

## Credits and Courses

**Total Number of Credits:** 304.25 (for domestic students) - 298.25 (for international students)

**Basic Medical Sciences Stage:** 95.25 (for domestic students) - 89.25 (for international students)

**Fundamental of Clinical Medicine Stage:** 32.5

**Clinical Clerkship Stage:** 102.5

**Clinical Internship Stage:** 74.0

### M.D. program Course Syllabus for International Students

M.D. - 1 <sup>st</sup> semester					
	Subject	Number of credits		Total credits	
		Credit (theory)	Credit (practical)	prerequisite	
1	<i>Tissue, Development &amp; Function</i>		2.25	0.25	2.5
2	<i>Cell and Molecules</i>	3.0	0.75	3.75	
3	<i>Anatomy of limbs</i>	1.5	1.5	3.0	
4	<i>Medical Physics</i>	2.0		2.0	
5	<i>Principles of Health Services</i>		2.0		2.0
6	<i>General English Language</i>		3.0		3.0
	<b>Total</b>	13.75	2.5	16.25	

**M.D.- 2<sup>nd</sup> semester**

	Subject	Number of credits		Total credits	
		Credit (theory)	Credit (practical)	prerequisite	
1	<i>Cardiovascular System</i>	3.25	1.0		4.25
2	<i>Respiratory System</i>	1.5	0.25		1.25
3	<i>Medical Genetic</i>	2.0			2.0
4	<i>Biochemistry</i>	1.5	0.5	<i>Cell and Molecules</i>	2.0
5	<i>Psychology</i>	2.0			2.0
6	<i>Family Health</i>	2.0			2.0
7	<i>Persian Language</i>	3.0			3.0
8	<i>Medical Terminology I</i>	3.0		<i>General English Language</i>	3.0
	<b>Total</b>	<b>18.25</b>	<b>1.75</b>		<b>20.0</b>

**M.D.- 3<sup>rd</sup> semester**

	Subject	Number of credits		Total credits	
		Credit (theory)	Credit (practical)	prerequisite	
1	<i>Gastrointestinal System</i>		2.0	0.75	2.75
2	<i>Endocrine Systems</i>	1.5	0.25		1.75
3	<i>Urinary System</i>	1.5	0.25		1.75
4	<i>Reproductive System</i>	1.25	0.5		1.75
5	<i>Nutrition</i>	2.0			2.0
6	<i>Principles of Epidemiology</i>	2.0		<i>Principles of Health Services</i>	
		2.0			
7	<i>Information Technology</i>		2.0		2.0
8	<i>Physical Training I</i>	1.0			1.0
9	<i>Devine Ethics</i>	2.0			2.0
10	<i>Introduction to Religion I</i>		2.0		2.0
	<b>Total</b>	<b>17.25</b>	<b>1.75</b>		<b>19.0</b>

**M.D.-4<sup>th</sup> semester**

	Subject	Number of credits		Total credits	
		Credit (theory)	Credit (practical)	prerequisite	
1	<i>Immunology</i>	2.5	0.5	3.0	
2	<i>Nervous System</i>	2.75	0.5	3.25	
3	<i>Special Senses</i>	1.0	0.25	1.25	
4	<i>Anatomy of Head and Neck</i>	1.0	0.5	1.5	
5	<i>Microbiology</i>	3.0	1.0	4.0	
6	<i>Virology</i>	1.0		1.0	
7	<i>Medical Terminology II</i>	3.0		<i>Medical Terminology I</i>	3.0
8	<i>Physical Training II</i>	1.0		<i>Physical Training I</i>	1.0
9	<i>Introduction to Religion II</i>		2.0		2.0
	<b>Total</b>	17.25	2.75	20	

**M.D.- 5<sup>th</sup> semester**

	Subject	Number of credits		Total credits	
		Credit (theory)	Credit (practical)	prerequisite	
1	<i>Pathology</i>	5.0	1.0	6.0	
2	<i>Parasitology</i>	3.0	1.0	4.0	
3	<i>Devine Texts</i>	2.0		2.0	
4	<i>Iran Revolution</i>		2.0		2.0
	<b>Total</b>	12.0	2.0	14.0	

