



**Teheran University of Medical Sciences**

International campus Vice-Dean for Educational Affairs



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**International Campus  
Handbook of MD Program  
2014-2017 entries**





## In the Name of God

### Degree: Doctor of Medicine (MD)

#### Introduction

Medical education in general is a seven and half years course which consist of **four Phases**. The first two phases of education (**Basic Medical Science** and **Fundamental of Clinical Medicine**), mainly Taught and pre-clinical which are held in the main campus of the College and field training and internship are mainly in hospitals and health centers respectively. The MD curriculum integrates basic medical science and clinical experience with in-depth study and independent research throughout the years of medical school. Other major themes of the MD curriculum include:

#### Medical Education Steps

##### ⊗ Basic Medical Sciences

In five semesters, **Basic Medical Sciences** Courses cover the natural structure of the body at the molecular and cellular level (biochemistry, histology and anatomy) of development (embryology) and function (physiology) that all are presented in the form of integrated blocks. In addition to these, different subjects (microbiology, parasitology, mycology, virology, immunology, and pathology) are also provided for the students

At the end of Basic Medical Science, **comprehensive exam** will be held.

##### ⊗ Fundamental of Clinical Medicine

In two semesters, students are prepared to enter the clinic for one year as a part of their education. Under the new program of medical education at the Tehran University of medical Sciences, in the course of lessons which are related to specific abnormalities of each organ - organ systems (special pathology), abnormal functioning of various body systems (pathophysiology of internal diseases), the fundamentals of drug (pharmacology), basic clinical skills (physical examination) are presented as block system. In the course of teaching communication skills with patients is also available.

At the end of preclinical course, OSCE exam is held.

##### ⊗ Clinical Clerkship

In this clinical diagnosis phase which lasts 20 months, diagnostic and treatment decisions and patient care as a whole is practiced by the students. At the end of clinical clerkship, a comprehensive test will be held and with OSCE test scores, the interns will be selected and placed in the hospitals.

##### ⊗ Clinical Internship

This phase consists of 18 months. In the new program and in the continuation of training, students can gradually acquire the ability to practice independently.





## Goals of the Medical Education Program

After completing the educational program for the MD degree, our graduates will demonstrate:

- Knowledge of the biomedical and behavioral sciences appropriate for the practice of clinical medicine by all physicians;
- Proficiency in clinical skills: eliciting a medical history, performing a physical examination, and performing basic technical procedures;
- Application of their knowledge and skills to the practice of medicine, including formulating an appropriate problem list, a set of competing hypotheses, and a diagnostic and therapeutic plan;
- Knowledge and skills in preventive medicine, including the ability to identify persons at risk for common and important health problems and to apply appropriate preventive measures, including screening, health education, and other forms of risk reduction;
- Ability to critically assess biomedical literature, and apply this to the evidence-based management of health problems;
- Progress in the development of self-directed life-long learning skills, including the recognition of personal educational needs, selection of appropriate learning resources and evaluation of progress;
- Professionalism through a commitment to professional responsibility, ethical principles, reflective practice, and self-improvement;
- Communication skills, including effective and humane interactions with patients, colleagues, health care personnel, and members of the community;
- Ability to function as a collaborative member of the healthcare team;

Understanding of the role and responsibility of the physician as a leader in the health care delivery system and in society.





## **Mission**

To prepare physicians who will provide outstanding, patient-centered care and to inspire future leaders who will improve world health through scholarship and innovation.

The MD curriculum integrates basic science and clinical experience with in-depth study and independent research throughout the years of medical school. Other major themes of the curriculum include: Melding of basic science and clinical concepts throughout the curriculum blocks of unscheduled time for individual or group study, elective coursework, and research. Enhance student satisfaction with the study of medicine and foster a lifelong commitment to investigation and cross-disciplinary thinking Strengthening of Doctor-Patient Communication and Clinical Skills Instruction broad clinical science education in the first two years with early exposure to patient care and the practice of medicine. Broader emphasis on doctor-patient communication, ethics, and the art of medicine

Students learn about the upstream factors that affect the health outcomes, such as personal behaviors, health care quality and access, social, cultural and economic factors, and the built and natural environment

The educational mission of the Tehran University of Sciences, School of Medicine is to graduate physicians with the ability and desire to improve the health of all populations by alleviating suffering and eliminating healthcare disparities through their leadership in patient care, research, education, health care administration and the community.

**General Competencies** It is essential for Medical students to have good written and oral communication skills. Students must be able to communicate effectively with patients, physicians and with other members of the health care team. The final applicant pool may be interviewed.

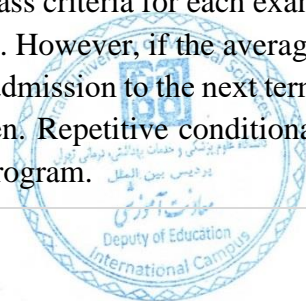
**The Terms and Conditions of Admission to the Course** All applicants must apply electronically on our website [www.gsia.ac.ir](http://www.gsia.ac.ir). After an application is submitted, the applicant will receive a confirmation e-mail and an application code from the Office of Admissions indicating successful submissions of the application.

If any part of the application is incomplete, our admission coordinator will request the missing information and mark the application incomplete until the requested information is submitted. The completed application form is reviewed in the preliminary review council (PRC).

Once the initial preliminary review council (PRC) has made a decision, the application will be sent to the School and the related department, for an Admission Review.

If you have requested or applied for a scholarship, your application is also forwarded to the Scholarship Committee.

**Student Assessment** Students should take part in the end of term exams for each module separately. Some lectures may decide to take an additional exam in the mid-term. The pass criteria for each exam are 50% of the total mark (check the educational regulation for more details). However, if the average mark for all exams taken in each term is less than 12 out of 20, the student's admission to the next term would be conditional in which a reduced number of modules could be taken. Repetitive conditional admission may result in student being expelled from the General Doctoral program.





## Ethical issues

The graduates should,

- Observe the Patient's Bill of Rights<sup>1</sup> when working with the patients.
- Strictly observe Biosafety and Patient Safety Rules\* concerning the patients, personnel and workplace.
- Observe the Rulebook for Dress Code<sup>2</sup>.
- Strictly observe the Regulations of Working with the Laboratory Animals<sup>3</sup>.
- Carefully preserve resources and equipment.
- Truly respect faculty members, the staff, classmates and other students and work for creating an intimate and respectful atmosphere.
- Observe social and professional ethical considerations in criticism.

1, 2 and 3 are contained in the Enclosures.

\* Biosafety and Patient Safety Rules will be set out by the Educational Departments and will be available to the students.

## Number and Type of Credits and Tables of the Courses

**Total Number of Credits:** 298.25 (for International Students)

**Basic Medical Sciences Phase:** 89.25 (for International Students)

**Fundamental of Clinical Medicine phase:** 32.5

**Clinical Clerkship Phase:** 102.5

**Clinical Internship Phase:** 74.0





	SIPAD Code	Subject	Number of credits			Total credits
			Credit (theory)	Credit (practical Clerkship Internship)	prerequisite	
1	1011137-38	<i>Tissue, Development &amp; Function</i>	2.25	0.25		2.50
2	1011133-34	<i>Cell and Molecules</i>	3.0	0.75		3.75
3	1011095-93	<i>Anatomy of limbs</i>	1.5	1.5		3.00
4	1011032	<i>Medical Physics</i>	2.0			2.00
5	1011013	<i>Principles of Health Services</i>	2.0			2.00
6	1011034	<i>General English Language</i>	3.0			3.00
7	1010002-04	<i>Cardiovascular System</i>	3.25	1.0		4.25
8	1010003-05	<i>Respiratory System</i>	1.5	0.25		1.75
9	1011029	<i>Medical Genetic</i>	2.0			2.00
10	1010006-07	<i>Biochemistry</i>	1.5	0.5	<i>Cell and Molecules</i>	2.00
11	1011017	<i>Psychology</i>	2.0			2.00
12	1011136	<i>Family Health</i>	2.0			2.00
13	1011004	<i>Persian Language</i>	3.0			3.00
14	1011014	<i>Medical Terminology I</i>	3.0		<i>General English Language</i>	3.00
15	1010008-12	<i>Gastrointestinal System</i>	2.0	0.75		2.75
16	1010009-13	<i>Endocrine Systems</i>	1.5	0.25		1.75
17	1010010-26	<i>Urinary System</i>	1.5	0.25		1.75
18	1010011-14	<i>Reproductive System</i>	1.25	0.5		1.75
19	1011030	<i>Nutrition</i>	2.0			2.00
20	1011018	<i>Principles of Epidemiology</i>	2.0		<i>Principles of Health Services</i>	2.00
21	1011033	<i>Information Technology</i>	2.0			2.00
22	8888888	<i>Physical Training I</i>	1.0			1.00
23	2111111	<i>Devine Ethics</i>	2.0			2.00
24	1111112	<i>Introduction to religion I</i>	2.0			2.00
25	1010023-24	<i>Immunology</i>	2.5	0.5		3.00
26	1010016-22	<i>Nervous System</i>	2.75	0.5		3.25
27	1010017-21	<i>Special Senses</i>	1.0	0.25		1.25
28	1010015-18	<i>Anatomy of Head and Neck</i>	1.0	0.5		1.50





