Sveučilište u Rijeci • Fakultet dentalne medicine
University of Rijeka • Faculty of Dental Medicine

Course: Physiology and Pathophysiology III
Course Coordinator: Prof. Damir Muhvić, MD, PhD
Department: Department of Physiology, Immunology, and Pathophysiology
Study: Integrated Undergraduate and Graduate University Study of Dental Medicine
Year of the study: 2.
Academic year: 2021/2022

COURSE SYLLABUS

Course information (basic description, general information, teaching overview, required equipment and preparation, etc.)

The aim of th course is to enable student to know elementary life functions of whole organism, to know function of organs and tissues and to acquire basic knowledge about physiologic and pathophysiologic processes in organism which provoke ilness.
For better understanding course is divided in two parts, PHYISIOLOGY AND PATHOPHYSIOLOGY I which is performed on the first year of study and PHYSIOLOGY AND PATHOPHYSIOLOGY II and III which takes translation exam on second year of study.
The main purpose of this course is to enable student the knowledge about physiologic and pathophysiologic mechanisms of gastrointestinal tract, hepatobiliary tract, metabolism and regulation of body temperature, endocrine and nervous system. The aim of this corse is to acquire the knowledge about basic and specific metabolic substances and their disturbances, endocine disturbances and functions of central nervous system.
By vertical and horisontal integration of knowledge student will be able to know etiology of factors which lead to the development of physiologic and pathophysiologic processes which lead to ilness.
Course is performed in lectures, seminars and exercises. On seminars and exercise student can discuss physiologic and pathophysiologic mechanisma at the molecular level and on the level of whole organism.Student has ability to actively participate in performing of exercises in laboratory and in computer programmes which simulate pathologic conditions and give clinical corelates of ilnesses.
Students have to participate actively in all forms of the course and to learn in advance the material for senminars and exercises.Teacher is controling the knowledge of student and seminars and lectures which comprise the knowledge about morphologic, ultrastructural, biochemical and functional factors and their disturbances which lead to the development of ilness.The knowledge of students is controled by thre partial test on which students earn points..
Course PHYSIOLOGY AND PATHOPHYSIOLOGY III has 30 hours of lectures, 30 hours of seminar and 30 hour of exercise. Corse PHYSIOLOGY AND PATHOPHISIOLOGY III has 7.5 ECTS points.

Compulsory literature:

1. Guyton AC, Hall JE. Textbook of Medical Physiology ,Thirteen edition, Elsevier, 2016.
2. Gamulin S, Marušić M, Kovač Z. Pathophysiology – Basic Mechanisms of disease - Textbook, Medicinska naklada, Zagreb, 2014.
3. Kovač Z., Gamulin S (Eds). Pathophysiology, study guide algorhythms – problem solver, Medicinska naklada Zagreb, 2014

Additional literature:

Course teaching plan:

List of lectures (with titles and learning outcomes):

Lecture 1. Metabolism of carbohydrates and formation of adenosine triphospate
Results of learning:
To explain physiology of carbohydrate metabolism and formation of adenosine triphosphate
To explain etiologic mechanisms and consequences of disturbed carbohydrate metabolism
To describe causes and effects of hyperglycemia.
To describe te causes and effects of hypoglycemia
To describe glycogen metabolism disturbances**.**

Lecture 2. Gastrointestinal tract-physiology
Results of learning:
To describe basic principles of structure of gastrointestinal wall
To describe electric activity of smooth gastrointestinal muscle.
To desribe blood flow of digestive tract
To describe functional movement of digestive tract
To describe nervous control of gastrointestinal tract (enteric nervous system)
To describe food intake,chewing and swallowing
To describe gastric function, movement of small intestine and colon
To define general and local principles of secretion in digestive tract
To define digestion and apsorption of different nutirients (carbohydrates,proteins and lipids

Lecture 3. Gastrointestinal tract-pathophysiology
Results of learning:
To describe disturbed function of pharynx, esophagus and stomach
To describe disorder of exocrine pancreas
To describe.disorder of small intestine and colon
To describe patophysiologic forms and consequences of diarrhea
To describe mechanisms and consequences of vomit
To describe causes and consequences of ileus