M.D.- 6 <sup>th</sup> semester					
	Subject	Number of credits			Total credits
		Credit (theory)	Credit (practical)	prerequisite	
1	<i>Physiopathology of Endocrine system</i>	2.0			2.0
2	<i>Physiopathology of Digestive system</i>	2.0			2.0
3	<i>Physiopathology of Cardiovascular system</i>	2.0			2.0
4	<i>Physiopathology of Urinary System</i>	2.0			2.0
5	<i>Communicational Skills</i>	0.5	1.0		1.5
6	<i>Fundamentals of Clinical practice</i>	2.0	2.0		4.0
7	<i>Pharmacology 1</i>	2.0			2.0
8	<i>Special Pathology 1</i>	2.0	1.0		3.0
9	<i>Clinical Immunology I</i>	1.0			1.0
	<b>Total</b>	15.5	4.0		19.5

M.D.- 7 <sup>th</sup> semester					
	Subject	Number of credits			Total credits
		Credit (theory)	Credit (practical)	prerequisite	
1	<i>Pathophysiology of Blood System</i>	2.0			2.0
2	<i>Pathophysiology of Respiratory System</i>	2.0			2.0
3	<i>Pathophysiology of Rheumatologic Diseases</i>	2.0			2.0
4	<i>Pharmacology 2</i>	2.0	1.0		3.0
5	<i>Special Pathology 2</i>	2.0	1.0		3.0
6	<i>Clinical Immunology 2</i>	1.0			1.0
	<b>Total</b>	<b>11.0</b>	<b>2.0</b>		<b>13.0</b>

<b>M.D.- 8<sup>th</sup> semester</b>					
	Subject	Number of credits			Total credits
		Credit (theory)	Credit (practical)	prerequisite	
1	<i>Statistics</i>	2.0			2.0
2	<i>Clinical Epidemiology</i>	2.0			2.0
3	<i>Toxicology</i>	1.0			1.0
4	<i>Forensic Medicine</i>	2.0	1.0		3.0
5	<i>Infectious Disease</i>	12.0			12.0
	<b>Total</b>	<b>19.0</b>	<b>1.0</b>		<b>20</b>

<b>M.D.- 9<sup>th</sup> semester</b>					
	Subject	Number of credits			Total credits
		Credit (theory)	Credit (practical)	prerequisite	
1	<i>General Surgery</i>	6.0	6.0		12.0
2	<i>Orthopedics</i>	2.0			2.0
3	<i>Clerkship in Orthopedics</i>		3.0		3.0
4	<i>Urology</i>	1.0			1.0
5	<i>Neurosurgery</i>	1.0			1.0
6	<i>Clerkship in Urology</i>		3.0		3.0
	<b>Total</b>	<b>10.0</b>	<b>12.0</b>		<b>22.0</b>

M.D.- 10 <sup>th</sup> semester					
	Subject	Number of credits			Total credits
		Credit (theory)	Credit (practical)	prerequisite	
1	<i>Infectious Diseases</i>	3.0	3.0		6.0
2	<i>General Obstetrics</i>	4.0			4.0
3	<i>Neurologic Diseases</i>	2.0	3.0		5.0
4	<i>Psychology</i>	2.0	3.0		5.0
5	<i>General Obstetrics and Gynaecology</i>		6.0		6.0
	<b>Total</b>	<b>11.0</b>	<b>15.0</b>		<b>26.0</b>

M.D.- 11 <sup>th</sup> semester					
	Subject	Number of credits			Total credits
		Credit (theory)	Credit (practical)	prerequisite	
1	<i>Medical Rules</i>	2.0			2.0
2	<i>Diseases of Pediatrics 1</i>	3.0	9.0		12.0
3	<i>Diseases of Paediatrics 2</i>	3.0			3.0
4	<i>Eye Diseases</i>		3.0		3.0
5	<i>Radiology</i>		3.0		3.0
6	<i>Skin Disease</i>		3.0		3.0
	<b>Total</b>	<b>8.0</b>	<b>18.0</b>		<b>26.0</b>

M.D.- 12 <sup>th</sup> semester					
	Subject	Number of credits			Total credits
		Credit (theory)	Credit (practical)	prerequisite	
1	<i>Ear, Nose and Throat Diseases</i>	3.0			3.0
2	<i>Health Training</i>	2.0			2.0
3	<i>Computer</i>	2.0			2.0
	<b>Total</b>	<b>7.0</b>			<b>7.0</b>