29	1011023-25	Microbiology	3.0	1.0		4.00
30	1011024	Virology	1.0			1.00
31	1011015	Medical Terminology II	3.0		Medical Terminology I	3.00
32	9999999	Physical Training II	1.0		Physical Training I	1.00
33	1111113	Introduction to religion II	2.0			2.00
34	1011027-98	Pathology	4.0	2.0		6.00
35	1011028-99	Parasitology	3.0	1.0		4.00
36	1111114	Devine Texts	2.0			2.00
37	1111111	Iran Revolution	2.0			2.00
38		Physiopathology of Endocrine system	2.0			2.00
39		Physiopathology of Digestive system	2.0			2.00
40		Physiopathology of Cardiovascular system	2.0			2.00
41		Physiopathology of Urinary System	2.0			2.00
42		Communicational Skills	0.5	1.0		1.50
43		Fundamentals of Clinical practice (Semiology)	2.0	2.0		4.00
44		Pharmacology 1	2.0			2.00
45		Advanced Pathology 1	2.0			2.00
46		Patho-physiology of Blood System	2.0			2.00
47		Patho-physiology of Respiratory System	2.0			2.00
48		Pathophysiology of Rheumatologic Diseases	2.0			2.00
49		Pharmacology 2	2.0	1.0		3.00
50		Advanced Pathology 2	2.0	2.0		4.00
51		Clinical Immunology 1	1.0			1.00
52		Clinical Immunology 2	1.0			1.00
53		Elective	1.5			1.5
54		Statistics	2.0			2.0
55		Clinical Epidemiology	2.0			2.0
56		Toxicology	1.0			1.0
57		Forensic Medicine	2.0	1.0		3.0
58		Internal Medicine Clerkship		12.0		12.0
59		General Surgery	6.0	6.0		12.0
60		Orthopedics	2.0			2.0







**COURSE NAME:** Cell and Molecules Block  
**NUMBER OF CREDITS:** 3.0 (theory) – 0.75 (practical)  
**COURSE TYPE:** Theoretical and Practical

**GENERAL AIMS and DESCRIPTION:**

This is the first block of MD program in Tehran University of Medical Sciences. The Cellular and Molecular Biology Program fosters interactions among students and faculty, helping to broaden the students' appreciation of diverse research opportunities and to encourage interdisciplinary thinking in a highly collaborative atmosphere. This program has been an integrative force that aims to tie together the various disciplines of genetics, biochemistry, microbiology, immunology, cell biology and others. The goal is to train our students to examine scientific problems from many perspectives through individualized, flexible programs of coursework and research. The biochemical pathways of living organisms are studied with a focus on metabolic processes. Topics include pathways linking nutritional intake and energy yielding processes as well as the application of underlying. Broad content includes a study of the chemistry and reactions of constituents of living matter, including carbohydrates, lipids, proteins, nucleic acids, vitamins, coenzymes, and minerals. In addition, the chemistry and regulation of the reactions and processes of whole organisms will be examined including: endocrinology, enzymology, nutrition, intermediary metabolism and biochemical mechanisms involved in select disease states.

**References**

1. **Junqueira's Basic Histology.** McGraw-Hill Medical 2010; 12th edition, chapters 1, 2, 3
2. **Guyton and Hall Textbook of Medical Physiology.** Saunders 2011, 12th edition, chapters 4 & 5
3. Cohen B.J. **Medical terminology: an illustrated guide.** Walter Kluwer/Lippincott Williams & Wilkins 2008. 5th edition
4. Devlin T.M. **Textbook of Biochemistry with Clinical Correlation.** John Wiley & Sons 2010; 7th edition
5. Murray R. Et al. **Harpers Illustrated Biochemistry.** McGraw-Hill Medical 2009; 28th edition
6. **Ganong's Review of Medical Physiology.** McGraw-Hill Medical 2009; 23rd edition

**Cell and Molecules (theory) subjects**

<i>Session Title</i>	<i>Hrs.</i>
<i>Introduction to Cell &amp; Molecule</i>	2
<i>Water and buffer</i>	2
<i>Introduction to Histology</i>	2
<i>Cell</i>	4
<i>Amino acid Structure &amp; Classification</i>	2
<i>Amino acids &amp; proteins classification</i>	2
<i>Amino acids &amp; proteins functions</i>	2
<i>Amino acids &amp; proteins Hemoglobin</i>	2
<i>Carbohydrates Mono- &amp; Di- Saccharides</i>	2
<i>Carbohydrates Glycoconjugates</i>	2
<i>Lipids &amp; Lipoproteins Structure</i>	4
<i>Enzymes</i>	6
<i>Vitamins &amp; Coenzymes</i>	2
<i>Water Soluble Vitamins</i>	2





<i>Fat soluble vitamins</i>	2
<i>Amino Acids Structure</i>	2
<i>DNA Replication</i>	2
<i>Molecular biology Transcription</i>	2
<i>Molecular biology Translation</i>	2
<i>Molecular biology Repair mechanisms</i>	2
<i>Molecular biology Regulation of gene expression</i>	2
<i>Membrane performances</i>	4
<i>Membrane Potential (Voltage)</i>	4
<b>Total hrs.</b>	<b>58</b>

**Cell and Molecules (practical) subjects**

<i>Session Title</i>	<i>Hrs.</i>
<i>Titration</i>	2
<i>Carbohydrates</i>	2
<i>AminoAcides</i>	2
<i>Enzymes</i>	2
<i>Spectrophotometer</i>	2
<i>DNA Extraction</i>	2
<i>Chromatography</i>	2
<i>FlamePhotometry</i>	2
<i>Osmose</i>	2
<b>Total hrs.</b>	<b>18</b>





**COURSE NAME:** Tissue, Development & Function Block

**NUMBER OF CREDITS:** 2.25 (theory) – 0.25 (practical)

**COURSE TYPE:** Theoretical and Practical

**GENERAL AIMS and DESCRIPTION:**

This is a lecture and laboratory course that examines the microanatomy of cells, tissues and organs. Lectures illustrate the microstructure of major tissues and organs in relation to their function. Laboratory exercises use the light microscope to study these components and make use of slides and electron micrographs for review and discussion. This lab-oriented program presents the molecular biology and histology of normal cells, tissues and organ systems at various developmental functional stages. Students learn how individual cell functions interact with one another and how such interactions are accomplished from the tissue levels to the organ levels. The course introduces molecular and control systems and prepares students for an understanding of normal (homeostasis) systems and pathological conditions. In addition, students learn how molecular building blocks are utilized for growth and differentiation, wound healing and tissue repair, defence mechanisms and transfer of hereditary characters.

**References**

1. **Junqueira's Basic Histology.** McGraw-Hill Medical 2010; 12th edition; chapters 4-10 and 12-13 and 18
2. **Langman's Medical Embryology.** Lippincott Williams & Wilkins 2012, 12th edition; chapters 2-9, pages 10-129
3. **Guyton and Hall Textbook of Medical Physiology.** Saunders 2011, 12th edition, chapters 6, 7, 8
4. **Ganong's Review of Medical Physiology.** McGraw-Hill Medical 2009; 23rd edition

**Tissue, Development & Function (theory) subjects**

<i>Session Title</i>	<i>Hrs.</i>
<i>Epithelial Tissue</i>	2
<i>Connective Tissue</i>	2
<i>Types of Connective &amp; Adipose Tissue</i>	2
<i>Cartilage Tissue &amp; Joints</i>	2
<i>Osseous Tissue &amp; Ossification</i>	2
<i>Blood &amp; Hematopoiesis</i>	2
<i>Muscular Tissue</i>	2
<i>Nervous Tissue</i>	4
<i>Definition for Neurotransmission &amp; Neurotransmitters</i>	2
<i>Cell Signaling</i>	2
<i>Skin</i>	2
<i>Introduction to Embryology</i>	2
<i>Gametogenesis</i>	2
<i>Ovulation &amp; Fertilization</i>	2
<i>Embryonic Period</i>	2
<i>1st &amp; 2nd Weeks of Embryonic Period</i>	2
<i>3rd Weeks of Embryonic Period</i>	2
<i>Fetal Period</i>	2
<i>Placenta &amp; Fetal Membranes</i>	2
<i>Congenital Malformations</i>	2
<i>Contraction of Skeletal Muscle</i>	2







**COURSE NAME:** Cardiovascular System Block  
**NUMBER OF CREDITS:** 3.25 (theory) – 1.0 (practical)  
**COURSE TYPE:** Theoretical and Practical

**GENERAL AIMS and DESCRIPTION:**

This course provides instruction into the mechanisms of operation of the human cardiovascular system. Emphasis is placed on the integration of relevant principles from anatomy, physiology, biochemistry, pathology, pharmacology and microbiology with respect to the behavior of the normal circulation and its responses to the stress of injury and disease. Both expert-directed and student-directed methodologies will be employed in this module and a select set of clinical cases will be used to guide instruction. Circulatory systems will present students with an integrated approach to the key supply chain and waste management systems of the body. Students will follow the movement of oxygen from the environment to the tissues, and movement of waste products of metabolism along the opposite path, examining the coordinated roles of the lungs, heart and kidney in the control and regulation of these processes. Introduction to anatomy, histology and pharmacology content will be incorporated into the course.