Lecture 4. Physiologic functions of liver
Results of learning:
To describe macro and micro anantomy of liver
To describe basic functional unit of the liver-liver lobule

To explain blood flow through the liver and system of liver macrophages.
To explain lymphatic system in the liver.
To describe liver metabolism of carbohydrates, aminoacids and ammonia
To explain syntheses and degradation of proteins (glycoproteins, angiotensin, coagulation factors, hematopietic factors, acute phase proteins).
To describe mechanisms of detoxification (drugs, toxic substances)
To describe metabolism of hormons, lipids and cholesterol
To describe metabolism of bilirubin
To describe bile tree and forming, excretion and role of bile in digestion and lipid apsorption
To describe storage of iron and vitamins in the liver
Disorders of liver function
Results of learning:
To describe general etiopathogenesis of liver disorders
To describe disorders of liver metabolic function
To desribe disturbances of composition, excretion and bile function
To describe protective function of the liver (neutralisation of toxin)
.To describe disturbances of salt and water transport
To describe pathogenesis of ascites
To describe distubances of liver blood flow
To describe pathogeneis of portal hypertension
To describe the effect of liver disturbances on other organs and organic systems

Lecture 5. Physiologic functions of pancreas and its disturbances

Results of learning:
To describe physiologic structure of exocrine pancreas
To describe secretion of water and elecdtrolites
To describe secretion of pancreatic digestive enzymes
To describe the control over pancreatic secretion
To describe etiopathogenetic factors, flow and complications of acute pancreatitis
To describe etiopathogenetic factors of chronic pancreatitis

Lecture 6. Overview of endocrine system function

Results of learning:
Hypophysis and their disturbances
To explain structure of endocrine system and to explain the mechanisms of hormonal action
To explain the mechaisms hormonal creation and of action and their control by hypothalamus
To explain the consequences of hormonal hypersecretion and hyposecretion
To describe and explain the consequences of hormonal disturbances in target tissues
To describe the disturbances of hormonal metabolism and disturbances of hormonal regulation
To explain disturbances of anterior and posterior lobe of hypophysis.

Lecture 7. Thyroid hormons and its disturbances

Results of learning:
To explain creation, secretion and physiologic functions of thyroid gland
To understand thyroid gland disturbances (thyrotoxicosis, hyperthyroidism, hypothyroidism and goiter)

Lecture 8. Insulin, glucagon and their disturbances

Results of learning:
To describe mechanisms of creation, secretion and metabolic effects of insulin, glucagon and somatostatin
To explain the causes and consequences of disturbed action of insulin, glucagon and somatostain
To describe and explain etiopathogeneis of different types of diabetes mellitus .
To explain the course of acute and chronic consequences of diabetes mellitus

Lecture 9. Parathyroid hormon, calcitonin, calcium and phosphate metabolism

Results of learning:
To define and explain creation and secretion of parathyroid hormon and calcitonin
To define mechanism ofcalcium and phosphate concentration maintenance
To explain disturbances of calcium, magnesium and phosphate traffic
To explain disturbances with hypoproduction and hyperproduction of parathyroid hormone
To explain disturbances with hypoproduction and hyperproduction of calcitonin

Lecture 10 . Organisation of central nervous system, synapse, neurotramitters

Results of learning
To define the organisation of central nervous system, basic functions of synapse and neurotransmitters
To define main levels in central nervous system function
To define central nervous system synapse

Lecture 11. Sensory system and its disturbances

Results of learning:
To define sensory system and its disturbances

Lecture 12. Motoric system and its disorders

Results of learning
To define motoric system and its disturbances

Lecture 13. Autonomus system and its disorders

Results of learning
To describe device of autonomus system
To describe disturbances of autonomous system

Lecture 14. Mechanisms of pain origin and its disorder

Results of learning
To describe mechanisms of pain origin and its disturbances

Lecture 15. Blood flow in the brain, cerebrospinal liquid and brain metabolism

Results of learning
To describe brain bllod flow
To describe composition of cerebrospinal fluid
To describe brain metabolism

List of seminars (with the titles and learning outcomes):

Seminar 1. Carbohydrate metabolism

Results of learning:
To explain the physiology of carbohydrate metabolism and formation of adenosin triphoshate
To explain etiologic mechanism and consequences of disturbed carohydrate metabolism .