M.D.- 13 <sup>th</sup> semester					
	Subject	Number of credits			Total credits
		Credit (theory)	Credit (internship)	prerequisite	
1	<i>Internal Infectious Disease</i>		16.0		16.0
2	<i>Health Training</i>		4.0		4.0
3	<i>Psychology</i>		4.0		4.0
	<b>Total</b>		<b>24.0</b>		<b>24.0</b>

M.D.- 14 <sup>th</sup> semester					
	Subject	Number of credits			Total credits
		Credit (theory)	Credit (internship)	prerequisite	
1	<i>Emergencies I</i>		4.0		4.0
2	<i>Diseases of Pediatrics</i>		12.0		12.0
3	<i>Orthopaedics</i>		2.0		2.0
4	<i>Ear, Nose, and Throat Diseases</i>		2.0		2.0
	<b>Total</b>		20.0		20.0

M.D.- 15 <sup>th</sup> semester					
	Subject	Number of credits			Total credits
		Credit (theory)	Credit (internship)	prerequisite	
1	<i>Surgery</i>		8.0		8.0
2	<i>General Obstetrics and Gynaecology</i>		4.0		4.0
3	<i>Infectious Diseases</i>		4.0		4.0
4	<i>Skin Disease</i>		2.0		2.0
5	<i>Burn Injuries</i>		2.0		2.0
	<b>Total</b>		20.0		20.0

	Subject	Number of credits			Total credits
		Credit (theory)	Credit (practical)	prerequisite	
1	<i>Thesis</i>		6.0		6.0
	Total		6.0		6.0

**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 M.D. 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***

<b><i>Session Title</i></b>	<b><i>Hrs.</i></b>
<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><i>Total hrs.</i></b>	<b>58</b>

## ***Cell and Molecules (practical) subjects***

<b><i>Session Title</i></b>	<b><i>Hrs.</i></b>
<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>Osiose</i>	2
<b><i>Total hrs.</i></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, defense 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, and Function (theory) subjects***

<b><i>Session Title</i></b>	<b><i>Hrs.</i></b>
<b><i>Epithelial Tissue</i></b>	<b><i>2</i></b>
<b><i>Connective Tissue</i></b>	<b><i>2</i></b>
<b><i>Types of Connective &amp; Adipose Tissue</i></b>	<b><i>2</i></b>
<b><i>Cartilage Tissue &amp; Joints</i></b>	<b><i>2</i></b>
<b><i>Osseous Tissue &amp; Ossification</i></b>	<b><i>2</i></b>
<b><i>Blood &amp; Hematopoiesis</i></b>	<b><i>2</i></b>
<b><i>Muscular Tissue</i></b>	<b><i>2</i></b>
<b><i>Nervous Tissue</i></b>	<b><i>4</i></b>
<b><i>Definition for Neurotransmission&amp; Neurotransmitters</i></b>	<b><i>2</i></b>
<b><i>Cell Signaling</i></b>	<b><i>2</i></b>
<b><i>Skin</i></b>	<b><i>2</i></b>
<b><i>Introduction to Embryology</i></b>	<b><i>2</i></b>
<b><i>Gametogenesis</i></b>	<b><i>2</i></b>
<b><i>Ovulation &amp; Fertilization</i></b>	<b><i>2</i></b>
<b><i>Embryonic Period</i></b>	<b><i>2</i></b>
<b><i>1st &amp; 2nd Weeks of Embryonic Period</i></b>	<b><i>2</i></b>
<b><i>3rd Weeks of Embryonic Period</i></b>	<b><i>2</i></b>
<b><i>Fetal Period</i></b>	<b><i>2</i></b>
<b><i>Placenta &amp; Fetal Membranes</i></b>	<b><i>2</i></b>
<b><i>Congenital Malformations</i></b>	<b><i>2</i></b>
<b><i>Contraction of Skeletal Muscle</i></b>	<b><i>2</i></b>
<b><i>Excitation of Skeletal Muscle</i></b>	<b><i>2</i></b>
<b><i>Contraction of Smooth Muscle</i></b>	<b><i>2</i></b>
<b><i>Neuromuscular Transmission</i></b>	<b><i>2</i></b>
<b><i>Total hrs.</i></b>	<b><i>50</i></b>