**References**

1. Drake R.L. **Gray's Anatomy for Students**. Churchill Livingstone 2010; 2nd edition. pp 58-243 excluding: 101-106, 128-130, 137-139, 159-176
2. **Junqueira's Basic Histology**. McGraw-Hill Medical 2010; 12th edition. Chapters 11 & 14
3. **Langman's Medical Embryology**. Lippincott Williams & Wilkins 2012; 12th edition. Chapter 13, pp: 162-201.
4. **Medical physiology, Guyton and hall**. Saunders 2011, 12th edition. Chapters 9-12, Chapters 14-19, Chapter 20 (exception: methods for measuring cardiac output up to end) Chapter 21 (exception: ischemic heart disease up to end) Chapter 23Chapter 23وChapter 23
5. Snell R.S. **Clinical Anatomy by Systems**. Lippincott Williams & Wilkins 2006 ,Chapters 4 and 5 Pages 94-95 Page 271 (Thoracic duct) Page 609 (Phrenic nerve) Pages 569-571 (Vagus nerve)
6. Snell R.S. **Clinical Anatomy by Regions** 2008; 8th edition.
7. **Ganong's Review of Medical Physiology**. McGraw-Hill Medical 2010; 23rd edition. Chapters 5, 30-34
8. **Berne & Levy**. Medical physiology. 2008. 8th edition. Chapters 15-19

**Cardiovascular System (theory) subjects**

<i>Session Title</i>	<i>Hrs.</i>
<b><i>Vertebral Column, Ribs &amp; Sternum</i></b>	<b>2</b>
<b><i>Back</i></b>	<b>2</b>
<b><i>Thoracic Wall</i></b>	<b>2</b>
<b><i>Mediastinum &amp; Heart</i></b>	<b>2</b>
<b><i>Heart</i></b>	<b>2</b>
<b><i>Superior &amp; Posterior Mediastinum</i></b>	<b>4</b>
<b><i>Overview of Cardiovascular system</i></b>	<b>2</b>
<b><i>Histology of Circulatory System</i></b>	<b>2</b>
<b><i>Histology of Lymphatic &amp; Immune System</i></b>	<b>4</b>
<b><i>Embryology of the Heart</i></b>	<b>2</b>
<b><i>Embryology of Vessels</i></b>	<b>2</b>
<b><i>Physiology of RBCs /WBCs and Plts</i></b>	<b>6</b>
<b><i>Action Potentials in Cardiac Muscle, Cardiac Cycle</i></b>	<b>2</b>
<b><i>Electrocardiogram</i></b>	<b>2</b>





<i>Blood Pressure, Heart Sounds</i>	2
<i>“Volume-Pressure Diagram” During the Cardiac Cycle</i>	2
<i>Physics Principles of Circulatory System</i>	4
<i>Control of Excitation and Conduction in the Heart of Circulatory System</i>	2
<i>Vessels of Circulatory System</i>	2
<i>Circulatory System of Lymph &amp; Capillaries</i>	2
<i>Central Cardiovascular Control</i>	2
<i>Special Circulatory</i>	2
<b>Total hrs.</b>	<b>56</b>

**Cardiovascular System (practical) subjects**

<i>Session Title</i>	<i>Hrs.</i>
<i>Histology of Heart, Lymph &amp; Capillaries Arteries</i>	4
<i>Cell blood Count (RBC/WBC)</i>	4
<i>Hematocrits and Coagulation tests</i>	2
<i>Electrocardiogram</i>	2
<i>Blood Pressure, Heart Sounds</i>	2
<i>Osteology</i>	4
<i>Anatomy of Back</i>	4
<i>Thoracic Wall</i>	2
<i>Mediastinum &amp; Heart</i>	4
<i>Superior &amp; Posterior Mediastinum</i>	2
<b>Total hrs.</b>	<b>30</b>







**COURSE NAME:** Respiratory System Block  
**NUMBER OF CREDITS:** 1.5 (theory) – 0.25 (practical)  
**COURSE TYPE:** Theoretical and Practical

**GENERAL AIMS and DESCRIPTION:**

This block integrates the basic sciences into a study of the pulmonary system in both health and disease. Each of the basic science topics is incorporated into an integrated body of knowledge utilizing both didactic and self-directed learning methods, and clinical models.

**References**

1. **Drake R.L. Gray's Anatomy for Students.** Churchill Livingstone 2010; 2nd edition. pages 159-175 & 985-1029
2. **Junqueira's Basic Histology.** McGraw-Hill Medical 2010; 12th edition, pages 298-315
3. **Langman's Medical Embryology.** Lippincott Williams & Wilkins 2012, 12th edition. 201-2071
4. **Guyton and Hall Medical physiology,** 12th edition, 2011, chapters 37-41.
5. **Ganong's Review of medical physiology,** 2010, 23rd edition, section VII, chapters 35-37.
6. **Berne & Levy physiology,** 2010, 6th edition, section 5, chapters 20-25
7. Snell R.S. **Clinical Anatomy by Systems.** Lippincott Williams & Wilkins 2006
8. Snell R.S. **Clinical Anatomy by Regions** 2008; 8th edition

**Respiratory System (theory) subjects**

<i>Session Title</i>	<i>Hrs.</i>
<i>Nasal Cavity</i>	<i>2</i>
<i>Pharynx &amp; Larynx</i>	<i>2</i>
<i>Lung &amp; Pleura</i>	<i>2</i>
<i>Histology of Respiratory System</i>	<i>2</i>
<i>Pulmonary Ventilation</i>	<i>2</i>
<i>Embryology of Respiratory System</i>	<i>2</i>
<i>Pulmonary Volumes and Capacities</i>	<i>2</i>
<i>Pulmonary circulation</i>	<i>2</i>
<i>Physical Principles of Gas Exchange</i>	<i>2</i>
<i>Transport of O<sub>2</sub> and CO<sub>2</sub> in Blood and Tissue Fluids</i>	<i>2</i>
<i>Regulation of Respiration</i>	<i>2</i>
<i>Total hrs.</i>	<i>22</i>

**Respiratory System (practical) subjects**

<i>Session Title</i>	<i>Hrs.</i>
<i>Histology of Respiratory system</i>	<i>2</i>
<i>Spirometry</i>	<i>2</i>
<i>Nasal Cavity, Pharynx &amp; Larynx</i>	<i>2</i>
<i>Lung &amp; Pleura</i>	<i>2</i>
<i>Applied Anatomy</i>	<i>2</i>
<i>Total hrs.</i>	<i>10</i>





**COURSE NAME:** Anatomy of upper & Lower Limbs

**NUMBER OF CREDITS:** 1.5 (theory) – 1.5 (practical)

**COURSE TYPE:** Theoretical and Practical

### GENERAL AIMS

Anatomy of the Limbs explores the principles of biomechanics: specifically levers, torques, force vectors and center of gravity, as related to the human body. The unit explores, in detail, the functional anatomy of the upper and lower limb and their associated girdles. Applications of anatomical and biomechanical principles in analysis of upper and lower limb function and dysfunction will also be covered.

this course will teach you what we know about anatomy of different parts of human body and how it relates to development, various injuries and disorders; you'll get a chance to work with prosected human cadaveric specimens and medical images such as MRI scans; course will increase your practical skills, improve your problem-solving and image interpretation skills, and help you understand why fundamental anatomy and imaging are important to understanding human health & disease; this course will focus on the anatomy of the back, upper & lower limbs, thorax and abdomen;

### References

1. **Junqueira's Basic Histology.** McGraw-Hill Medical 2010; 12th edition; chapters 4-10 and 12-13 & 18
2. **Langman's Medical Embryology.** Lippincott Williams & Wilkins 2012, 12th edition; chapters 2-9, pages 10-129
3. Snell R.S. **Clinical Anatomy by Systems.** Lippincott Williams & Wilkins 2006
4. Snell R.S. **Clinical Anatomy by Regions** 2008; 8th edition
5. Drake R.L. **Gray's Anatomy for Students.** Churchill Livingstone 2010; 2nd edition. Chapter 1, pages 4-53, Chapter 7, pages 650-791, Chapter 6, pages 512-647

