

COURSE OUTLINE

(1) GENERAL

MD-202 Structure and function of the human body II

SCHOOL	Medical		
ACADEMIC UNIT	Basic and Clinical Sciences		
LEVEL OF STUDIES	1 st Cycle		
COURSE CODE	MD-202	SEMESTER	Year 2 / Semester 3 (Fall)
COURSE TITLE	Structure and function of the human body II		
INDEPENDENT TEACHING ACTIVITIES <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>	WEEKLY TEACHING HOURS	CREDITS	
	20	11	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Core		
PREREQUISITE COURSES:	None		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	English		
IS THE COURSE OFFERED TO ERASMUS STUDENTS			
COURSE WEBSITE (URL)			

(2) LEARNING OUTCOMES

<p>Learning outcomes</p> <p><i>The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> • <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i> • <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i> • <i>Guidelines for writing Learning Outcomes</i>
<p>Gastrointestinal system</p> <p><u>Theme 1. The gastrointestinal tract</u></p> <ul style="list-style-type: none"> • Describe the gross anatomy of the gastrointestinal tract, including the mouth, pharynx, oesophagus, stomach, small intestine, large intestine & anus, and the accessory organs (liver, pancreas, gallbladder), and explain the microscopic organization of tissues within these structures. • Describe the microscopic anatomy and histology of the gastrointestinal tract and the accessory organs. • Identify and explain the histological characteristics of the layers of the gastrointestinal wall (mucosa, submucosa, muscularis propria, and serosa) and relate them to their specific functional roles in digestion and absorption. • Outline the major physiological roles of the GI system, including digestion & absorption of

nutrients and the regulation of gastrointestinal motility.

- Describe the regulation of gastrointestinal motility and secretions and explain the role of the enteric nervous system.
- Apply principles of physics, such as pressure gradients and smooth muscle contraction, to understand the process of peristalsis and other forms of gastrointestinal motility, as well as the regulation of sphincter control.
- Describe the secretory function of the gastrointestinal tract, including the secretion of saliva, gastric secretions, the exocrine function of the pancreas, the secretion of bile & the small bowel secretions, discuss the role of these secretions in digestion and explain the regulation of this secretory function.
- Explain how the GI system contributes to nutrient, water, and electrolyte homeostasis.
- Describe the immune functions of the gastrointestinal system, including the role of gut-associated lymphoid tissue (GALT) in immune surveillance and the prevention of pathogen entry, as well as the role of the microbiome in immune regulation.
- Outline the interpretation of common gastrointestinal function tests, such as liver function tests, endoscopy, and imaging studies.
- Describe the social experiences of patients with IBD.

Theme 2. Accessory Organ: The liver

- Explain how the microscopic structure, the different cell types, and their arrangement within the organs correlate with the different functions of the liver and pancreas.
- Describe the role of the liver in the storage of vitamins and ferritin and outline the synthesis of components of the coagulation pathway.
- Describe the role of the liver in the metabolism of substances such as hormones and drugs and their excretion in bile.
- Describe the four main processes of pharmacokinetics (absorption, distribution, metabolism and excretion)
- Define the terms first-pass effect, bioavailability and volume of distribution.
- Understand the role of the liver in drug metabolism and how CYP450 inducers or CYP450 can affect overall drug metabolism.

Theme 3. Accessory Organ: The pancreas

- Explain how the microscopic structure, the different cell types, and their arrangement within the organs correlate with the different functions of the liver and pancreas.

Theme 4. Aspects of GI function: Metabolism and nutrition

- Explain the key biochemical processes involved in carbohydrate, lipid and protein metabolism, their regulation and their adaptations in the fed and fasting state.
- Explain the processes involved in steroid metabolism with an emphasis on the synthesis of cholesterol and the role of lipoproteins in cholesterol transport.
- Discuss the role of essential nutrients (essential lipids and amino acids, vitamins, and minerals).
- Discuss and explore experimentally, the genetic basis of lactose intolerance and its link to ancestry.
- Describe the metabolic pathways involved in ethanol metabolism, including the enzymes responsible for its breakdown, the physiological effects of ethanol and its metabolites, and the phenomenon of ethanol flushing, particularly in relation to genetic variations affecting enzyme activity.

Renal System

Theme 1 Formation of urine

- Describe the gross anatomy of the kidneys, including structure, key anatomical relationships, surface anatomy, nerve supply, blood supply and lymphatic drainage and explain the relevance of these elements to clinical examination and medical procedures.
- Discuss the use of ultrasound to visualise the kidneys and the urinary bladder and outline the use of other radiological modalities to visualise the renal system.
- Outline the embryological development of the renal system and identify relevant clinical correlates.
- Describe the histology of the kidneys, ureters, urinary bladder and urethra.
- Explain how the microscopic anatomy of the kidney and the histological features of the components of the nephron correlate with urine formation.
- Describe the process of glomerular filtration and the way it is closely interrelated with renal blood flow, and discuss the regulation of the latter.
- Apply principles of physics, such as fluid dynamics, hydrostatic and oncotic pressure and diffusion, to explain the function of the kidney.
- Describe the processes of tubular reabsorption and secretion and their regulation.
- Outline the neural and muscular mechanisms involved in the control of micturition, including the roles of the bladder, urethral sphincters and the nervous system.
- Outline the interpretation of common renal function tests (e.g. plasma urea and creatinine and glomerular filtration rate).

