BAU TIP

BAHÇEŞEHİR UNIVERSITY SCHOOL OF MEDICINE

"scientia et amore vitae"

BAHÇEŞEHİR UNIVERSITY

SCHOOL OF MEDICINE

CLASS 2

ACADEMIC PROGRAMME

2026-2027

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BAHÇEŞEHİR ÜNİVERSİTESİ TIP FAKÜLTESİ
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Dean	Adnan Kaya , Prof.
Vice Dean	Timuçin Avşar, Assoc. Prof.
Vice Dean	Özlem Unay Demirel, Assoc. Prof.
Class 2 Coordinator	Ayşe Seval Palteki, Assist. Prof.

SECOND YEAR					
3. Semester					
CODE	**COURSE**	**T**	**P**	**C**	**E**
TMED2100	Human Body Systems and Introduction to Disease Processes	7	2	8	20
MED2011	Medical Genetics I	2	0	2	2
TLL1003	Turkish Language and Literature I	2	0	2	2
HST1001	Atatürk's Principles and History of Turkish Republic I	2	0	2	2
	Departmental Elective			2	2
	Departmental Elective			2	2
	GE-Elective			3	4
			Total	**21**	**34**
4. Semester					
CODE	**COURSE**	**T**	**P**	**C**	**E**
TMED2100	Human Body Systems and Introduction to Disease Processes	7	2	8	20
MED2012	Medical Genetics II	2	0	2	2
TLL1004	Turkish Language and Literature II	2	0	2	2
HST1002	Atatürk's Principles and History of Turkish Republic II	2	0	2	2
	Departmental Elective			2	2
	Departmental Elective			2	2
	GE-Elective			3	4
			Total	**21**	**34**

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	COURSE 1 Endocrine Renal and Urogenital Systems		COURSE 2 Nervous and Sensory Systems		COURSE 3 Introduction to Infection, Immunity and Tissue Damage(Lymphoid)		COURSE 4 Introduction to Hematology and Oncology		TOTAL
	T	P	T	P	T	P	T	P	
Anatomy	20	6	40	10	-	-	-	-	76
Biophysics	2	0	14	1	11	1	11	-	42
Biochemistry	17	4	2	-	12	-	12	2	49
Histology and Embryology	15	8	15	8	5	2	-	-	53
Medical Microbiology	11	1	18	2	24	2	32	3	93
Pathology	-	-	-	-	24	-	35	-	59
Pharmacology	-	-	-	-	-	-	20	-	20
Physiology	30	0	31	5	2	-	4	2	77
Immunology	5	-	-	-	4	-	2	-	11
Problem-Based Learning				8		8		8	24
Radiation Oncology							7	0	7
Medical Education			4	0					
Clinical Skills	2	2	2	2	2	2	2	2	16
Panel						2		6	8
TOTAL	**103**	**22**	**126**	**36**	**84**	**17**	**125**	**23**	**535**
STUDY TIME	**84**		**63**		**95**		**84**		
Medical Genetics	**16**		**16**		**16**		**16**		**64**

BAHCESEHIR UNIVERSITY SCHOOL OF MEDICINE 2026 – 2027 ACADEMIC CALENDAR FOR THE SECOND YEAR	
2026 – 2027 ACADEMIC YEAR FALL SEMESTER	
September 7, 2026	Orientation Seminar
September 7-October 30, 2026	1st Block - Endocrine, Renal and Urogenital Systems
October 27, 2026	1st Block Committee Exam
November 2,2026 -January 22, 2027	2nd Block- Nervous and Sensory Systems
January 21, 2027	2nd Block Committee Exam
October 29, 2026, Thursday	National Holiday (Republic Day)
January 1, 2027, Friday	Holiday (New Year)
January 25-February 1	Semester Break
February 2, 2027	Make-up Exams for Fall Committees
2026 – 2027 ACADEMIC YEAR SPRING SEMESTER	
February 1- April 2, 2027	3rdBlock- Introduction to Infection, Immunity and Tissue Damage (Lymphoid)
April 1, 2027	3rd Block Committee Exam
April 5-June 11, 2027	4th Block - Introduction to Hematology, and Oncology
June 10, 2027	4th Block Committee Exam
March 9-11	Holiday (Ramadan Feast)
April 23, 2027, Friday	National Holiday (National Sovereignty and Children's Day)
May 19, 2027, Wednesday	National Holiday (Commemoration of Atatürk, Youth and Sports Day)
May 16-19	Holiday (Feast of Sacrifice)
June 14– June 15, 2027	Make-up Exams for Spring Committees
June 22, 2027, Tuesday	Final Exam
July 14, 2027, Wednesday	Resit Exam for the Final Exam

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BAHÇEŞEHİR UNIVERSITY SCHOOL OF MEDICINE CLASS II (2026-2027) EVALUATION SYSTEM										
		EXAM 1 (Theoretical Exam)		**EXAM 2 (Practical Exam)**		**AVERAGE OF COMMITTEE GRADES**	**EXAM 3**		**YEAREND GRADE**	**PASSING GRADE**
	Committee Names	**Method**	**%**	**Method**	**%**		**Method**	**%**		
YEAR 2	Committee 1:	MCQ	90 %	PRACTICAL EXAMS	10 %	**(C1 + C2+ C3+ C4) / 4**	MCQ	100%	AVERAGE OF COMMITTEE GRADES (60%) + FINAL EXAM SCORE(40%)	YEAREND GRADE (95%) + CLINICAL SKILLS SCORE (3%)+ PBL (2%)
	Committee 2:	MCQ	90 %	PRACTICAL EXAMS	10 %					
	Committee 3:	MCQ	90 %	PRACTICAL EXAMS	10 %					
	Committee 4:	MCQ	90 %	PRACTICAL EXAMS	10 %					
	Clinical Skills	Average of Clinical Skills Evaluation Forms	100%	Problem-Based Learning (PBL)	100%					

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CLINICAL SKILLS EVALUATION: 2026-2027

	Satisfactory	Needs Improvement	Poor
A- Professionalism			
Always on time and has no unexcused tardiness/absence	**2**	**1**	**0**
Appearance is appropriate: respects dress code, wears name tag	**2**	**1**	**0**
Has teamwork ability	**2**	**1**	**0**
Shows effective time management	**2**	**1**	**0**
Obeys clinical skills laboratory rules	**2**	**1**	**0**
TOTAL			
B- Medical Knowledge and Clinical Reasoning			
Demonstrates theoretical knowledge	**2**	**1**	**0**
Demonstrates analytical thinking	**2**	**1**	**0**
TOTAL			
C-Interpersonal and Communication Skills			
Demonstrate the ability to communicate effectively with the lecturer and friends	**2**	**1**	**0**
TOTAL			
D- Clinical Skills			
Performs steps of the clinical skill in the guideline appropriately	**2**	**1**	**0**
Applies standard precautions for infection prevention and control	**2**	**1**	**0**
TOTAL			

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PROBLEM-BASED LEARNING EVALUATION 2026-2027

Evaluation of Parameters	GRADES
Identifying of hypotheses	1 | 2 | 3 | 4

Linking and explaining hypothesis to the problems using prior knowledge	1 | 2 | 3 | 4
In the inquiry process, asking questions by using evidence; questioning the accuracy of the information; research, etc.	1 | 2 | 3 | 4
Active participation in questioning the case, examining it, requesting the necessary tests	1 | 2 | 3 | 4
Contribution to the setting of learning goals	1 | 2 | 3 | 4
Able to discuss the case with its biological, social, behavioral, and ethical dimensions	1 | 2 | 3 | 4
Get ready by using classical resources and appropriate resources in the independent work hours	1 | 2 | 3 | 4
Sharing information with the group, creating drawings, diagrams, and concept maps	1 | 2 | 3 | 4
Communication Skills (active listening, making clear explanations, expressing herself/himself; supporting group dynamics; encouraging; upholding rights; making appropriate explanations where the group is blocked, etc.)	1 | 2 | 3 | 4
Evaluation Skills (evaluation of: herself/himself, group, training guide, the scenario in an objective, content-oriented, supportive of development manner)	1 | 2 | 3 | 4
TOTAL GRADE	

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CLASS 2

AIM: The aim of the Class 2 Program is to provide students with integrated knowledge of selected human body systems, basic disease mechanisms, diagnostic principles, and essential clinical skills required for medical practice.

LEARNING OBJECTIVES:

At the end of this class, the students should be able to:

KNOWLEDGE:

1. Explain the normal structure and function of the endocrine, renal, urogenital, nervous, sensory, hematologic, and immune systems.
2. Explain the basic mechanisms of infection, inflammation, tissue injury, hemodynamic disorders, neoplasia, and hematologic diseases.

3. Explain the main microbiological, pathological, pharmacological, biochemical, and biophysical principles related to disease processes.
4. Explain the basic principles of laboratory diagnosis, imaging methods, radiation, and selected diagnostic technologies.
5. Relate foundational knowledge of body systems and disease mechanisms to basic clinical and diagnostic conditions.

SKILLS:

6. Perform venipuncture and peripheral intravenous cannulation.
7. Perform blood culture test.
8. Dress a wound properly
9. Take measures to stop/limit external bleeding.
10. Transport a patient with a spine board.
11. Apply an elastic bandage and splint.
12. Get skills about how to take an arterial blood gas.
13. Perform a simple interrupted suture
14. Insert a nasogastric tube on mannequins
15. Insert a Foley Catheter on mannequins.
16. Learn how to do lumbar puncture
17. Communicate effectively with the colleagues.
18. Understand the importance of effective communication between a patient and a doctor.

ATTITUDES:

19. Have the perception that medicine is an honorable and respected profession, reflect this on his/her behavior.
20. Observe the rules of professional ethics in his/her relations with colleagues.
21. Realize the importance of following the working principles and rules in multidisciplinary and clinical skills laboratories.
22. Realize the importance of hand hygiene in preventing diseases.
23. Realize the importance of introducing himself/herself to the patient, giving information about the interventions to be made, and getting approval.
24. Gain the program evaluation culture.

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MED 2101: Endocrine, Renal and Urogenital Systems	
Course Date	**September 7 -October 30, 2026**
Exam Dates	**Committee Exam: October 27, 2026**
Course Coordinators:	Ayşe Seval Palteki, Asst. Prof.

Academic Unit	Academic Staff	Theoretical hours	Practical Hours	Total
Anatomy	Uğur Baran Kasırga, Asst. Prof.	20	6	26
Biochemistry	Özlem Unay Demirel; Assoc. Prof. Yeşim Neğiş; Assoc. Prof. Merve Karayel Başar; Asst. Prof. İrem Kırış; Asst. Prof.	16	4	20
Biophysics	Duygu Tarhan, Asst. Prof.	2	0	2
Histology and Embryology	Yasemin Ersoy Çanıllıoğlu; Assoc. Prof. Merjem Purelku; Asst. Prof.	11	12	23
Physiology	Numan Ermutlu; Prof. Elif Bahadır; Asst. Prof. Betilay Topkara Arslan; Asst. Prof. Yasemin Keskin Ergen; Asst. Prof.	31	0	31
Microbiology	Gülden Çelik; Prof. Seyda Iğnak Tarlığ; Asst. Prof. Zehra Kipritçi; Asst. Prof.	11	1	12
Immunology	Seyda Iğnak Tarlığ; Asst. Prof.	5	0	5
Clinical Skills	Özgür Hançerli; Assoc. Prof. Ayşe Güliz Dirimen Arıkan; Asst. Prof.	2	2	4
TOTAL		**98**	**25**	**123**
Medical Genetics	Timuçin Avşar; Assoc. Prof.	12	0	12
STUDY TIME				**109**

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COURSE AIM:

The aim of this course is:

- to provide students with an integrated understanding of the anatomical, histological, embryological, physiological, biochemical, biophysical, and microbiological characteristics of the endocrine, renal, and urogenital systems;
- to enable students to explain the normal structure and function of these systems, hormonal regulatory mechanisms, basic laboratory evaluation of renal and urogenital functions, solubility of gases in blood and body fluids, the biophysical basis of glomerular filtration, acid–base balance and buffer systems, common infectious agents of the renal/urogenital system, and the concept of antimicrobial resistance;
- to help students interpret basic findings obtained from anatomy, histology, biochemistry, biophysics, physiology, and microbiology laboratory applications.

LEARNING OUTCOMES:

At the end of this lesson, the student will be able to:		
KNOWLEDGE		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
ANATOMY	Introduction to Urogenital System (T-1)	• Describe the embryological origin of the urinary and genital systems from the intermediate mesoderm (urogenital ridge). • Outline the overall organization of the urinary tract (kidney, ureter, bladder, urethra) and its relationship to the retroperitoneum. • Distinguish the internal and external genital organs in the male and female. • Explain why the urinary and genital systems are studied together developmentally and anatomically. • Identify the key anatomical landmarks used to locate urogenital organs on cross-sectional imaging.
	Kidney-I (T-1)	• Describe the gross anatomy of the kidney: poles, borders, surfaces, and hilum. • Identify the coverings of the kidney (fibrous capsule, perinephric fat, renal fascia, paranephric fat) and their clinical relevance to nephroptosis and perinephric abscess spread. • Describe the relations of the right and left kidney to neighboring organs and the diaphragm. • Explain the internal macroscopic structure of the kidney: cortex, medulla, renal pyramids, columns. • Correlate the posterior relations of the kidney with the risk of pleural injury during a posterior surgical approach.
	Kidney-II, Ureter (T-1)	• Describe the renal sinus contents and the formation of the renal pelvis and major/minor calyces. • Trace the course of the ureter from the renal pelvis to the bladder and identify its three normal constrictions. • Explain the blood supply, venous drainage and lymphatic drainage of the kidney and ureter. • Describe the nerve supply of the kidney and ureter and the referred pain pattern of ureteric colic. • Correlate the ureteric constrictions with the most common sites of ureteric stone impaction.

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	Vesica Urinaria, Urethra Feminina (T-1)	• Describe the shape, parts (apex, body, fundus, neck) and relations of the urinary bladder. • Explain the trigone of the bladder and its clinical significance. • Describe the blood supply, innervation, and support structures of the bladder. • Describe the course and parts of the female urethra and its relationship to the vagina. • Compare the length and course of the female urethra with the male urethra and relate this to differences in urinary tract infection risk.
	Urethra Masculina, Prostat (T-1)	• Describe the four parts of the male urethra (preprostatic, prostatic, membranous, spongy) and their relations. • Identify the anatomical narrowings and curvatures of the male urethra relevant to catheterization. • Describe the location, zones (peripheral, central, transition) and relations of the prostate gland. • Explain the blood supply, lymphatic drainage and innervation of the prostate. • Correlate the zonal anatomy of the prostate with the typical sites of benign prostatic hyperplasia versus carcinoma.
	Pelvic content (T-1)	• Describe the boundaries and subdivisions (greater and lesser pelvis) of the pelvic cavity. • List the pelvic viscera in the male and female and their general arrangement. • Describe the peritoneal reflections and pouches of the pelvis (rectovesical, vesicouterine, rectouterine/Pouch of Douglas). • Explain the somatic and autonomic nerve supply of the pelvic viscera. • Correlate the rectouterine pouch (Pouch of Douglas) with its clinical significance as the most dependent part of the peritoneal cavity.
	Pelvic floor and perineum (T-1)	• Describe the muscles that form the pelvic diaphragm (levator ani, coccygeus) and their functions. • Define the boundaries of the perineum and its division into urogenital and anal triangles. • Describe the layers of the urogenital triangle (perineal membrane, superficial and deep perineal pouches). • Explain the clinical relevance of the pelvic floor to continence and pelvic organ prolapse. • Correlate perineal body anatomy with obstetric perineal tears and episiotomy.
	Male internal genitalia (T-1)	• Describe the parts of the male internal genitalia: epididymis, ductus deferens, seminal vesicle, ejaculatory duct. • Trace the pathway of sperm from the testis to the urethra. • Describe the blood supply and lymphatic drainage of the testis and note why testicular lymphatics drain to para-aortic nodes. • Explain the anatomy of the spermatic cord and its contents. • Correlate the venous drainage of the testis with the clinical presentation of a varicocele.
	Male external genitalia (T-1)	• Describe the structure of the scrotum and its layers. • Describe the parts of the penis (root, body, glans) and its erectile tissue (corpora cavernosa, corpus spongiosum). • Explain the blood supply and innervation relevant to penile erection. • Describe the lymphatic drainage of the scrotum and penis. • Correlate the layers of the scrotum with the anatomical planes traversed in a scrotal ultrasound or surgical approach.

	Canalis inguinalis (T-1)	• Describe the boundaries of the inguinal canal and its deep and superficial rings. • Explain the contents of the inguinal canal in the male and female. • Describe the layers of the anterior abdominal wall that contribute to the inguinal canal. • Differentiate the anatomical basis of direct and indirect inguinal hernias relative to the inferior epigastric vessels. • Correlate inguinal canal anatomy with the descent of the testis.
	Female external genitalia (T-1)	• Describe the components of the vulva: mons pubis, labia majora/minora, clitoris, vestibule. • Identify the openings within the vestibule and the greater/lesser vestibular glands. • Describe the blood supply, lymphatic drainage and innervation of the female external genitalia. • Explain the erectile tissue components homologous to the male external genitalia. • Correlate the lymphatic drainage of the vulva with the pattern of inguinal lymph node metastasis in vulvar carcinoma.
	Female internal genitalia (T-1)	• Describe the parts, position and support structures (ligaments) of the uterus. • Describe the parts, relations, and function of the uterine tubes. • Describe the anatomy of the ovary, its position, and its attachments. • Describe the parts and relations of the vagina. • Explain the blood supply of the female internal genitalia and correlate the ureter's relation to the uterine artery ('water under the bridge') with its risk during hysterectomy.
	Uterus, Tuba uterina, ovary (T-2)	• Describe in detail the layers of the uterine wall (endometrium, myometrium, perimetrium) and the positions of anteversion/anteflexion. • Describe the parts of the uterine tube (infundibulum, ampulla, isthmus, uterine part) and their relevance to fertilization site. • Describe the ligaments supporting the uterus and ovary (broad, round, ovarian, suspensory ligaments) and their contents. • Explain the blood supply and lymphatic drainage of the uterus, tube and ovary. • Correlate the ovarian lymphatic drainage to para-aortic nodes with the spread pattern of ovarian malignancy.
	Radiological Anatomy of Urogenital System (T-2)	• Identify normal kidney, ureter, bladder and prostate/uterus anatomy on ultrasound, CT and MRI. • Recognize the normal appearance of the collecting system on intravenous urography/CT urography. • Differentiate cortex, medulla and sinus fat of the kidney on cross-sectional imaging. • Correlate common urogenital pathologies (hydronephrosis, renal calculi, prostatic enlargement) with their imaging appearance. • Apply knowledge of urogenital anatomy to systematically interpret an abdominopelvic CT at the level of the kidneys and pelvis.
	Adrenal, Pancreas (T-1)	• Describe the location, shape and relations of the adrenal (suprarenal) glands. • Differentiate the cortex and medulla of the adrenal gland by embryological origin and function. • Describe the blood supply (three suprarenal arteries) and venous drainage (asymmetry between right and left) of the adrenal gland. • Describe the location, parts (head, neck, body, tail) and relations of the pancreas. • Explain the exocrine and endocrine (islets of Langerhans) organization of the pancreas and its ductal drainage.