### ***Tissue, Development, and Function (practical) subjects***

<b><i>Session Title</i></b>	<b><i>Hrs.</i></b>
<b><i>Microscopes</i></b>	<b><i>2</i></b>
<b><i>Epithelial Tissue</i></b>	<b><i>2</i></b>
<b><i>Connective &amp; Osseous Tissue</i></b>	<b><i>2</i></b>
<b><i>Blood smears and cell differentiation</i></b>	<b><i>2</i></b>
<b><i>Cartilage Tissue</i></b>	<b><i>2</i></b>
<b><i>Muscular Tissue</i></b>	<b><i>2</i></b>
<b><i>Nervous Tissue</i></b>	<b><i>2</i></b>
<b><i>Skin</i></b>	<b><i>2</i></b>
<b><i>Total hrs.</i></b>	<b><i>16</i></b>

**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 23
  - Chapter 23
  - Chapter 23
5. **Snell R.S. *Clinical Anatomy by Systems*. Lippincott Williams & Wilkins 2006**
  - o Chapters 4 and 5
  - o Pages 94-95
  - o Page 271 (Thoracic duct)
  - o Page 609 (Phrenic nerve)
  - o 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***

<b><i>Session Title</i></b>	<b><i>Hrs.</i></b>
<b><i>Vertebral Column, Ribs, &amp; Sternum</i></b>	<b><i>2</i></b>
<b><i>Back</i></b>	<b><i>2</i></b>
<b><i>Thoracic Wall</i></b>	<b><i>2</i></b>
<b><i>Mediastinum &amp; Heart</i></b>	<b><i>2</i></b>
<b><i>Heart</i></b>	<b><i>2</i></b>
<b><i>Superior &amp; Posterior Mediastinum</i></b>	<b><i>4</i></b>
<b><i>Overview of Cardiovascular system</i></b>	<b><i>2</i></b>
<b><i>Histology of Circulatory System</i></b>	<b><i>2</i></b>
<b><i>Histology of Lymphatic &amp; Immune System</i></b>	<b><i>4</i></b>
<b><i>Embryology of the Heart</i></b>	<b><i>2</i></b>
<b><i>Embryology of Vessels</i></b>	<b><i>2</i></b>
<b><i>Physiology of RBCs/WBCs and Plts</i></b>	<b><i>6</i></b>
<b><i>Action Potentials in Cardiac Muscle, Cardiac Cycle</i></b>	<b><i>2</i></b>
<b><i>Electrocardiogram</i></b>	<b><i>2</i></b>
<b><i>Blood Pressure, Heart Sounds</i></b>	<b><i>2</i></b>
<b><i>“Volume-Pressure Diagram” During the Cardiac Cycle</i></b>	<b><i>2</i></b>
<b><i>Physics Principles of Circulatory System</i></b>	<b><i>4</i></b>
<b><i>Control of Excitation and Conduction in the Heart</i></b>	<b><i>2</i></b>
<b><i>of Circulatory System</i></b>	<b><i>2</i></b>
<b><i>Vessels of Circulatory System</i></b>	<b><i>2</i></b>
<b><i>Circulatory System of Lymph &amp; Capillaries</i></b>	<b><i>2</i></b>
<b><i>Central Cardiovascular Control</i></b>	<b><i>2</i></b>
<b><i>Special Circulatory</i></b>	<b><i>2</i></b>
<b><i>Total hrs.</i></b>	<b><i>56</i></b>

### ***Cardiovascular System (practical) subjects***

<b><i>Session Title</i></b>	<b><i>Hrs.</i></b>
<b><i>Histology of Heart, Lymph, &amp; Capillaries Arteries</i></b>	<b><i>4</i></b>
<b><i>Cell blood Count (RBC/WBC)</i></b>	<b><i>4</i></b>
<b><i>Hematocrits and Coagulation tests</i></b>	<b><i>2</i></b>
<b><i>Electrocardiogram</i></b>	<b><i>2</i></b>
<b><i>Blood Pressure, Heart Sounds</i></b>	<b><i>2</i></b>
<b><i>Osteology</i></b>	<b><i>4</i></b>
<b><i>Anatomy of Back</i></b>	<b><i>4</i></b>
<b><i>Thoracic Wall</i></b>	<b><i>2</i></b>
<b><i>Mediastinum &amp; Heart</i></b>	<b><i>4</i></b>
<b><i>Superior &amp; Posterior Mediastinum</i></b>	<b><i>2</i></b>
<b><i>Total hrs.</i></b>	<b><i>30</i></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.  
 159-175  
 985-1029
2. **Junqueira's Basic Histology.** McGraw-Hill Medical 2010; 12th edition  
 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>

