy and lactation <p>SEMINARS:</p> <ul style="list-style-type: none"> • Introduction to the Physiology; Basic of Histology; Physiology of cell membranes, nerves and muscules. • Anatomy of the cardiovascular system; physiology of the heart. • Physiology of the circulation: basic principles; functions of arterious and venous system; mycrocirculation and lymphatic system; local and humoral control of tissue blood flow; nervous regulation of the circulation and rapid control of arterial pressure; role of the kidneys in long-term control of the arterial pressure; cardiac output, venous return and their regulation; muscule blood flow and cardiac output during exercise. • Body fluids and kidneys: body fluids compartments; anatomy and histology of the kidney; production of the urine; urine concentration and dilution; regulation of the extracellular fluid osmolarity and sodium concentration;renal regulation of potassium, calcium, phosphate, and magnesium; integration of renal mechanisms for control of the blood volume and extracellular fluids;acid-base regulations. • Blood cells, immunity and blood coagulation: red blood cells, leukocytes, granulocytes, monocyte-macrophage system; inflammation, immunity and allergy; blood type, transfusion, tissue and organ transplantation;hemostasis and blood coagulation • Respiratory system: anatomy of the respiratory system; pulmonary ventilation and circulation; physical principles of gas exchange; diffusion of oxygen and carbon dioxide through respiratory membrane and transport in blood and tissue fluids, regulation of respiration. • Osteomuscular anatomy (bones, joints and muscules). • Central and peripheral nervous system anatomy. • The nervous system: general principles and sensory physiology; the chemical senses; anatomy and phisiology of the eye and ear; sense of vision and hearing; motoric and integrative neurophysiology; the limbic system and hypothalamus; vegetative nervous system; adrenal medulla;cerebral blood flow, cerebrospinal fluid. • Digestive system: anatomy of digestive organs; general principles of gastrointestilal functions; motility, propulsion and mixing of food;secretion functions, digestion and absorption in gastrointestinal tract • Metabolism of carbohydrates, lipids and proteins; liver as an organ, regulation of feeding; vitamines and minerals; energetcs and metabolic rate; temperature regulation; introduction to endocrinology; anatomy and physiology of hypotalamus, pituitary gland and thyroid • Endocrine system: adrenocortical hormones; pancreatic hormones: insulin and glucagon; parathyroid hormone; calcitonin; calcium and phosphate metabolism and vitamine D; Male and female reproductive organ anatomy. • Reproductive and hormonal functions of the male; reproductive and hormonal functions of the female before pregnancy.
2.6. Type of instruction	<div>lectures</div> <div>independent study</div> <div>2.7. Comments:</div>

2.6. Type of instruction	<u>seminars</u> and workshops exercises online in entirety mixed e-learning field work		multimedia and the internet laboratory work with the mentor (other)		2.7. Comments:	
2.8. Student responsibilities	Regular attendance to lectures and active participation during seminars.					
2.9. Screening of student's work (specify the proportion of ECTS credits for each activity)	Class attendance	2.5	Research		Practical training	
	Experimental work		Report			
	Essay		Seminar essay	1.5	(Other--describe)	
	Tests		Oral exam		(Other—describe)	
	Written exam	5	Project		(Other—describe)	
2.10. Grading and evaluation of student work over the course of instruction and at a final exam	The Course is divided into 4 parts (Lectures 1-6;7-12;13-20;21-29). After the end of each part, a written exam will be organized,containing 50 multiple choice questions. To pass, the student will have to answer correctly to at least 70% of the questions. For students who failed partial exams, additional written exam (including whole Course matter) will be organized (120 multiple choice questions).					
2.11. Required literature (available at the library and via other media)	Title					
	Guyton AC, Hall JE. Medicinska fiziologija, 12th edition, Medicinska naklada. Zagreb, 2012.					
	Keros P, Pećina M, Ivančić-Košuta M. Temelji anatomije čovjeka. Naprijed, Zagreb, 1999.					
2.12. Optional literature	Sobotta Anatomic Atlas Jalšovec D: Anatomija: osnove građe tijela čovjeka za studente 1.st.ed. ZT Zagraf, Zagreb 2013.					
2.13. Methods of monitoring quality that ensure acquisition of exit competences	Exit competences 1-4 wil be evaluated during seminars and writen exams.					