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	Skin, Breast (T-2)	• Describe the layers of the skin (epidermis, dermis, hypodermis) and their principal functions. • Describe the location and extent of the breast and its relationship to the pectoral fascia and axillary tail. • Describe the internal structure of the breast: lobes, lactiferous ducts and sinuses, suspensory (Cooper's) ligaments. • Explain the blood supply and, in particular, the lymphatic drainage of the breast. • Correlate breast lymphatic drainage (axillary, parasternal, supraclavicular routes) with patterns of breast cancer metastasis.
	Kidneys, Adrenal gland, Ureter, Urinary Bladder and Male Urethra (P-2)	• Locate the kidneys, adrenal glands, ureters and urinary bladder on a prosection or cadaveric specimen. • Identify the hilum of the kidney and trace the renal artery, vein and pelvis within it. • Trace the ureter from the renal pelvis to the bladder on a specimen, noting its relation to the gonadal vessels. • Identify the parts of the male urethra on a sagittal pelvic specimen or model. • Demonstrate the peritoneal versus retroperitoneal position of each structure on the specimen.
	Scrotum, testis, epididymis, ductus deferens, vesicula seminalis, funiculus spermaticus (spermatic cord); Prostate, penis, Ovaries, uterine tubes, Uterus, Vagina; Urethra feminina, vestibulum vaginae, clitoris, hymen, glandula vestibularis major and minor, bulbus vestibule (P-2)	• Identify the testis, epididymis, ductus deferens, seminal vesicle and spermatic cord on a specimen or model. • Locate the prostate and trace the course of the male urethra on a sagittal pelvic specimen. • Identify the ovary, uterine tube, uterus and vagina on a female pelvic specimen or model. • Demonstrate the external genital structures (vulva components; scrotum and penis) on models. • Trace the pathway of the female urethra from bladder neck to external urethral orifice on a specimen.
	Pelvic floor and ischioanal fossa, vessels of pelvic cavity, common iliac artery, internal iliac artery and its branches and accompanying veins, lumbal and sacral part of the sympathetic system; perineum (P-2)	• Identify the levator ani and coccygeus muscles forming the pelvic diaphragm on a specimen or model. • Locate the ischioanal fossa and identify its boundaries and contents. • Trace the common iliac artery to its internal iliac branch and identify the main branches supplying the pelvis. • Identify the lumbosacral (sacral) part of the sympathetic trunk within the pelvis. • Demonstrate the boundaries of the perineum and locate the perineal body on a specimen.

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At the end of this lesson, the student will be able to:		
KNOWLEDGE		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
BIOCHEMISTRY	Biochemistry of adipose tissue (T-2)	• List the metabolic processes regulated by adipose tissue • Explain different types of adipose tissue in terms of development, morphology and function • Explain the mechanism of heat generation by brown adipose tissue • Explain the significant physiological functions of white adipose tissue • Explain lipogenesis, lipolysis and regulation of lipid metabolism in adipocytes • List the factors secreted by adipose tissue • Explain the structure, tissue expression, signaling mechanisms and physiological effects of leptin • Discuss the role of leptin in glucose and lipid homeostasis

		• Explain the structure, tissue expression, signaling mechanisms and physiological effects of adiponectin • Explain the function and metabolic effects of some of the factors secreted by white adipose tissue: resistin, acylation stimulating protein, adipsin, plasminogen activator inhibitor, adipocyte renin-angiotensin system, visfatin, apelin, metallothionein • Discuss the inflammatory functions of adipose tissue
	Endocrine function of pancreas (T-2)	• Explain the biochemical function of pancreas • List the hormones secreted from the pancreas • Describe the effects of insulin in the lipid, carbohydrate and amino acid metabolism • Compare and contrast type 1 and type 2 diabetes mellitus with respect to incidence, age of onset and distinguishing characteristics • Recognize the clinical presentation of type 1 diabetes mellitus and discuss established diagnostic criteria • Describe abnormalities in blood glucose homeostasis in patients with type 1 diabetes • Compare and contrast postprandial blood glucose changes in a patient with type 1 diabetes with someone who does not have diabetes • Discuss the metabolic derangements leading to diabetic ketoacidosis • List the laboratory parameters used to diagnose diabetes mellitus
	Biochemistry of thyroid hormones (T-2)	• Define thyroid hormones and secretion mechanism. • List different types of thyroid hormones and describe their composition and features. • Explain the biosynthesis of the thyroid hormones • Describe the level changes in plasma by dietary changes. • Describe the symptoms when thyroid hormone levels change.
	Disturbances of adrenocortical function (T-2)	• Describe the adrenocortical hormone biosynthesis in terms of enzymes and reactants • Describe the structure of adrenocortical hormones Describe the hypothalamic, pituitary and adrenal gland axis • Define the source of ACTH • Explain the feedback regulation of aldosterone and cortisol • Describe the circadian and pulsatile secretion of ACTH Tell the metabolism of cortisol • Categorize the adrenocortical diseases according to hormone involved • Compare Cushing syndrome and Cushing disease • Compare primary hyperaldosteronism and secondary hyperaldosteronism • Discuss diagnosis of Addison's disease in terms of laboratory parameters • Explain the hormonal basis of congenital adrenal hyperplasia • List the laboratory parameters used to assess adrenocortical function
	Hormone stimulation tests (T-2)	• Explain the feedback regulatory system in terms of hypothalamus, hypohyseal and gland axis • Categorize hormone stimulation and suppression tests by means of clinical use • Explain ACTH stimulation test • Explain low dose dexamethasone suppresion test • Explain high dose dexamethastone suppresion test • Explain metyrapone test • List the clinical use of ACTH stimulation, low dose, high dose dexamethasone suprresion and metyrapone test • Explain the interpretation of results of stimulation and suppression tests

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	Renal function tests (T-2)	• Explain the functional role of kidney in terms of biochemistry • Define glomerular filtration rate and estimated glomerular filtration rate (eGFR) • Explain and calculate the creatinine clearance • List the names of renal function tests • Explain the use of guidelines in the evaluation of renal function • Explain the renal threshold of substances (Eg.Glucose) • Compare Urea and blood urea nitrogen in the clinical use • Tell the use of microalbumin in a clinical setting • Explain urinary protein, specific gravity, albumin excretion rate, albumin/creatinine ratio, protein/creatinine ratio • Describe when to use renal function tests
	Analysis of Urine (P-2)	• Explain the principal biochemical pathways, molecules, or laboratory parameters related to Analysis of Urine
	Female and Male sex hormones and regulation (T-2)	• List male sex hormones • Identify the structure of male sex hormones • Describe the hypothalamic, pituitary and gonadal axis of male hormones • Describe the structure of LH and FSH • Discuss the feedback regulation of Gonadotropin releasing hormone, LH and FSH in males • Describe the main effects of testosterone, anti müllerian hormone • Explain the testosterone, antimüllerian hormone • Discuss the catabolism of testosterone • List female sex hormones • Identify the structure of female sex hormones • Describe the hypothalamic, pituitary and gonadal axis of female • Describe the structure of LH and FSH • Discuss the feedback regulation of Gonadotropin releasing hormone, LH and FSH • Explain the physiological menstrual cycle in terms of hormones • Describe the main effects of estrogens and progesterone • Explain the estrogen and progesterone biosynthesis • Explain the two cell theory of estrogen production in the ovary • Discuss the catabolism of estrogen and progesterone
	Placenta, amnion fluid and cord blood's biochemistry (T-2)	• List the placental hormones • Tell the properties of amniotic fluid • Tell the properties of cord blood by mentioning its clinical use • Discuss the functional role of alpha feto protein in pregnancy • Discuss the levels of human chorionic gonadotropin level in pregnancy • Explain the effects of human placental lactogen • Explain the functional role of estrogens and progesterone in pregnancy • Discuss the catabolism and excretion of progesterone, estrogen and human chorionic gonadotropin
	Prenatal diagnostic tests (T-1)	• Compare prenatal diagnosis and prenatal screening • List the prenatal diagnostic techniques • List the prenatal screening tests • Name the parameters in first trimester and second trimester screening tests • Explain the information needed to record in case of prenatal screening tests • Explain the calculation of MoM (multiple of the median) • List the use of prenatal diagnostic tests • Explain the follow up testing for patients with positive prenatal screening tests

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	Determination of glucose in body fluids and use of glucometer (P-2)	• Explain the principal biochemical pathways, molecules, or laboratory parameters related to Determination of Glucose in Body Fluids and Use of Glucometer

At the end of this lesson, the student will be able to:		
KNOWLEDGE		
DEP.	TOPIC	LEARNING OUTCOMES
BIOPHYSICS	Solubility of gases in blood and blood fluids (T-1)	• • Describe the factors affecting the solubility of gases. • Describe Henry's law for the solubility of gases in liquids. • Compare the composition of atmospheric air and alveolar air. • Describe the mechanisms that drive gas exchange. • Discuss the importance of sufficient ventilation and perfusion, • and how the body adapts when they are insufficient
	Biophysical Basis of Acid–Base Balance: pH, Buffer Systems, and Compensation Mechanisms (T-1)	• Define pH and explain its significance in biological systems. • Explain the relationships among pH, pKa, temperature, and buffer capacity. • Apply the Henderson–Hasselbalch equation to biological buffer systems. • Explain the roles of chemical buffers, the respiratory system, and the kidneys in maintaining acid–base homeostasis. • Differentiate metabolic and respiratory acidosis and alkalosis and explain their major compensation mechanisms. • Interpret basic changes in pH and acid–base parameters in selected clinical scenarios involving acid–base disturbances.

At the end of this lesson, the student will be able to:		
KNOWLEDGE		
DEP.	TOPIC	LEARNING OUTCOMES
HISTOLOGY AND EMBRIYOLOGY	Development of Endocrine System (T-2)	• Describe the developmental stages of the endocrine organs such as hypophysis, pineal gland, thyroid, parathyroid and adrenal gland. • Interpret the malformations that occur during the development process of the these endocrine organs
	Histology of Endocrine Organs (T-2)	• Recognize histologic features of each of the endocrine organs (pituitary, epiphysis, thyroid, parathyroid and adrenal glands) and relate their structure to function and explain the close proximity of the vasculature in the endocrine organs. • Describe the relations, embryological origin and the histological appearance of the pituitary, thyroid, parathyroid and adrenal glands. • Describe structural and functional relationships between the hypothalamus and the pituitary gland • Discuss the structure of the anterior and posterior pituitary and describe the effects of the their hormones • Name the cell types that produce the various hormones of the anterior pituitary and know whether they are acidophils or basophils. • Know the products of the organs and how their synthesis and release are controlled. • Explain how structures are seen in the thyroid gland are involved in the production of thyroglobulin, its storage, and its subsequent breakdown to yield thyroid hormones and explain what is unique about the structure of the thyroid gland. • Compare the structure of the thyroid with that of the parathyroid.

		• Name and describe the different layers of the cortex of the adrenal gland, as well as the blood supply to this gland. • Recognize the adrenal medulla in histological section and explain the functional similarity of its cells to those of the sympathetic nervous system. • Identify islets of langerhans within pancreatic tissue and explain the relative positions of alpha and beta cells.
	Development of Urogenital System (T-3)	• Define the developmental stages of organs forming the urinary system such as kidney, ureter, urinary bladder and urethra. • Define the developmental stages of genital system both in female and male. • Interprete the malformations that occur during the development process of the reproduvtive system
	Histology of Endocrine Organs (P-2)	• Recognize histologic features of each of the endocrine organs (pituitary, epiphysis, thyroid, parathyroid and adrenal glands) and relate their structure to function and explain the close proximity of the vasculature in the endocrine organs. • Describe the relations, embryological origin and the histological appearance of the pituitary, thyroid, parathyroid and adrenal glands. • Describe structural and functional relationships between the hypothalamus and the pituitary gland • Discuss the structure of the anterior and posterior pituitary and describe the effects of the their hormones • Name the cell types that produce the various hormones of the anterior pituitary and know whether they are acidophils or basophils. • Know the products of the organs and how their synthesis and release are controlled. • Explain how structures are seen in the thyroid gland are involved in the production of thyroglobulin, its storage, and its subsequent breakdown to yield thyroid hormones and explain what is unique about the structure of the thyroid gland. • Compare the structure of the thyroid with that of the parathyroid. • Name and describe the different layers of the cortex of the adrenal gland, as well as the blood supply to this gland. • Recognize the adrenal medulla in histological section and explain the functional similarity of its cells to those of the sympathetic nervous system. • Identify islets of langerhans within pancreatic tissue and explain the relative positions of alpha and beta cells.
	Histology Of Urinary System (T-2)	• Describe the structural organization of a kidney as cortex and medulla with their specific structures. • Describe the components of a nephron with organization of the renal corpuscle, tubules and the cells present within their. • Describe the filtration barrier between blood and urine in the renal corpuscle. • Describe the various components of the juxtaglomerular apparatus • Compare the structure of the proximal and distal convoluted and collecting tubules. • Describe the blood supply of the kidney. • Describe what structures are involved in regulation of blood pressure. • Describe the transitional epithelium and interprete the structure-function relationships in it. • Interprete what structural changes the urinary system undergoes due to diseases.
	The Histology Of Male Reproductive System (T-2)	• Describe the histological structure and function of the intra-extratesticular duct system during sperm production, maturation and ejaculation. • İdentify the histological appearance and functions of the accessory sex glands such as seminal vesicles, prostate and bulbourethral gland • Explain the contribution of each part to the production of semen for the final ejaculate. • İdentify the histological features of the penis and define the role of its components in erection and detumescence.

		• Count the flow of the spermatozoa through the male reproductive tract from site of production to site of ejaculation. • Recognize some key pathological symptoms related to the tubes and glands of the male reproductive system.
	Histology Of Urinary System (P-2)	• Describe the structural organization of a kidney as cortex and medulla with their specific structures. • Describe the components of a nephron with organization of the renal corpuscle, tubules and the cells present within their. • Describe the filtration barrier between blood and urine in the renal corpuscle. • Describe the various components of the juxtaglomerular apparatus • Compare the structure of the proximal and distal convoluted and collecting tubules. • Describe the blood supply of the kidney. Describe what structures are involved in regulation of blood pressure. Describe the transitional epithelium and interprete the structure-function relationships in it. Interprete what structural changes the urinary system undergoes due to diseases.
	The Histology Of Female Reproductive System (T-2)	• Define the basically developmental stages of the female reproductive system • Describe the histological structure and regional variations of the uterine tube, uterus and vagina. • Distinguish the cyclical alterations and functional changes in the uterine endometrium, cervix, oviduct and vagina and understand their hormonal bases during the menstrual cycle and pregnancy. • İdentify the histological features of the external genitalia of the female reproductive system. • Recognize some key pathological symptoms related to female reproductive system.
	The Histology Of Male Reproductive System (P-2)	• Distinguish histological organization of the testis and discriminate between the different cells forming the germinal epithelium of the seminiferous tubules. • Compare the histological features of the intratesticular ducts and the extratesticular ducts in order to differentiate them from each other. • Define the histological features of accessory glands and penis by light microscope
	Histology Of Mammary Gland (T-1)	• Explain the histologic components of the mammary gland associated with the nipple and the areola, the overall organization into lobes and lobules, as well as secretory alveoli (acini), lactiferous ducts and sinuses and the intralobular and interlobular connective tissue • Describe the mammary gland structure in the newborn, puberty • Define histological differences between the mammary gland in adult females prior to pregnancy (inactive), during pregnancy and during lactation (active)
	Plasenta (T-1)	• Name the fetal membranes and cavities together with their components and functions • Describe the initial formation and expansion of the amnion and chorion. • Describe a chorionic villus. • Define how placenta is formed and identify its functions • Describe the macroscopic morphology of the placenta • Describe the placental barrier and maternal and fetal blood flow in the placenta and distinguish between the maternal and fetal parts of the placenta • Describe the pathologies of embryonic development in connection with the fetal membranes and placenta
	The Histology Of Female Reproductive System (T-2)	• Distinguish histological organization of the ovary as cortex and medulla with their histologic features • İdentify histologic sections of the ovary, uterine tubes, uterus, vagina.

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		• İdentify the stages of the follicular growth (primary, secondary and tertiary) and corpus luteum with their specific cells such as granulosa cells, theca cells, interstitial gland cells, granulosa lutein cells • Classify the epithelium in the uterine tubes, uterus, and vagina. • İdentify the regional variations in the structure of the oviduct, uterus and vagina with their layers

At the end of this lesson, the student will be able to:		
KNOWLEDGE		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
Physiology	Introduction to endocrine system (T-2)	• Define a hormone molecule • Explain the categorization of hormones with respect to their chemical structures • State the physiological mechanisms for the synthesis of hormones • Describe functional relationships between hormone molecules and their receptors • Explain the transport and clearance processes of hormones • State the feedback control mechanism in hormone synthesis and secretion • Describe the mechanisms of actions of hormones by considering intracellular signaling pathways in target tissues
	Organization Of The Hypothalamo - Hypophyseal System and Hormones of Pituitary Gland (T-2)	• Define the classification of pituitary gland hormones • Explain the physiological functions of pituitary hormones • State the feedback mechanism controlling the synthesis and secretion of anterior lobe pituitary hormones • Describe functional relationship between hypothalamus and the anterior lobe pituitary hormones • Explain the regulation of synthesis and secretion of posterior lobe pituitary hormones • State the involvement of hypothalamus in the synthesis and secretion of posterior lobe pituitary hormones • Describe the significance and clinical importance of hypothalamus • Explain the physiological abnormalities seen in the abnormal secretion of growth hormone
	Thyroid Hormones (T-2)	• Describe the formation and secretion of thyroid hormones • Describe the major steps of iodide metabolism which result in iodination of thyroglobulin • Describe cellular processes that mediate the effects of thyroid hormones • Define effects of the thyroid hormones on the organs and the systems • Define effects of the over and under production of thyroid hormones on the organs and the systems • Describe regulation of thyroid hormone secretion • Define the effects of thyroid-stimulating hormone (TSH) on thyroid gland • Define the hypothalamus - pituitary gland – thyroid gland axis
	Endocrine Functions of Pancreas (T-2)	• Describe the physiological anatomy of the pancreas • Name the hormones secreted from pancreas • Describe physiological roles of the pancreatic hormones • Describe effects of insulin and glucagon on metabolism of carbohydrate, lipid and protein

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		• Define diabetes mellitus, describe pathophysiology of the disease and sub-types of diabetes mellitus • Explain the possible effects of over secretion of insulin
	Calcium and Bone Metabolism (T-2)	• Specify the normal ranges of calcium and phosphate concentrations in the extracellular fluid • Define the role of calcium and phosphate in bone structure • Explain the regulation process of blood calcium and phosphate levels • Define the exchange mechanism of calcium between the bone and the extracellular fluid • Define the effect of hyper- and hypocalcemia on the different organ systems • Describes the "stress" related control of bone deposition rate. • Define the effect of Vitamin D on different organs.
	Adrenal Hormones and Stress Response (T-2)	• Explains the effects of glucocorticoids • Explains the effects of adrenal medullary hormones • Explains the stress response • Explains the control of adrenal hormons bu pituitary and hypothalamus
	Urine Formation by the Kidneys:I. Glomerular Filtration, Renal Blood Flow, and Their Control (T-2)	• Define the functions of the kidney by giving examples • Explain the stages of urine formation by the kidney • Describe the structural and the functional differences between cortical and medullary nephrons • Describe the properties of glomerulus and filtration barrier • Explain the process of glomerular filtration and the features of glomerular filtrate • Explain the effects of dilation and vasoconstriction of afferent and efferent arterioles on glomerular filtration rate (GFR) and renal blood flow. • Explain the role of tubuloglomerular feedback mechanism in regulation of GFR • Explain the effects of hormones and paracrine secretions on GFR and renal blood flow • Describe the structure of the juxtaglomerular apparatus and its role in regulation of GFR • Explain the term of renal clearance and measurement of renal clearance of a substance • Explain the measurements of GFR and renal blood flow • Describe the micturition reflex
	Urine Formation by the Kidneys: II. Tubular Processing of the Glomerular Filtrate (T-2)	• Describe the roles of the parts of the renal tubular system in the processing of glomerular filtrate • List the important electrolytes and molecules which are processed in the renal tubular system • Describe the endocrinal and neural control of tubular reabsorption and secretion • Explain clearance methods for the evaluation of kidney functions
	Urine Concentration and Dilution (T-1)	• Explain the physiological mechanisms and regulatory processes related to Urine Concentration and Dilution. • Relate these mechanisms to homeostasis and basic clinical changes
	Control of Extracellular Osmolarity and Sodium Concentration (T-1)	• Explain the physiological mechanisms and regulatory processes related to Control of Extracellular Osmolarity and Sodium Concentration. • Relate these mechanisms to homeostasis and basic clinical changes.
	Regulation of Potassium (T-1)	• Explain the physiological mechanisms and regulatory processes related to Regulation of Potassium. • Relate these mechanisms to homeostasis and basic clinical changes.