To describe causes and effects of hyperglycemia.
To describe te causes and effects of hypoglycemia
To explain distubences of glycogen metabolism
Seminar 2.Movements in gastrointestinal tract
Results of learning:
To describe repression and mixing of food in gastrointestinal tract
To explain general principle of structure of gastrointestinal wall, blood circulation and motility of gastrointestinal tract
To explain nervous control of gastrointesinal function
To explain functional movements, repression and mixing of food in gastrointestinal tract
Seminar 3. Secretory functions of gastrointestinal tract
To define general and local principles of secretion in gastrointestinal tract
To describe secretion in gastrointestinal tract
To describe the salivation
To describe secretion in stomach
To describe pancreatic secretion
To describe bile secretion
To describe small intestine and colon secretion
Seminar 4. Patophysiology of gastrointestinal tract
Results of learning:
To describe disturbances of pharynx, esophagus, stomach,exocrine pancreas, small intestine and colon
To explain pathophysiologic forms of diarrhea and mechanism of vomit
To explain causes and consequences of ileus
Seminar 5. Liver and liver disorders
Results of learning:
To explain liver function and its disorder
Seminar 6. General endocrinology. Pituitary hormons
Results of learning:
To explain mechanism of creation and action of hormons of anterior and posterior lobe of pituiary gland and its control by hypothalamus
To understand physiologic function of growth hormon
To explain disorder of function of anterior nad posterior lobe of pituitary gland
Seminar 7: Thyroid gland
To explain creation and secretion of thyroid gland
To explain thyroid gland disorders
Seminar 8. Insulin, glucagon and diabetes mellitus
Results of learning:
To understand mechanisms of creation,secretion and metabolic effects of insulin, glucagon and somatostatin
To explain causes and consequences disturbed insulin,glucagon and somatostatin
To understand different types of diabetes mellitus
To explain acute and chronic consequences of diabetes mellitus
Seminar 9. Parathyroid hormon,calcitonin, calcium and phosphate metabolism,

Vitamin D, bones and teeth
Results of learning
To explain creation, secretion and action of parathyroid hormon and calcitonin
To understand calcium and phosphate metabolism
To understand disturbed traffic of calcium, phoshate and manesium
To explain disturbances with increases and decresed secretion of parathyroid hormon
To explain disturbences with increased and dereased creation of calcitonin
To explain the teeth physiology
Seminar 10. Organisation of central nervous system, synapse and neurotransmitters
Results of learning
To define organisation of central nervous system, basic synapse function and neurotransmiters
To describe main levels in the organisation of central nervous system
To define central nervous system synapse
Seminar 11. Sensory system and its disorders
Results of learning
To define sensory system and its disorders
Seminar 12. Motoric system and its disorders
Results of learning
To define motoric system and its disorders
Seminar 13. Autonomous system and its disorders
Results of learning
To describe device of automomous system
To describe disorders of autonomous system
Seminar 14. Mechanism of pain appeareance and its disorders
Results of learning
To define mechanisms of pain origin and its disorders
Seminar 15. Blood flow in brain, cerebrospinal fluid and brain metabolism
Results of learning
To describe blood flow in brain
To describe composition of cerebrospinal liquid
To describe brain metabolism

List of laboratory practicals (with the titles and learning outcomes):

Exercise 1. Metabolism of carbohydrates
Learning outcomes
To define carbohydrate, lipid and protein metabolism To describe physiology of protein metabolism
To describe etiologic mechanisms and consequences of disturbed protein metabolim To describe causes and consequences of protein deficit
To describe mechanisms of primary and secondary undernutrition
To describe physiology of carbohydrate metabolism and formation of adenosin triphoshate
To describe etiologic mechanisms and consequences of disturbed carbohydrate metabolism

To describe etiologic mechanisms and consequences of disturbed carbohydrate metabolism
To describe causes and effects of hyperglycemia. To describe te causes and effects of hypoglycemia To describe glycogen metabolism disturbance

Exercise 2. Balance in nutition, regulation of food intake,obesity, starving, vitamins and minerals