### *Anatomy of Limbs (theory) subjects*

<i>Session Title</i>	<i>Hrs.</i>
<i>Introduction to Anatomical Sciences</i>	<b>2</b>
<i>Osteology of Upper limb</i>	<b>4</b>
<i>Shoulder Region</i>	<b>2</b>
<i>Axillary Cavity &amp; Ant. Compartment of Arm</i>	<b>2</b>
<i>Post. Compartment of Arm &amp; Cubital Fossa</i>	<b>2</b>
<i>Forearm</i>	<b>2</b>
<i>Hand</i>	<b>2</b>
<i>Joints, Clinical &amp; Surface Anatomy Of Upper Limb</i>	<b>2</b>
<i>Osteology of Lower Limb</i>	<b>2</b>
<i>Ant.&amp; Med. Compartments of Thigh</i>	<b>2</b>
<i>Luteal Region &amp; Post. Compartment of Thigh</i>	<b>2</b>
<i>Popliteal Fossa &amp; Post. Compartment of Calf</i>	<b>2</b>
<i>Foot</i>	<b>2</b>
<i>Ant. &amp; Lat. Compartment of Calf</i>	<b>2</b>
<i>Joints, Clinical &amp; Surface Anatomy of Lower Limb</i>	<b>2</b>
<b>Total hrs.</b>	<b>30</b>

### *Anatomy of Limbs (practical) subjects*





<i>Session Title</i>	<i>Hrs.</i>
<i>Intro. to dissection ethics &amp; professionalism</i>	<b>2</b>
<i>Osteology of Upper limb</i>	<b>2</b>
<i>Axilla wall</i>	<b>2</b>
<i>The contents of axilla and the anterior arm</i>	<b>2</b>
<i>Triceps and cubital</i>	<b>2</b>
<i>The anterior compartment of the forearm</i>	<b>2</b>
<i>Posterior compartment of the forearm and dorsum of the hand</i>	<b>2</b>
<i>Palm</i>	<b>2</b>
<i>Surface Anatomy and clinical and joints</i>	<b>2</b>
<i>Ant.&amp; Med. Compartments of Thig</i>	<b>2</b>
<i>Gluteal and thigh</i>	<b>2</b>
<i>Popliteal and posterior tibia</i>	<b>2</b>
<i>Anterior and outside leg and back foot</i>	<b>2</b>
<i>Metatarsus</i>	<b>2</b>
<b><i>Total hrs.</i></b>	<b>28</b>





**COURSE NAME:** Clinical Biochemistry  
**NUMBER OF CREDITS:** 1.5 (theory) – 0.5 (practical)  
**COURSE TYPE:** Theoretical and Practical

**GENERAL AIMS and DESCRIPTION:**

Topics include pathways linking nutritional intake and energy yielding processes as well as the application of underlying. Broad content includes a study of the chemistry and reactions of constituents of living matter, the chemistry and regulation of the reactions and processes of whole organisms will be examined including: endocrinology, enzymology, nutrition, intermediary metabolism and biochemical mechanisms involved in select disease states.

**References**

1. **Junqueira's Basic Histology.** McGraw-Hill Medical 2010; 12th edition, chapters 1, 2, 3
2. **Guyton and Hall Textbook of Medical Physiology.** Saunders 2011, 12th edition, chapters 4 & 5
3. Cohen B.J. **Medical terminology: an illustrated guide.** Walter Kluwer/Lippincott Williams & Wilkins 2008. 5th edition
4. Devlin T.M. **Textbook of Biochemistry with Clinical Correlation.** John Wiley & Sons 2010; 7th edition
5. Murray R. et al. **Harpers Illustrated Biochemistry.** McGraw-Hill Medical 2009; 28th edition
6. **Ganong's Review of Medical Physiology.** McGraw-Hill Medical 2009; 23rd edition

**Clinical Biochemistry (theory) subjects**

<i>Session Title</i>	<i>Hrs.</i>
<i>Metabolism of carbohydrates</i>	<b>6</b>
<i>Metabolism of amino acids &amp; other nitrogen compounds</i>	<b>4</b>
<i>Metabolism of non-protein nitrogen compounds</i>	<b>4</b>
<i>Clinical Enzymology</i>	<b>2</b>
<i>Metabolism of lipids &amp; lipoproteins</i>	<b>6</b>
<i>Oxidative phosphorylation</i>	<b>2</b>
<b>Total hrs.</b>	<b>24</b>

**Clinical Biochemistry (practical) subjects**

<i>Session Title</i>	<i>Hrs.</i>
<i>Titration</i>	<b>2</b>
<i>Carbohydrates</i>	<b>2</b>
<i>AminoAcides</i>	<b>2</b>
<i>Enzymes</i>	<b>2</b>
<i>Spectrophotometer</i>	<b>2</b>
<i>DNA Extraction</i>	<b>2</b>
<i>Chromatography</i>	<b>2</b>
<i>FlamePhotometry</i>	<b>2</b>
<i>Osmose</i>	<b>2</b>
<b>Total hrs.</b>	<b>18</b>

**COURSE NAME:** Gastrointestinal System Block





**NUMBER OF CREDITS: 2.0 (theory) – 0.75 (practical)**

**COURSE TYPE: Theoretical and Practical**

**GENERAL AIMS and DESCRIPTION:**

This required system-based block integrates the basic sciences into the study of the gastrointestinal system and metabolism in both health and disease. Each of the basic science topics is incorporated into an integrated body of knowledge utilizing both didactic and self-directed learning methods, and clinical models.

**References**

1. Drake R.L. **Gray's Anatomy for Students**. Churchill Livingstone 2010; 2nd edition. Chapter 4, pages 246-355 and 366-381, chapter 5, pages 439-441, chapter 8, pages 1030-1060 and 985-998
2. **Junqueira's Basic Histology**. McGraw-Hill Medical 2010; 12th edition, Chapters 15-16, pages 249-297
3. **Langman's Medical Embryology**. Lippincott Williams & Wilkins 2009, 11th edition, chapter 15, pages 208-231
4. **Guyton and Hall Textbook of Medical Physiology**. Elsevier 2016, 13th edition, chapters 63-64-65-66

**Gastrointestinal System (theory) subjects**

<i>Session Title</i>	<i>Hrs.</i>
<i>Anatomy of Oral Cavity, Pharynx &amp; Esophagus</i>	<b>2</b>
<i>Histology of Oral Cavity</i>	<b>2</b>
<i>Histology of Salivary Glands &amp; General Structure of Digestive Tract</i>	<b>2</b>
<i>Abdominal Wall- regions &amp; Inguinal Canal</i>	<b>4</b>
<i>Peritoneal Cavity &amp; Abdominal Viscera</i>	<b>2</b>
<i>Abdominal Digestive Tract</i>	<b>2</b>
<i>Digestive Tract in Pelvis</i>	<b>2</b>
<i>Microanatomy of Digestive Tract</i>	<b>2</b>
<i>Histology of Accessory Glands of Digestive System</i>	<b>2</b>
<i>Vessels &amp; Nerves of Digestive System</i>	<b>2</b>
<i>Embryology of Foregut</i>	<b>2</b>
<i>Embryology of Midgut &amp; Hindgut</i>	<b>2</b>
<i>General Principles of GI System</i>	<b>2</b>
<i>Gastric Secretion &amp; Salivary and Esophagus Secretions</i>	<b>2</b>
<i>Pancreatic, Small and Large Secretions</i>	<b>2</b>
<i>Bile Secretion, Gall Bladder and Liver Functions</i>	<b>2</b>
<i>GI Motility, Digestion and Absorption</i>	<b>2</b>
<b>Total hrs.</b>	<b>38</b>





**Gastrointestinal System (practical) subjects**

<i>Session Title</i>	<i>Hrs.</i>
<i>Histology of Oral Cavity, Pharynx &amp; Esophagus</i>	2
<i>Histology of Digestive Tract (Stomach, duodenum, Jejunum Ileum)</i>	2
<i>Histology of Digestive Tract in Pelvis</i>	2
<i>Anatomy of Oral Cavity, Pharynx &amp; Esophagus</i>	2
<i>Abdominal Wall- regions &amp; Inguinal Canal</i>	4
<i>Peritoneal Cavity &amp; Abdominal Viscera</i>	2
<i>Abdominal Digestive Tract</i>	2
<i>Anatomy of Digestive Tract in Pelvis</i>	2
<i>Mesenteric and Inferacolin vessels</i>	2
<b>Total hrs.</b>	<b>20</b>







**COURSE NAME:** Endocrine System Block

**NUMBER OF CREDITS:** 1.5 (theory) – 0.25 (practical)

**COURSE TYPE:** Theoretical and Practical

**GENERAL AIMS and DESCRIPTION:**

This block integrates the basic sciences into a study of the endocrine and reproductive systems in both health and disease. Each of the basic science topics is incorporated into an integrated body of knowledge utilizing both didactic and self-directed learning methods, and clinical models.