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	Regulation of Calcium, Phosphate and Magnesium (T-1)	• Explain the physiological mechanisms and regulatory processes related to Regulation of Calcium, Phosphate and Magnesium. • Relate these mechanisms to homeostasis and basic clinical changes.
	Regulation of water and electrolyte balance in the body (T-1)	• List the factors that determine body water content and describe the effect of each factor (i.e. age, body mass, and body fat) • Describe the factors that determine fluid shifts in the body • List the routes by which water enters and leaves the body • Describe control mechanisms that regulate water intake and water output in urine • Describe the renin-angiotensin II – aldosterone system and its effects on fluid – electrolyte balance of the body • Explain the regulation of antidiuretic hormone (ADH) secretion and the effects of ADH on body fluid composition • Describe the function of atrial natriuretic peptide (ANP) and other natriuretic peptides • Describe the mechanisms involved in regulation of sodium balance, blood volume and pressure
	Integration of Renal Mechanisms for Control of Extracellular Fluid (T-1)	• Explain the physiological mechanisms and regulatory processes related to Integration of Renal Mechanisms for Control of Extracellular Fluid. • Relate these mechanisms to homeostasis and basic clinical changes.
	Acid - Base Regulation(T-1)	• List the major sources of acids in the body • Name the three major chemical buffer systems of the body and describe how they resist pH changes • Describe the influence of the respiratory system on acid-base balance • Describe how the kidneys regulate hydrogen and bicarbonate ion concentrations in the blood • Distinguish between acidosis and alkalosis resulting from respiratory and metabolic factors. • Describe the mechanisms of respiratory and renal compensations to acid base disturbances
	Renal Control of Acid-Base Balance (T-1)	• Explain the physiological mechanisms and regulatory processes related to Renal Control of Acid-Base Balance. • Relate these mechanisms to homeostasis and basic clinical changes.
	Acid-Base Disorders (T-1)	• Classify the major acid-base disorders as metabolic acidosis, metabolic alkalosis, respiratory acidosis, and respiratory alkalosis. • Explain the main causes and basic pathophysiological mechanisms of common acid-base disorders. • Differentiate primary acid-base disorders from appropriate respiratory or metabolic compensatory responses. • Recognize simple clinical findings and laboratory patterns associated with common acid-base disturbances.
	Male reproductive system physiology (T-2)	• List the endocrine glands involved in male reproductive system. • List the key hormones secreted from Leyding and Sertoli cells. • Explain the regulation of hormone secretions by hypothalamic and pituitary hormones. • Explain the process of spermatogenesis, including its time course, spatial distribution, and role of supporting cells and hormones. • Explain the morphological and functional features of a mature spermatozoon. • Outline the role of chromosomes, hormones, and related factors in sex determination and development. • Summarize the hormonal changes that occur at puberty in males. • Explain the mechanisms that produce erection and ejaculation.

		• Describe the general structure of testosterone, and explain its biosynthesis, transport, metabolism, and actions. • Explain the effects of androgens on target organs, secondary sex characteristics, libido, and sexual behavior. • Explain the causes of major reproductive dysfunctions in men
	Female reproductive system physiology (T-2)	• Describe hormonal changes that take place during female puberty. • Describe the roles of hypothalamus and the anterior pituitary gland in regulation of ovarian cycle. • Describe the function of the gonadotropic hormones. • Name main hormones secreted from corpus luteum and graft follicles. • Describe the changes that occur in female reproductive organs during menstrual cycle. • Describe the synthesis, transport and physiological functions of progesterone. • Describe the synthesis, transport and physiological functions of estrogens. • Describe hormonal changes that take place during female menopause
	Pregnancy, labor, and lactation (T-1)	• Describe hormonal changes that take place in embryogenesis, implantation, pregnancy and labor • Describe physiological effects of hormones during the processes of embryogenesis, implantation, pregnancy and labor • Define role of placenta in pregnancy • Name the placental hormones and describe their functions • Explain the process of lactation • Describe the hormones that regulate lactation
	Lab: Renal Physiology in a simulating platform (P-1)	• Discuss how changes in afferent arteriole radius impact glomerular capillary pressure and filtration based on the measurements that they performed in the simulation platform • Discuss how changes in efferent arteriole radius impact glomerular capillary pressure and filtration based on the measurements that they performed in the simulation platform • Discuss how blood pressure affects glomerular capillary pressure and glomerular filtration based on the measurements that they performed during the experiments

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At the end of this lesson, the student will be able to:		
KNOWLEDGE		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
MICROBIOLOGY	Bacterial Structure & Classification (T-1)	• List the main groups of medically important microorganisms • Explain the Taxanomic methods for bacterial classifications • Define the basic structure of bacteria • Define the functions of the basic structural parts of bacteria
	Bacterial Pathogenesis (T-1)	• Define the concepts; pathogen/non-pathogen, virulence and opportunistic bacteria • List the ways of entry of bacteria into the body • Define colonization, adhesion, and invasion • Define the primary virulence factors of bacteria • Define the host defence mechanisms • Distinguish infection and stages
	Laboratory Diagnosis of Bacteria (T-1)	• List the main basic methods in the laboratory diagnosis of bacteria • Explain the importance of bacterial identification for the diagnosis

		• List the essential tools for isolation and identification • List the main advantages and disadvantages of the methods
	Advanced Microbiological Methods (T-1)	• List the advanced methods in the laboratory diagnosis of bacteria • Explain the importance of novel techniques in the diagnosis • List the main advantages and disadvantages of these methods • Explain the future prospects for fast and precise diagnosis
	Antimicrobial Agents & Resistance (T-2)	• Define antimicrobial agents • List antibiotics action mechanism and main targets in the bacteria • Classify antibiotics into the groups • Define antimicrobial resistance types • Describe different resistance mechanisms • Classify antimicrobial susceptibility test methods
	Sterilization, Disinfection, and Antisepsis (T-2)	• Define sterilization, disinfection and antisepsis • Define the methods and devices for sterilization and list their use. • List the disinfectants and their use • List the antiseptics and their use.
	Staphylococcus (T-2)	• Define Gram positive cocci • Classify Staphylococci genus • List important properties of Staphylococci • List clinical manifestations for Staphylococci • Describe the lab diagnosis of Staphylococci • Define the antibacterial resistance in Staphylococci • Describe prevention measures from Staphylococcal infections
	Streptococci (T-2)	• Define Streptococci genus • Classify Streptococci genus • List important properties of Streptococci • List clinical manifestations of streptococcal infections • Describe the lab diagnosis of Streptococci • Define the antibacterial resistance in Streptococci • Describe prevention measures from streptococcal infections
	Enterococcus (T-1)	• Define Enterococci genus • Classify Enterococci genus • List important properties of Enterococci • List the clinical manifestations of enterococcal infections • Describe the lab diagnosis of Enterococci • Define the antibacterial resistance in Enterococci • Describe prevention measures from enterococcal infections
	Common infectious agents of renal/urogenital system (T-1)	• Describe and classify the microorganisms or microbiological concepts related to Common infectious agents of renal/urogenital system. • Explain their major properties, pathogenesis, and clinically relevant manifestations. • Describe the basic principles of laboratory diagnosis, prevention, and/or treatment where applicable.
	SKILLS	
	Introduction to Medical Microbiology Laboratory : accepting infectious agents and Microscopy and staining for clinical specimens for bacteria (P-1)	• List the main basic methods in the laboratory diagnosis of bacteria Explain the importance of bacterial identification for the diagnosis List the essential tools for isolation and identification List the main advantages and disadvantages of the methods

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	TOPIC	LEARNING OUTCOMES

IMMUNOLOGY	Elements of Host Protective Responses (T-2)	• Explain the immune mechanisms related to Elements of Host Protective Responses. • Relate these mechanisms to protection, disease, diagnosis, prevention, or treatment as appropriate.
	Innate Host Responses (T-1)	• Explain the immune mechanisms related to Innate Host Responses. • Relate these mechanisms to protection, disease, diagnosis, prevention, or treatment as appropriate.
	Antigen-Specific Immune Responses (T-2)	• Explain the immune mechanisms related to Antigen-Specific Immune Responses. • Relate these mechanisms to protection, disease, diagnosis, prevention, or treatment as appropriate.

At the end of this lesson, the student will be able to:		
SKILLS		
DEP	**TOPIC**	**LEARNING OUTCOMES**
CLINICAL SKILLS	Venipuncture, peripheral Intravenous cannulation (T-1) (P-1)	• Describe the anatomy relevant to venipuncture • List the contraindications to venipuncture • Describe the technique of venipuncture • Understand the safety aspects relating to venipuncture • Recognize the basic components of cannulas and their different gauges • Understand the relevant anatomy and common sites for peripheral iv cannulation • Have acquired a safe, methodical approach to peripheral iv cannulation
	Elastic bandage application(T-1) (P-1)	• Describe the indications, equipment, and safety considerations for Clinical Skills Lab: Elastic bandage application. • Perform the main steps of Clinical Skills Lab: Elastic bandage application in the correct sequence on a simulator/mannequin where applicable. • Apply standard precautions and communicate appropriately during the procedure.

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At the end of this lesson, the student will be able to:		
KNOWLEDGE		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
MEDICAL GENETICS	Introduction to medical genetics (T-2)	• Explain the organization of human genome • Define genetic disorders and medical genetics. • Explain the types of genetic disorders • Explain the content and structure DNA • Explain the mitochondrial genome structure and properties
	Cell cycle and cell division (T-2)	• List and classify steps of cell cycle. • Explain the steps and different features of mitosis and meiosis. • Define the medical relevance of cell division. • Explain the medical relevance of mitosis and meiosis. • Explain human gametogenesis and fertilization with respect to differences between males and females.
	Gene structure and function-1 (T-2)	• Explain the content and structure DNA • Descibe the central dogma of biology • Explains the basic principles of transcription and translation • Explain the organization of human genome • Explains gene families and their evolution • Explains pseudogenes and importance in evolution • Explain mitochondrial genome structure and properties • Explains the transcription of mitochondrial genome

	Gene structure and function-2 (T-2)	• Explain the epigenetic mechanisms and their roles in gene expression. • Describe alternative splicing. • Explain DNA methylation and histone modifications. • Explains the noncoding RNAs and their importance in diseases. • Explain gene expression as the integration of genomic and epigenomic signals. • Describe allelic imbalance and its importance in gene expression. • Explain somatic rearrangements and monoallelic expression. • Explain parent of origin imprinting.
	Human genetic diversity, mutations and polymorphisms (T-2)	• Explain nature of genetic variation • Define allele, wild-type or common allele / variant or mutation • Define polymorphisms and its importance in medical genetics. • List the common variation types in human genome with respect to their size, frequency and basis for the polymorphisms • List the different types of mutations, their consequences and frequencies • Explain the term dynamic mutations
	Human genetic diversity, mutations and polymorphisms – 2 (T-2)	• Explain the mutation rates for selected human diseases • Explain the sex differences and age effects on mutation rates • Describe allelic imbalance and its importance in gene expression • Explain somatic rearrangements and monoallelic expression

MED2102: Nervous and Sensory Systems				
Course Date	**November 2, 2026 - January 22, 2027**			
Exam Date	**Committee Exam: January 21, 2027**			
Course Coordinator	Ayşe Seval Palteki, Asst. Prof.			
Academic Unit	**Academic Staff**	**Theoretical hours**	**Practical hours**	**Total**
Anatomy	Uğur Baran Kasırga, Asst. Prof.	40	10	50
Biophysics	Serdar Durdağı, Prof.; Bircan Dinç, Assoc. Prof.; Duygu Tarhan, Asst. Prof.	14	1	15
Biochemistry	Merve Karayel Başar, Asst. Prof.	2	0	2
Histology and Embryology	Yasemin Ersoy Çanıllıoğlu, Assoc. Prof.; Merjem Purelku, Asst. Prof.	15	8	23
Microbiology	Gülden Çelik, Prof.; Seyda İğnak Tarlığ, Asst. Prof.; Zehra Kipritçi, Asst. Prof.	18	2	20
Physiology	Numan Ermutlu, Prof.; Betilay Topkara Arslan,	31	5	36

	Asst. Prof.; Elif Bahadır, Asst. Prof.; Yasemin Keskin Ergen, Asst. Prof.			
Medical Education	İnanç Sümbüloğlu, Asst. Prof.	4	0	4
Clinical Skills	Yeşim Neğiş, Assoc. Prof.	2	2	4
Problem-Based Learning	Faculty members from relevant departments	0	8	8
TOTAL		**122**	**36**	**158**
Medical Genetics	Timuçin Avşar, Assoc. Prof.	14	0	14
STUDY TIME				**94**

COURSE AIM:

The aim of this course is: to provide students with an integrated understanding of the anatomical, histological, embryological, physiological, biochemical, biophysical, and microbiological characteristics of the nervous and sensory systems; to enable students to explain the normal structure and function of the central and peripheral nervous systems and the mechanisms of vision, hearing, balance, taste, olfaction, and somatic sensation; to relate synaptic transmission, sensory and motor integration, brain electrical activity, cognitive functions, and the biophysical basis of sensory systems to basic clinical and diagnostic situations; and to help students interpret findings obtained from relevant laboratory and practical applications.

LEARNING OUTCOMES:

At the end of this course, the student will be able to:

Explain the anatomical organization, embryological development, and histological structure of the nervous and sensory systems.

Explain the physiological mechanisms of sensory, motor, autonomic, and cognitive functions of the nervous system.

3. Relate synaptic transmission, brain electrical activity, and the biophysical and biochemical principles of vision, hearing, taste, and olfaction to normal function.
4. Explain the major medically important microorganisms related to the nervous system, including basic principles of laboratory diagnosis and antimicrobial susceptibility.
5. Interpret basic findings obtained from anatomy, histology, physiology, biophysics, and microbiology laboratory or practical applications.
6. Relate foundational knowledge of the nervous and sensory systems to basic clinical and diagnostic conditions.

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At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
ANATOMY	Introduction to nervous system (T-1)	• Describe the overall organization of the nervous system into central and peripheral divisions. • Differentiate gray matter from white matter and explain their basic functional significance. • Outline the major subdivisions of the brain (cerebrum, diencephalon, brainstem, cerebellum) and spinal cord. • Explain the concept of a neuron and its basic structural components in the context of gross anatomy. • Introduce the meningeal layers and ventricular system as an anatomical framework for the rest of the module.
	Lobes, Cortex (T-1)	• Identify the four lobes of the cerebral hemisphere and their boundaries (central, lateral, parieto-occipital sulci).

		• Describe the major gyri and sulci of each lobe. • Localize the primary motor, primary sensory, visual, auditory and language areas on the cortical surface. • Explain the concept of cortical localization of function (Brodmann-style functional mapping) at an introductory level. • Correlate lesions of specific lobes with characteristic clinical deficits (e.g., frontal lobe and personality change, Broca's/Wernicke's areas and aphasia).
	Basal Nuclei (T-1)	• Identify the components of the basal nuclei (caudate, putamen, globus pallidus) and their collective terms (corpus striatum, lentiform nucleus). • Describe the location of the basal nuclei relative to the thalamus and internal capsule. • Explain the general role of the basal nuclei in the control of voluntary movement. • Introduce the connections of the basal nuclei with the substantia nigra and subthalamic nucleus. • Correlate basal nuclei dysfunction with the clinical features of Parkinson's disease and Huntington's disease.
	White Matter, Commisures (T-1)	• Classify cerebral white matter fibers into association, commissural and projection types. • Describe the corpus callosum: parts (rostrum, genu, body, splenium) and the regions it connects. • Describe the anterior commissure and its connections. • Explain the internal capsule as the major projection pathway and identify its parts (anterior limb, genu, posterior limb). • Correlate internal capsule lesions with dense contralateral hemiparesis/hemisensory loss.
	Ventricles (T-1)	• Identify the lateral, third and fourth ventricles and their parts. • Trace the pathway of cerebrospinal fluid from its site of production to its absorption. • Describe the interventricular foramen (of Monro) and cerebral aqueduct as connections between ventricles. • Explain the choroid plexus and its role in CSF production. • Correlate obstruction at each level of the ventricular system with the corresponding pattern of hydrocephalus.
	Diencephalon. Thalamus, epithalamus (T-1)	• Describe the boundaries and subdivisions of the diencephalon. • Identify the major nuclear groups of the thalamus and their general relay functions. • Explain the thalamus's role as the principal relay station for sensory and motor pathways to the cortex. • Describe the components of the epithalamus (pineal gland, habenular nuclei) and their function. • Correlate thalamic lesions with contralateral sensory loss and thalamic pain syndrome.
	Diencephalon. hypothalamus, subthalamus (T-1)	• Identify the boundaries and major nuclear groups of the hypothalamus. • Explain the hypothalamus's role in autonomic regulation, homeostasis and the neuroendocrine axis. • Describe the hypothalamo-hypophyseal connections (tracts) to the pituitary gland. • Describe the location and connections of the subthalamic nucleus. • Correlate hypothalamic dysfunction with disorders of temperature regulation, appetite and the sleep-wake cycle.
	Cerebellum (T-2)	• Describe the gross anatomy of the cerebellum: lobes, vermis and hemispheres. • Identify the three cerebellar peduncles and the general nature of the fibers they carry. • Describe the deep cerebellar nuclei and cerebellar cortical layers at an introductory level. • Explain the general functional role of the cerebellum in coordination, balance and motor learning. • Correlate cerebellar lesions with ataxia, dysmetria, and intention tremor.

	CNS glandular structure (Pituitary and Pineal glands) (T-1)	• 1Describe the location, parts (anterior and posterior lobes) and relations of the pituitary gland. • Explain the embryological origin of the anterior (Rathke's pouch) versus posterior (neural) pituitary. • Describe the hypothalamo-hypophyseal portal system and its functional significance. • Describe the location and function of the pineal gland. • Correlate pituitary gland anatomy with the visual field defect (bitemporal hemianopia) produced by a pituitary tumor compressing the optic chiasm.
	Brainstem (T-3)	• Describe the external gross anatomy and boundaries of the midbrain, pons and medulla oblongata. • Identify the major internal structures at representative cross-sectional levels of each brainstem division (cranial nerve nuclei, long tracts, cerebellar peduncles). • Describe the rhomboid fossa (floor of the fourth ventricle) and the major landmarks visible on its surface. • Explain the general organization and function of the reticular formation within the brainstem. • Correlate the level of a brainstem lesion with the resulting combination of cranial nerve and long-tract (crossed) clinical signs.
	Spinal cord-I (T-1)	• Describe the external gross anatomy of the spinal cord: enlargements, conus medullaris, filum terminale. • Explain the relationship between spinal cord segments and vertebral levels. • Describe the meningeal coverings of the spinal cord and the epidural/subarachnoid spaces. • Identify the internal gray matter organization (dorsal, lateral, ventral horns) in cross-section. • Correlate the level of the conus medullaris with the clinical landmark used for safe lumbar puncture.
	Spinal cord-II (T-1)	• Describe the organization of spinal cord white matter into dorsal, lateral and ventral funiculi. • Identify the blood supply of the spinal cord (anterior and posterior spinal arteries) and its watershed vulnerability. • Explain the formation and distribution of a typical spinal nerve and its rami. • Describe the arrangement of dermatomes and myotomes. • Correlate anterior spinal artery occlusion with the resulting pattern of motor and sensory loss.
	Ascending pathway (T-1)	• Describe the three-neuron organization common to major ascending sensory pathways. • Trace the dorsal column-medial lemniscus pathway and the sensory modalities it carries. • Trace the anterolateral (spinothalamic) system and the sensory modalities it carries. • Identify the decussation level of each pathway and its clinical significance. • Correlate a spinal cord hemisection (Brown-Séquard syndrome) with the resulting dissociated sensory loss pattern.
	Descending pathway (T-1)	• Describe the origin and course of the corticospinal (pyramidal) tract, including the pyramidal decussation. • Differentiate the lateral and anterior corticospinal tracts. • Outline the major extrapyramidal descending tracts (rubrospinal, vestibulospinal, reticulospinal) and their general roles. • Differentiate upper motor neuron from lower motor neuron on an anatomical basis. • Correlate corticospinal tract lesions above versus below the decussation with the resulting laterality of weakness.