Learning outcomes
To describe energetic value of food
To describe regulation of food intake and storage of energy To describe nervous centers for regulation of food intake To describe obesity and treatment of obesity
To describe the functions of vitamins and minerals

Excercise 3. Physiology of gastrointestinal tract

Learning outcomes
To describe structure of gastrointestinal wall
To describe electric activity od gastrointestinal smooth muscle To describe blood flow in gastrointestinal tract
To describe functional movements of gastrointestinal tract
To describe nervous control of gastrointectinal tract (enteric nervous system) To describe food intake,chewing and swalowing
To describe function of stomach and movement of small intestine and colon To define general and local porinciples of secretion in gastrointestinal tract
To describe digestion and absorption of different nutritional substances (carohydrates, proteins and lipids) in different parts of gastrointestinal tract

Excercise 4. Liver physiology and pathophysiology of digestion

Learning outcomes
Physiology of liver and pathophysiology of digestion
To describe disorders of pharynx, esophagus, stomach,exocine pancreas,smal intestine and colon
To describe pathopysiologic causes of diarrea and mechanism of vomitus To explain causes and consequences of ileus

Excercise 5. Pituitary gland, thyroid gland and suprarenal gland Learning outcomes

To explain structure od endocrine system and mechanisms of hormonal action
To explain mechanisms of creation and action of hormons of anterior and posterior lobe of pituitary gland hormons and their control by hypothalamus
To explain causes and consequences of increased and decreased secretion of hormons To unerstand causes and consequences of hormonal disorder at target tissue
To understand disorder of hormonal metabolism and regulation
To explain hormonal disorder of anterior and posterior lobe of pituitary gland To describe pituitary gland hormons and their control by hypothalamus
To describe creation, secretion and physiolgic functions of thyroid gland hormons
o understand disorders of thyroid gland function: (hyperthyroidism, hypothyroidism and goiter)

To explain creation, secretion and phaysiological functions of suprarenal gland cortex To understand causes, course and consequences of hyperfunction or hypofunction of suprarenal gland

To understand disorders of suprarenal gland core

Exercise 6. Insulin,glucagon and diabetes mellitus

Learning outcomes :

To describe insulin and its metabolic effects To describe glucagon and its metabolic effects To describe diabetes mellitus type I and type II To describe treatment of diabetes mellitus

Exercise 7. Parathyroid hormon, calcitonin, metabolism of calcium and phosphate, vitamin D, bones and teeth

Learning outcomes :

To explain creation,secretion and impact of parathyroid hormon and calcitonin To explain disorder ofcalcium, phoshate and magnesium traffic

To explain disorder with increased and decreased creation of parathyroid hormon To describe the role of vitamin D

To describe the physiology of teeth

Exercise 8. Reproductive tract

Learning outcomes :

To understand functional anatomy of female and male sexual organs To know female and male sexual hormones

To describe female ovarian cycle and function of gonadotropic hormons To explain function of ovarian hormons, estrogen and progesteron

To explain connection between ovary hormons and hypothalamo-pituitary hormons To explan sexual act in male and female

To explain pregnancy, lactation and fetal and newborn physiology

Exercise 9. Organisation of nervous system, motoric axis and motoric nervous disorders

Learning outcomes :

To describe organisation of nervous system To describe motoric function of spinal cord

To describe control of cortex and brainstem over motoric functions

To describe the role of cerebellum and basal ganglia in control of motoric functions To describe disorders od motoric system

Exercise 10. Physiology of eye, sense of hearing, sense of taste and sense of smell

Learning outcomes :

To describe eye optic

To describe receptor and neural function of retina

To describe central neurophysiology od sight To describe sense of hearing

To describe chemical senses-taste and smell

Student obligations:

Students have obligations to attend all forms of course:lectures, seminars and exercises.
Student have to prepare course material for seminars and exercises in advance.

Exam (exam taking, detailed exam description of the oral/written/practical part, point distribution, grading criteria):

ECTS grading system:

Student grading will be conducted according to the current **Ordinance on Studies of the University of Rijeka.**

The students work will be evaluated and scored during performing on the course and on final exam. From 100 points in total, during the course student can earn 70 points and 30 points on final exam

I. During the course the score of 70 points can be earned by the following;

1) 70 points student can earn on three partial exams (partial exam I, partial exam II and partial exam III) which will be held at the and of every course whole.At each partial exam student can earn maximaly 23,33 points.