<b>Regulation of Respiration</b>	<b>2</b>
<b>Total hrs.</b>	<b>22</b>

### **Respiratory System (practical) subjects**

<b>Session Title</b>	<b>Hrs.</b>
<b>Histology of Respiratory system</b>	<b>2</b>
<b>Spirometry</b>	<b>2</b>
<b>Nasal Cavity, Pharynx &amp; Larynx</b>	<b>2</b>
<b>Lung &amp; Pleura</b>	<b>2</b>
<b>Applied Anatomy</b>	<b>2</b>
<b>Total hrs.</b>	<b>10</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>	2
<i>Histology of Oral Cavity</i>	2
<i>Histology of Salivary Glands &amp; General Structure of Digestive Tract</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>Digestive Tract in Pelvis</i>	2
<i>Microanatomy of Digestive Tract</i>	2
<i>Histology of Accessory Glands of Digestive System</i>	2
<i>Vessels &amp; Nerves of Digestive System</i>	2
<i>Embryology of Foregut</i>	2
<i>Embryology of Midgut &amp; Hindgut</i>	2
<i>General Principles of GI System</i>	2
<i>Gastric Secretion, Salivary and Esophagus Secretions</i>	2
<i>Pancreatic, Small and Large Secretions</i>	2
<i>Bile Secretion, Gall Bladder, and Liver Functions</i>	2
<i>GI Motility, Digestion, and Absorption</i>	2
<i>Total hrs.</i>	38

### **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
<i>Total hrs.</i>	20

**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

<b><i>Biochemistry of Thyroid Hormones</i></b>	<b>2</b>
<b><i>Thyroid Metabolic Hormones</i></b>	<b>2</b>
<b><i>Biochemistry of Parathyroid Hormones &amp; Regulation Mechanism of Ca<sup>2++</sup></i></b>	<b>2</b>
<b><i>Total hrs.</i></b>	<b>28</b>

### ***Endocrine System (practical) subjects***

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

<b><i>Male Reproductive Physiology</i></b>	<b>2</b>
<b><i>Female Reproductive Physiology</i></b>	<b>2</b>
<b><i>Biochemistry of Reproductive System</i></b>	<b>2</b>
<b><i>Total hrs.</i></b>	<b>22</b>

### ***Reproductive System (practical) subjects***

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

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

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

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

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

**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,
3. □ chapter 9, pages 152-158
4. **Langman's Medical Embryology.** Lippincott Williams & Wilkins 2012, 12th edition,
5. □ chapter 18, pages 287-320
6. **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>	<b>2</b>
<i>Spinal cord and spinal nerves</i>	<b>2</b>
<i>Autonomic nervous system and the body dermatome</i>	<b>2</b>
<i>Brainstem and cerebellum</i>	<b>2</b>
<i>Dyansfal and the cerebral hemispheres</i>	<b>2</b>
<i>Vessels and membranes of the brain and cranial nerves</i>	<b>2</b>
<i>Applied anatomy of the brain vessels, blinds, and sinus Cranial venous</i>	<b>2</b>
<i>Histology of the spinal cord, cerebellum, cerebral cortex, and nerve tissue</i>	<b>2</b>
<i>Investigating the neural reflex</i>	<b>2</b>
<i>Two-point discrimination</i>	<b>2</b>
<b>Total hrs.</b>	<b>20</b>

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

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

<i>Sleep and Brain Waves</i>	<i>2</i>
<i>The Limbic System</i>	<i>2</i>
<i>Total hrs.</i>	<i>52</i>

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

### ***Special Senses (practical) subjects***

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

**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.

**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 units, 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.

**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:** Epidemiology  
**NUMBER OF CREDITS:** 2.0 (theory)  
**COURSE TYPE:** Theoretical

### **GENERAL AIMS**

Because of the important role of the pharmacist in the health care cycle, it is important to increase the knowledge of different health care systems and services, and this course provides students with sufficient information on the topic and familiarizing students with epidemiology principles

### **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 and 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 familiarize 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.