	Blood circulation of CNN (T-2)	• Describe the formation of the circle of Willis and its major contributing arteries. • Trace the territories supplied by the anterior, middle and posterior cerebral arteries. • Describe the vertebrobasilar system and the structures it supplies (brainstem, cerebellum, occipital lobe). • Describe the venous drainage of the brain (superficial and deep cerebral veins, dural venous sinuses). • Correlate occlusion of a specific cerebral artery territory with the corresponding clinical stroke syndrome.
	Meninges and dural sinuses (T-1)	• Describe the three meningeal layers (dura, arachnoid, pia mater) and the spaces between them. • Identify the dural reflections (falx cerebri, tentorium cerebelli, falx cerebelli, diaphragma sellae). • Describe the major dural venous sinuses and their connections. • Explain the pathway of CSF absorption via arachnoid granulations into the venous sinuses. • Correlate the anatomical location (epidural, subdural, subarachnoid) of a hemorrhage with its typical clinical presentation and imaging appearance.
	Autonomic nervous system (T-4)	• Differentiate the sympathetic and parasympathetic divisions by their central origin, ganglion location, and general pattern of fiber length. • Describe the sympathetic trunk, its ganglia, and the formation of white and gray rami communicantes. • Describe the craniosacral outflow of the parasympathetic system and identify the cranial nerves that carry parasympathetic fibers. • Identify the major autonomic plexuses (cardiac, pulmonary, celiac, hypogastric) and the organs each supplies. • Correlate autonomic anatomy with clinical phenomena such as Horner's syndrome and visceral referred pain patterns.
	Cranial nerves, central parts, Olfactory nerve (I) (T-1)	• List the twelve cranial nerves in order and classify each as sensory, motor or mixed. • Identify the brainstem attachment site of each cranial nerve. • Describe the origin, course and skull foramen of exit of the olfactory nerve. • Explain the pathway of the olfactory pathway from the nasal mucosa to the olfactory cortex. • Correlate anterior cranial fossa fracture with anosmia via olfactory nerve injury.
	Trigeminal nerve (V) (T-1)	• Describe the three divisions of the trigeminal nerve (ophthalmic, maxillary, mandibular) and their skull foramina. • Outline the sensory distribution of each trigeminal division on the face. • Describe the motor function of the trigeminal nerve (muscles of mastication). • Identify the trigeminal ganglion and its location. • Correlate trigeminal nerve pathology with the clinical features of trigeminal neuralgia.
	Fascial nerve (VII) (T-1)	• Describe the course of the facial nerve from the brainstem through the internal acoustic meatus and facial canal. • Identify the branches of the facial nerve within the facial canal (greater petrosal, chorda tympani, nerve to stapedius). • Describe the extracranial branching pattern of the facial nerve within the parotid gland. • Explain the motor, sensory (taste) and parasympathetic components of the facial nerve. • Differentiate the clinical presentation of a central (upper motor neuron) versus peripheral (Bell's palsy) facial nerve lesion.
	Glossopharyngeal nerve (IX) (T-1)	• Describe the origin and skull exit (jugular foramen) of the glossopharyngeal nerve. • Outline the motor, sensory, taste and parasympathetic components of the glossopharyngeal nerve. • Explain the glossopharyngeal nerve's role in the gag reflex and the carotid sinus/body reflexes. • Identify the muscle innervated by the glossopharyngeal nerve (stylopharyngeus).

		• Correlate glossopharyngeal neuralgia with its characteristic pain distribution.
	Vagus nerve (X) (T-1)	• Describe the origin and skull exit (jugular foramen) of the vagus nerve. • Outline the extensive course and distribution of the vagus nerve in the neck, thorax and abdomen. • Explain the vagus nerve's parasympathetic role in thoracic and abdominal viscera. • Identify the recurrent laryngeal nerve as a branch of the vagus and its clinical importance. • Correlate recurrent laryngeal nerve injury (e.g., during thyroidectomy) with resulting voice change.
	Vestibulocochlear nerve (VIII), Accessory nerve (XI), Hypoglossal nerve (XII) (T-1)	• Describe the two functional components (vestibular and cochlear) of the vestibulocochlear nerve and their pathways. • Describe the cranial and spinal roots of the accessory nerve and the muscles it supplies. • Describe the course and skull exit (hypoglossal canal) of the hypoglossal nerve and the muscles it supplies. • Correlate hypoglossal nerve injury with tongue deviation toward the side of the lesion. • Correlate accessory nerve injury with weakness of the trapezius and sternocleidomastoid.
	Orbita, Optic nerve (II) (T-1)	• 1Describe the bony walls of the orbit and the foramina/fissures that transmit neurovascular structures. • Trace the course of the optic nerve from the retina to the optic chiasm. • Describe the optic canal and the structures that pass through it. • Explain the visual pathway from optic nerve to optic tract at an introductory level. • Correlate lesions at different points along the optic pathway with corresponding visual field defects.
	The Eye (T-2)	• Describe the three tunics of the eyeball (fibrous, vascular, neural/retina). • Describe the chambers of the eye and the pathway of aqueous humor circulation and drainage. • Identify the extraocular muscles and their actions. • Explain the blood supply of the eye (ophthalmic artery and its branches). • Correlate obstruction of aqueous humor outflow with the pathophysiology of glaucoma.
	Oculomotor nerve (III), Trochlear nerve (IV) and Abduncens nerve (VI) (T-1)	• Describe the extraocular muscles innervated by each of the oculomotor, trochlear and abducens nerves. • Identify the skull exit (superior orbital fissure) common to these three nerves. • Explain the parasympathetic component of the oculomotor nerve and its role in pupillary constriction and accommodation. • Differentiate the clinical presentation of an isolated oculomotor, trochlear, or abducens nerve palsy. • Correlate a 'down and out' eye position with oculomotor nerve palsy and its relation to raised intracranial pressure/uncal herniation.
	The Ear (T-2)	• Describe the three parts of the ear (external, middle, internal) and their boundaries. • Identify the ossicles of the middle ear and their role in sound transmission. • Describe the components of the bony and membranous labyrinth. • Explain the basic mechanism of hearing (cochlea) and balance (vestibular apparatus) at an anatomical level. • Correlate middle ear infection (otitis media) with its potential spread to adjacent structures (mastoid, facial nerve canal).
	Radiological anatomy of NS (T-2)	• Identify normal brain, brainstem, cerebellum and spinal cord anatomy on CT and MRI.

		• Recognize the normal appearance of the ventricular system and basal cisterns on cross-sectional imaging. • Differentiate gray and white matter on CT versus MRI. • Correlate common neuroanatomical pathology (infarct territory, hemorrhage location, mass effect) with its imaging appearance. • Apply a systematic approach to interpreting an axial brain CT/MRI using anatomical landmarks.
	Introduction to GIS (T-1)	• Outline the overall organization of the gastrointestinal system from mouth to anus. • Describe the embryological origin of the gut (foregut, midgut, hindgut) and its correlation with adult blood supply. • Explain the general peritoneal relationships (intraperitoneal versus retroperitoneal) of GI organs. • Introduce the accessory digestive organs (liver, pancreas, biliary tract) and their relationship to the gut tube.
	Mouth (T-1)	• Describe the boundaries and subdivisions of the oral cavity. • Identify the structures of the tongue and its innervation (motor, general sensory, taste) by cranial nerve. • Describe the salivary glands (parotid, submandibular, sublingual) and their duct openings. • Describe the dentition and the blood/nerve supply of the teeth and gums at an introductory level. • Correlate the differential nerve supply of the tongue with the clinical testing of cranial nerves V, VII, IX and XII.
	Pharynx (T-1)	• Describe the three parts of the pharynx (naso-, oro-, laryngopharynx) and their boundaries. • Identify the muscles of the pharynx and their role in swallowing. • Describe the innervation of the pharynx (pharyngeal plexus). • Explain the anatomical basis of the swallowing reflex. • Correlate pharyngeal constrictor weakness with dysphagia and aspiration risk.
	Oesophagus,Stomach (T-1)	• Describe the course, constrictions and relations of the esophagus. • Describe the parts of the stomach (cardia, fundus, body, pylorus) and its curvatures. • Explain the blood supply of the esophagus and stomach. • Describe the peritoneal relations of the stomach (lesser and greater omentum attachments). • Correlate the esophageal constrictions with common sites of foreign body impaction and stricture.
	Duodenum, Jejunum, Ileum (T-1)	• Describe the four parts of the duodenum and its retroperitoneal/intraperitoneal relationships. • Differentiate the jejunum from the ileum by gross and mesenteric characteristics. • Describe the relationship of the duodenum to the pancreas, common bile duct and major vessels. • Explain the blood supply of the small intestine from the superior mesenteric artery. • Correlate the duodenojejunal flexure (ligament of Treitz) with its use as a radiological landmark for upper versus lower GI bleeding.
	Peritoneum (T-1)	• Differentiate parietal from visceral peritoneum and describe the peritoneal cavity. • Explain the concepts of mesentery, omentum, and peritoneal ligament. • Describe the greater and lesser sacs and the epiploic foramen (of Winslow) connecting them. • Identify the paracolic gutters and their role in the spread of peritoneal fluid/infection. • Correlate peritoneal recesses with the accumulation of ascites or pus in specific clinical scenarios.
	. Peritoneum, Omentum (T-1)	• Describe the greater omentum: attachments, layers and its role as the 'abdominal policeman'.

		• Describe the lesser omentum: attachments, contents (portal triad) and boundaries of the omental foramen. • Explain the developmental basis of the omental bursa (lesser sac). • Differentiate the mesenteries of the small and large intestine. • Correlate omental adhesion/wrapping around an inflamed appendix with its role in localizing infection.
	Large intestines, Rectum, Anus (T-1)	• Describe the parts of the large intestine (cecum, colon, rectum, anal canal) and their distinguishing gross features (taeniae coli, haustra, omental appendices). • Describe the blood supply of the large intestine and identify the watershed zone at the splenic flexure. • Describe the anatomy of the rectum and anal canal, including the anorectal ring and anal sphincters. • Explain the differing venous drainage and lymphatic drainage above versus below the pectinate (dentate) line. • Correlate the pectinate line with the differing character (painful versus painless) of external and internal hemorrhoids.
	Liver (T-1)	• Describe the lobes of the liver by surface anatomy and the Couinaud (functional/segmental) classification. • Describe the peritoneal attachments and ligaments of the liver (falciform, coronary, triangular ligaments). • Explain the porta hepatis and its contents (portal triad). • Describe the dual blood supply of the liver (hepatic artery and portal vein) and hepatic venous drainage. • Correlate liver segmental anatomy with its relevance to planning a hepatic resection.
	Portal Vein, Portal System (T-1)	• Describe the formation of the portal vein from the superior mesenteric and splenic veins. • Trace the tributaries of the portal venous system. • Identify the sites of portosystemic anastomosis (esophageal, rectal, paraumbilical, retroperitoneal). • Explain the physiological role of the portal system in delivering nutrient-rich blood to the liver. • Correlate portal hypertension with the clinical consequences at each portosystemic anastomotic site (esophageal varices, caput medusae, hemorrhoids).
	Biliary tract, Pancreas (T-1)	• Describe the extrahepatic biliary tree: cystic duct, common hepatic duct, common bile duct. • Describe the gallbladder: parts, location and function in bile storage/concentration. • Describe the relationship of the common bile duct and pancreatic duct at the major duodenal papilla (ampulla of Vater). • Describe the parts and relations of the pancreas and its dual exocrine/endocrine function. • Correlate obstruction at the ampulla of Vater (e.g., by a gallstone) with the combined biliary and pancreatic clinical consequences.
	Radiological Anatomy of GIS-1 (T-1)	• Identify normal esophagus, stomach and duodenum anatomy on contrast studies and CT. • Recognize the normal small bowel appearance on cross-sectional imaging. • Differentiate intraperitoneal from retroperitoneal GI structures on axial CT. • Correlate common upper GI pathology with its imaging appearance.
	Radiological Anatomy of GIS-2 (T-1)	• Identify normal colon, rectum, liver, biliary tree and pancreas anatomy on CT and MRI. • Recognize the normal portal venous anatomy on cross-sectional and Doppler imaging. • Correlate common lower GI and hepatobiliary pathology with its imaging appearance. • Apply a systematic approach to interpreting an abdominal CT at the level of the liver, pancreas and colon.
	Telencephalon: sulci, gyri, lobes, cortical/subcortical structures;	• Identify the lobes, major sulci and gyri of the cerebral hemispheres on a brain specimen or model.

	Cerebellum; IV Ventricle; Diencephalon (hypothalamus, epithalamus); III Ventricle (P-2)	• Locate the cerebellum and identify its vermis and hemispheres on a specimen. • Identify the fourth ventricle and its boundaries on a sagittal brain specimen. • Locate the hypothalamus and epithalamus (pineal gland) on a midsagittal brain specimen. • Identify the third ventricle and its relationship to the diencephalon on a specimen.
	Bulbus (medulla), pons, mesencephalon and fossa rhomboidea; Spinal cord (P-2)	• Identify the medulla oblongata, pons and mesencephalon (midbrain) on a specimen and describe their external landmarks. • Locate the rhomboid fossa (floor of the fourth ventricle) and identify its major landmarks. • Identify the external anatomy of the spinal cord (enlargements, conus medullaris, filum terminale) on a specimen. • Demonstrate the continuity between the medulla and spinal cord at the foramen magnum. • Locate the anterior median fissure and posterior median sulcus on a spinal cord cross-section.
	Meninges of the brain; dural venous sinuses; ventricular system overview; vessels of the CNS; sympathetic and parasympathetic system (P-2)	• Identify the dura mater, arachnoid mater and pia mater on a brain specimen. • Locate the superior sagittal sinus and other major dural venous sinuses on a specimen or model. • Identify the components of the ventricular system on a sectioned brain specimen. • Trace the circle of Willis and its major branches on a specimen. • Identify sympathetic and parasympathetic structures relevant to the head and neck on the specimen.
	Cranial Nerves (P-2)	• Identify the attachment points of all twelve cranial nerves on a brainstem/brain specimen. • Trace the intracranial course of selected cranial nerves to their skull exit foramen on a skull base specimen. • Locate the trigeminal, facial and vestibulocochlear nerves within the skull on a dissected specimen. • Demonstrate the extracranial course of the facial nerve through the parotid gland on a head specimen. • Correlate cranial nerve exit foramina identified on the specimen with their corresponding clinical testing.
	The Eye, The Ear (P-2)	• Identify the extraocular muscles and their attachments on an orbital specimen or model. • Locate the layers of the eyeball and chambers of the eye on a sectioned globe/model. • Identify the external, middle and internal ear structures on a temporal bone specimen or model. • Locate the ossicles of the middle ear on a model or dissected specimen. • Demonstrate the bony versus membranous labyrinth on an inner ear model.
	Mouth, Pharynx (P-2)	• Identify the boundaries of the oral cavity and the structures of the tongue on a specimen. • Locate the parotid, submandibular and sublingual salivary glands and their duct openings on a specimen. • Identify the three parts of the pharynx on a sagittal head/neck specimen. • Demonstrate the pharyngeal constrictor muscles on a posterior pharyngeal wall specimen. • Locate the palatine tonsil and its bed on a specimen.
	Oesophagus, Stomach, Small and large intestines (P-2)	• Trace the esophagus from the neck through the thorax to the abdomen on a cadaveric specimen. • Identify the parts and curvatures of the stomach on an abdominal specimen. • Locate the duodenum, jejunum and ileum and differentiate them by gross features on a specimen. • Identify the parts of the large intestine (cecum, colon, rectum) and their distinguishing features (taeniae coli, haustra) on a specimen. • Demonstrate the ileocecal junction and appendix on a specimen.

	Liver, Biliary tract, Pancreas, Peritoneum (P-2)	• Identify the lobes and surfaces of the liver on a specimen and locate the porta hepatis. • Locate the gallbladder and trace the cystic duct, common hepatic duct and common bile duct on a specimen. • Identify the parts of the pancreas and its relationship to the duodenum and splenic vessels on a specimen. • Demonstrate the greater and lesser omentum and the omental (epiploic) foramen on a specimen. • Locate the peritoneal ligaments attaching the liver to the diaphragm and anterior abdominal wall.
	Portal Vein, Portal System (P-2)	• Trace the formation of the portal vein from the splenic and superior mesenteric veins on a specimen. • Identify the tributaries of the portal vein on an abdominal specimen. • Locate the portal triad within the lesser omentum/porta hepatis on a specimen. • Demonstrate at least one site of portosystemic anastomosis on a specimen or diagram (e.g., esophageal or rectal). • Correlate the portal venous anatomy identified on the specimen with the clinical presentation of portal hypertension.

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
HISTOLOGY AND EMBRYOLOGY	Histology of the nervous tissue (T-2)	• Define the basic components and functions of nervous tissue. • Classify the types of neurons and neuroglial cells based on structure and function. • Describe the organization of the central and peripheral nervous systems at the histological level. • Explain the structural and functional differences between myelinated and unmyelinated nerve fibers. • Discuss the role of supporting (glial) cells in neural tissue homeostasis and function. • Outline the histological features of synapses and their relevance to signal transmission. • Summarize common histological methods used in the examination of nervous tissue.
	Histology of the nervous system (T-2)	• Define the basic components and functions of nervous tissue. • Classify the types of neurons and neuroglial cells based on structure and function. • Describe the organization of the central and peripheral nervous systems at the histological level. • Explain the structural and functional differences between myelinated and unmyelinated nerve fibers. • Discuss the role of supporting (glial) cells in neural tissue homeostasis and function. • Outline the histological features of synapses and their relevance to signal transmission. • Summarize common histological methods used in the examination of nervous tissue.
	Histology of Eye (T-2)	• Describe the three layers of the eye wall and identify their key structural components relevant to function. • Identify the embryologic origins of the eye and their clinical significance. • Explain the morphology and functional roles of the eyelid, conjunctiva, and associated specialized structures. • Explain the production, flow, and functional importance of aqueous humor in ocular physiology. • Describe the anatomical features of the retina, including the fovea, optic disc, and the distribution of retinal blood vessels. • Describe the retinal epithelium and its relationship with the outer segments of rods and cones, linking structure to visual function.
	Histology of Ear (T-2)	• Describe the overall organization of the ear, the histological components of the external and middle ear, their characteristic features, and explain their embryological origins.

		• Identify the structural differences between the outer, middle, and inner ear, and explain their respective functions. • Recognize the location and structure of the cochlea and its compartments, and describe the location and production of endolymph. • Identify the structure and function of hair cells in the cochlear organ of Corti and the vestibular regions of the inner ear. • Describe what sensory hair cells are, and explain how they differ in structure and function from the neurons of the spiral ganglion.
	Histology of Skin and Adnex (T-2)	• Identify the epidermis, dermis, and hypodermis, and explain their embryologic origins, organization, and functions. • Differentiate between the two main types of skin and explain their features and functions. • Describe various skin adnexa and determine their physiological roles. • Identify cutaneous sensory receptors and describe their morphological characteristics. • Recognize key pathological conditions affecting the skin and epidermal derivatives.
	Development Of Central Nervous System (T-3)	• Describe the germ layers during the developmental process of the central nervous system Define the developmental stages of central nervous system and organs forming central nervous system such as cerebrum, cerebellum, spinal cord. Interprete the malformations that occur during the development process of the nervous system
	Development of Eye and Ear (T-2)	• Describe the histological and/or developmental features related to Development of Eye and Ear. • Relate structural organization and embryological development to normal function and selected clinical correlations.
	Development of GIS (T-2)	• Describe the histological and/or developmental features related to Development of GIS. • Relate structural organization and embryological development to normal function and selected clinical correlations.
	Histology of Upper GIS (T-3)	• stinguish the histological features of the oral cavity, tongue, and teeth under the light microscope. • Compare oral mucosa types and lip, and differentiate the
	Histology of Lower GIS (T-3)	• Identify the major histological layers of the lower gastrointestinal tract, including the mucosa, submucosa, muscularis externa, and adventitia/serosa. • Distinguish the histological differences between regions of the lower GI tract, such as the small intestine (duodenum, jejunum, ileum), large intestine (colon), rectum, and anal canal. • Recognize histological features that correlate with the absorptive and secretory functions of different segments of the lower GI tract. • Identify regional specializations of the lower GI tract
	Histology of the nervous tissue (P-2)	• Show the histological features of cerebrum, cerebellum and medulla spinalis. • Demonstrate a neuron and label its key histological and structural features. • Explain the microscopic structure of a nerve fiber, including the structure of the myelin sheath and connective tissue organization. • Show the histological features of ganglion.
	Histology of Eye (P-2)	• Distinguish three layers of the eye with their morphologic features • Show the retinal epithelium with their cells by light microscope • Demonstrate the layers of the cornea and say histologic features
	Histology of Ear (P-2)	• Show the structural differences between the outer, middle and inner ear and recognize them at the light microscope levels. • Distinguish the auditory parts of the inner ear from those of the vestibular system. • Show the components of the organ of corti
	Histology of Skin and Adnex (P-2)	• Distinguish two types of the skin by light microscope • Name and distinguish the five layers of the epidermis by light microscope • İdentify the two layers of the dermis and hypodermis • Show the skin sensorial receptor and say their morphological features.