**References**

1. **Guyton and Hall Textbook of Medical Physiology.** Saunders 2011, 12th edition, chapter 27, page 339 chapter 28, pages 345-348 and 353-357, chapters 74-79
2. **Junqueira's Basic Histology.** McGraw-Hill Medical 2010; 12th edition, chapter 20, pages 348-370
3. **Langman's Medical Embryology.** Lippincott Williams & Wilkins 2009, 11th edition, chapter 17, pages 274-275 and 267-268, chapter 18, pages 303-304 and 316-317

**Endocrine System (theory) subjects**

<i>Session Title</i>	<i>Hrs.</i>
<i>Anatomy, Histology &amp; Embryology of Hypothalamus &amp; Pituitary Gland</i>	2
<i>Anatomy, Histology &amp; Embryology of Thyroid, Parathyroid, Adrenal Glands &amp; Pancreatic Islands</i>	2
<i>Introduction to Physiology of Endocrine System</i>	2
<i>Biochemical Principles of Hormones</i>	2
<i>Hypothalamus and Posterior Pituitary</i>	2
<i>Anterior Pituitary</i>	2
<i>Insulin, Glucagon, and Diabetes Mellitus</i>	2
<i>Thyroid Metabolic Hormones</i>	2
<i>Adrenocortical Hormones</i>	2
<i>Parathyroid Hormone, Calcitonin, Vitamin D and Bone</i>	2
<i>Biochemistry of Hypothalamus &amp; Pituitary Gland</i>	2
<i>Biochemistry of Thyroid Hormones</i>	2
<i>Thyroid Metabolic Hormones</i>	2
<i>Biochemistry of Parathyroid Hormones &amp; Regulation Mechanism of Ca<sup>2++</sup></i>	2
<b>Total hrs.</b>	<b>28</b>

**Endocrine System (practical) subjects**

<i>Session Title</i>	<i>Hrs.</i>
<i>Microscopic structure of Endocrine system Glands</i>	2
<i>Macroscopic structure of Endocrine system Glands</i>	2
<i>Body Mass Index Calculation</i>	2
<b>Total hrs.</b>	<b>6</b>





**COURSE NAME:** Reproductive System Block  
**NUMBER OF CREDITS:** 1.25 (theory) – 0.5 (practical)  
**COURSE TYPE:** Theoretical and Practical

**GENERAL AIMS and DESCRIPTION:**

In the reproductive system block, students will learn how to explain the cellular and anatomical components of reproduction and early development. These components include the development of the reproductive track, development of gametes, fertilization, and formation of the germ layers, development of the embryonic environment, and endocrinology of the system. Students will learn the behaviors, attitudes and psycho-social factors that accompany the physical changes of puberty during normal development, as well as some of the psychiatric disorders that may emerge and disrupt normal development during this period. Students will also become familiar with psychosocial treatments for pre and postpartum psychiatric disorders. Finally, students will critically evaluate basic and clinical research in the field.

**References**

1. Drake R.L. **Gray's Anatomy for Students**. Churchill Livingstone 2010; 2nd edition. Chapter 5, pages 448-496
2. **Junqueira's Basic Histology**. McGraw-Hill Medical 2010; 12th edition, chapters 21-22, pages 371-411, chapter 18, pages 316-331.
3. **Langman's Medical Embryology**. Lippincott Williams & Wilkins 2009, 11th edition, chapter 16, pages 243-259, chapter 21, pages 339-344
4. **Guyton and Hall Textbook of Medical Physiology**. Saunders 2011, 12th edition, chapters 80-83

**Reproductive System (theory) subjects**

<i>Session Title</i>	<i>Hrs.</i>
<i>Anatomy of Male Reproductive System</i>	2
<i>Histology of Male Reproductive System</i>	2
<i>Anatomy of Female Reproductive System &amp; Breast</i>	2
<i>Histology of Female Reproductive System &amp; Breast</i>	2
<i>Embryology of Reproductive System</i>	4
<i>Perineum &amp; Radiological Anatomy of Reproductive System</i>	2
<i>Sex Differentiation</i>	2
<i>Male Reproductive Physiology</i>	2
<i>Female Reproductive Physiology</i>	2
<i>Biochemistry of Reproductive System</i>	2
<b>Total hrs.</b>	<b>22</b>

**Reproductive System (practical) subjects**

<i>Session Title</i>	<i>Hrs.</i>
<i>Testicle, Epididymis and Prostate gland</i>	2
<i>Ovary, Ovary fallopian tube and Uterus</i>	2
<i>Anatomy of Male reproductive system</i>	4
<i>Anatomy of Female reproductive system</i>	4
<i>Perineum &amp; Radiological Anatomy of Reproductive System</i>	4
<b>Total hrs.</b>	<b>16</b>





## COURSE NAME: Urinary System Block

NUMBER OF CREDITS: 1.5 (theory) – 0.25 (practical)

COURSE TYPE: Theoretical and Practical

This required system based block integrates the basic sciences into a study of the urinary tract and renal system in both health and disease. Each of the basic science topics is incorporated into an integrated body of knowledge utilizing both didactic and self-directed learning methods, and clinical models.

### References

1. **Drake R.L. Gray's Anatomy for Students.** Churchill Livingstone 2010; 2nd edition. pages 355-366, 421-438, pages 441-447, 462-477
2. **Junqueira's Basic Histology.** McGraw-Hill Medical 2010; 12th edition, chapter 19 pages: 332-347
3. **Langman's Medical Embryology.** Lippincott Williams & Wilkins 2009, 11th edition, chapter 16 pages: 232-242
4. **Guyton and Hall Textbook of Medical Physiology.** Saunders 2011, 12th edition, chapters 25-31 pages: 285-409

### Urinary System (theory) subjects

<i>Session Title</i>	<i>Hrs.</i>
<i>Pelvic Osteology</i>	<b>2</b>
<i>Pelvic Diaphragm</i>	<b>2</b>
<i>Pelvic Circulatory &amp; Nervous System</i>	<b>2</b>
<i>Anatomy of Urinary System</i>	<b>2</b>
<i>Histology of Urinary System</i>	<b>2</b>
<i>Embryology of Urinary System</i>	<b>2</b>
<i>Structure and function of biological water</i>	<b>4</b>
<i>Electrolytes</i>	<b>2</b>
<i>Blood PH. &amp; Mechanism of PH regulation</i>	<b>2</b>
<i>Principles of ABG</i>	<b>2</b>
<i>Renal Basic Mechanisms, Reabsorption and Secretion</i>	<b>2</b>
<i>Renal and Nephron Functions</i>	<b>2</b>
<i>Clearance and Auto regulation</i>	<b>2</b>
<i>Urine Concentrating Ability</i>	<b>2</b>
<i>Control of Blood Volume and Acid-Base Balance</i>	<b>2</b>
<b>Total hrs.</b>	<b>30</b>

### Urinary System (practical) subjects

<i>Session Title</i>	<i>Hrs.</i>
<i>Microscopic Structure of Urinary System</i>	<b>2</b>
<i>Anatomy of Urinary System</i>	<b>2</b>
<i>Pelvic Osteology</i>	<b>2</b>
<i>Pelvic Circulatory &amp; Nervous System</i>	<b>2</b>
<b>Total hrs.</b>	<b>8</b>





**COURSE NAME:** Anatomy of Head and Neck  
**NUMBER OF CREDITS:** 1.0 (theory) – 0.5 (practical)  
**COURSE TYPE:** Theoretical and Practical

**GENERAL AIMS and DESCRIPTION:**

Identify key events and stages in development of major nervous system structures. Summarize the main structures and functions within the major divisions of the normal nervous system: the brain, spinal cord and peripheral nervous system. Describe how regional nervous system structures interact to perform specific functions. Locate nervous system dysfunction based on common neurological syndromes. Synthesize vascular anatomy and neuroanatomy to locate dysfunction in ischemic stroke syndromes. Exhibit critical thinking, effective communication, problem solving and interpersonal skills to contribute to a high-performance team. Provide constructive feedback to peers and use peer feedback to identify and improve strengths and limitations in skills and attitudes.