The points scale is the following:

Correct answers	Number of points
49, 50	**23,33**
46,47, 48	**22**
43, 44, 45	**20**
40, 41, 42	**18**
3 , 38, 39	**16**
31,32,33,34 35, 36	**14**
25,26,27,28,29,30,	**12**

II Final exam (till 30 points)

On final written exam the key and specific competences for each course part are tested

Who can approach to the final exam:

The students which are during the course earn 35-70 points obligatory approach to the final *multiple choice question (MCQ*) test-on which they can earnadditional ponts.

- Students which during the course earned 35 and more points have a right attend writtenexam.In final test they have to earn minimally 50% of test.
- Students which earned less of 35 points and students which were absent more than 30% of course do not have the right to attent final exam (unsuccessful E)
- Passed partial exams are not condition for attendance of final exam.

The work of students are evaluated during the course (70%) and on final exam (30%). The students work and attainment are expressed in achieved points on whichthe final evaluation is formed.

Final exam is consisted from written exam and oral exam. On written exam student can earn 7,5 - 15 points. On oral exam student can earn 7,5 - 15 points divided in 4 cathegories

(7,5, 9, 12, 15).
To pass the final exam it is necessary that student earn minimally 7,5 points on written exam and minimally 7,5 points on oral part of final exam. The points earned on written exam and oral exam are added..

The number of earned points on final test of 80 questions are the following:

Correct answers	Grade points
76,77,78, 79,80	15
71,72,73, 74,75	14
66,67,68, 69,70	13
61,62,63, 64,65	12
56,57,58, 59,60	11
50,51,52, 53,54,55	10
46,47,48, 49	9
43,44,45	8
40,41,42	7,5

The students which have successfully passes the written final test attend to oral par of final exam.On oral part of final exam student can earn 0 points if he shows grat ignorance or 7, 5 till 15 points if he is graded by grade sufficient, good, very good and excellent.

Excellent 5 -15

Very good 4 - 12

Good 3 – 9

Sufficient 2 – 7,5

Insufficient 1 - 0

Student which earn grade unsufficient on oral part of final exam is not passed on the final exam. The written final test and oral exam make one whole.

The final grade is made by addition of points earned during the course with added points on final written exam and the points earned on final oral exam by apsolute distribution according to the following scale:

FINAL GRADE		
90-100 pints	**A**	**excellent (5)**
75-89,99 points	**B**	**very good (4)**
60-74,99 points	**C**	**good (3)**
50-59,99 points	**D**	**sufficient (2)**
less than 50 points	**F**	**Insufficient(1)**

COURSE SCHEDULE for academic year 2021/2022

Date	Lectures (time and place)	Seminars (time and place)	Practicals (time and place)	Teacher
20.12.2021.	L1 (08,15-10,00),			Prof. dr. sc. D. Muhvić, dr. med.
20.12.2021.	L2 (10,15-12,00),			Prof. dr. sc. D.Muhvić, dr. med
20.12.2021.		S1 (12.15-13.45)		Lj. Karleuša, dipl. ing. bioteh.
21.12. 2021.	L3 (8,15-10,00),			Prof. dr. sc. D.Muhvić, dr. med
21.12.2021.	L4 (10,15-12,00),			Prof.. dr. sc. Hrvoje Jakovac, dr. med.
21.12.2021.		S2(12.15-13.45)		Lj. Karleuša, dr.sc.
21.12.2021.			E1 (18.00-20.15)	Lj. Karleuša, dr.sc.
22.12..2021	L5 (8,15-10,00),			Prof. dr. sc. D. Muhvić, dr. med.
22.12..2021.		S3(10,15-11,45)		Lj. Karleuša, dr.sc.
22.12. 2021.			E2(17.00-19.15)	Natalia Jug-Vučko, mag. pharm.
23.12.2021	L6 (8,15-10,00), **MS teams**			Prof. dr. sc. D. Muhvić, dr. med.
23.12.2021.		S4(10.15-11.45)		Prof. dr. sc. D. Muhvić, dr. med
23.12..2021.			E3 (17.00-19.15)	In.Šutić Udović, dr.med.
10.01 2022.	L7 (8,15-10,00) **MS teams**			Prof.dr.sc.Vesna Barac Latas, dr.med
10.01. 2022.		S5(10.15-11,45)		Prof. dr. sc. Zlatko Trobonjača, dr.med.
10.01.2022.	Partial exam I			
	(14,15-15,15),			
11.01. 2022.	L8 (08,15-10,00) **MS teams**			Prof.dr.sc.Kristina Grabušić, dip.ing.biol.
11.01. 2022.		S6(10.15-11.45)		Prof. dr. sc. D. Muhvić, dr. med
11.01 2022.			E4 (18.00-20.15)	N.Jug-Vučko, mag. pharm.