	Histology of Upper GIS (P-2)	• Distinguish histological features of the oral cavity, tongue and tooth features. • Show histological similarities and dissimilarities among the differences of oral mucosae and lip and among the different types of each papillae of the tongue by light microscope. • Demonstrate histological features of esophagus with its layers on its wall. • İdentify the regional variations in the structure of the esophagus.

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
PHYSIOLOGY	General organization of nervous system (T-1)	• Define the general organization of nervous system by explaining its subdivisions as central vs. peripheral; somatic vs. autonomic nervous system; motor vs. sensory divisions • Describe the location and constitution of the Central Nervous System (CNS) • Define the functions of the various cell types in the nervous system • Describe synaptic transmission by giving examples • Describe post-synaptic potentials by giving examples • Name the main neurotransmitters of the nervous system with their main functions • Explain in which ways the neurotransmitter action terminates
	Sensory receptors & receptor potentials (T-1)	• Define somatic (general) and special senses • Describe common features of the sensory receptors • Classify sensory receptors based on anatomical position and based on their sensitivity to specific stimulus modalities • Describe the basic components of the sensory pathways • Explain receptor potential • Describe receptive field by giving examples • Explain adaptation to a sensory stimuli • Explain the differences between rapidly adapting and slowly adapting receptors with their functions
	Sense of touch (T-1)	• Describe the location, type, and function of receptors that mediate the sensations of touch • Describe the steps involved in sensory transduction and action potential generation in cutaneous mechanoreceptors. • Differentiate cutaneous receptors based on their location, receptive field, receptor sensitivity, and receptor adaptation. • Compare the pathways that mediates input from touch and vibratory senses to that mediating information from other sensory modalities. • Describe the two-point discrimination test by explaining how it is used
	Cerebro-spinal-fluid and the blood-brain-barrier, Cerebral Circulation (T-2)	• Describe regulation of cerebral blood flow • Describe characteristics of cerebral microcirculation • Describe general properties of cerebrospinal fluid system • Describe the functions of anatomical structures that secrete, absorb containing cerebrospinal fluid • Describe formation, flow and absorption of cerebrospinal fluid • Define the composition of cerebrospinal fluid • Describe the characteristics of both blood-cerebrospinal fluid and blood-brain barriers • Name diseases that may be related to cerebrospinal fluid and cerebral circulation
	Proprioception (T-1)	• Define the roles of receptors in proprioception • Explain the organization of proprioception pathway • Describe the functional role of muscle spindle in proprioception • Explain the physiological importance of Golgi tendon organ in proprioception and inverse stretch reflex • State the role of joint capsule receptors in proprioception
	Sensation of pain and Thermoreception (T-1)	• Describe the features of pain receptors • Explain the characteristics of the different pain pathways • Describe the intrinsic analgesia system of the body

		• Explain the role of the different parts of the cerebral cortex on the evaluation and perception of pain • Defines the characteristics of visceral pain • Explain the referred pain • Describe the features of thermal receptors • Describe the features of the thermal pathways
	Organization of Cerebral Cortex (T-1)	• Name the brain lobes • Describe white matter and grey matter • Describe the 6-layer organization of cerebral cortex by explaining their features and connections • Explain 5 major functional divisions of cerebral cortex • Localize primary sensory areas, primary motor area, unimodal association areas and multimodal association areas of the cerebral cortex • Describe general functions of primary areas, unimodal association areas and multimodal association areas of the cerebral cortex • Discuss possible methods that can be used to create functional map of cerebral cortex
	Control of body movements from reflex to complex motor control (T-2)	• Define the general principles of central organization of motor pathways • Explain the motor functions of spinal cord • Describe the roles of motor neurons located in the spinal cord • Explain the neural circuitry of stretch reflex and its clinical importance • State the neural circuitry of crossed extensor reflex • Describe the functional organization of motor cortex in voluntary motor actions • Define the roles of corticospinal and corticobulbar tracts in motor actions • Explain the function of red nucleus and corticorubrospinal pathway in motor activities
	Functions of cerebellum and basal ganglia (T-2)	• Define the functional organization of cerebellum • Explain the neural connections of cerebellum with other central nervous system centers • Describe the physiological roles of deep cerebellar nuclei • Explain the functions of different cell types in cerebellar cortex • State the functional organization of basal ganglia • Describe the roles of neurons located in different parts of basal ganglia in terms of neurotransmitters • Define the role of putamen circuit in motor activities • Explain the role of caudate circuit in motor activities
	Hypothalamus, Thalamus, brain stem and reticular formation (T-2)	• Define physiologic anatomy of the brain stem, the reticular activating system and the thalamus • Describe major effects of pontine reticular nuclei on spinal cord and cerebral cortex • Describe major effects of medullary reticular nuclei on spinal
	Physiology of Pain (T-1)	• Explain the physiological mechanisms and regulatory processes related to Physiology of Pain. • Relate these mechanisms to homeostasis and basic clinical changes.
	Physiology of Pain Suppression (T-1)	• Explain the physiological mechanisms and regulatory processes related to Physiology of Pain Suppression. • Relate these mechanisms to homeostasis and basic clinical changes.
	Electroencephalography (T-1)	• Explain the physiological mechanisms and regulatory processes related to Electroencephalography. • Relate these mechanisms to homeostasis and basic clinical changes.
	Different states of brain and Sleep (T-2)	• Explain the physiological mechanisms and regulatory processes related to Different states of brain and Sleep. • Relate these mechanisms to homeostasis and basic clinical changes.
	Limbic system (T-2)	• Explain the physiological mechanisms and regulatory processes related to Limbic system. • Relate these mechanisms to homeostasis and basic clinical changes.
	Physiological basis of cognitive functions (learning, memory, attention, language) (T-2)	• Explain the physiological mechanisms and regulatory processes related to Physiological basis of cognitive functions (learning, memory, attention, language). • Relate these mechanisms to homeostasis and basic clinical changes.
	Taste and Olfaction (T-2)	• Describe the position, the structure and the functions of taste buds. • Name the five major taste receptors and signal transduction mechanisms in these receptors. • Outline the transmission of the taste signals to the insular cortex. • Describe the organization of the olfactory epithelium and olfactory bulb. • Describe transduction of the signals from the olfactory receptors.

		• Outline the olfactory pathways. • Explain the adaptation mechanism of olfactory sensation
	Hearing (T-2)	• Explain the physiological mechanisms and regulatory processes related to Hearing. • Relate these mechanisms to homeostasis and basic clinical changes.
	Vestibular System (T-1)	• Explain the physiological mechanisms and regulatory processes related to Vestibular System. • Relate these mechanisms to homeostasis and basic clinical changes.
	Physiology of Vision (T-3)	• Describe the parts of the eye by explaining their functions • Explain pupillary light reflex • Describe the organization of the retina • Explain how light rays are brought to a focus on the retina • Describe accommodation process • Define hyperopia, myopia, astigmatism, presbyopia, and strabismus • Describe the properties of rods and cones and explain how they respond to light rays • Describe the properties and functions of bipolar, horizontal, amacrine, and ganglion cells of the retina.
	Physiology Lab: Sensory Physiology,(P-1)	• Perform or interpret the physiological measurements addressed in Physiology Lab: Sensory Physiology,. • Explain the physiological basis of the observed results.

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
BIOCHEMISTRY	Biochemical Aspect of Nervous Tissue (T-2)	• Describe the functional organization of the nervous system • Explain the properties of neurons • Describe the processes occurring in a chemical synapse • Explain the biochemistry of blood brain barrier • Define a neurotransmitter, neuropeptide and a neurohormone by mentioning their structure, synthesis and site of origin • Compare neurotransmitter and neurohormones • Compare neurotransmitters and neuropeptides • Explain the metabolism of neurotransmitters • Mention the biosynthetic reactions requiring tetrahydrobiopterin • Explain the glucose metabolism leading to biosynthesis of glycine, aspartate, glutamate and GABA

BAU TIP
BAHÇEŞEHİR ÜNİVERSİTESİ TIP FAKÜLTESİ
"scientia et amore vitae"

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
BIOPHYSICS	Biological Signals and Information Processing (T-1)	• Explain the physical and biophysical principles underlying Biological Signals and Information Processing. • Relate these principles to biomedical measurement, diagnosis, imaging, or treatment as appropriate.
	Biophysics of Sensory Systems and Perception (T-1)	• Explain the physical and biophysical principles underlying Biophysics of Sensory Systems and Perception. • Relate these principles to biomedical measurement, diagnosis, imaging, or treatment as appropriate.
	Biophysical principles of the electroencephalogram (EEG) (T-2)	• Explain EEG electrodes, international 10-10, 10-20 system, • Demonstrate anterior-posterior bipolar montage, common average reference montage • Distinguish common EEG patterns, gamma, alpha, beta, theta, delta waves • Describe rhythmic patterns at characteristic frequencies • Describe basic components of EEG • Define position of electrodes and polarity • Explain diagnostic yield of EEG
	Biophysics of hearing (T-2)	• Explain sound, speech sound, high and low frequency sound, ultrasound • Describe the parts of outer ear, middle ear, inner ear • Explain functions of outer ear, middle ear, inner ear • Define the frequency and decibel discrimination, limits of hearing • Explain harmonics, Fourier analysis • Define binaural hearing • Explain semicircular canals, balance and hair cell relation.
	Biophysical Principles of Hearing Rehabilitation and Auditory Implants (T-1)	• Explain the physical and biophysical principles underlying Biophysical Principles of Hearing Rehabilitation and Auditory Implants. • Relate these principles to biomedical measurement, diagnosis, imaging, or treatment as appropriate.
	Biophysics of Olfactory and Gustatory Systems (T-1)	• Explain the physical and biophysical principles underlying Biophysics of Olfactory and Gustatory Systems. • Relate these principles to biomedical measurement, diagnosis, imaging, or treatment as appropriate.
	Biophysical Principles of Vision and Refractive Errors (T-1)	• Explain the physical and biophysical principles underlying Biophysical Principles of Vision and Refractive Errors. • Relate these principles to biomedical measurement, diagnosis, imaging, or treatment as appropriate.
	Biophysics of vision, rods and cones (T-1)	• Describe the light and basic characteristics of vision, visual acuity and accommodation • Explain the refractive index, Snell's law, lenses • Distinguish the functions of cornea, iris, retina, lens and vitreous humor • Define formation of colors and Grassmann's laws • Explain the measurement of retinal activity, electroretinogram (ERG) • Explain structural and functional properties of rodes, cones, fovea and blind spot
	Ocular Implants and Bionic Vision Systems (T-1)	• Explain the physical and biophysical principles underlying Ocular Implants and Bionic Vision Systems. • Relate these principles to biomedical measurement, diagnosis, imaging, or treatment as appropriate.

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
MICROBIOLOGY	Listeria and Erysipelothrix (T-1)	• Define Listeria and Erysipelothrix Classify Listeria and Erysipelothrix List important properties of Listeria and Erysipelothrix List the clinical manifestations of Listeria and Erysipelothrix infections • Describe the lab diagnosis for Listeria and Erysipelothrix
	Bacillus (T-1)	• Define Bacillus genus Classify Bacillus genus List their important properties of Bacillus • List the clinical manifestations of Bacillus infections • Describe the lab diagnosis for Bacillus • Describe prevention measures from Bacillus infections
	Corynebacterium and other Gram+ rods (T-1)	• Define Corynebacterium and Other Gram-Positive Rods • Classify Corynebacterium and Other Gram-Positive Rods • List important properties of Corynebacterium and related bacilli List the clinical manifestations of Corynebacterium infections • Describe the lab diagnosis for Corynebacterium species • Describe prevention measures from Corynebacterium
	Nocardia and Actinomyces (T-1)	• Define Nocardia and aerobic Actinomycetes • Classify Nocardia and aerobic Actinomycetes • List important properties of Nocardia and aerobic Actinomycetes • List the clinical manifestations of infections of Nocardia and aerobic Actinomycetes • Describe the lab diagnosis for Nocardia and aerobic Actinomycetes
	Mycobacterium (T-2)	• Define Mycobacteria • Classify Mycobacteria List important properties of Mycobacteria • List the clinical manifestations of Mycobacterial infections • Define Atypical Mycobacteria and features • Describe the lab diagnosis for Mycobacteria Define the antibacterial resistance to M.tuberculosis • Describe M.leprae and clinical manifestations • Describe prevention measures for Mycobacterial infections
	Neisseria and related genera (T-2)	• Classify Neisseria genus List important properties of Neisseria genus • List the clinical manifestations of Neisseria infections • Describe the lab diagnosis for N.gonorrheae&N.menengitidis • Define the antibacterial resistance of N.gonorrheae & N.menengitidis Describe prevention measures from Neisseria infections
	Haemophilus and related bacteria (T-1)	• Define Pasteurellaceae family List Pasteurellaceae family members Define Haemophilus and Related Bacteria (Actinobacillus, Aggregatibacter and Pasteurella) Classify Haemophilus and Related Bacteria (Actinobacillus, Aggregatibacter and Pasteurella) List important properties of Pasteurellaceae family members List the clinical manifestations of Haemophilus and Related Bacteria (Actinobacillus, Aggregatibacter and Pasteurella) Describe the lab diagnosis for Pasteurellaceae family members Define the antibacterial resistance to Haemophilus species Describe prevention measures from Haemophilus species
	Bordetella (T-1)	• Define Bordetella genus Classify Bordetella genus List important properties of Bordetella genus List the clinical manifestations of Bordetella infections Describe the lab diagnosis for Bordetella species Describe prevention measures from Bordetella infections
	Legionella (T-1)	• Define Legionella genus Classify Legionella genus List their important properties of Legionella species List the clinical manifestations of Legionella infections Describe the lab diagnosis for Legionella species
	Francisella and Brucella (T-1)	• Define Francisella and Brucella Classify Francisella and Brucella List important properties of Francisella and Brucella List the clinical manifestations of Francisella and Brucella Describe the lab diagnosis for Francisella and Brucella Define the antibacterial resistance to Francisella and Brucella Describe prevention measures from Francisella and Brucella
	Enterobactericea (T-2)	• Define Enterobacteriaceae Classify Enterobacteriaceae members Define the pathogens, as Salmonella, Shigella List general properties of Enterobacteriaceae List the clinical manifestations of Enterobacteriacea Describe the lab diagnosis for Enterobacteriaceae by elementary tests and serologic markers Define the antibacterial resistance to

		Enterobacteriaceae (i.e.ESBL) Describe prevention measures for the Enterobacteriaceae
	Vibrio and Aeromonas (T-1)	• Define Vibrio and Aeromonas Classify Vibrio and Aeromonas List important properties of Vibrio List the clinical manifestations of Vibrio Describe the lab diagnosis for Vibrio and Aeromonas Describe prevention measures from Vibrio and Aeromonas
	Campylobacter- Helicobacter (T-1)	• Define Campylobacter and Helicobacter List Campylobacter and Helicobacter species • Classify Campylobacter and Helicobacter List important properties of Campylobacter and Helicobacter • List clinical manifestations of Campylobacter and Helicobacter • Describe the lab diagnosis for Campylobacter and Helicobacter • Define the antibacterial resistance to Campylobacter and Helicobacter
	The most common infectious agents regarding nervous system (T-1)	• Describe and classify the microorganisms or microbiological concepts related to The most common infectious agents regarding nervous system. • Explain their major properties, pathogenesis, and clinically relevant manifestations. • Describe the basic principles of laboratory diagnosis, prevention, and/or treatment where applicable.
	Pseudomonas and other Nonfermentative bacteria (T-1)	• Define Pseudomonas and other nonfermentative bacteria List nonfermentative bacteria • Classify nonfermentative bacteria List important properties of Pseudomonas List the clinical manifestations of nonfermentative bacteria • Describe the lab diagnosis for Pseudomonas and other nonfermentative bacteria • Define the antibacterial resistance to Pseudomonas

At the end of this lesson, the student will be able to:		
SKILLS		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
MEDICAL EDUCATION	Body-Mind-Behavior : Neurobiological Foundations of Behaviour (T-2)	• Describe the basic structure and function of neurons and synaptic transmission; identify key neurotransmitters (e.g., dopamine, serotonin, norepinephrine, GABA, glutamate) and their roles in mood, motivation, and behaviour; identify key hormones (e.g., cortisol, adrenaline/epinephrine, oxytocin, testosterone, estrogen) and their behavioural effects; describe the roles of key brain structures (e.g., amygdala, hippocampus, hypothalamus, prefrontal cortex) and the HPA axis in regulating behaviour and stress response.
	Body-Mind-Behavior Cognitive Functions (T-2)	• Define core cognitive functions — attention, memory (working, short-term, long-term), perception, language, and executive function; describe the neurobiological correlates of these functions (e.g., prefrontal cortex and executive function, hippocampus and memory consolidation, parietal/occipital cortex and perception); identify key neurotransmitters relevant to cognition (e.g., acetylcholine and memory, dopamine and attention/executive function).

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	TOPIC	LEARNING OUTCOMES
CLINICAL SKILLS	Arterial Blood Gas Sampling (T-1) (P-1)	• Describe the indications, equipment, and safety considerations for Clinical Skills Lab: Arterial Blood Gas Sampling. • Perform the main steps of Clinical Skills Lab: Arterial Blood Gas Sampling in the correct sequence on a simulator/mannequin where applicable. • Apply standard precautions and communicate appropriately during the procedure.

MED2103: Introduction to Infection, Immunity and Tissue Damage (Lymphoid)				
Course Date	February 1 - April 2, 2027			
Exam Date	Committee Exam: April 1, 2027			
Course Coordinator	Ayşe Seval Palteki, Asst. Prof.			
Academic Unit	Academic Staff	Theoretical hours	Practical hours	Total
Biophysics	Bircan Dinç, Assoc. Prof.; Duygu Tarhan, Asst. Prof.; İrem Demirkan, Asst. Prof.	11	1	12
Biochemistry	Özlem Unay Demirel, Assoc. Prof.; Yeşim Neğiş, Assoc. Prof.; Merve Karayel Başar, Asst. Prof.; İrem Kırış, Asst. Prof.	12	0	12
Histology and Embryology	Yasemin Ersoy Çanıllıoğlu, Assoc. Prof.	5	2	7
Medical Microbiology	Gülden Çelik, Prof.; Seyda İğnak Tarlığ, Asst. Prof.; Zehra Kipritçi, Asst. Prof.; Sibel Ergüven; Rabia Can	24	2	26
Pathology	Özlem Yapıcıer, Prof.; Yeşim Gürbüz, Prof.; Zehra Affan	24	0	24
Physiology	Betilay Topkara Arslan, Asst. Prof.	2	0	2
Immunology	Günnur Deniz, Prof.; Gülden Çelik, Prof.	4	0	4
Clinical Skills	Babek Tabandeh; Ufuk Utku Göktuğ	2	2	4
Problem-Based Learning	Faculty members from relevant departments	0	8	8
Panel	Faculty members from relevant departments	0	2	2
TOTAL		**84**	**17**	**101**
Medical Genetics	Timuçin Avşar, Assoc. Prof.	20	0	20
STUDY TIME				**95**

COURSE AIM:

The aim of this course is to provide students with an integrated understanding of infection, immunity, inflammation, tissue injury, repair, and hemodynamic disorders; to explain the biochemical, microbiological, pathological, physiological, histological, and biophysical mechanisms underlying these processes; to introduce relevant diagnostic and imaging principles and practical laboratory applications; and to help students relate these foundational mechanisms to basic clinical conditions.