**References**

1. **Langman's Medical Embryology.** Lippincott Williams & Wilkins 2021, 11th edition, chapter 17, pages 260-286, Chapter 10, pages 133-142, Chapter 19, pages 321-328, Chapter 20, pages 329-338

**Anatomy of Head and Neck (theory) subjects**

<i>Session Title</i>	<i>Hrs.</i>
<i>Overview of Skull &amp; Osteology</i>	<b>8</b>
<i>Sinuses &amp; Fontanelles</i>	<b>2</b>
<i>Carotid Triangle</i>	<b>2</b>
<i>Posterior Triangle</i>	<b>2</b>
<i>Suprahyoid &amp; Prevertebral Region</i>	<b>2</b>
<i>Infrahyoid Region</i>	<b>2</b>
<i>Face (Muscles, Parotid Gland)</i>	<b>2</b>
<i>Scalp, Temporal &amp; Infratemporal Region</i>	<b>2</b>
<i>Oral &amp; Nasal Cavity</i>	<b>2</b>
<i>Pharynx, Lymph Nodes of Head &amp; Neck</i>	<b>2</b>
<i>Embryology of Head and Neck</i>	<b>2</b>
<b>Total hrs.</b>	<b>28</b>

**Anatomy of Head and Neck (practical) subjects**

<i>Session Title</i>	<i>Hrs.</i>
<i>Skull Osteology</i>	<b>6</b>
<i>Carotid Triangle</i>	<b>2</b>
<i>Posterior Triangle</i>	<b>2</b>
<i>Face (Muscles, Parotid Gland)</i>	<b>2</b>
<i>Temporal &amp; Infratemporal Region</i>	<b>2</b>
<i>Applied Anatomy of head and Neck</i>	<b>4</b>
<b>Total hrs.</b>	<b>18</b>





**COURSE NAME:** Nervous System Block  
**NUMBER OF CREDITS:** 2.75 (theory) – 0.5 (practical)  
**COURSE TYPE:** Theoretical and Practical

**GENERAL AIMS and DESCRIPTION:**

This required system-based block integrates the basic sciences into a study of neuroscience and behavior in both health and disease. Each of the basic science topics is incorporated into an integrated body of knowledge covering neuroanatomy, neurophysiology, neurological correlations, neuropharmacology, neuropathology, human behavior and psychiatry, utilizing both didactic and self-directed learning methods and clinical models.

**References**

1. **Snell Clinical neuroanatomy**
2. **Junqueira's Basic Histology**. McGraw-Hill Medical 2010; 12th edition,  
• chapter 9, pages 152-158
3. **Langman's Medical Embryology**. Lippincott Williams & Wilkins 2012, 12th edition,  
• chapter 18, pages 287-320
4. **Guyton and Hall Textbook of Medical Physiology**. Saunders 2011, 12th edition, Chapters 45-48, Chapters 54-60

**Nervous System (practical) subjects**

<i>Session Title</i>	<i>Hrs.</i>
<i>Anatomy of the vertebral canal and spinal cord</i>	2
<i>Spinal cord and spinal nerves</i>	2
<i>Autonomic nervous system and the body dermatome</i>	2
<i>Brainstem and cerebellum</i>	2
<i>Dyansfal and the cerebral hemispheres</i>	2
<i>Vessels and membranes of the brain and cranial nerves</i>	2
<i>Applied anatomy of the brain vessels, blinds and sinus Cranial venous</i>	2
<i>Histology of the spinal cord, cerebellum, cerebral cortex and nerve tissue</i>	2
<i>Investigating the neural reflex</i>	2
<i>Two-point discrimination</i>	2
<b>Total hrs.</b>	<b>20</b>





***Nervous System (theory) subjects***

<i>Session Title</i>	<i>Hrs.</i>
<i>Division of the nervous system &amp; spinal cord appearance</i>	2
<i>The internal structure of the spinal cord</i>	2
<i>Medulla oblongata</i>	2
<i>Pons</i>	2
<i>Midbrain</i>	2
<i>Cerebellum</i>	2
<i>Diencephalon</i>	2
<i>Cerebral hemispheres</i>	2
<i>The cerebral hemispheres and basal Nuclei</i>	2
<i>Limbic system and reticular formation</i>	2
<i>Vessels and Meninges</i>	2
<i>The structure of cranial nerves</i>	2
<i>Embryology of Nervous system</i>	2
<i>Radiological and clinical anatomy of brain and spinal cord</i>	2
<i>Organization of Nervous System</i>	2
<i>Somatic Sensations: Tactile and Position Senses</i>	2
<i>Sensory Receptors, Neuronal Circuits for Processing Information</i>	2
<i>Somatic Sensations: Pain and Thermal Sensations</i>	2
<i>Motor Functions of the Spinal Cord</i>	2
<i>Cortical and Brain Stem Control of Motor Function</i>	2
<i>The Cerebellum</i>	2
<i>Basal Ganglia</i>	2
<i>The Autonomic Nervous System</i>	2
<i>Cerebral Cortex, Learning, and Memory</i>	2
<i>Sleep and Brain Waves</i>	2
<i>The Limbic System</i>	2
<i>Total hrs.</i>	52



Tehran University of Medical Sciences





**COURSE NAME:** Special Senses System Block  
**NUMBER OF CREDITS:** 1.0 (theory) – 0.25 (practical)  
**COURSE TYPE:** Theoretical and Practical

**GENERAL AIMS and DESCRIPTION:**

The most important concepts and common disorders in dermatology, otolaryngology and ophthalmology are discussed during a three-week period. The skills in the performance of proper procedures for diagnosis and treatment of minor and urgent disorders are acquired. Emphasis is placed on the recognition of manifestations of common systemic disorders.

**References**

1. **Junqueira's Basic Histology.** McGraw-Hill Medical 2010; 12th edition
  - Chapter 23, pages 412-438
2. **Langman's Medical Embryology.** Lippincott Williams & Wilkins 2021, 11th edition
  - Chapter 19, pages 321-328
  - Chapter 20, pages 329-338
3. **Guyton and Hall Textbook of Medical Physiology.** Saunders 2011, 12th edition
  - Chapters 49 & 50: pages 597-621
  - Chapters 50 & 51: 609-632
  - Chapter 52 & 53
  - Chapter 55: pages 674-678

**Special Senses (theory) subjects**

<i>Session Title</i>	<i>Hrs.</i>
<i>Macroscopic structure of the eyes</i>	<i>2</i>
<i>Macroscopic structure of ears</i>	<i>2</i>
<i>Microscopic structure of eyes and ears</i>	<i>2</i>
<i>Embryology (Development) of eyes and ears</i>	<i>2</i>
<i>The Eye: Optics of Vision</i>	<i>2</i>
<i>The Eye: Neural Function of the Retina and Central Neurophysiology of Vision</i>	<i>2</i>
<i>The Sense of Hearing</i>	<i>2</i>
<i>Vestibular Sensations and the Chemical Senses—Taste and Smell</i>	<i>2</i>
<i>Total hrs.</i>	<i>16</i>

**Special Senses (practical) subjects**

<i>Session Title</i>	<i>Hrs.</i>
<i>Anatomy of the eye and contents the eye</i>	<i>4</i>
<i>Anatomy of the ear and contents the eye</i>	<i>2</i>
<i>Applied anatomy of the eye and ear</i>	<i>2</i>
<i>Histology of the eye and ear</i>	<i>2</i>
<i>Ophthalmoscopy, otoscopy and perimetry</i>	<i>2</i>
<i>Total hrs.</i>	<i>12</i>





**COURSE NAME: Medical Microbiology**

**NUMBER OF CREDITS: 3.0 (theory) – 1.0 (practical)**

**COURSE TYPE: Theoretical and Practical**

### **GENERAL AIMS**

1. Learning the principles of microbiology, including the structural and physiological properties of microorganisms and their roles in diseases and the methods to control them.
2. Classification of pathogens
3. Treatment of bacterial diseases
4. Familiarizing students with the structure of microorganisms, staining, lam preparation

### **LEARNING OUTCOMES**

#### **Students must:**

1. Know microbial and physiological principles
2. Know the methods and problems of microorganism classification
3. Know pathogenic and epidemiological mechanisms
4. Know antiseptic effect mechanisms
5. Know control methods the mechanisms of antibiotic effects
6. know the methods to determine the effect mechanisms of antibiotics
7. Be able to explain the relationship between dosage, parasite and the drug.
8. Know protection methods while working with microorganisms
9. Know methods to work with microorganisms, microscope use and microscopic and macroscopic identification of microorganisms
10. Be able to do cell culture and perform identification experiments
11. Perform antibiogram tests and know and examine antibiotic effects
12. Know microbiology lab equipment
13. Know staining methods
14. Be able to prepare culture medium
15. Know microorganism identification methods

#### **References**

1. **ZINSSER MICROBIOLOGY**. 13th Edition. Reviewed by Ernest Jawetz.