Theme 2. The role of the kidneys in homeostasis

- Explain how the microscopic anatomy of the kidney and the histological features of the components of the nephron correlate with the homeostatic functions of the kidney.
- Describe the juxtaglomerular apparatus and correlate structure with function.
- Outline the importance of the excretion in the urine of waste products, such as urea and creatinine, as well as toxins, drugs and their metabolites.
- Discuss the role of the kidney in drug excretion and overall drug elimination
- Define the terms: clearance, steady-state, zero-order and first-order kinetics as they relate to drug action and understand their clinical relevance.
- Explain the terms half-life, infusion rate, loading dose and maintenance dose as they relate to drug action.
- Explain the role of the kidneys in the homeostasis of extracellular fluid osmolarity and discuss how this is related to the regulation of urine concentration.
- Describe the role of the kidneys in the regulation of plasma sodium and potassium concentrations and discuss the hormonal control of these processes.
- Explain the renal mechanisms of blood pressure regulation, including the renin-angiotensin-aldosterone system (RAAS).
- Explain the role of the kidneys in acid-base homeostasis and correlate this to clinical conditions of acidosis and alkalosis.
- Explain the role of the kidneys in calcium and phosphate homeostasis.
- Outline the role of the kidneys in erythropoiesis.
- Explain how the renal system interacts with other systems (e.g. cardiovascular, respiratory and endocrine) to maintain overall physiological homeostasis.
- Explain the ethical principles and cultural competences for working with diverse patients, in terms of gender identity and cultural health beliefs. (Cultural Competence integrated with Medical Ethics).
- Discuss and practise the ethical principles and cultural competences for working with diverse patients, such as gender identity and cultural health beliefs. (Cultural Competence integrated

with Medical Ethics).

Medical Ethics/Cultural Competence

- Explain the ethical principles and cultural competences for working with diverse patients, in terms of gender identity and cultural health beliefs.
- Discuss and practise the ethical principles and cultural competences for working with diverse patients, such as gender identity and cultural health beliefs.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i>	<i>Project planning and management</i>
<i>Adapting to new situations</i>	<i>Respect for difference and multiculturalism</i>
<i>Decision-making</i>	<i>Respect for the natural environment</i>
<i>Working independently</i>	<i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i>
<i>Team work</i>	<i>Criticism and self-criticism</i>
<i>Working in an international environment</i>	<i>Production of free, creative and inductive thinking</i>
<i>Working in an interdisciplinary environment</i>	<i>.....</i>
<i>Production of new research ideas</i>	<i>Others...</i>
	<i>.....</i>

Knowledge

- Explain normal human structure and function at the molecular, cellular, tissue, organ and whole-body level from conception to old age.
- Explain the scientific principles underlying common and important disease processes including inflammation, infection, neoplasia and trauma.
- Describe the role of genetics in predicting the risk of disease and in personalised medicine.
- Explain the concept of ‘wellness’ and describe the importance of promoting lifestyle factors in achieving the best possible health.
- Discuss the role of nutrition in health and illness.

(3) SYLLABUS

Gastrointestinal System Themes:

- The gastrointestinal tract
- Accessory Organ: The liver
- Accessory Organ: The pancreas
- Aspects of GI function: Metabolism and nutrition

Renal System Themes:

- Formation of urine
- The role of the kidneys in homeostasis

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Face-to-face	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	<i>Use of ICT in teaching / Χρήση ΤΠΕ</i> <i>Communication with students / Επικοινωνία με Φοιτητές</i>	
TEACHING METHODS <i>The manner and methods of teaching are described in detail.</i> <i>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography,</i>	Activity	Semester Workload
	Lectures/large-group teaching*	61
	Tutorials	24

<p>tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</p> <p>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</p>	Small group work	24
	Laboratories**	12
	Directed self-study***	96
	Coursework	15
	Revision/assessment	45
	Total	277
<p>STUDENT PERFORMANCE EVALUATION</p> <p>Description of the evaluation procedure</p> <p>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</p> <p>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</p>	<ul style="list-style-type: none"> • Final exam (80%) • Coursework (20%) 	

(5) ATTACHED BIBLIOGRAPHY

Required Textbooks/Reading:					
Authors	Title	Edition	Publisher	Year	ISBN
Arthur F. Dalley, Anne M. R. Agur	Moore's Clinically oriented anatomy	9 th Int'l Edition	Wolters Kluwer Health	2024	9781975209544
Sadler, Thomas	Langman's Medical Embryology	15th Edition	Wolters Kluwer	2024	9781975180010
Pawlina, Wojciech	Histology: A Text and Atlas with correlated cell and molecular biology	9th Edition	Wolters Kluwer	2024	9781975181574
David L. Nelson and Michael M. Cox	Lehninger Principles of Biochemistry	8th Edition	W. H. Freeman and Company	2021	9781319381493
Recommended Textbooks/Reading:					
Authors	Title	Edition	Publisher	Year	ISBN
Costanzo, Linda	BRS: Physiology	8th Edition	Wolters Kluwer	2023	9781976963467
Halliday, N.L. & Chung, H. M	BRS Gross Anatomy	10 th Edition International	Lippincott Williams & Wilkins	2023	9781975181482