LEARNING OUTCOMES:

At the end of this course, the student will be able to:

Explain the major mechanisms of cellular injury, cell death, inflammation, tissue repair, and hemodynamic disorders.

Explain the basic components and functions of innate and adaptive immunity and their roles in tissue injury and disease.

Explain the biochemical and physiological mechanisms related to plasma proteins, reactive oxygen species, inflammation, and tissue damage.

Describe medically important infectious agents covered in the committee and explain basic principles of their pathogenesis, laboratory diagnosis, prevention, and antimicrobial susceptibility.

Explain selected biophysical and diagnostic principles related to imaging, biomaterials, sterilization, electric current, lasers, and related medical technologies.

Interpret basic laboratory, histological, pathological, microbiological, and practical findings and relate them to basic clinical conditions.

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	TOPIC	LEARNING OUTCOMES
HISTOLOGY AND EMBRYOLOGY	Histology of lymphoid organs (T-2)	• Describe the histological and/or developmental features related to Histology of lymphoid organs. • Relate structural organization and embryological development to normal function and selected clinical correlations.
	Development of Head and Neck (T-3)	• Describe the histological and/or developmental features related to Development of Head and Neck. • Relate structural organization and embryological development to normal function and selected clinical correlations.

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	TOPIC	LEARNING OUTCOMES
PHYSIOLOGY	Structure and functions of white blood cells (T-2)	• Explain regulation of erythropoiesis and importance of vitamin B12, folic acid and iron for RBC production. • Explain the features of red blood cells (RBC) by describing their life span, count, shape, hemoglobin concentrations. • Explain the meaning of mean corpuscular volume (MCV), microcytosis, macrocytosis; mean corpuscular hemoglobin; and the mean corpuscular hemoglobin concentration (MCHC). • Describe how we can measure hematocrit value and what it reflects • Explain how red blood cells transport oxygen and CO. 2 • Describe the metabolic pathways that RBC are using for energy production. • Explain the erythrocyte sedimentation rate (ESR) and the factors affecting ESR • Explain the blood groups and how we can identify blood types

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	TOPIC	LEARNING OUTCOMES
BIOCHEMISTRY	Plasma Proteins and Acute Phase Reactants (T-3)	• Explain the principal biochemical pathways, molecules, or laboratory parameters related to Plasma Proteins and Acute Phase Reactants. • Relate these biochemical mechanisms to normal physiology and selected clinical conditions.

	Patterns of Plasma Protein Abnormalities (T-1)	• Explain the principal biochemical pathways, molecules, or laboratory parameters related to Patterns of Plasma Protein Abnormalities. • Relate these biochemical mechanisms to normal physiology and selected clinical conditions.
	ROS and Tissue Damage (T-2)	• Describe the term “free radical” Explain the formation of various types of reactive oxygen species (ROS) • Describe the properties of ROS • Explain the sources of ROS in cells • Explain how ROS are formed by nonenzymatic and enzymatic reactions • Explain the beneficial effects of ROS in cells • Explain the mechanisms of ROS mediated cellular injury • Discuss the role of ROS in human diseases and clinical conditions associated with ROS damage
	Antioxidants: Cellular Defenses Against Reactive Oxygen Species (T-1)	• Explain the term antioxidant • Classify antioxidants according to their nature and action • Discuss how enzymatic antioxidants are expressed in cells • Explain the function and mechanism of action of antioxidant enzymes (e.g., superoxide dismutase,catalase, glutathione reductase, and glutathione peroxidases) in cellular defence against reactive oxygen species • Expain the mechanisms underlying the antioxidant effects of nutritients, specific vitamins and trace elements • Discuss whether too much antioxidants are good or bad for human health
	Disorders of Amino Acids Metabolism (T-3)	• Explain the metabolism of amino acids during well-fed state, fasting state and starvation • Tell the significance of essential and non-essential amino acids in the organism • Explain the overflow of nitrogen in amino acid metabolism • Tell the enzymes of urea cycle • Explain the biological role of urea cycle • Explain the defects of the urea cycle • Explain the catabolism of carbon skeleton of amino acids • Classify the human genetic disorders affecting amino acid catabolism • Explain the clinical significance of amino acid related disorders • Define the tests performed in the “National newborn screening program in Turkey” • Define the cofactors and coenzymes involved in amino acid metabolism
	Disorders of Vitamin Metabolism (T-2)	• Define the structure of water and lipid soluble vitamins • Explain the Vitamin B12, Folic acid and Vitamin D metabolism • Explain the functional role of Vitamin B12, Folic acid and Vitamin D • Explain the mechanisms of disorders related with Vitamin B12, Folic acid and Vitamin D metabolism • Define the clinical characteristics of disorders related with Vitamin B12, Folic acid and Vitamin D metabolism

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
BIOPHYSICS	Biomaterials (T-2)	• Explain the physical and biophysical principles underlying Biomaterials. • Relate these principles to biomedical measurement, diagnosis, imaging, or treatment as appropriate.
	Electromagnetic Waves and Biophysical Systems in Sterilization. (T-1)	• Explain the physical and biophysical principles underlying Electromagnetic Waves and Biophysical Systems in Sterilization.. • Relate these principles to biomedical measurement, diagnosis, imaging, or treatment as appropriate.
	Effects of electric current on tissues (T-1)	• Define the basics of electrodiagnosis, low, medium, and high-frequency currents. • Explain the physical and chemical effects of direct current, electrolysis, iontophoresis, electrophoresis, and electroosmosis

		• Describe the electrotherapy medical galvanization, antifibrillation, electroshock, iontophoresis, and surgical galvanism • Define physiological, general, and local effects of electricity. • Distinguish of diathermy, shortwave diathermy, and microwave diathermy
	Lasers and medical practices (T-1)	• Define light, basic laser properties, methods of laser generation • Distinguish laser types used in medicine • Explain laser tissue interactions • Discuss laser treatment and therapy processes and describe the optical spectroscopic, diagnostic and imaging applications in medicine. • Define the essential laser safety precautions.
	Magnetic Resonance Imaging (MRI) (T-2)	• Discuss the physics of image formation, contrast mechanisms, and how these interact with imaging sequences • Define magnetic resonance sequences, including radiofrequency pulses, different readout strategies, and gradient sensitization for motion/flow/diffusion. • Describe critically appraise methods available for quantitative, microstructural and functional MRI • Evaluate the techniques used for image manipulation in CT and the properties which affect image quality in CT Scanning • Discuss the safety issues in MRI and understand how safety can be accessed via numerical models
	Ultrasound Imaging Techniques (T-2)	• Describe the basic properties and modes of ultrasound. • Describe continuous-wave, pulsed-wave and color flow imaging • Define Doppler echocardiography • Explain the basic principle of piezoelectric transducer • Explain the use of ultrasound gel on the imaging area

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
MICROBIOLOGY	Introduction to Anaerobs and anaerobic infections , Clostiridial infections (T-2)	• Describe and classify the microorganisms or microbiological concepts related to Introduction to Anaerobs and anaerobic infections , Clostiridial infections. • Explain their major properties, pathogenesis, and clinically relevant manifestations. • Describe the basic principles of laboratory diagnosis, prevention, and/or treatment where applicable.
	Anaerobic Gram Negative Bacteria (T-1)	• Define anaerobic gram negative bacteria • Classify anaerobic gram negative bacteria • List important properties of anaerobic gram negative bacteria • List clinical manifestations of anaerobic gram negative bacteria • Describe the lab diagnosis for anaerobic gram negative bacteria • Define the antibacterial resistance in anaerobic gram negative bacteria
	Anaerobic, Non-Spore-Forming, Gram Positive Bacteria (T-1)	• Define anaerobic non-spore-forming gram positive bacteria • Classify anaerobic non-spore-forming ram positive bacteria • List important feature of non-spore-forming gram positive bacteria • List clinical manifestations of non-spore-forming gram positive bacteria • Describe the lab diagnosis of non-spore-forming gram positive bacteria • Define the antibacterial resistance in non-spore-forming gram positive bacteria
	Bartonella& Miscellaneous Gram negative Bacteria (T-1)	• Define Bartonella genus Define Miscellaneous Gram negative Bacteria • Classify Miscellaneous Gram negative Bacteria • List important properties of Bartonella and Miscellaneous Gram negative Bacteria • List the clinical manifestations of Bartonella and related bacteria • Describe the lab diagnosis of Bartonella and related bacteria

	Spirochetes: Treponema, Leptospira and other Spirochetes (T-2)	• Define Spirochetes List Spirochetes: Treponema, Leptospira and Borrelia • Classify Spirochetes: Treponema, Leptospira and Borrelia • List important properties of Spirochetes List clinical manifestations of Treponema, Leptospira and Borrelia Describe the lab diagnosis of Spirochetes Prevention measures from Treponema, Leptospira and other Spirochetes infections
	Chlamydia and Chlamydophila (T-1)	• Define Chlamydia and Chlamydophila • Classify Chlamydia and Chlamydophila • List important properties of Chlamydia and Chlamydophila • List the clinical manifestations of Chlamydia and Chlamydophila infections • Describe the lab diagnosis of Chlamydia and Chlamydophila
	Mycoplasma and Ureoplasma (T-1)	• Define Mycoplasma and Ureoplasma • Classify Mycoplasma and Ureoplasma • List important properties of Mycoplasma and Ureoplasma • List the clinical manifestations of Mycoplasma and Ureoplasma infections • Describe the lab diagnosis of Mycoplasma and Ureoplasma • Describe prevention measures from Mycoplasma and Ureoplasma infections
	Rickettsia, Erlichia, Anaplasma and Coxiella (T-1)	• Define Rickettsia, Erlichia, Anaplasma and Coxiella • Classify Rickettsia, Erlichia, Anaplasma and Coxiella • List important properties of Rickettsia,,Erlichia, Anaplasma and Coxiella List the clinical manifestations of Rickettsia,,Erlichia, Anaplasma and Coxiella • Describe the lab diagnosis of Rickettsia,,Erlichia, Anaplasma and Coxiella
	Parasitology: Structure & Classification (T-1)	• Define the basic structure of parasites • Define the functions of the basic structural parts of parasites • Classify parasites
	Intestinal Protozoa (T-1)	• Define protozoa • Classify protozoa List intestinal protozoa • List important properties of intestinal protozoa • List their clinical manifestations of intestinal protozoa • Describe the lab diagnosis for intestinal protozoa • Describe treatment and prevention measures from intestinal protozoan infections
	Urogenital Protozoa (T-1)	• Define urogenital protozoa • Classify urogenital protozoa • List important properties of urogenital protozoa • List clinical manifestations of urogenital protozoa • Describe the lab diagnosis for urogenital protozoa • Describe treatment and prevention measures from urogenital protozoan infections
	Blood Protozoa (T-1)	• Define blood protozoa • Classify blood protozoa • List important properties of blood protozoa • List clinical manifestations of blood protozoa • Describe the lab diagnosis for blood protozoa • Describe treatment and prevention measures from blood protozoan infections
	Tissue Protozoa (T-1)	• Define tissue protozoa • Classify tissue protozoa List important properties of tissue protozoa • List clinical manifestations of tissue protozoa • Describe the lab diagnosis for tissue protozoa • Describe treatment and prevention measures from tissue protozoan infections
	Helmints: Nematods (T-2)	• Define helmints • Classify helmints List nematodes • List important properties of nematodes List clinical manifestations of nematodes Describe the lab diagnosis for nematodes Describe treatment and prevention measures from nematode infections
	Helmints: Cestods (T-1)	• Define cestodes Classify cestodes • List important properties of cestodes

		• List clinical manifestations of cestodes • Describe the lab for cestodes • Describe treatment and prevention measures from cestode infections
	Helmints: Trematods (T-1)	• Define trematodes • Classify trematodes List important properties of trematodes • List clinical manifestations of trematodes • Describe the lab diagnosis for trematodes • Describe treatment and prevention measures from trematode infections
	Opportunistic Parasites (T-1)	• List the main opportunistic parasites • Explain the importance of them in certain hosts • List advanced diagnostic methods for opportunistic parasites • List important properties of opportunistic parasites • Compare them in normal host and impaired patients • Describe treatment and prevention measures to opportunistic parasites
	Arthropods (T-1)	• Define arthropodes • Classify arthropodes • List important properties of arthropodes • List clinical manifestations of arthropodes • Describe the lab diagnosis for arthropodes • Describe treatment and prevention measures from arthropode infections
	Antiparasitic Agents (T-1)	• Define antiparasitic agents • List their main targets in the parasite • Classify antiparasitic agents
	Diagnosis of helmints (Cellophane band application): (P-1)	• Apply the laboratory approach used in Diagnosis of helmints (Cellophane band application):. • Interpret the principal laboratory findings and relate them to microbiological diagnosis.

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
IMMUNOLOGY	Hypersensitivity Reactions (T-2)	• Explain the immune mechanisms related to Hypersensitivity Reactions. • Relate these mechanisms to protection, disease, diagnosis, prevention, or treatment as appropriate.
	Immune Responses to Infectious Agents (T-2)	• Explain the immune mechanisms related to Immune Responses to Infectious Agents. • Relate these mechanisms to protection, disease, diagnosis, prevention, or treatment as appropriate.
	Immunization and vaccines (T-1)	• Explain the immune mechanisms related to Immunization and vaccines. • Relate these mechanisms to protection, disease, diagnosis, prevention, or treatment as appropriate.

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
PATHOLOGY	Introduction to pathology, tissue processing (T-1)	• Explain the mechanisms and morphological features related to Introduction to pathology, tissue processing. • Relate the pathological process to its major clinical consequences and diagnostic findings.
	Histochemical/immunohistochemical stains, frozen section (T-1)	• Explain the mechanisms and morphological features related to Histochemical/immunohistochemical stains, frozen section. • Relate the pathological process to its major clinical consequences and diagnostic findings.

	Overview of cellular responses to stress and noxious stimuli (T-1)	• Explain the mechanisms and morphological features related to Overview of cellular responses to stress and noxious stimuli. • Relate the pathological process to its major clinical consequences and diagnostic findings.
	Sequence of events in cell injury and cell death,Apoptosis, Autophagy (T-1)	• Explain the mechanisms and morphological features related to Sequence of events in cell injury and cell death,Apoptosis, Autophagy. • Relate the pathological process to its major clinical consequences and diagnostic findings.
	Mechanisms of cell injury and death, Hypoxia and Ischemia, Oxidative Stress (T-1)	• Explain the mechanisms and morphological features related to Mechanisms of cell injury and death, Hypoxia and Ischemia, Oxidative Stress. • Relate the pathological process to its major clinical consequences and diagnostic findings.
	Cellular Adaptations of Stress (Hypertrophy, hyperplasia, atrophy, metaplasia) (T-1)	• Explain the mechanisms and morphological features related to Cellular Adaptations of Stress (Hypertrophy, hyperplasia, atrophy, metaplasia). • Relate the pathological process to its major clinical consequences and diagnostic findings.
	Intracellular accumulations, pathologic calcification, cellular aging (T-1)	• Explain the mechanisms and morphological features related to Intracellular accumulations, pathologic calcification, cellular aging. • Relate the pathological process to its major clinical consequences and diagnostic findings.
	Overview of inflammation and tissue repair (T-1)	• Explain the mechanisms and morphological features related to Overview of inflammation and tissue repair. • Relate the pathological process to its major clinical consequences and diagnostic findings.
	Acute inflammation/Leukocyte recruitment and activation in inflammation (T-1)	• Explain the mechanisms and morphological features related to Acute inflammation/Leukocyte recruitment and activation in inflammation. • Relate the pathological process to its major clinical consequences and diagnostic findings.
	Phagocytosis and clearance of the offending agent/Leukocyte- mediated tissue injury (T-1)	• Explain the mechanisms and morphological features related to Phagocytosis and clearance of the offending agent/Leukocyte-mediated tissue injury. • Relate the pathological process to its major clinical consequences and diagnostic findings.
	Mediators of inflammation (Vasoactive amines) (T-1)	• Explain the mechanisms and morphological features related to Mediators of inflammation (Vasoactive amines). • Relate the pathological process to its major clinical consequences and diagnostic findings.
	Mediators of inflammation (Cytokines and chemokines, Complement system, Other mediators) (T-1)	• Explain the mechanisms and morphological features related to Mediators of inflammation (Cytokines and chemokines, Complement system, Other mediators). • Relate the pathological process to its major clinical consequences and diagnostic findings.
	Outcomes of acute inflammation/morphologic patterns (T-1)	• Explain the mechanisms and morphological features related to Outcomes of acute inflammation/morphologic patterns. • Relate the pathological process to its major clinical consequences and diagnostic findings.
	Chronic inflammation (Causes, morphologic features , cells and mediators) (T-1)	• Explain the mechanisms and morphological features related to Chronic inflammation (Causes, morphologic features , cells and mediators). • Relate the pathological process to its major clinical consequences and diagnostic findings.
	Systemic effects of inflammation / Tissue Repair (T-1)	• Explain the mechanisms and morphological features related to Systemic effects of inflammation / Tissue Repair. • Relate the pathological process to its major clinical consequences and diagnostic findings.
	Repair by scarring/factors that impair tissue repair (T-1)	• Explain the mechanisms and morphological features related to Repair by scarring/factors that impair tissue repair. • Relate the pathological process to its major clinical consequences and diagnostic findings.

	Clinical examples of abnormal wound healing and scaring (T-1)	• Explain the mechanisms and morphological features related to Clinical examples of abnormal wound healing and scaring. • Relate the pathological process to its major clinical consequences and diagnostic findings.
	Thrombosis and Embolism (T-1)	• Explain the mechanisms and morphological features related to Thrombosis and Embolism. • Relate the pathological process to its major clinical consequences and diagnostic findings.
	Infarction and shock (T-1)	• Explain the mechanisms and morphological features related to Infarction and shock. • Relate the pathological process to its major clinical consequences and diagnostic findings.
	Hyperemia and congestion, edema, hemorrhage (T-1)	• Explain the mechanisms and morphological features related to Hyperemia and congestion, edema, hemorrhage. • Relate the pathological process to its major clinical consequences and diagnostic findings.
	Normal Hemostasis (T-1)	• Explain the mechanisms and morphological features related to Normal Hemostasis. • Relate the pathological process to its major clinical consequences and diagnostic findings.
	Genetic diseases, nature of genetic abnormalities (T-1)	• Explain the mechanisms and morphological features related to Genetic diseases, nature of genetic abnormalities. • Relate the pathological process to its major clinical consequences and diagnostic findings.
	Complex Multigenic Disorders, Cytogenetic Disorders (T-1)	• Explain the mechanisms and morphological features related to Complex Multigenic Disorders, Cytogenetic Disorders. • Relate the pathological process to its major clinical consequences and diagnostic findings.
	Single-Gene Disorders With Atypical Patterns of Inheritance (T-1)	• Explain the mechanisms and morphological features related to Single-Gene Disorders With Atypical Patterns of Inheritance. • Relate the pathological process to its major clinical consequences and diagnostic findings.
	Pathology LAB 1 (P-2)	• Gain the ability of identifying the pathological areas in normal tissues microscopically • Get through to benign and malignant tumors microscopically • Give descriptions for the microscopic findings of neoplasms

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
CLINICAL SKILLS	Dressing Wounds In Skin Injuries (T-1) (P-1)	• Describe the indications, equipment, and safety considerations for Clinical Skills Lab: Dressing Wounds In Skin Injuries. • Perform the main steps of Clinical Skills Lab: Dressing Wounds In Skin Injuries in the correct sequence on a simulator/mannequin where applicable. • Apply standard precautions and communicate appropriately during the procedure.
	Nasogastric Tube Insertion (T-1) (P-1)	• Describe the indications, equipment, and safety considerations for Clinical Skills Lab: Nasogastric Tube Insertion. • Perform the main steps of Clinical Skills Lab: Nasogastric Tube Insertion in the correct sequence on a simulator/mannequin where applicable. • Apply standard precautions and communicate appropriately during the procedure.