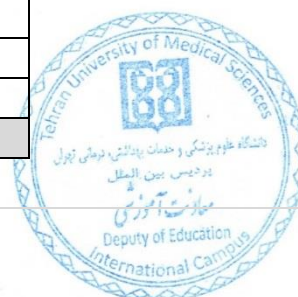


### Microbiology (practical) subjects

Session Title	Hrs.
<i>Laboratory Safety, Sterilization, and Culture media</i>	2
<i>Specimen Collection, Bacterial Identification and staining</i>	2
<i>Bacterial Cultivation</i>	2
<i>Antimicrobial Susceptibility Testing</i>	2
<i>laboratory identification of Staphylococci</i>	2
<i>laboratory identification of Neisseria and Moraxella catarrhalis</i>	2
<i>lab. identification of Streptococcus, Enterococcus, and Other Catalase Negative, Gram-Positive Cocci</i>	2
<i>lab. identification of Corynebacterium, and Similar Organisms</i>	2
<i>lab. identification of Bacillus and Similar Organisms</i>	2
<i>laboratory identification of Enterobacteriaceae and Pseudomonas</i>	2
<i>laboratory identification of Mycobacterium</i>	2
<i>laboratory identification of Vibrio</i>	2
<i>Review</i>	2
<b>Total hrs.</b>	<b>26</b>

### Microbiology (theory) subjects

Session Title	Hrs.
<i>Bacterial Classification, Microbial Cell Structure and Function</i>	2
<i>Commensal and Pathogenic Microbial Flora in Humans</i>	2
<i>Bacterial Metabolism and Microbial Growth</i>	2
<i>Microbial Growth, Environmental Effects on Microbial Growth</i>	2
<i>Bacterial Genetics</i>	2
<i>Antibiotics</i>	2
<i>Sterilization, Disinfection, and Antisepsis</i>	2
<i>Staphylococcus and Related Gram-Positive Cocci</i>	2
<i>Streptococcus, Enterococcus and Other Gram-Positive Cocci</i>	2
<i>Neisseria and Related Genera</i>	2
<i>Corynebacterium, Listeria and Erysipelothrix</i>	2
<i>Spore-forming Gram-Positive Bacteria (Bacillus)</i>	2
<i>Clostridium</i>	2
<i>Mycobacterium</i>	2
<i>Mycobacterium, Nocardia and Related Bacteria</i>	3
<i>Pseudomonas, Related Bacteria</i>	2
<i>Enterobacteriaceae (Klebsiella, Escherichia, Proteus)</i>	3
<i>Acinetobacter, Haemophilus and Related Bacteria</i>	2
<i>Enterobacteriaceae ( Salmonella, Yersinia, Shigella)</i>	3
<i>Bordetella, Francisella, Brucella and Legionella</i>	2
<i>Vibrio, Campylobacter and Helicobacter</i>	2
<i>Treponema, Borrelia and Leptospira</i>	2
<i>Chlamydia, Mycoplasma</i>	2
<i>Rickettsia, Orientia, Chlamydia, Chlamydomphila, Mycoplasma and Ureaplasma</i>	2
<b>Total hrs.</b>	<b>51</b>



**COURSE NAME: Medical Virology**

**NUMBER OF CREDITS: 1.0 (theory)**

**COURSE TYPE: Theoretical**



**References**

**ZINSSER MICROBIOLOGY.** 13th Edition. Reviewed by Ernest Jawetz.

<i>Session Title</i>	<i>Hrs.</i>
<i>Significance of Viral diseases, History ·Structure of Viruses Classification of Viruses ·Replication of viruses, and viral pathogenesis</i>	2
<i>Control of Viral infections: Antiviral agents, interferon, Viral vaccines, Diagnosis of viral infections, and viral nosocomial infections</i>	2
<i>Parvoviridae, Papovaviruses, Adenoviridae, Poxviridae, and Herpesviridae family (HSV-1&amp;2)</i>	2
<i>Herpesviridae family, (HHV-1 thru 8), Hepatitis viruses (B-D)</i>	2
<i>Hepatitis viruses (C), Hepatitis viruses (A-E)</i>	2
<i>Picornaviridae (polio ·coxsackie ·Echo &amp; paraechoviruses) Caliciviruses (Norovirus), Togaviridae, (Rubella virus)</i>	2
<i>Flaviviridae (Dengue, Zika, and Yellow Fever viruses), Retroviridae (HIV-1 &amp; 2 – HTLV)</i>	2
<i>Paramyxoviridae (Metapneumovirus, Parainfluenza ·Measles · Respiratory Syncytial Virus Orthomyxoviridae (Influenza viruses (A. B)</i>	2
<i>Rabdoviridae (Rabies virus), Viruses and Human Cancer (HPV/ EBV/ HBV/HCV)</i>	2
<i>Total hrs.</i>	<b>18</b>





**COURSE NAME:** Immunology

**NUMBER OF CREDITS:** 2.5 (theory) – 0.5 (practical)

**COURSE TYPE:** Theoretical and Practical

**GENERAL AIMS**

Familiarizing students with the science of immunology and its use in understanding, preventing, diagnosis and treatment of disease.

The functions of the immune system and body defense mechanisms, different body organs which have significant roles in the functions of the immune system and the different types of immunity in body will be covered. Moreover, in practical the aim is familiarizing students with different lab equipment and diagnostic testing kits and their use.

**LEARNING OUTCOMES**

**Students must:**

1. Know pathogens and immunologic mechanism of diseases
2. Know resistance against diseases
3. Know lab diagnosis methods
4. Know immunologic substances used to cure diseases

**Immunology (theory) subjects**

<i>Session Title</i>	<i>Hrs.</i>
<i>Introduction to Immunology</i>	2
<i>Cells and organs of the Immune system</i>	2
<i>Antigens</i>	2
<i>Antibodies</i>	2
<i>Complement System</i>	2
<i>Antigen-Antibody Interactions</i>	2
<i>Cytokines</i>	2
<i>Major Histocompatibility Complex(MHC) and Antigen presentation</i>	2
<i>Innate Immunity and Inflammation</i>	2
<i>Genetic basis of antigen receptors diversity</i>	2
<i>Development and activation of B lymphocytes (Humoral Immunity)</i>	2
<i>Development and activation of T lymphocytes (Cell mediated Immunity)</i>	2
<i>Mechanisms and Classification of Hypersensitivity</i>	2
<i>Immunology of Infectious diseases</i>	2
<i>Mucosal Immunity</i>	2
<i>Immunohematology</i>	2
<i>Immunodeficiency</i>	2
<i>Mechanisms of Autoimmunity</i>	2
<i>Immune responses to Tumors</i>	2
<i>Vaccines and Vaccination</i>	2
<i>Transplantation Immunology and Immunopharmacology</i>	2
<i>Immunologic Tolerance</i>	2
<i>Total hrs.</i>	44





**Immunology (practical) subjects**

<i>Session Title</i>	<i>Hrs.</i>
<i>Introduction (Check in, syllabus, preliminary session)</i>	<i>2</i>
<i>Hemagglutination Reactions</i>	<i>2</i>
<i>Agglutination Reactions</i>	<i>2</i>
<i>Neutralization Reactions</i>	<i>2</i>
<i>Immunoprecipitation- Reactions</i>	<i>2</i>
<i>Elisa, Radioimmunoassay</i>	<i>2</i>
<i>IF, Flowcytometry</i>	<i>2</i>
<i>Cell Isolation Techniques, Lymphocytotoxicity</i>	<i>2</i>
<i>Molecular Tests</i>	<i>2</i>
<i>Total hrs.</i>	<i>18</i>

**COURSE NAME:** Medical Genetics

**NUMBER OF CREDITS:** 2.0 (theory)

**COURSE TYPE:** Theoretical

**GENERAL AIMS**

The increasing impact of genetics in healthcare and the development of newer sophisticated technologies require close collaboration between research scientists, clinical laboratory scientists and clinicians to deliver a high quality service to patients. The Medical Genetics course covers basic concepts of genetically disorders and the clinical genetics service, including risk analysis and application of modern genetic and genomic technologies in medical genetics research and in diagnostics and population screening.

**LEARNING OUTCOMES**

**Students must:**

1. Know the History and Significance of Medical Genetics in the clinic.
2. Know the Genetics of Metabolic, Neurologic and Musculoskeletal Disorders.
3. Know Population Genetics and Medicine.
4. Know Modern Molecular Medicine- Gene Therapy.







**COURSE NAME: Principles of Public Health**

**NUMBER OF CREDITS: 2.0 (theory)**

**COURSE TYPE: Theoretical**

- 1-health (definitions, spectrums and dimensions)
- 2-health education, health promotions and preventions.
- 3-social determinants of health
- 4-public health foundations
- 5-environmental health (introduction, water safety, water born disease, climate, Air pollution)
- 6-health system in IR Iran (definitions, objectives and functions)
- 7-Health care planning
- 8-levels for health care (historical evolution)
- 9- Immunization against Major Infectious Diseases.
- 10-general health care on mothers and children's
- 11-healthy life style and behaviors
- 12-Occupational health
- 13-medicine as profession (professional medical duties)
- 14- Principles and methods for preventing occupational diseases.
- 15-national and International health agenesis.
- 16-quality and safety in health care delivery
- 17-health status in Iran and the world.