12.01. 2022.	L9 (8,15-10,00) **MS teams**			Prof. dr. sc. D. Muhvić, dr. med
12.01. 2022.		S7(10.15-11,45)		Prof.dr.sc.Kristina Grabušić, dip.ing.biol.
12.01.2022.			E5 (18.00-20.15	Silvija-Lukanović Jurić,dr.med
13.01.2022.	L10 (8,15-10,00), **MS teams**			Prof. dr. sc. D. Muhvić, dr. med.
13.01.2022.		S8 (10.15-11.45)		Prof.dr.sc.Kristina Grabušić, dip.ing.biol..
13.01.2022.			E6 (18.00-20.15)	Tamara Gulić, dr.sc.
14.01.2022.	L11 (8,15-10,00), **MS teams**			Prof. dr. sc. N. Kučić, dr. med.
14.01.2022.		S9(10.15-11,45)		Prof. dr. sc. D. Muhvić, dr. med.
1401.2022.			E7 (14.00-16.15)	Lj.Karleuša, dr.sc.
17.01.2022.	L12 (08,15-10.00), **MS teams**			Prof. dr. sc. D. Muhvić, dr. med.
17.01.2022.		S10 (10.15-11.45)		Prof. dr. sc. N. Kučić, dr. med.
17.01.2022.			E8 (18.00-20.15	Tamara Gulić, dr.sc.
17.01.2022.	Partial exam II (15.-15.50)			
18.01.2022.	L13 (8,15-10,00)			Prof. dr. sc. N.Kučić, dr. med
18.01.2022.		S11(10.15-11,45)		Prof. dr. sc. N. Kučić, dr. med.
18.01.2022.			E9 (16.00-18.15)	.doc.dr.sc.Božena Ćurko Cofek, dr.med..
19.01.2022.	L14 (8,15-10,00)	S12(10,15-11.45) P9		Prof. dr. sc. I. Mrakovčić-Šutić, dr.med.
19.01.2022.		S12(10,15-11.45)		Prof. dr. sc. D. Muhvić, dr. med.
19.01.2022.			E10(17.00-19.15)	Tamara Gulić, dr.sc.
20.1.2022.	L15 (08,15-10,00),			Prof. dr. sc. N. Kučić, dr. med.
20.1.2022.		S13(10.15-11,45)		Prof. dr. sc. N.Kučić, dr. med.

21.1.2022..		S14(08.15-09,45)		Prof. dr. sc. I. Mrakovčić-Šutić, dr.med.
24.01.2022..		S15(08.15-09,45)		Prof. dr. sc. D. Muhvić, dr. med.
24.01.2022	Partial exam III (10,10-11,00)			
25.01.2022.	Exam first term 1. rok (10-11.20)			
01.02.2022.	Partial exam repair 10.00-12.00			
08.022022.	Exam second term (10-12)			
22.02. 2022.	Exam third term (10-12)			
07.09.2022	Exam fourth term (10-12)			
21.09-2022.	Exam fifth term (12,00-14,00)			

List of lectures, seminars, and practicals:

	Lectures (Lecture themes)	Number of hours	Place
L1	Metabolism of carbohydrates metabolism and creation of adenosine triphosphate	2	Lecture hall 7
L2	Gastrointestinal tract physiology	2	Lecture hall 7
L3	Pathophysiology of gastrointestinal tract	2	Main Hall
L4	Physiological function of the liver and disorders of the liver function	2	Main Hall
L5	Physiological functions of the pancreas and its disorders	2	Main Hall
L6	Overview of endocrine system functions Pituitary gland and its disorders	2	Lecture hall 8
L7	Thyroid hormons and its disorders	2	Lecture hall 5
L8	Insulin, glukagon,dijabetes mellitus	2	Lecture hall 8
L9	Parathyroid hormons, calcitonin,calcium and phosphate metabolism and its disorders	2	Lecture hall 5

L10	Organisation of nervous system, synapse and neurotransmitters	2	Lecture hall 8
L11	Sensory system and its disorders	2	Lecture hall 5
L12	Motoric system and its disturbances	2	Lecture hall 5
L13	Autonomus system and its disorders	2	Lecture hall 7
L14	Mechanism of pain appeareance and its disorders	2	Lecture hall P8
L15	Blood flow in the brain, cerebrospinal liquid and brain metabolism	2	Lecture hall P6

	SEMINARS (seminars themes)	**The numberof course hours**	**Place**
S1	Carbohydrate metabolism and its disorder	2	Lecture hall 9
S2	Movements in gastrointestinal tract	2	Lecture hall5
S3	Secretory functions of gastrointestinal tract	2	Main hall
S4	Patophysiology of gastrointestinal tract	2	Lecture halll5l
S5	Liver and liver disorders	2	Online
S6	General endocrinology. Pituitary hormons	2	Lecture hall 7
S7	Thyroid gland and its disorders	2	Lecture hall 5
S8	Insulin, glucagon and diabetes mellitus	2	Lecture hall 8
S9	Parathyroid hormon,calcitonin, calcium and phosphate metabolism,Vitamin D, bones and teeth	2	Lecture hall 8
S10	Organisation of central nervous system, synapse and neurotransmitters	2	Lecture Hall 7
S11	Sensory system and its disorders	2	Lecture hall 7
S12	Motoric system and its disorders	2	Lecture hall 9
S13	Autonomous system and its disorde	2	Lecture hall 6 and 5
S14	Mechanism of pain appeareance and its disorders	2	Lecture hall 5
S15	Blood flow in brain, cerebrospinal fluid and brain metabolism	2	Lecture hall 6
	Total	30	

	Exercise (Exsercise theme)	The number	Place
P1	Metabolism of carbohydrates,lipids and proteins	3	Faculty of Medicine, Practicum of Department for physiology and immunology
P2	Balance in nutition, regulation of food intake,obesity, starving, vitamins and minerals	3	Faculty of Medicine, Practicum of Department for physiology and immunology
P3	Gastrointestinal motility.Repression and mixing of food,secretory functions of gastrointestinal tract, digestion and apsorption in gastrointestinaltract	3	Faculty of Medicine, Practicum of Department for physiology and immunology
P4	Liver as organ.Pathophysiology of digestion.	3	Faculty of Medicine, Practicum of Department for physiology and immunology
P5	Pituitary gland, thyroid gland and suprarenalgland	3	Faculty of Medicine, Practicum of Department for physiology and immunology
P6	Innsulin, glucagon,diabetes mellitus. Disorders ofpancreas.	3	Faculty of Medicine, Practicum of Department for physiology and immunology
P7	Parathyroid hormon, calcitonin, calcium andphosphate.Disorders of parathyroid glands.	3	Faculty of Medicine, Practicum of Department for physiology and immunology
P8	Reproductive functions of male and femaleSexual hormons.	3	Faculty of Medicine, Practicum of Department for physiology and immunology
P9	Organisation of central nervous system.Motoricaxis.Disorders of motoric axis.	3	Faculty of Medicine, Practicum of Department for physiology and immunology

P10	The eye and its function.The sense of hearing.Thesense of taste.The sense of smell.	3	Faculty of Medicine, Practicum of Department for physiology and immunology
	Total number of exercise hours	**30**	

	Final exams
1.	25.01. 2022.
2.	08.02.2022.
3.	22.02.2022.
4.	21. 09.2022.