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	**TOPIC**	**LEARNING OUTCOMES**

PANEL	Edema (T-2)	• Explain the key concepts and principles related to Edema.

MED2104: Introduction to Hematology and Oncology				
Course Date	**April 5 - June 11, 2027**			
Exam Date	**Committee Exam: June 10, 2027**			
Course Coordinator	Ayşe Seval Palteki, Asst. Prof.			
Academic Unit	**Academic Staff**	**Theoretical hours**	**Practical hours**	**Total**
Biophysics	Serdar Durdağı, Prof.; Bircan Dinç, Assoc. Prof.; Duygu Tarhan, Asst. Prof.; İrem Demirkan, Asst. Prof.	11	0	11
Biochemistry	Özlem Unay Demirel, Assoc. Prof.; Yeşim Neğiş, Assoc. Prof.; Merve Karayel Başar, Asst. Prof.; İrem Kırış, Asst. Prof.	12	2	14
Medical Microbiology	Gülden Çelik, Prof.; Seyda İğnak Tarlığ, Asst. Prof.; Zehra Kipritçi, Asst. Prof.; Rabia Can	32	3	35
Pathology	Özlem Yapıcıer, Prof.; Yeşim Gürbüz, Prof.; Zehra Affan	35	0	35
Pharmacology	Kevser Erol, Prof.; Şahika Güner, Asst. Prof.	20	0	20
Physiology	Numan Ermutlu, Prof.; Betilay Topkara Arslan, Asst. Prof.; Elif Bahadır, Asst. Prof.; Yasemin Keskin Ergen, Asst. Prof.	4	2	6
Immunology	Günnur Deniz, Prof.	2	0	2
Radiation Oncology	Cengiz Gemic, Prof.; Volkan Niyazi Demircan, Asst. Prof.	7	0	7
Internal Medicine	Tarık Ercan, Asst. Prof.	2	0	2
Clinical Skills	Emre Ünal; Cansu Sarıkaya	2	2	4
Problem-Based Learning	Faculty members from relevant departments	0	8	8
Panel	Faculty members from relevant departments	0	6	6
TOTAL		**127**	**23**	**150**
Medical Genetics	Timuçin Avşar, Assoc. Prof.	6	0	6
STUDY TIME				**84**

COURSE AIM:

The aim of this course is to provide students with an integrated understanding of hematology, hemostasis, oncogenesis, neoplasia, infectious agents, pharmacological principles, radiation biology, and selected diagnostic and therapeutic technologies; to explain the pathological, physiological, biochemical, microbiological, pharmacological, immunological, and biophysical mechanisms involved in hematologic and oncologic conditions; and to help students interpret relevant laboratory and practical findings and relate them to basic clinical situations.

LEARNING OUTCOMES:

At the end of this course, the student will be able to:

- Explain the normal physiology and biochemical basis of blood cells, hemoglobin, hemostasis, coagulation, and fibrinolysis.
- Explain the mechanisms, morphology, and major clinical consequences of neoplasia and selected hematologic diseases.
- Describe the medically important viral and fungal agents covered in the committee and explain basic principles of their pathogenesis and laboratory diagnosis.
- Explain fundamental pharmacological principles including pharmacodynamics, pharmacokinetics, drug metabolism, interactions, rational prescribing, and antimicrobial therapy.
- Explain the basic principles of radiation biology, radiation protection, oncologic treatment, imaging, and selected medical technologies.
- Interpret basic laboratory, pathological, microbiological, biochemical, physiological, and practical findings and relate them to hematologic and oncologic clinical conditions.

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
PHYSIOLOGY	Hemostasis and coagulation (T-2)	• Describe vasospasm, role of vasospasm in hemostasis and detailed mechanisms underlying the vasospasm. • Describe formation of platelet plug, role of platelet plug in hemostasis and detailed mechanisms underlying the platelet plug formation. • Describe formation of blood clot, role of blood clot in hemostasis and detailed mechanisms underlying the blood clot formation. • Name each component of intrinsic and extrinsic coagulation pathways Describe process of prevention of blood clotting • Name procoagulant and anticoagulants factors and their specific roles • Describe concept of fibrinolysis and name factors promoting fibrinolysis • Describe bleeding diathesis and role of individual factors in bleeding diathesis • Name a few clinically important diseases due to abnormal coagulation • Name natural and artificial anticoagulants • Name coagulation test that are used in clinical practice and physiology underlying these tests
	Blood Physiology (P-1)	• Perform or interpret the physiological measurements addressed in Blood Physiology. • Explain the physiological basis of the observed results.

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
BIOCHEMISTRY	Metabolism of Purine & Pyrimidine Nucleotides (T-2)	• Integrate the terminology and defining structural features that distinguish different classes of nucleotide metabolites • Name the major purine and pyrimidine bases and identify amino acid and one-carbon metabolites that contribute to the synthesis of these ring structures. • Connect the pentose phosphate pathway to 5'phosphoribosyl-1-pyrophosphate (PRPP) synthesis and explain the central role of this metabolite in nucleotide metabolism

		• Explain the de novo synthesis of purine and pyrimidine nucleotides with emphasis on the key regulated steps. • Explain the purine and pyrimidine salvage pathways • Explain the regulation of purine and pyrimidine synthesis • Describe the ribonucleotide reductase reaction and its regulation • Explain the synthesis thymine and its relevance to pharmacotherapy • Explain the catabolic pathways of purine and pyrimidine nucleotides
	Disorders of Purine & Pyrimidine Metabolism (T-1)	• Identify the disorders of (such as gout, deficiencies of HPRTase, adenosine deaminase and nucleotide phosphorylase), describe their mechanism and primary clinical presentations. • Expain the causes an treatment of gout • Explain how glucose-6-phosphatese deficiency can cause gout formation Identify inborn errors of pyrimidine metabolism • Expain the etiology and primary clinical presentations of orotic aciduria
	Biochemistry of Hemoglobin (T-2)	• Identify heme structure • Recite and define three oxidation states of heme • Define ligand • Define KD • Define cooperative binding and sketch a binding curve • Name and interpret the three factors that affect oxygen binding to hemoglobin
	Hemoglobin Disorders (T-1)	• Understand how the basic anatomy of a gene has a direct bearing on the occurrence of genetic disease. • Know the normal and abnormal expression patterns of the hemoglobin genes. • Understand the mutations that cause quantitative abnormalities in globin. Unequal crossing over, and every other possible type of mutation • Recognize mutations that cause qualitative abnormalities in globin. • Understand the molecular basis of sickle cell anemia
	Complete Blood Count and Peripheral Blood Smear (T-1)	• List the parameters of complete blood count Explain briefly the parameters of complete blood count Identify the components peripheral blood smear Describe how the peripheral blood smear is made
	Biochemical aspect of anemia (T-2)	• Describe erythropoiesis and its regulation • Compare erythrocyte and reticulocyte • Describe the iron cycle • Define anemia • Classify the types of anemia according to morphology and aetiology Identify the typical hemoglobin levels that define anemia in children/adolescents and post-pubertal men and women • List factors that impair the normal reticulocyte response to anemia
	Biochemistry of Tumor markers (T-2)	• Define a biomarker • Classify tumor markers according to tissue of origin and structure • Describe when a test can be used to screen the general population for a particular disorder • Know the ideal characteristics of a tumor marker • Explain the current use of tumor markers and their limitations • Understand the role of tumor markers for diagnosis and management of patients with cancer • Know the emerging technologies for tumor markers • Understand the role of tumor markers for therapeutic selection • List the applications of tumor markers
	Biochemistry of Coagulation, PT, PTT Tests (T-1)	• Outline the sequential mechanisms involved in normal hemostasis. • Summarize the processes through which the vessel wall regulates hemostasis and thrombosis. • Describe the role of platelets in hemostasis and thrombosis. • Outline pathways through which antiplatelet drugs act. • Describe the pathways of blood coagulation, and how these are tested in the clinical hemostasis laboratory to identify coagulation disorders. • Describe the physiologic inhibitors of blood coagulation. • Outline pathways through which anticoagulant drugs act. • Describe the main components of the fibrinolytic system. • Describe how thrombolytic (fibrinolytic) drugs act.

	Clinical laboratory findings of anemia (P-1)	• Discuss the hematological parameters used in the laboratory to diagnose anemia • List the red cell indices used to diagnose anemia • Describe the diagnosis of anemia morphologically by using peripheral blood smear
	LAB-Biochemistry of hematology (P-1)	• Explain the principles in the collection and handling of blood specimen • Define complete blood count (CBC) and explain what is it used for and how it is reported • Define each parameter in CBC and state normal adult values for CBC test results • Explain leukocyte (WBC) differential analysis • Decribe how red and white blood cell morphology is analyzed on a peripheral smear and define the morphology of each cell type observed • Explain how reticulocytes is analyzed under microscope and define their morphology

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
BIOPHYSICS	Electromagnetic Radiation (T-1)	• Explain the physical and biophysical principles underlying Electromagnetic Radiation. • Relate these principles to biomedical measurement, diagnosis, imaging, or treatment as appropriate.
	Radioactivity (T-2)	• Describe the quantities, units, radioisotopes of radioactive elements • Explain interaction of radiation with matter • Explain energy transfer process, half-life, decay types • Explain radiation chemistry, theory and models of cell survival curves, types of cellular damage • Explain exposure to background radiation and other radioactive sources, applications in diagnose and therapy
	Biological Effects of Radiation and Protection from Radiation (T-2)	• Define the basics of ionizing radiation biological effects and risks from cellular to human. • Explain the factors that affect the dose-effect relationship. • Describe the acute and late effects from ionizing radiation. • Define radiation carcinogenesis, stochastic effects of ionizing radiation. • Distinguish of radionuclides and biological effects of radionuclides in human body.
	X-Ray Radiography and Computerized Tomography (CT) (T-2)	• Explain the physical and biophysical principles underlying X-Ray Radiography and Computerized Tomography (CT). • Relate these principles to biomedical measurement, diagnosis, imaging, or treatment as appropriate.
	Positron Emission Tomography (PET) and Single Photon Emission Computed Tomography (SPECT) (T-2)	• Explain the physical and biophysical principles underlying Positron Emission Tomography (PET) and Single Photon Emission Computed Tomography (SPECT). • Relate these principles to biomedical measurement, diagnosis, imaging, or treatment as appropriate.
	Biophysics LAB: Viscosity (P-1)	• Apply the biophysical principles demonstrated in Biophysics LAB: Viscosity. • Interpret the measurements or observations obtained during the application.

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
MEDICAL MICROBIOLO	Viral Structure (T-1)	• Define the basic structure of viruses • Define the functions of the basic structural parts of virus
	Viral Pathogenesis (T-1)	• Define determinants of viral disease

		• Define inclusion bodies in viral infection • Define persistent viral infection • Define latent viral infection • Define oncogenic viruses List oncogenic viruses • List the host protective responses in viral infections
	Herpesvirus (T-1)	• Define herpesviruses • Classify herpesviruses List the important properties of herpesviruses • List the clinical manifestations of herpesviruses • Describe the lab diagnosis of herpesvirus infections • Define the antiviral resistance in herpes virusinfections • Describe prevention measures from herpesvirus infections
	Adenoviruses (T-1)	• Define adenoviruses • Classify adenoviruses • List the important properties of adenoviruses • List the clinical manifestations of adenoviruses • Describe the lab diagnosis of adenovirus infections • Define the antiviral resistance in adenovirus infections • Describe prevention measures from adenovirus infections
	Poxviruses (T-1)	• Define poxviruses • Classify poxviruses • List the important properties of poxviruses • List the clinical manifestations of poxviruses • Describe the lab diagnosis of poxvirus infections • Define the antiviral resistance in poxvirus infections • Describe prevention measures from poxvirus infections
	Parvoviruses (T-1)	• Define parvoviruses • Classify parvoviruses • List the important properties of parvoviruses • List the clinical manifestations of parvovirus infections • Describe the lab diagnosis of parvovirus infections • Define the antiviral resistance in parvovirus infections • Describe prevention measures from parvovirus infections
	Papovaviruses (T-1)	• Define papovaviruses • Classify papovaviruses • List the important properties of papovaviruses • List the clinical manifestations of papovaviruses • Describe the lab diagnosis in papovavirus infections • Define the antiviral resistance in papovavirus infections • Describe prevention measures from papovavirus infections
	Hepatitis Viruses (T-1)	• Define hepatitis viruses • Classify hepatitis viruses • List the important properties of hepatitis viruses • List the clinical manifestations of hepatitis virus infections • Describe the lab diagnosis of hepatitis virus infections • Define the antiviral resistance in hepatitis viruses • Describe prevention measures from hepatitis virus infections
	Orthomyxoviruses (T-1)	• Define orthomyxoviruses • Classify orthomyxoviruses • List the important properties of orthomyxoviruses • List the clinical manifestations of orthomyxoviruses • Describe the lab diagnosis of orthomyxovirus infections • Define the antiviral resistance in orthomyxovirus infections • Describe prevention measures from orthomyxovirus infections
	Paramyxoviruses (T-1)	• Define paramyxoviruses • Classify paramyxoviruses

		• List thei important properties of paramyxoviruses • List the clinical manifestations of paramyxoviruses • Describe the lab diagnosis of paramyxovirus infections • Define the antiviral resistance in paramyxovirus infections • Describe prevention measures from paramyxovirus infections
	Coronaviruses (T-1)	• Define coronaviruses • Classify coronaviruses • List the important properties of coronaviruses • List the clinical manifestations of coronaviruses • Describe the lab diagnosis of coronavirus infections • Define the antiviral resistance in coronavirus infections • Describe prevention measures from coronavirus infections
	Picornavirus (T-1)	• Define picornaviruses • Classify picornaviruses • List the important properties picornaviruses • List the clinical manifestations of picornaviruses • Describe the lab diagnosis in picornavirus infections • Define the antiviral resistance in picornavirus infections • Describe prevention measures from picornavirus infections
	Rabies (T-1)	• Define rabies virus • Classify rabies virus • List the important properties of rabies • List the clinical manifestations of rabies • Describe the lab diagnosis of rabies • Define the antiviral resistance in rabies • Describe prevention measures from rabies virus infections
	Togaviruses (T-1)	• Define togaviruses • Classify togaviruses • List the important properties of togaviruses • List the clinical manifestations of togaviruses • Describe the lab diagnosis of togavirus infections • Define the antiviral resistance in togavirus infections • Describe prevention measures from togavirus infections
	Flaviviruses (T-1)	• Define flaviviruses • Classify flaviviruses • List the important properties of flaviviruses • List their clinical manifestations of flaviviruses • Describe the lab diagnosis of flavivirus infections • Define the antiviral resistance in flavivirus infections • Describe prevention measures from flavivirus infections
	Arena-Bunyaviruses (T-1)	• Describe and classify the microorganisms or microbiological concepts related to Arena-Bunyaviruses. • Explain their major properties, pathogenesis, and clinically relevant manifestations. • Describe the basic principles of laboratory diagnosis, prevention, and/or treatment where applicable.
	Filoviruses and Bornaviruses (T-1)	• Define filoviruses and bornaviruses • Classify filoviruses and bornaviruses • List the important properties of filoviruses and bornaviruses • List their clinical manifestations of filoviruses and bornaviruses • Describe the lab diagnosis of filovirus bornavirus infections • Define the antiviral resistance in filovirus bornavirus infections • Describe prevention measures from filovirus bornavirus infections
	Antivirals (T-1)	• Define antiviral agents List the main targets of antivirals in the virus

		• Classify antivirals • Define antiviral resistance • Describe resistance mechanisms for antivirals Classify antiviral susceptibility methods
	Reoviruses & Other GE Viruses (T-1)	• Define reoviruses and other GE viruses • Classify reoviruses and other GE viruses • List the important properties of reoviruses and other GE viruses • List the clinical manifestations of reoviruses and other GE viruses • Describe the lab diagnosis in reoviruses and other GE viruses infections • Define the antiviral resistance of reoviruses and other GE viruses infections • Describe prevention measures from reoviruses and other GE viruses infections
	Retroviruses and HIV) (T-1)	• Define retroviruses • Classify retroviruses • List the important properties of retroviruses • List the clinical manifestations of retroviruses • Describe the lab diagnosis of retrovirus infections • Define the antiviral resistance in retrovirus infections • Describe prevention measures from retrovirus infections
	Medically Important Fungi and Fungal Structure (T-1)	• Define the basic structure of fungi • Define the functions of the basic structural parts of fungi • Define medically important fungi
	Prions (T-1)	• Define Prions • Classify Prions List the important properties of prions List their clinical manifestations of prions • Describe the lab diagnosis in prion infections • Describe prevention measures from prion infections
	Opportunistic Fungi (T-1)	• Define opportunistic fungi • Classify opportunistic fungi • List the important properties of opportunistic fungi • List the clinical manifestations of of opportunistic fungi • Describe the lab diagnosis of of opportunistic fungi • Describe prevention measures from opportunistic fungi
	Superficial&Cutaneous Mycoses (T-1)	• Define superficial and cutaneous mycoses • Classify superficial and cutaneous mycoses • List the important properties of superficial and cutaneous mycoses • List the clinical manifestations of superficial and cutaneous mycoses • Describe the lab diagnosis of superficial and cutaneous mycoses • Describe prevention measures from superficial and cutaneous mycoses
	Subcutaneous Mycoses (T-1)	• Define subcutaneous mycoses • Classify subcutaneous mycoses • List the important properties of subcutaneous mycoses • List the clinical manifestations of subcutaneous mycoses • Describe the lab diagnosis of subcutaneous mycoses • Describe prevention measures from subcutaneous mycoses
	Dimorphic Fungi (T-1)	• Define dimorphic fungi • Classify dimorphic fungi • List the important properties of dimorphic fungi • List the clinical manifestations of dimorphic fungi • Describe the lab diagnosis of dimorphic fungi

		• Describe prevention measures from dimorphic fungi
	Anti-Fungal Agents (T-1)	• Define antifungal agents • List their main targets in the fungi Classify antifungal agents • Define the main properties of antifungal agents
	Antimicrobial vaccines (T-1)	• Describe and classify the microorganisms or microbiological concepts related to Antimicrobial vaccines. • Explain their major properties, pathogenesis, and clinically relevant manifestations. • Describe the basic principles of laboratory diagnosis, prevention, and/or treatment where applicable.
	Laboratory Methods in Virology (P-1)	• List the main basic methods in the laboratory diagnosis of viruses • Explain the importance of the laboratory methods in the diagnosis of viral infections • List the main advantages and disadvantages of the methods in the diagnosis of viral infections
	Laboratory Diagnosis Of Fungi (P-1)	• List the main basic methods in the laboratory diagnosis of fungi • Explain the importance of th laboratory methods in the diagnosis of fungi • List the main advantages and disadvantages of the methods in the laboratory diagnosis of fungi
	Interpretation of laboratory findings of HIV infection (DRY LAB):/Physiology Lab: Blood physiology "Determination of Blood Groups", "Blood Cell Counting with Haemocytometer", "Determination of Bleeding Time" (P-2)	• Apply the laboratory approach used in Interpretation of laboratory findings of HIV infection (DRY LAB):/Physiology Lab: Blood physiology "Determination of Blood Groups", "Blood Cell Counting with Haemocytometer", "Determination of Bleeding Time". • Interpret the principal laboratory findings and relate them to microbiological diagnosis.
	Interpretation of laboratory findings of HIV infection (DRY LAB):/ Physiology Lab: Blood physiology "Determination of Blood Groups", "Blood Cell Counting with Haemocytometer", "Determination of Bleeding Time" (P-1)	• Apply the laboratory approach used in Interpretation of laboratory findings of HIV infection (DRY LAB):/ Physiology Lab: Blood physiology "Determination of Blood Groups", "Blood Cell Counting with Haemocytometer", "Determination of Bleeding Time". • Interpret the principal laboratory findings and relate them to microbiological diagnosis.