**COURSE NAME: Epidemiology**

**NUMBER OF CREDITS: 2.0 (theory)**

**COURSE TYPE: Theoretical**

- 1-definition of epidemiology, encounter ecologic with diseases
- 2- common terms in epidemiology
- 3-factors of physics diseases, chemical and biologic
- 4-host factors
- 5-environmental factors of physiochemical, biological and social
- 6-epidemics and prevention.
- 7-general and types of epidemiological studies
- 8-epidemiology and control the diseases that can be prevented by vaccine

**Educational partners international E.P.I: (6 hours)**

- 1-vaccine, making, maintenance and usage
- 2-how to make and manage a center of vaccination
- 3-how to evaluate the practical E.P.I program

**Epidemiology and controlling Diarrheal disease (5 hours)**

- 1-definition, importance, epidemiology and pathology of Diarrheal disease
- 2-definition and types of Dehydration and the recognition of its degree
- 3-Diarrheal treatment with considering the prevention and treatment of dehydration
- 4-preventing and controlling Diarrheal disease and health education, health food, improvement of environment and struggle with fly.



**Other major diseases (4 hours)**

1-General information about other common infectious diseases in Iran (Tuberculosis - Malta Malaria –Malaria)

2-General on some of the specific diseases in Iran (Rabies and leprosy ...)

3-Epidemiology and control of no communicable diseases (cancers, rheumatism, and cardiovascular diseases, Events and poisonings and ...)

**LEARNING OUTCOMES****Students must:**

1. Know the basic principles of epidemiology and health care.
2. Know the level of health care services.
3. Know the health care system compartments and understand the role of the pharmacist in the system.

**COURSE NAME:** Psychology

**NUMBER OF CREDITS:** 2.0 (theory)

**COURSE TYPE:** Theoretical

**GENERAL AIMS**

Knowing the basic principles of psychology, different sense and thought processes is central to building a more effective relationship between the pharmacist and the patient and therefore this course will increase the knowledge of the pharmacist and familiarizing students with the principles of psychology and learning methods, thought process and perception

**LEARNING OUTCOMES****Students must:**

1. Know the relationship between psychology and human mind and soul.
2. Know the principles of psychology.
3. Be able to explain different sense stages.
4. Know learning methods and thought processes.
5. Know human motivation.
6. Know psychological health.
7. Know the physiological principles of psychology.





**COURSE NAME: Parasitology/Myology**

**NUMBER OF CREDITS: 2.0+1.0 (theory) – 1.0 (practical)**

**COURSE TYPE: Theoretical and Practical**

A- Theoretical (43 hours)

1. Protozoa (11 hours)

Malaria parasites of humans (*Plasmodium vivax*, *Plasmodium malariae*) *Toxoplasma gondii*, *Sarcocystis*, *Isospora hominis*, flagellates blood and tissues (*Leishmania tropica*, *Leishmania donovani* and *Leishmania braziliensis* and trypanosome briefly), flagellates gastrointestinal and genitourinary (*Giardia lamblia* and other flagellates of the digestive system and *Trichomonas vaginalis*), ciliophora (*Balantidium coli*) - amebae (*Amoeba*), free living damage and other digestive amoebae) – pneumocystis

2. Helminthology (15 hours)

Trematodes (*Fasciola*, *Dictyostelium*, Schistosomes and other pathogens) Patches (Tsetse, *Echinococcus* and Hydatid Cyst, *Hymenolipis*, *Diphilopotrim* and *Dipilidium*) Symptoms (*Ascaris*, *Axialis*, *Trichocephalus*, hookworms, *Trichostrongylus*, *Stroganuloidus*, *Pyox*, trichin, fillers and migratory larvae)

3. Arthropod (8 hours)

Lice (*Pediculus humanus corporis* and *Phthirus pubis*) *Cimex lectularius* and *Tribolium castaneum* Fleas (*Goniatopallanus* and *Baghestani*, *Polksirinens*, *Dosozpocilus fasciatus* and *Centenosofuscanis*), flies (*Muscadumyscica* and *Sorbianta obnubus* and *Gazizops*) - myiasis - anophelids carriers of malaria in Iran - *Culex*, *Aedes* and *Theobaldia* - phlebotomes carrying disease in Iran - *Colicoides* and *Simulium* - mites (*Eriothelasma* and *Lachesenesis*, *Arcaspericus*, *Hyalomorphs bispifalus*, *Scabard sarcidis*) - household beetles and some invertebrates of *Essenophyllite*.

4. Fungi (9 hours)

Saprophytic fungi (*Penicillium*, *Aspergillus*, *Mucor*, *Cladosporium*, *Ascorporalaripipis*, *Avezarium*, *Streptomyces*) Causes of surface fungal diseases (malaria, *Mucor*, *Aspergillus*, *Penicillium*, *Mucocandida*) The causes of cutaneous fungal diseases (*Ocotrexes*, *Endotheres*, *Favors*, *Milium*, *Arthrospores*,

*Microspores*, *Trichophyton* and *Epidermophyton*) causes of subcutaneous fungal diseases (*Mycoticactinomyoma*, *Myastoma*) causes of mucosal fungal diseases (*Candida albicans* and other candidates) causes of visceral fungal diseases (*Cryptococcus*, *Neofornense*, *Histoplasma capsulatum*, types of *Aspergillosis* and *Nocardia asteroides*)

B. Practical (51 hours)

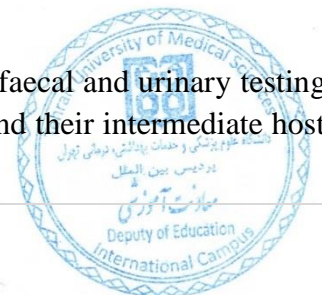
This lesson is conducted in accordance with the faculty facilities and observing the following issues.

1. Protozoology

In this section, the methods of laboratory diagnosis of protozoal diseases and the practical value of each of them, and blood, tissue and stool testing techniques, sample collection methods, laboratory tests, staining and microscopic testing are presented.

2. Helminthology

In this section, the methods of laboratory diagnosis of helminth diseases, faecal and urinary testing techniques, the morphological study of each helminth and egg and larvae and their intermediate host are trained.



### 3. Entomology

In this section, the biology and morphological diagnosis of the important arthropod in terms of the transmission of the disease and ways to combat them are presented.

### 4. Mycology

In this section, methods of laboratory diagnosis of fungal diseases, sampling, direct testing and macroscopic culture of saprophytic and pathogenic fungi are presented.

### **References**

1. Paniker's Text Book of Medical Parasitology 7th Edition Chapter 1 to 24.

**COURSE NAME:** Medical physics

**NUMBER OF CREDITS:** 2.0 (theory)

**COURSE TYPE:** Theoretical

### **LEARNING OUTCOMES**

#### **Students must:**

1. Know the optic physics: -the importance and properties of the visible light. Ultraviolet rays, infrared rays and its medical expenses.
2. Know the Physical examination of the eye, diagnosis and treatment of fractal abnormalities in the eye. -astigmatism and the ways for correction. -retinal properties, FOV, sharpness, ophthalmoscopy. -camera, proximity, prominence recognition.
3. Know the ultrasound waves and its medical expenses. -ultrasound production and properties.
4. Know the high frequency currents application in medicine. The effects of electric current on the body and the way of protection.
5. Know the Nuclear Medicine and physical foundation of radiology and radiotherapy





**COURSE NAME:** General Principles of Nutrition

**NUMBER OF CREDITS:** 2.0 (theory)

**COURSE TYPE:** Theoretical

### **LEARNING OUTCOMES**

**Students must:**

1. Know the Role and Importance of Nutrition
2. Know the Nutrients and their original sources
3. Know the Nutrients and their original sources
4. Know the Understanding the regional culture, traditions, and habits of nutrition and its relation with the nutritional status of individuals and communities and organizing nutritional program
5. Know the Nutrition of susceptible groups
6. Know the Methods of assessment of nutritional status
7. Know the diseases resulting from malnutrition and preventing them
8. Know the Safety of nutritional materials
9. Know the Toxicity of nutritional materials

**COURSE NAME:** Terminology 1

**NUMBER OF CREDITS:** 3.0 (theory)

**COURSE TYPE:** Theoretical

This course intended from this books

#### **References**

1. **Saunders, Guyton 1979**, physiologic of the human body
2. **Cohen Medical Terminology**, 8th Edition. by Barbara J. Cohen BA MEd (Author), Ann DePetris RN BSN MSA (Author)

**COURSE NAME:** Terminology 2

**NUMBER OF CREDITS:** 3.0 (theory)

**COURSE TYPE:** Theoretical

**Prerequisite:** Termnology1

This course heavier than Termnology1 and it is taught from practical courses of some universities

#### **References**

1. **Saunders, Guyton 1979**, physiologic of the human body
2. **Cohen Medical Terminology**, 8th Edition. by Barbara J. Cohen BA MEd (Author), Ann DePetris RN BSN MSA (Author)