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
IMMUNOLOGY	Tumor immunology (T-1)	• Explain the immune mechanisms related to Tumor immunology. • Relate these mechanisms to protection, disease, diagnosis, prevention, or treatment as appropriate.
	Transplantation immunology (T-1)	• Explain the immune mechanisms related to Transplantation immunology. • Relate these mechanisms to protection, disease, diagnosis, prevention, or treatment as appropriate.

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
PATH	Normal Immune Response (innate and adaptive immunity) (T-1)	• Define what immunity means

		• Explain the immune system with the functions of cells and molecules • Classify the types of immunity • Describe the major components of innate and adaptive immunity • Explain the mechanism of recognition of microorganisms by phagocytes • Describe the types and basic mechanism of adaptive immunity • Explain the distribution of lymphoid tissue in the body
	Overview of Lymphocyte Activation and Adaptive Immune Responses (T-1)	• Explain the differences, mechanisms and clinical importance of cellular and humoral immunity • Explain the mechanism involved in lymphocyte activation • Classify the cells involved in hypersensitivity reactions • Describe the types and functions of the cytokines • Define the major mechanisms of adaptive immune response
	Hypersensitivity: Immunologically Mediated Tissue Injury, Type I, II, III, IV Hypersensitivity (T-1)	• Classify the types of hypersensitivity reactions • Explain the definition and mechanisms of hypersensitivity reactions • Give examples to each type of hypersensitivity reactions • Classify the causes of glomerular diseases • Explain the correlation between pathological findings, etiology and clinical findings in glomerular diseases.
	Autoimmune diseases I (SLE) (T-1)	• Give five examples for the most important autoimmune diseases • Explain the pathogenesis of the autoimmune diseases • Describe the pathogenesis and clinical findings of sle • Describe the self and peripheral tolerances
	Autoimmune diseases II (RA-Scleroderma-Sjögren Syndrome) (T-1)	• Explain the pathogenesis of RA-Scleroderma-Sjögren Syndrome. • Give examples of at least two significant antibodies regarding to RA-Scleroderma-Sjögren Syndrome. • Describe the pathological and clinical findings of the above mentioned diseases
	Rejection of transplants (T-1)	• Classify the types of the immunuty in organ rejection • Describe the pathogenesis and mechanisms of immunity in organ rejections • Define the clinical consequences of the organ rejection
	Immune deficiency diseases, amyloidosis (T-1)	• Classify the immunodeficiency diseases • Explain the pathogenesis of the immunodeficiency diseases • Describe the pathological and clinical findings of the immunodeficiency diseases • Explain the pathogenesis of amyloidosis. • Classify the the types of amyloid accumulation
	General principles of microbial pathogenesis (T-1)	• Describe the pathological features of infectious diseases caused by various bacteria, viruses, fungi and parasites • Describe general principles of infectious diseases • Define the pathways of microorganisms to enter the host • Explain the pathogenetic mechanisms of various infections • Define the methods of sampling for the laboratory tests. • Define the basic principles of prevention and control. • Explain the basic principles of clinical approach to infectious diseases • Describe the pathological finding so mycoplasma and mycobacterium infections
	Pathology of viral diseases and bacterial infections (T-1)	• Explain the disease-causing mechanisms of viruses and bacteria • Give examples to common bacterial diseses • Classify the viral diseases

		• Explain acute (transient) infections (measles, mumps, polio), chronic latent infections (hsv1-2, vzv, cmv), chronic productive infections (hepatitis b) • Describe the inflammation pattern and pathogenesis of acute, chronic latent and chronic productive infections
	Tuberculosis (T-1)	• Explain the pathogenesis of tuberculosis • Describe the typical histomorphologic findings of tubersulosis • Define the various diagnostic methods for tuberculosis • Explain the clinical and radiological features of tuberculosis
	Neoplasia, Nomenclature, Characteristics of benign and malignant neoplasm (T-1)	• Identify the common genetic changes seen in cancer • Explain the molecular mechanisms of neoplasia • Classify the neoplasms in terms of their histogenesis and define their subgroups • Give at least 5 most important features of malignant and benign tumors • Define the specific characteristics of malignant and benign tumors • Explain the differences between hamartoma and choristoma • Describe the properties of dysplasia and anaplasia • Explain the approach in naming the tumors • Describe the grading and staging the tumors • Explain the main differences between benign and malignant tumors • Explain the mechanisms of local invasion of tumors • Describe metastasis, metastatic routes and patterns • Explain the differences between in situ and invasive carcinoma
	Epidemiology of cancer (T-1)	• Explain the differences in the frequency of cancer relating with eographical distribution • Give examples to the common cancers which mostly cause death • Give examples to common types of cancer in men and women • Explain cancer epidemiology related to geographical factors, age and sex. • Explain the significant agents facilitating carcinogenesis • Explain the basic concepts of cancer prevention • Define the parameters used in the diagnosis and laboratory diagnosis of cancer • Understand the role of immunohistochemistry and molecular pathology in cancer diagnosis • Classify the main methods of cancer treatment
	Pathology of fungal diseases and parasitic diseases (T-1)	• Explain the pathogenesis of fungal and parasitic diseases • Describe the typical histomorphologic findings of fungal and parasitic diseases • Define the various diagnostic methods for fungal and parasitic diseases • Explain the clinical and radiological features of fungal and parasitic diseases • Describe the main virulence factors, clinical findings and inflammation patterns of candida, aspergillus, cryptococcus and mucor infections • Outline the main virulence factors, clinical findings and inflammation patterns of malaria, leishmania, echinococcus and schistosoma infections
	Cancer genes, Genetic Lesions in Cancer (T-1)	• Explain the mechanisms and type of mutations that may cause cancer • Describe the basic cellular and molecular properties of cancer • Explain the mechanisms of carcinogenesis by exemplifying carcinogenic agents

	Hallmarks of cancer: Self-sufficiency in growth signals (T-1)	• Define the functions of protooncogene, oncogene and tumor suppressor gene • Explain the mechanism of the significant genes (p53, rb, ras, cyclin, cyclin dependent kinase inhibitors
	Hallmarks of cancer : Tumor Suppressor Genes (T-1)	• Describe the mechanisms of functions of the tumor supressor genes • Explain the importance of the tumor supressor genes in various cancers
	Hallmarks of cancer: Altered cellular metabolism, Evasion of apoptosis, immortality, Sustained angiogenesis (T-1)	• Describe the role and mechanism of angiogenesis • Define the evasion from apoptosis adn its relation with limitless replicative potential
	Hallmarks of cancer: Invasion and metastasis, Evasion of immune surveillance, Genomic Instability Tumor-Promoting Inflammation (T-1)	• Explain the immune mechanisms in cancer • Describe the clinical picture of the immunity. • Describe the stages of invasion and metastasis
	Etiology of cancer: Carcinogenic agents (Chemical , radiation and viral) (T-1)	• Explain the definition and effect mechanisms of carcinogens Explain the mechanisms of mutations and carcinogens
	Environmental and nutritional diseases environmental pollution, Health Effects of Climate Change (T-1)	• Explain the relationship between environmental factors and diseases • Classify nutritional disorders and define the clinical importance of these diseases • Give examples to at least five environmental and nutritional factors that cause diseases
	Nutritional Diseases (T-1)	• Explain basic mechanisms of the nutritional diseases. • Define appropriate clinical findings to related nutritional disease
	Effects of Tobacco and Alcohol, Injury by Therapeutic Drugs and Drugs of Abuse (T-1)	• Explain effects of tobacco, effects of alcohol,injury by therapeutic drugs and drugs of abuse • Explain the mechanisms of tobacco, alcohol nd other drugs and relate them with clinical findings
	Injury by Physical Agents (T-1)	• Describe the types of injury by physical agents • Explain the histopathological and clinical findings of physical injury
	Red Blood Cell Disorders-Anemia of blood loss, Hemolytic Anemias (T-1)	• Define hemorrhage, hemolysis, extramedullary hematopoiesis and decreased red cell production • Describe at least four blood tests to evaluate anemia Define adult reference ranges for red blood cells • Define clinical manifestations of anemias Explain the differential diagnosis of anemias in concurrence with the laboratory findings • Describe the types of hemolytic anemia (Hereditary Spherocytosis, Sickle Cell Anemia, Thalassemia, Glucose-6-Phosphate Dehydrogenase Deficiency, Immunohemolytic Anemia, Malaria)
	Anemia of Diminished Erythropoiesis, Polycythemia (T-1)	• Classify the types of anemia of diminished erythropoiesis (Iron Deficiency Anemia, Anemia of Chronic Inflammation, Megaloblastic Anemia, Aplastic Anemia, Myelophthisic Anemia) Explain the mechanisms of anemia of diminished erythropoiesis • Describe the types and causes of Polycythemia
	Non-Neoplastic Disorders Of White Blood Cells (T-1)	• Define leukopenia, lymphopenia, leutropenia and agranulocytosis • Explain the mechanisms underlying leukopenia, lymphopenia, neutropenia • Differentiate reactive leukocytosis and leukemoid reaction • Explain the causes of leukocytosis

		• Define the clinical, pathological and laboratory findings of infectious mononucleosis • Explain relation of Epstein-Barr Virus with different cancers Group chronic nonspecific lymphadenitis into subtypes • Describe the specific pathological changes of chronic nonspecific lymphadenitis • Explain the differences of the acute and chronic Lymphadenitis regarding the mechanism and morphological features
	Neoplastic proliferations of white cells, lymphoid neoplasms 1 (T-1)	• Define the five types of B cell and T cell neoplasms • Define diagnostic immunohistochemical markers for B and T cells lymphomas • Define lymphoid, myeloid and histiocytic neoplasms • Describe the underlying pathogenic differences (immunophenotypic differences) in lymphoid neoplasms
	Neoplastic proliferations of white cells, lymphoid neoplasms 2 (T-1)	• Explain the morphological patterns of the mantle cell, Burkitt, follicular and diffuse large B cell lymphomas • Describe the carcinogenesis in different types of lymphomas
	Plasma cell neoplasms and related entities (T-1)	• Classify the plasma cell neoplasms • Explain the morphological patterns of the plasma cell neoplasms • Explain the clinical and laboratory findings of the multiple myelom
	Bleeding Disorders (T-1)	• Explain the pathogenesis of bleeding disorders. • Classify the bleeding disorders
	Disorders of Spleen and Thymus (T-1)	• Define the thymus diseases • Explain the massive splenomegaly reasons
	Myeloid neoplasms, acute myeloid leukemia, myelodysplastic syndromes (T-1)	• Define the differences between acute and chronic leukemia • Define the differences between lymphoma and leukemia • Describe the pathogenesis of acute myeloid leukemias and myelodysplastic syndromes • Explain the pathogenetic mechanisms of myelodysplastic syndrome • Describe the histomorphological features of acute myeloid leukemia and myelodysplastic syndromes
	Myeloid neoplasms, myeloproliferative neoplasms, histiocytic neoplasms (T-1)	• Describe the pathogenesis of myeloproliferative neoplasms • Classify the myeloproliferative neoplasms • Describe the histomorphological features of myeloproliferative neoplasms
	Hodgkin Disease (T-1)	• Describe the pathogenesis of Hodgkin Disease • Classify Hodgkin Disease into histological subgroups • Describe the histomorphological features of the Hodgkin Disease and explain the prognosis of them
	Clinical aspects of neoplasia, effects of tumor on host, grading and staging, laboratory diagnosis (P-1)	• Define grading and staging cancer and establish the relationship between grade and staging and life expectancy • Describe the effects of cancer on host clinically • Determine suitable laboratory test for diagnosing the cancer
	Pathology 1 Lab: (P-2)	• Gain the ability of identifying the pathological areas in normal tissues microscopically • Get through to benign and malignant tumors microscopically • Give descriptions for the microscopic findings of neoplasms
	Pathology 2 Lab: (P-2)	• Gain the ability of identifying the pathological areas in normal tissues microscopically • Get through to benign and malignant tumors microscopically • Give descriptions for the microscopic findings of neoplasms

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	TOPIC	LEARNING OUTCOMES
PATHOPHYSIOLOGY	Anemias (T-2)	• Explain the physiological mechanisms and regulatory processes related to Anemias. • Relate these mechanisms to homeostasis and basic clinical changes.
	Platelet Disorders (T-1)	• Explain the physiological mechanisms and regulatory processes related to Platelet Disorders. • Relate these mechanisms to homeostasis and basic clinical changes.
	Coagulation Disorders (T-1)	• Explain the physiological mechanisms and regulatory processes related to Coagulation Disorders. • Relate these mechanisms to homeostasis and basic clinical changes.

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	TOPIC	LEARNING OUTCOMES
INTERNAL MEDICINE HAEMATOLOGY	History taking and physical examination of the Hematopoietic System (T-1)	• Describe the key clinical findings and assessment principles related to History taking and physical examination of the Hematopoietic System. • Relate history and physical examination findings to basic hematological conditions.
	Signs and symptoms of the hematopoietic system (T-1)	• Describe the key clinical findings and assessment principles related to Signs and symptoms of the hematopoietic system. • Relate history and physical examination findings to basic hematological conditions.

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	TOPIC	LEARNING OUTCOMES
PHARMACOLOGY	Introduction: The Nature of Drugs & Drug Development & Regulation (T-3)	• Define and describe the terms receptor and receptor site. • Distinguish between a competitive inhibitor and an allosteric inhibitor. • Predict the relative ease of permeation of a weak acid or base from knowledge of its pKa, the pH of the medium, and the Henderson-Hasselbalch equation. • List and discuss the common routes of drug administration and excretion. • Draw graphs of the blood level versus time for drugs subject to zero-order elimination and for drugs subject to first-order elimination. Label the axes appropriately. • Describe the major animal and clinical studies carried out in drug development. • Define carcinogenesis, mutagenesis, and teratogenesis.
	Drug Receptors & Pharmacodynamics (T-3)	• Compare the efficacy and the potency of 2 drugs on the basis of their graded dose response curves. • Predict the effect of a partial agonist in a patient in the presence and in the absence of a full agonist. • Name the types of antagonists used in therapeutics.

		• Specify whether a pharmacologic antagonist is competitive or irreversible based on its effects on the dose-response curve and the dose-binding curve of an agonist in the presence of the antagonist. • Name 5 transmembrane signaling methods by which drug-receptor interactions exert their effects
	Pharmacokinetics & Pharmacodynamics: Rational Dosing & the Time Course of Drug Action (T-4)	• Estimate the half-life of a drug based on its clearance and volume of distribution or from a graph of its plasma concentration over time. • Calculate loading and maintenance dosage regimens for oral or intravenous administration of a drug when given the following information: minimum therapeutic concentration, minimum toxic concentration, oral bioavailability, clearance, and volume of distribution. • Calculate the dosage adjustment required for a patient with impaired renal function
	Drug Biotransformation (T-2)	• List the major phase I and phase II metabolic reactions. • Know which P450 isoform is responsible for the greatest number of important reactions. • Describe the mechanism of hepatic enzyme induction and list 3 drugs that are known to cause it. List 3 drugs that inhibit the metabolism of other drugs. • Describe some of the effects of smoking, liver disease, and kidney disease on drug elimination. • Describe the pathways by which acetaminophen is metabolized to harmless products if normal doses are taken and to hepatotoxic products if an overdose is taken.
	Pharmacogenomics (T-2)	• Name 3 gene polymorphisms that increase or decrease drug efficacy or toxicity. • Name 3 drugs that may require dosage adjustments in specific genetic populations. • Name 1 drug that is more toxic due to a polymorphism. • Name 1 drug that is less effective due to a loss of function polymorphism
	Pharmacokinetics & Pharmacodynamics of Perinatal and Pediatric Drugs (T-1)	• Describe the pediatric patient differs from an adult patient • Describe the pharmacokinetic and pharmacodynamic alterations on drug disposition and therapeutic outcome in the pediatric patient and pregnant women • Apply this knowledge to the management of drug therapy in the pediatric patient and pregnant women • List the special pharmacokinetic factors operative in pregnant women and in rapidly maturing infants
	Pharmacokinetics & Pharmacodynamics of Geriatric Drugs (T-1)	• Describe age-related changes that affect pharmacokinetic properties of medications. • Identify best current and updated resources or potentially inappropriate medications • Discuss the use of a systematic improvement framework to reduce potentially inappropriate medications for older adults
	Therapeutic and Toxic Potential of Drugs and Over-the-Counter Agents (T-2)	• Select effective and safe OTC product formulations for their claimed for therapeutic use • Know the agents switched from prescription to OTC status. • Know ingredients of known efficacy for selected OTC classes. • Know classification of drug toxicity
	Dietary Supplements and Herbal Medications (T-1)	• Contrast the regulations in the United States of botanicals and nutritional supplements with those of therapeutic drugs with regard to efficacy and safety.

		• List several of the most widely used botanical products, and describe their purported medical uses, adverse effects, and potential for drug interactions. • Describe the proposed medical uses and adverse effects of several purified nutritional supplements.
	Rational Prescribing and Prescription Writing (T-1)	• Principles of prescription order writing and patient compliance Contents of a prescription • Principles of rational prescribing • Make a specific diagnosis • Consider the pathophysiologic implications of the diagnosis • Select a specific therapeutic objective • Select an optimal drug of choice Follow the therapy

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At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
RADIATION ONCOLOGY	Essentials of radiationtherapy (T-1)	• Explain the core oncological and radiobiological principles related to Essentials of radiationtherapy. • Relate these principles to cancer prevention, diagnosis, treatment, safety, and patient care as appropriate.
	Role of radiotherapy in management of multimodal cancer treatment (T-1)	• Explain the core oncological and radiobiological principles related to Role of radiotherapy in management of multimodal cancer treatment. • Relate these principles to cancer prevention, diagnosis, treatment, safety, and patient care as appropriate.
	Acute and chronic side effects of radiationtherapy and oncological emergencies (T-1)	• Explain the core oncological and radiobiological principles related to Acute and chronic side effects of radiationtherapy and oncological emergencies. • Relate these principles to cancer prevention, diagnosis, treatment, safety, and patient care as appropriate.
	Cancer prevention and cancer screening (T-1)	• Explain the core oncological and radiobiological principles related to Cancer prevention and cancer screening. • Relate these principles to cancer prevention, diagnosis, treatment, safety, and patient care as appropriate.
	Cancer diagnosis and approach to cancer patient (T-1)	• Explain the core oncological and radiobiological principles related to Cancer diagnosis and approach to cancer patient. • Relate these principles to cancer prevention, diagnosis, treatment, safety, and patient care as appropriate.
	Radiation safety, protection and outcomes of the exposure (T-1)	• Explain the core oncological and radiobiological principles related to Radiation safety, protection and outcomes of the exposure. • Relate these principles to cancer prevention, diagnosis, treatment, safety, and patient care as appropriate.
	Basis of radiobiology (T-1)	• Explain the core oncological and radiobiological principles related to Basis of radiobiology. • Relate these principles to cancer prevention, diagnosis, treatment, safety, and patient care as appropriate.

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	**TOPIC**	**LEARNING OUTCOMES**

CLINICAL SKILLS	Patient transport with a spine board / Applying a Cervical Collar (T-1) (P-1)	• Describe the indications, equipment, and safety considerations for Clinical Skills Lab: Patient transport with a spine board / Applying a Cervical Collar. • Perform the main steps of Clinical Skills Lab: Patient transport with a spine board / Applying a Cervical Collar in the correct sequence on a simulator/mannequin where applicable. • Apply standard precautions and communicate appropriately during the procedure.
	Lumbar Puncture (T-1) (P-1)	• Describe the indications, equipment, and safety considerations for Clinical Skills Lab: Lumbar Puncture. • Perform the main steps of Clinical Skills Lab: Lumbar Puncture in the correct sequence on a simulator/mannequin where applicable. • Apply standard precautions and communicate appropriately during the procedure.

At the end of this lesson, the student will be able to:		
KNOWLEDGE / SKILLS		
DEP.	**TOPIC**	**LEARNING OUTCOMES**
PANEL	Anemias (T-2)	• Explain the key concepts and principles related to Anemias.
	Cancer (T-2)	• Explain the key concepts and principles related to Cancer.
	Losing Weight (T-2)	• Explain the key concepts and principles related to Losing Weight.

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